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A NEW
Dictionary of Arts, Sciences, &c.

Sculpture.

SCULPTURE, the art of carving wood, or hewing ſtone, into images.

The antiquity of this art is paſt doubt; as the ſacred writings, the moſt ancient and authentic monuments we have of the earlieſt ages, mention it in ſeveral places: witneſs Laban's idols ſtolen away by Rachel, and the golden calf which the Iſraelites ſet up in the deſart, &c. But it is very difficult to fix the original of the art, and the firſt artiſts, from profane authors; what we read thereof being intermixed with fables, after the manner and taſte of thoſe ages.

The firſt works in ſculpture were with clay, not only in making ſtatues, but in forming models; and to this day a ſculptor never undertakes any thing conſiderable, without forming a model either in clay or wax. In making figures of theſe materials, they begin and finiſh their work with their hands, uſing only three or four pieces of wood, which are roundiſh at one end, and at the other flat, with a ſort of claws and teeth, which are to ſmooth and ſcratch the work. For waxen models, to every pound of wax add half a pound colophony; ſome add turpentine, and melt it together with oil of olives, more or leſs of the latter being uſed as they would have the matter harder or ſofter; ſome alſo add a little vermilion to give it a colour: this is wrought and moulded with the fingers like clay.

For ſculpture in wood, which we properly call CARVING., the firſt thing required is to chooſe wood proper for the work the ſculptor is to perform. If it be any thing large, and that requires a great deal of ſtrength and ſolidity, the hardeſt and moſt durable wood is to be choſen; and for ſmaller works and ornaments, the ſofter wood is uſed; but it muſt be ſuch, however, as is firm and cloſe: for a large work, though it be only a ſingle figure, it is better to make uſe of ſeveral pieces of wood, or bits of board, glued together, than of one whole piece, which is more liable to crack; for a thick piece of wood may not be dried to the heart, however it may appear on the outſide. See CARVING.

In ſculpture in marble and other ſtone, the firſt thing to be done is to ſaw out a block of marble, of the bigneſs of the work to be performed; and this being done, the ſuperfluities are to be taken off by a ſtubbed point and a heavy mallet: thus bringing it near the meaſures required, the ſculptor reduces it ſtill nearer with a finer tool, called a dog's tooth, it having two points, but one not ſo ſharp as the other. After this he makes uſe of his gradine, which is a flat cutting tool with three teeth; he then takes off, with a ſmooth chiſel, the ſcratches the gradine left on the marble, and uſes it with dexterity and delicacy to give ſoftneſs and tenderneſs to his figure; till at length, taking raſps of different degrees of fineneſs, the work is gradually rendered fit for poliſhing. To poliſh the work, the ſculptor uſes pumice-ſtone and ſmalt; then he goes over it with tripoli; and when he would give it more luſtre, rubs it with leather and ſtraw-aſhes. There are ſeveral other tools uſed by ſculptors, adapted to the different parts of the work and the nature of the ſtone they make uſe of. As the models of clay ſhrink as they grow dry, whenever ſculptors undertake a conſiderable piece of work, they only uſe the model for making a mould of plaſter or ſtucco, in which is formed a figure of the ſame matter, which ſerves them thenceforth for a model, and by which they adjuſt all their meaſures and proportions. To proceed the more regularly, on the head of the model they place an immoveable circle divided into degrees, with a moveable rule or index, fixed in the centre of the circle, and divided alſo into equal parts: from the end of the rule hangs a line with a plummet, which ſerves to take all the points, to be transferred thence to the block of marble, from whoſe top hangs another plummet like that of the model. But there are ſome excellent ſculptors who diſapprove of this method; urging, that the ſmalleſt motion of the model changes their meaſures; for which reaſon they chooſe rather to take all their meaſures with the compaſſes.

For the caſting of ſtatues or figures of metal, and the moulding of ſtatues, &c. of ſtucco, plaſter, &c. ſee the articles CASTING, FOUNDERY *of Statues*, &c.

SCUM, properly denotes the impurities which a liquor, by boiling, caſts up to the ſurface. The term *ſcum* is alſo uſed for what is more properly called the ſcoria of metals.

SCURVY, in medicine. See that article, n° 97, 448.

SCURVY-GRASS, in botany. See COCHLEAREA.

The officinalis, or common officinal ſcurvy-graſs; grows upon rocks on the ſea coaſt, and on the Highland mountains, abundantly. It has an acrid, bitter, and acid taſte, and is highly recommended for the ſcurvy. There are inſtances of a whole ſhip's crew having been cured of that diſtemper by it; and as it abounds with acid ſalts, there can be no doubt but that it is a great reſiſter of putrefaction. The beſt way of taking

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it is raw in a ſalad. It is alſo diuretic, and uſeful in dropſies. The Highlanders eſteem it as a good ſtomachic.

The coronopus, another ſpecies, was ſome years ago rendered famous, the aſhes of it being an ingredient in Mrs Joanna Stephens's celebrated medicine for the ſtone and gravel; but, unfortunately for thoſe afflicted with that excruciating complaint, it has not been able to ſupport its credit. It is acrid, and taſtes like garden creſs.

SCUTAGE (*ſcutagium*, Sax. *ſcildpening*), was a tax or contribution raiſed by thoſe that held lands by knights-ſervice, towards furniſhing the king's army, at one, two, or three merks for every knight's fee. Henry III. for his voyage to the Holy Land, had a tenth granted by the clergy, and *ſcutage* three merks of every knight's fee by the *laity*. This was alſo levied by Henry II. Richard I. and king John. See KNIGHT-*Service*.

SCUTE, (*ſcutum*) a French gold coin of 3s. 4d. in the reign of king Henry V. And Catharine queen of England had an aſſurance made her of ſundry caſtles, manors, lands, &c. valued at the ſum of 40,000 *ſcutes*, every two whereof were worth a noble. *Rot. Parl.* 1. *Hen.* VI.

SCUTTLES, in a ſhip, ſquare holes cut in the deck, big enough to let down the body of a man, and which ſerve upon ſome occaſions to let the people down into any room below, or from one deck to another.

SCYLAX, a celebrated mathematician and geographer in the iſle of Caryanda, in Caria, flouriſhed under the reign of Darius Hyſtaſpes, about 522 B. C. Some have attributed to him the invention of geographical tables. We have under his name a geographical work publiſhed by Hoeſchelius; but it is written by a much latter author, and is perhaps only an abridgement of Scylax's Ancient Geography.

SCYLLA, (anc. geog.) a rock in the Fretum Siculum, near the coaſt of Italy, dangerous to ſhipping, oppoſite to Charybdis, a whirlpool on the coaſt of Sicily: both of them famous in mythology.

SCYROS, (anc. geog.) an iſland in the Egean ſea, oppoſite to the middle of Eubœa to the eaſt, with a cognominal town, (Ptolemy). The country of king Lycomedes; where Achilles, in the habit of a girl, was educated and lay concealed, to prevent going to the ſiege of Troy; who debauchrd Diedamia, the king's daughter, and by her had Pyrrhus, (Ovid.) Famous alſo for the death and place of exile of Theſeus, king of Athens, (Valerius Maximus). Anciently inhabited by the Dolopes, a race of intolerable robbers, expelled by Timon the Athenian, (Thucydides, Plutarch). Now *Sciro*. E. Long. 25. 0. N. Lat. 38. 15.

SCYTALA LACONICA, in antiquity, a ſtratagem or device of the Lacedemonians, for the ſecret writing of letters to their correſpondents, ſo that if they ſhould chance to be intercepted, nobody might be able to read them —To this end they had two wooden rollers, or cylinders, perfectly alike and equal; one whereof was kept in the city, the other by the perſon to whom the letter was directed. For the letter, a ſkin of very thin parchment was wrapped round the roller, and thereon was the matter written; which done, it was taken off, and ſent away to the party, who, upon putting it in the ſame manner upon his roller, found the lines and words in the very ſame diſpoſition as when they were firſt wrote. This expedient they ſet a very high value on; though, in truth, artleſs, and groſs enough: the moderns have improved vaſtly on this method of writing. See CIPHER.

SCYTHIA, an ancient name for the northern parts of Aſia, now known by the name of *Tartary;* alſo for ſome of the north-eaſtern parts of Europe.

This vaſt territory, which extends itſelf from the Iſter or Danube, the boundary of the Celtes, that is from about the 25th to almoſt the 110th degree of eaſt longitude; was divided into Scythia in Europe, and Scythia in Aſia, including, however, the two Sarmatias; or, as they are called by the Greeks, *Sauromatias*, now the Circaſſian Tartary, which lay between and ſevered the two Scythias from each other. Sauromatia was alſo diſtinguiſhed into European and Aſiatic; and was divided from the European Scythia by the river Don or Tanis, which falls into the Paulus Meotis; and from the Aſiatic by the Rha, now Volga, which empties itſelf into the Caſpian ſea.

1. The Aſiatic Scythia comprehended, in general, great Tartary, and Ruſſia in Aſia; and, in particular, the Scythia beyond or without Imaus contained the regions of Bogdoi or Oſtiacoi, and Tanguti. That within, or on this ſide Imaus, had Turkeſtan and Mongal, the Uſbeck or Zagatai, Kalmuc and Nagaian Tartars; beſides Siberia, the land of the Samoiedes, and Nova Zembla. Theſe three laſt not being ſo ſoon inhabited as the former, as may be reaſonably ſuppoſed, were wholly unknown to the ancients; and the former were peopled by the Bactrians, Sogdians, Gandari, Sacks, and Maſſagetes. As for Sarmatia, it contained Albania, Iberia, and Colchis; which makes now the Circaſſian Tartary, and the province of Georgia.

2. Scythia in Europe, reached (towards the ſouth-weſt) to the Po and the Alps, by which it was divided from the Celtes, or Celto-Gallia, and by the Rhine northward. It was bounded on the ſouth by the Iſter or Danube, and the Euxine ſea. Its northern limits have been ſuppoſed to ſtretch to the ſpring-heads of the Boriſthenes or Nieper, and the Rha or Volga, and ſo to that of the Tanais.—The ancients divided this country into Scythia Arimaſpæa, which lay eaſtward, joining to Scythia in Aſia; and Sarmatia Europeana on the weſt. In Scythia, properly ſo called, were the Arimaſpæi on the north; the Getæ or Dacians along the Danube, on the ſouth; and the Neuri between theſe two. So that it contained the European Ruſſia, or Muſcovy, and the leſſer Crim Tartary eaſtward; and, on the weſt, Lithuania, Poland, part of Hungary, Tranſilvania, Walachia, Bulgaria, and Moldavia. Sarmatia is ſuppoſed to have reached northward, to that part of Swedeland called *Feningia*, now *Finland;* in which they placed the Oœnes, Panoti, and Hippopodes. This part they divided from northern Germany, now the weſt part of Sweden and Norway, by the *Mare Sarmaticum* or *Scythicum*, which they ſuppoſed ran up into the northern ocean, and, dividing Lapland into two parts, formed the weſtern part of Sweden, with Norway, into one iſland, and Finland into another; ſuppoſing this

alſo to be cut off from the continent by the gulph of that name.

Although the ancient Scythians were celebrated as a warlike people, yet their hiſtory is too uncertain and obſcure to enable us to give any detail which would not prove equally tireſome and unintereſting to the reader.

Scythian *Lamb*, in natural hiſtory. See *Scythian* **Lamb.**

SEA, is frequently uſed for, that vaſt tract of water encompaſſing the whole earth, more properly called *ocean*. See **Ocean.**

What proportion the ſuperficies of the ſea bears to that of the land, is not preciſely known, though it is ſaid to be ſomewhat more than two-thirds. As the waters of the earth muſt neceſſarily riſe to the ſurface thereof, as being ſpecifically lighter than the earth, it was neceſſary there ſhould be large cavities therein for receptacles to contain them; otherwiſe they would have overſpread all the ſuperficies of the earth, and ſo have rendered it utterly uninhabitable for terreſtrial animals: for the centre of the earth being the common centre of gravity, and the nature of fluids being ſuch that they equally yield to equal powers, and the power of attraction being every where equal at equal diſtances from the centre, it follows, that the ſuperficial parts of the water will every where conform themſelves to an equidiſtant ſituation from the centre, and conſequently will form the ſurface of a ſphere ſo far as they extend. Hence, that the ſea ſeems higher than the earth or land, reſults from the fallacy of viſion, whereby all objects, and the parts of land as well as ſea, the farther they are off from us, the higher they appear; the reaſon of all which is plain from optics: for it is well known, that the denſer any medium is through which we behold objects, the greater is the refraction, or the more their images appear above the horizontal level; alſo the greater quantity of the medium the rays paſs through, the more will they be bent from their firſt direction: on both theſe accounts, the appearances of things remote, and on the ſea, will be ſomewhat above the horizon, and the more ſo as they are the more remote.

With regard to the depth or profundity of the ſea Varenius affirms, that it is in ſome places unfathomable, and in others very various, being in certain places $\frac{1}{20}$, $\frac{1}{25}$, $\frac{45}{100}$, $1\frac{2}{10}$, $4\frac{1}{2}$ Engliſh miles, in other places deeper, and much leſs in bays than in oceans. In general, the depths of the ſea bear a great analogy to the height of mountains on the land, ſo far as is hitherto diſcovered.

There are two principal reaſons why the ſea doth not increaſe by means of rivers, &c. falling every where into it. The firſt is, becauſe waters return from the ſea by ſubterranean cavities and aqueducts, thro' various parts of the earth. Secondly, becauſe the quantity of vapours raiſed from the ſea, and falling on the land, only cauſe a circulation, but no increaſe, of water. It hath been found by calculation, that in a ſummer's day there may be raiſed in vapours, from the Mediterranean Sea, 5280000000 tuns of water; and yet this ſea receiveth not, from all its nine great rivers above 1827000000 tuns *per* day, which is but a third part of what is exhauſted in vapours.

Sea, is more properly uſed for a particular part or diviſion of the ocean; denominated from the countries it waſhes, or from other circumſtances.—Thus we ſay, the *Iriſh ſea*, the *Mediterranean ſea*, the *Baltic ſea*, the *Red ſea*, &c.

Till the time of the emperor Juſtinian, the ſea was common and open to all men: whence it is that the Roman laws grant an action againſt a perſon who ſhall prevent another in the free navigation or fiſhing therein.—The emperor Leo, in his 56th novel, firſt allowed ſuch as were in poſſeſſion of the land the ſole privilege of fiſhing before their reſpective territories, excluſive of all others: he even gave a particular commiſſion to certain perſons, to divide the Thracian Boſphorus among them. From that time, the ſovereign princes have been endeavouring to appropriate the ſea, and to withdraw it from the public uſe. The republic of Venice pretends to be ſo far miſtreſs in her gulf, that there is a formal marriage every year, between that ſeignory and the Adriatic.

In theſe laſt ages, the Britiſh have particularly claimed the empire of the ſea in the channel; and even that of all the ſeas encompaſſing the three kingdoms of England, Scotland, and Ireland; and that as far as the ſhores of the neighbouring ſtates. In conſequence of which pretenſion it is, that children born on theſe ſeas are declared natural Britons, as much as if born on Britiſh ground.—The juſtice of this pretenſion is ſtrenuouſly argued between Grotius and Selden, in the *Mare Liberum*, and *Mare Clauſum*.

Encroachments by the **Sea** *on the Dry Land*. It has been matter of diſpute whether the land or the water are gaining upon each in this terraqueous globe, and it is a diſpute which ſeems not to be capable of an eaſy ſolution. In many places, it is certain that the ſea has gained very conſiderably, and very recently too. In Britain ſeveral remarkable encroachments have been remarked. In the reign of Auguſtus, the iſle of Wight made part of the iſland of Britain, ſo that at low water the Britons croſſed over towards it with cart-loads of tin; but now the connection is totally cut off, and the iſle of Wight is conſtantly ſeparated from Britain by a channel half a mile wide. And in other places the ſame encroachments are perceptible. In general, on the eaſtern coaſt, the ſea has gained ground; while on the ſouthern and weſtern, it has gained in ſome places, and loſt in others. It has gained conſiderably on the coaſt of Yorkſhire, Norfolk, Suffolk, Eſſex, and the eaſtern ſhore of Kent; as alſo that of Suſſex, Hampſhire, Dorſetſhire, and Cornwall. Within this laſt half century alſo the ſea has made large encroachments upon the iſlands of Scilly, and from May 1766 to May 1767 was obſerved to encroach 40 inches. It has alſo encroached upon the coaſts of North Devonſhire, Pembrokeſhire, and Cardiganſhire. But, on the other hand, in the ſouthern parts of Kent, in Lincolnſhire and Lancaſhire, the land has gained upon the ſea. In Kent, it has retreated from the beach of Sandwich, ſunk the ſmall æſtuary of Solinus into an inſignificant current, and converted a fine harbour, called by the Romans *Rhutupæ*, where their fleet were regularly laid up, into a valley watered by a river. In Lincolnſhire it has added a conſiderable quantity of ground to the coaſt, and left many thouſand acres betwixt the old bank of its waters and the preſent margin of its ſhore. And in Lancaſhire, the ſands which originally formed the beach of the ſea, and were covered every tide with its waters, are now regularly inhabited. They ſtill retain the name given them by the Britons, viz. *Meales*, or *looſe quaggy lands*; tho', looſe and quaggy as they once were, they are now cultivated, and a parochial church and village erected upon them.

From conſidering theſe facts, we may doubt whether the ſea in fact has gained on the land, or the land on the ſea; as what is gained by either on one ſide may perhaps be loſt on the other. Buffon imagines, that the ſea is perpetually gaining upon the land, and will at laſt cover the tops of the higheſt mountains, leaving its preſent bed quite dry; but his notions concerning the gradual motion of the waters from one place to another have been ſo fully refuted under the article Earth, that it is needleſs to mention any thing further concerning them in this place. Others there are who argue ſtrenuouſly for the continual increaſe of dry land, and decreaſe of the ſea. Their principal argument is drawn from a ſuppoſition of the vegetation of ſtone, and a petrifying quality inherent in ſea water.

A Scotch gentleman, who was at Boulogne in the ſummer 1750, has favoured us with a remarkable inſtance of this petrifying quality in ſea-water. He obſerved, that the Britiſh channel, which waſhes the bottom of a hill near that place, (commonly called *Cæſar's Fort*, from a Roman encampment ſtill viſible on it, ſaid to have been conſtructed by Julius Cæſar when he invaded Britain), had worn in thro' a great part of the hill, which conſiſts moſtly of mixed ſand, with about three or four feet of a ſtrong bluiſh clay ſoil above. As the ſandy part is waſhed away, the clay falls down in large maſſes, and, as the inhabitants there affirm, is petrified by the ſalt water. In fact, one ſees, about 40 or 50 yards within the preſent high-water mark, a large ſtratum of rocks, much reſembling the black-rocks at Leith; and between theſe and the hill many huge maſſes of rock, though there appears nothing rocky on the bare ſide of the hill next the channel. And the inhabitants of Boulogne are every day ſeen blowing up theſe rocky maſſes with gun-powder, burning the ſtones into lime, and uſing them alſo as ſtones for their buildings. This gentleman, walking one day on the ſands, ſaw a large lump of clay fallen from the hill, and ſo lying to be waſhed by the tide. He impreſſed a mark on it with his ſtick, which, being ſoft, it then eaſily received. But paſſing the ſame way about three weeks afterwards, he could not force his ſtick into the ſame lump.

From ſome limeſtone quarries alſo in the neighbourhood of Kirkcaldy in Fife, and which are taken notice of under the article Quarry, it is inferred that ſtones vegetate, and that the waters of the ſea have retreated ever ſince the deluge. Theſe two cauſes, ſay the abetters of this doctrine, in a long ſeries of ages, alter the face of our globe entirely, or rather have reduced the earth into its preſent form, by creating rocks at the bottom of the ſea, and then leaving them in dry land, where they turn into inland mountains. This ſeems to be the method which nature obſerves: for all along our coaſts there are limeſtone rocks, and ſome of them within low-water mark, which have the very ſame inclination, and the ſame mixture of petrified ſea-bodies, as in the quarry we have deſcribed; but ſince we ſee rocks of this kind ariſing out of the ſea, we muſt of neceſſity aſcribe the ſame origin to ſuch as are more remote from the ſhore, and left up in the country.

All rocks, therefore, where ſuch extraneous bodies are found, ſeem to be formed from the common ſediment of the ſea, as ſands of ſeveral kinds, with the bones of fiſhes, ſtalks of ſea-weed, and empty ſhells, which are all rolled into beds by the agitation of the waters. Theſe different bodies, thus blended together, are, by the violence of the flux and reflux, banked up towards the ſhore: which is the cauſe of the inclination or dipping of the rock. No ſooner is one ſtratum laid, than, by a continual acceſſion of the ſame matter, a ſecond is ſuperinduced; and ſo on ſucceſſively, till the maſs has reached a certain height in water. Theſe looſe materials, as ſoon as the vegetation commences, are faſtened by a very ſtrong cement, and, as at the ſight of Meduſa's head, begin to aſſume the conſiſtency of ſtone. For the petrific matter fills up all the interſtices, pervades the pores of the moſt ſolid bodies, and lodges every where the particles that enter into its own compoſition; which ſeems to be a fixed ſalt, or very powerful aſtringent, together with a mixture of mineral juices or metallic ores, which run in ſmall veins, like wire, in ſeveral places of the rock.

The ſhells, being of a cloſe and compact texture, and therefore refuſing admiſſion to the groſſer parts, ſeem to have received only the finer parts of the mixture, which has converted them into a tranſparent ſubſtance, ſomewhat reſembling cryſtal. The ſea-weeds, of a more porous and ſpungy nature, have imbibed the whole lapidific matter; which has changed them into a fine white marble, capable of a very high poliſh. The like may be ſaid of all the other bodies, as they are more rare or denſe in their texture, and fitted to receive more or leſs of the petrific matter.

The only difficulty in this hypotheſis, and what we muſt endeavour to ſurmount, is, that we muſt conceive the ſea to be ſo high as to cover all the hills where ſuch ſea-bodies are to be found. So, in the preſent caſe, we muſt ſuppoſe it to have been above 200 feet higher than it is at preſent. Now, though neither hiſtory nor tradition could aſſiſt us in the inquiry, yet ſtill the fact may be aſcertained from indelible monuments, and more to be depended on than any human teſtimony whatever. For ſince our inland hills have the very ſame inclination, and the ſame mixture of ſhells, &c. as the rocks have which ſtand within low-water mark; what can we think, but that the former once ſtood where the latter ſtand now? why may we not conclude for certain, that, according to their diſtances, they have all ſucceſſively ariſen from the ſea, as the only proper matrix for ſuch productions, and the only place, too, where the materials that enter into their compoſition can be found? In ſhort, by means of theſe petrified ſea-bodies, we trace the waters which drowned the old world, like an enemy who leaves his ſpoils behind him in his retreat, from the tops of our higheſt inland hills down to the ſhore; and there ſee them all confined within the limits of our preſent ſea, which ſeems ſtill to be making the proper diſpoſitions for leaving us. Hiſtorians, when all our helps fail, produce medals and gold coins, as an authentic evidence of certain facts; in like manner, we may look upon ſea-rocks, turned into inland hills, to be an undeniable proof that our earth hath ariſen, inch by inch, from the ſea.

The age of man bears ſo ſmall a proportion to the age of the world, that the inſenſible changes made on the face of nature paſs unobſerved. We ſee ſo few alterations in our own times, that we conclude, too haſtily, that there are none at all; or, when the land makes any encroachments in one place, the ſea, we imagine, takes her revenge by inundations in another, and that in this manner their limits are pretty well ſecured. But this is undoubtedly a very lame account of the matter. For inundations ſeldom happen, and are but partial; whereas the receſs of the waters is univerſal, and, like the other great laws of nature, acts inceſſantly at all times. An earthquake in one place, the waſhing of looſe ſands and earths in another, may lay ſome particular ſpots under water; but theſe will by no means balance the encroachments of the land, remarkable more or leſs over all the globe. We will but give two or three inſtances out of many which with equal facility might be produced.

The iſland Pharos, according to Homer, who, perhaps ſpoke from experience, ſtood a day's ſailing with a fair wind from the continent. That iſland, however, was joined to the land, in very ancient times, by a cauſeway of 900 paces, and makes now a part of the city of Alexandria. The city of Tyre, before the time of Alexander the Great, and for ſome ages after, was ſurrounded with a very deep ſea of four ſtades over; and yet we know for certain, it has been joined to the continent upwards of 1000 years.—Æneas landed at Lavinium, if we can believe Virgil; but Lavinium ſtands now above 12 miles from the ſea, and as rich vineyards and corn-fields as are in Italy muſt for ever go by the name of the *Lavinian ſhores*.—Oſtia too has undergone the ſame fate, and become an inland town. Nothing but the expreſs authority of hiſtorians, and its own ſtately ruins, could convince us that it was the celebrated Oſtia built at the mouth of the Tiber.—The ſame obſervations may be extended to all the maritime towns famous in ancient hiſtory: their old harbours are now all choaked up, buried under ground, or deſerted by the ſea, and left far up in the country.

Nor is there much weight in an objection that may be ſtarted in this place, namely, That there are ſeveral ſea-port towns, famous in the ancient world, which have the ſame character in our own times. So London, under the emperor Nero, was, as it ſtill is, a rendezvous of merchants, and a place of great foreign trade. But are we ſure that theſe towns, though they have the ſame names, occupy alſo the ſame ſpots of ground with the old ones? Is it not more probable, that the inhabitants, not out of choice, but abſolute neceſſity, and for the conveniency of ſhipping, draw gradually down towards the ſea as the rivers choke up towards their ſources? This, we know, has happened to ſome, and we have great reaſon to believe the ſame of all.

" We may produce ſeveral very ſtrong circumſtances, which, taken all together, will amount to the force of a direct proof that the land has gained very conſiderably on our coaſts. Whoever views the Carſe of Falkirk from Stirling caſtle in Scotland, will think it extremely probable, that all that champaign country, as the ancients believe of the Lower Egypt, has been gained from the ſea, by the vaſt quantity of ſand and mud brought down the river. To confirm this conjecture, whenever the ground is digged in ſeveral places thereabouts, they meet with vaſt collections of ſhells and other ſpoils of the ſea. A ſhip's anchor was found, ſome time ſince, in the ſame country, buried under ground, at two miles diſtance from the Forth. Theſe two circumſtances put it out of all doubt, nor need we any further proof of the matter. We have nothing but the name to inform us, that ever Burntiſland was ſurrounded with the ſea; but whoever views the ſituation of that place, will be convinced, that, not many centuries ago, it has been joined to Fife by a narrow and flat neck of land to the north. The inhabitants of Kirkcaldy, even thoſe of a middle age, remember to have ſeen the tides flow a great deal higher than they do at preſent. The truth of it is, our ſhores are inſenſibly riſing, not only from the huge ſand-banks, but from a vigorous vegetation of ſtone, which prevails, among all our coaſts, at the bottom of the ſea. For nature is as hard at work now as ever; and it is improbable, that theſe rocks, where there is ſuch a mixture of ſea-bodies, which but juſt ſhow their heads above water, will occaſion as much ſpeculation to future ages as their elder brothers in the inland places of the country do to us.

The encroachments of the land in the frith of Tay are more remarkable, and ſeem to be of a more recent date. The whole Carſe of Gowrie has been, we may ſay, but a late acquiſition from the ſea; as the flat face of the country, and names of the towns, ſufficiently evince. Moſt of their towns begin or end with *inſe*, that is, *iſland*; as Meg-inſe, Inſe-tower, &c. probably the very names they went by when they were ſand-banks, or iſlands ſurrounded by the ſea.—Some old written inſtruments mention Errol as a place ſtanding to the ſouth of Tay, though it ſtands a long mile to the north of the river at preſent. The inhabitants of the country have a tradition, that the courſe of Tay, in former ages, was by the foot of the hills to the north of Errol, and to this day they ſhow the very holes in rocks to which the ſhips cables were faſtened. But if the Tay ran ſo far to the north, as there is great reaſon to believe, all the lower grounds to the ſouth of Errol would be drowned, and that frith would be twice, if not thrice, as broad as it is in our time.—The inhabitants of Perth remember to have heard their fathers ſay, that, in the high hill of Kinnoul, they have ſeen the remains of ſtaples and rings, with other conveniences for ſhipping, as in a harbour. At a village two miles above Perth, and far from the Tay, ſome workmen draining a peat-marſh, found the ring, ſtock, and ſhaft, of an anchor, with a great log of wood ſtanding erect in the earth, to which it was conjectured the ſhips cables were fixed. The children of the workmen were lately alive to atteſt this fact.

Theſe circumſtances make it probable, that the land is continually uſurping upon the ſea, and alſo may reconcile us to what follows; for if the limeſtone quarry in the neighbourhood of Kirkcaldy was a ſea-rock, as it undoubtedly was, our frith muſt have covered twice the extent of ground that it does at preſent. All the lower part of Fiſe, for ſome miles up the country, except ſome iſlands here and there, and which are now hills or high lands, would be laid under water. The Lothians muſt have ſhared the ſame fate with Fife: for the very ſpot on which Edinburgh ſtands, would be covered with water; the Caſtle-rock, Calton-hill, and Saliſbury Craig, would be ſea-rocks; Arthur's ſeat would be diminiſhed almoſt to its head; and, with reſpect to the coaſt then, might appear what Inſe Keith does to us. Northumberland and the Merſe muſt have been in the ſame ſituation with the counties bordering on the Forth. The lower part of theſe two counties would be deluged with a great ſea, whoſe ſhores would be five or ſix miles weſtward from Berwick. The Tweed muſt have been ſo great a frith, that the largeſt ſhip in the preſent navy of England might have gone up the river, as far as Kelſo, if not farther. We call places by their names which then had none. In this manner we might make the tour of Great Britain, and, by imagining the ſea to be 200 or 300 feet higher than it is at preſent, demonſtrate, that our iſland is larger, by a third at leaſt, than it was at that time.

Such has been the ſtate of our iſland; in a very remote period of time, no doubt; though perhaps not in the ages immediately ſucceeding the deluge: on the contrary, it may be preſumed, that as many ages muſt have paſſed from the deluge to the period we are ſpeaking of as from thence to our own times. For we have all the reaſon in the world to believe, that, ever ſince the old world was drowned, the waters have fallen equally in equal times, and not faſter at one time than at another as is commonly imagined. The bare rocks on our higheſt hills ſhow ſufficiently both the place where they have vegetated, and that for many ages they have borne the violence of that dreadful element: for it is impoſſible to conceive, that they could have come out of nature's hands in the miſerable and ruinous condition in which they appear. Their ragged tops, tattered ſurfaces, and rifted ſides, are the wounds they have received from an obſtinate foe; who, though vanquiſhed at laſt, has made many furious attacks, and diſputed every inch of ground, before he has retreated.

It is very probable, that, in the earlier ages after the flood, the country between the Tweed and the Tay might appear in the following manner. The Cheviot hills to the ſouth, and Lamermoor hills to the north, would be the limits of the frith of Tweed; the ſame Lamermoor hills to the ſouth, and the Lomond hills to the north, would be the boundaries of the frith of Forth; the Lomond hills to the ſouth, and a like ridge of hills to the north of the Tay, would be the confines of the frith; ſo that in all the ſpace betwixt the Tweed and the Tay there would be three very great friths, with no inland intervening but the backs of theſe bare hills, which would ſhow like long tongues of land running out a great way in the ſea.

In reality, when one views the country around, from any of the high hills we have mentioned, and obſerves it ſloping gradually from the inland parts down to the ſea, and on each hand towards the beds of the rivers, one can hardly forbear thinking it was once in ſuch a ſituation, and that it ſtill looks like the ſhore of a great ſea, which has now, after a long ſucceſſion of ages, almoſt diſappeared. For, not only the earth ſlopes, as we have ſaid before, towards the ſea, or towards the rivers; but the very rocks, contrary to their natures, conform themſelves to this inclination. The flat rocks, where the growth or vegetation runs horizontally, dip all at one extremity; whereas we might expect to find them all lying in the plane of the horizon. Again, in ſome kind of flint-rock, where the vegetation ſhoots directly upwards, the flakes of the ſtone are all reflected from the perpendicular, and make a very obtuſe angle with the horizon, not under 120 degrees, as nearly as can be gueſſed. Now, it is abſolutely impoſſible to account for ſuch an inclination, unleſs we ſuppoſe that the ſand-banks, of which theſe rocks were originally formed, having been ſhored up towards the land, by the flux and reflux of the waters, before they were fixed by vegetation."

Theſe are ſome of the ſtrongeſt arguments which have been advanced for the continual increaſe of the dry-land, and decreaſe of the ſea. How far they appear concluſive, we leave to the judgment of the reader.

Luminouſneſs of the SEA. See LIGHT, n° 26.

SEA-*Anemony*, the ſame with ANIMAL-*flower*, a ſpecies of marine animals of the nature of polypi, very much reſembling vegetables in their method of generation. In theſe creatures the young grow out from their ſides, and when they are arrived at a certain ſize fall off from the parent. They are multiplied likewiſe by cutting them in pieces. In ſome the young ones are produced from the inſide, and after a certain ſeaſon are ejected by the mouth, which will alſo be the caſe at any time if the old one is put to great pain. The Abbé Dicquemarre has publiſhed three eſſays on theſe animals, in the 64th and 67th vol. of the Philoſophical Tranſactions, in which a great number of experiments are related concerning them. In his laſt eſſay he mentions a ſpecies of ſea-anemonies which propagate by tearing off ſmall ſhreds from their own bodies, each of which thro' time becomes a perfect animal. See ANIMAL-*flower*.

SEA-*Bear*. } See PHOCA.
SEA-*Calf*. }

SEA-*Cow*. See TRICHECUS.

SEA-*Crow*, MIRE-*Crow*, or *Pewit*. See LARUS.

SEA-*Horſe*. } See PHOCA.
SEA-*Lion*. }

SEA-*Mall*, or SEA-*Mew*. See LARUS.

SEA-*Marks*. The erection of beacons, light-houſes, and ſea-marks, is a branch of the royal PREROGATIVE. By 8 Eliz. 13. the corporation of the Trinity-houſe are empowered to ſet up any beacons or ſea-marks wherever they ſhall think them neceſſary; and if the owner of the land or any other perſon ſhall deſtroy them, or take down any ſteeple, tree, or other known ſea-mark, he ſhall be forfeit 100 l. Sterling; or, in caſe of inability to pay it, he ſhall be *ipſo facto* outlawed.

SEA-*Water*, that briny bitteriſh fluid which conſtitutes the ſea.

The ſaltneſs of this water is very rationally judged to ariſe from great multitudes both of mines and mountains of ſalt, diſperſed here and there in the depths of the ſea. Dr Halley ſuppoſes that it is probable the greateſt part of the ſea-ſalt and of all ſalt lakes, as the Caſpian Sea, the Dead Sea, the Lake of Mexico, and the Titicaca in Peru, is derived from the water of the rivers which they receive: and ſince this ſort of lakes has no exit or diſcharge but by the exhalation of vapours; and alſo ſince theſe vapours are entirely freſh, or devoid of ſuch particles; it is certain the ſaltneſs of the ſea and ſuch lakes muſt from time to time increaſe, and therefore the ſaltneſs at this time is greater than at any time heretofore. He further adds, that if, by experiments made in different ages, we could find the different quantity of ſalt which the ſame quantity of water (taken up in the ſame place, and in all other the ſame circumſtances) would afford, it would be eaſy from thence, by rules of proportion, to find the age of the world very nearly, or the time wherein it has been acquiring its preſent ſaltneſs.

With regard to the uſe of this ſalt property of ſea-water, it is obſerved, that the ſaltneſs of the ſea preſerves its waters pure and ſweet, which otherwiſe would corrupt and ſtink like a filthy lake, and conſequently that none of the myriads of creatures which now live therein could then have a being. From thence alſo the ſea-water becomes much heavier, and therefore ſhips of greater ſize and quantity may be uſed thereon. Salt water alſo doth not freeze ſo ſoon as freſh water, whence the ſeas are more free for navigation. We have a diſſertation, by Dr Ruſſel, concerning the medical uſes of ſea-water in diſeaſes of the glands, &c. wherein the author premiſes ſome obſervations upon the nature of ſea-water, conſidered as impregnated with particles of all the bodies it paſſes over, ſuch as ſubmarine plants, fiſh, ſalts, minerals, &c. and ſaturated with their ſeveral effluvia, to enrich it, and keep it from putrefaction: whence this fluid is ſuppoſed to contract a ſoapineſs; and the whole collection, being pervaded by the ſulphureous ſteams paſſing through it, to conſtitute what we call *ſea-water*, the confeſſed diſtinguiſhing characteriſtics of which are ſaltneſs, bitterneſs, nitroſity, and unctuoſity: whence the author concludes, that it may be juſtly expected to contribute ſignally to the improvement of phyſic. The caſes in which our author informs us we are to expect advantage from ſea-water, are, 1. In all recent obſtructions of the glands of the inteſtines and meſentery. 2. All recent obſtructions of the pulmonary glands, and thoſe of the viſcera, which frequently produce conſumptions. 3. All recent glandular ſwellings of the neck, or other parts. 4. Recent tumours of the joints, if they are not ſuppurated, or become ſcirrhous or cancerous, and have not carious bones for their cauſe. 5. Recent defluctions upon the glands of the eye-lids. 6. All defœdations of the ſkin, from an eryſipelas to a lepra. 7. Diſeaſes of the glands of the noſe, with their uſual companion a thickneſs of the lip. 8. Obſtructions of the kidneys, where there is no inflammation, and the ſtone not large. 9. In recent obſtructions of the liver, this method will be proper, where it prevents conſtipations of the belly, and aſſiſts other medicines directed in icteric caſes. The ſame remedy is ſaid to be of ſignal ſervice in the bronchocele; and is likewiſe recommended for the prevention of thoſe bilious colics that ſo frequently affect our mariners.

Freſhening SEA-*Water*. The method of making ſea-water freſh, an advantage long wanted for the benefit of navigation, is now found to be eaſily performed by the ſimple proceſs of diſtillation in a common ſtill. This method was publiſhed by Dr Lind ſome time ago, and cannot by any means be improved, as the proceſs is already reduced to its utmoſt ſimplicity. A pretended improvement was afterwards propoſed by Dr Irvine; for which he had the dexterity not only to get the merit of Dr Lind's diſcovery, but a premium of L. 5000. The improvement, if ſuch it may be called, conſiſts only in having a very large tube inſtead of the worm of the common ſtill, and a perſon to wet the tube conſtantly with a mop, inſtead of uſing a worm-tub.

SEA-*Needle*, *Horn-fiſh*, *Gar-fiſh*. See ESOX.

SEA-*Nettle*. See URTICA *Marina*.

SEA-*Pie* or *Oyſter-Catcher*. See HÆMATOPUS.

SEA-*Serpent*, a monſtrous creature, ſaid to inhabit the northern ſeas about Greenland and on the coaſts of Norway. Pontoppiddan, in his natural hiſtory of Norway, brings ſeveral teſtimonies of mariners who pretend to have ſeen it; but no diſtinct account of its form and properties has been obtained. According to the relations there given, the ſea-ſerpent is thicker than a large hogſhead, and upwards of 600 feet in length; with large blue eyes, reſembling two poliſhed pewter-plates, when ſeen at a diſtance. Sometimes it raiſes part of its body out of the water, ſo that its head will reach above the higheſt maſts: and it is thought to be able to ſink the largeſt man of war by throwing itſelf acroſs it: yet it is ſaid to be a timid animal; and not only has never been known to do hurt, but flies from the ſlighteſt appearance of injury, &c. See Plate CCLXV.

SEA-*Plants*. Count Marſigli, who was at indefatigable pains to collect the various ſea-plants of ſeveral places, divides all thoſe productions into three claſſes.

The firſt claſs contains the ſoft or herbaceous ones; the ſecond the ligneous ones, or ſuch as are of a woody hardneſs; and the third, thoſe which are of the hardneſs of ſtone. Of the firſt claſs are the algas, called *ſea-wrack*; the fucuſes, or ſea-oaks; the ſea-moſſes, or conſervas; and the different ſpecies of ſponges.

Of the ſecond kind are thoſe called *lythophyta* by the ancients, as if their hardneſs approached to that of ſtones. All theſe conſiſt of two ſubſtances, a cortical and an internal. The cortical part, while in the ſea, is ſoft; but in drying, it becomes as hard as chalk, or thereabouts, eaſily crumbling to pieces between the fingers: this is what deceived the ancients into an opinion of its being of a ſtony nature. The internal ſubſtance, properly ſpeaking, ſeems to have more the nature of horn than of wood: if it is burnt, it throws out a ſpume or froth, like that which horns or feathers of animals yield in the fire, and their ſmell in burning is of the ſame kind. The branches of theſe plants are very pliable, bending in the manner of whalebone; and they give the ſame reſiſtance to a knife in the cutting.

The ſtony plants, which ſhould properly be called the *lythophyta*, but which never are called ſo, are the ſeveral ſpecies of coral, madrepora, and the like. The madrepora differs from the coral, in having its ſurface pierced with almoſt innumerable holes. The corals, however, are now diſcovered to belong to the animal, not the vegetable kingdom. See Coral.

The algas are the only ſea-plants which have any roots, properly ſo called; theſe therefore grow out of the ſoft bottom of the ſea as other plants out of the earth: but all the other ſea-plants, without exception, appear fixed upon hard and ſolid bodies, incapable of affording them any nouriſhment; ſuch as ſtones, ſhells, pieces of iron, of wood, &c. and ſometimes on other plants; and they are not faſtened to theſe ſubſtances by fibres paſſing into or ſurrounding them, but merely by a foot or pediment, capable of only fixing them down, not of drawing nouriſhment from the ſubſtances, were there any there. From this obſervation, the author concludes, that all the plants which have no roots, may be properly ſaid to be all root, or to perform the office of roots in their whole ſubſtance, or that they take in nouriſhment in every part by certain pores, which in many are viſible, and cover the whole ſurface.

This manner of receiving nouriſhment, he alſo obſerves, very well ſuits their condition, ſince they are always ſurrounded on all ſides with that water by which they are to be nouriſhed; whereas the plants which grow on land have only a part of them buried in the earth, from whence they are to be ſupplied with the proper juices. The roots of land-plants, therefore, have only the neceſſary organs for receiving ſupplies; whereas the ſea-plants, he finds to be all over covered with ſmall glandules, whoſe office it is to receive and to convey into the internal parts of the plant the proper juices for its nouriſhment; and theſe, he obſerves, are in general of a glutinous and milky nature. The great difference between the land and ſea plants is ſeen in this familiar inſtance: A land-plant will remain freſh for a long time in all its parts, on one end of the ſtalk only being plunged in water; but a ſea-plant, if part of it be out of water and part in, will always be freſh and vigorous in that part which is under water, while the part that is dry will wither and decay. It is eaſy hence to ſee, that the ſeveral parts of the land-plants have connections with and dependences on one another; whereas, in the ſea-plant, every part takes in its own nouriſhment, and lives and flouriſhes wholly independent of the reſt.

After having gone through this general ſyſtem, the author deſcends to ſeveral remarkable particulars. He mentions an inſtance of a fucus, whoſe ſtalk, when in its growing ſtate, is a quarter of an inch in diameter; yet in drying ſhrinks up ſo much, as to be not thicker than a ſingle thread. Another ſpecies, called by the fiſhermen the *ſea-orange*, from its reſemblance to an orange in ſhape, he obſerves, is properly a fucus; it has neither ſtalk nor branches, but conſiſts wholly of this globular body; it is not a ſolid ſubſtance, but a membrane of about one ninth of an inch in thickneſs, regularly diſtended into this ſhape by being filled with ſea-water. All over the ſides of this cavity there are fixed ſlender filaments, which traverſe the whole, and probably receive nouriſhment from the water contained in the cavity, and diſtribute it to the ſeveral parts of the ſides where they are inſerted. Another ſea-plant this author mentions, only appears in the ſhape of a bark; it affixes itſelf to the branches of the lythophyta, when they have loſt their natural bark, and ſometimes in the ſame manner coats and cruſts over the ſurface of ſtones. When it is freſh, it is of a lively red, of the conſiſtence of a muſhroom, and about the thickneſs of the back of a common knife; and its external ſurface is full of ſmall prominences, which contain a glutinous juice; round about theſe alſo there ſtand ſeveral yellow tubercles, which, with the red of the ground of the plant, make upon the whole a very beautiful appearance. Its under-ſurface is perfectly ſmooth and gloſſy. This ſeems a much more remarkable plant, as to the manner of its vegetation, than thoſe which grow on other plants at land.

Sea-*Weed*, or *Alga Marina*, is commonly uſed as a manure in thoſe places where it can be had in plenty. The beſt is that cut from the rocks, and of which kelp is made. The ſecond beſt is that called the *peaſy ſort*; and the worſt is that with a long ſtalk. This kind of manure is uſed chiefly for the barley-crop; in which caſe, or for fallow, it is ploughed in directly. The people of the country have ſuch an high opinion of its fertilizing qualities, that they ſometimes lay it on after the barley is in the ground; but that is a ſlovenly and injudicious method. In the neighbourhood of Berwick, it is uſed in their compound dunghills, with fold-yard, ſtable-dung, and earth; and in that manner an immenſe quantity of dung is produced by ſuch farmers as are ſituated near the ſea. It is remarkable, that ſuch farmers as uſe the ſea-weed properly, have their lands in ſuch heart as ſeldom to have occaſion for a fallow to reſtore their freſhneſs. This ſpecies of manure is experimentally found to be excellent for gardens, as it not only enriches the ground, but deſtroys all the kinds of vermin.

Sea-*Wolf*. See Anarrhicas.

South-Sea. See Pacific *Ocean*, and South-*Sea*.

SEAL, a puncheon, piece of metal, or other matter, uſually either round or oval; whereon are engraven the arms, device, &c. of ſome prince, ſtate, community, magiſtrate, or private perſon, often with a legend or inſcription; the impreſſion whereof in wax ſerves to make acts, inſtruments, &c. authentic.

The uſe of ſeals, as a mark of authenticity to letters and other inſtruments in writing, is extremely ancient. We read of it among the Jews and Perſians in the earlieſt and moſt ſacred records of hiſtory. And in the book of Jeremiah there is a very remarkable inſtance, not only of an atteſtation by ſeal, but alſo of the other uſual formalities attending a Jewiſh purchaſe. In the civil law alſo, ſeals were the evidence of truth, and were required, on the part of the witneſſes at leaſt, at the atteſtation of every teſtament. But in the times of our Saxon anceſtors, they were not much in uſe in England. For though Sir Edward Coke relies on an inſtance of king Edwyn's making uſe of a ſeal about 100 years before the conqueſt, yet it does not follow that this was the uſage among the whole nation: and perhaps the charter he mentions may be of doubtful authority, from this very circumſtance of being ſealed; ſince we are aſſured by all our ancient hiſtorians, that ſealing was not then in common uſe. The method of the Saxons was, for ſuch as could write to ſubſcribe their names, and, whether they could write or not, to affix the ſign of the croſs: which cuſtom our illiterate vulgar do for the moſt part to this day keep up, by ſigning a croſs for their mark when unable to write their names. And indeed this inability to write, and therefore making a croſs in its ſtead, is honeſtly avowed by Cædwalla, a Saxon king, at the end of one of his charters. In like manner, and for the ſame unſurmountable reaſon, the Normans, a brave but illiterate nation, at their firſt ſettlement in France, uſed the practice of ſealing only, without writing their names: which cuſtom continued when learning made its way among them, though the reaſon for doing it had ceaſed; and hence the charter of Edward the Confeſſor to Weſtminſter-abbey, himſelf being brought up in Normandy, was witneſſed only by his ſeal, and is generally thought to be the oldeſt ſealed charter of any authenticity in England. At the conqueſt, the Norman lords brought over into this kingdom their own faſhions; and introduced waxen ſeals only, inſtead of the Engliſh method of writing their names, and ſigning with the ſign of the croſs. The impreſſions of theſe ſeals were ſometimes a knight on horſeback, ſometimes other devices; but coats of arms were not introduced into ſeals, nor indeed into any other uſe, till about the reign of Richard I. who brought them from the croiſade in the Holy Land, where they were firſt invented and painted on the ſhields of the knights, to diſtinguiſh the variety of perſons of every Chriſtian nation who reſorted thither, and who could not, when clad in complete ſteel, be otherwiſe known or aſcertained.

This neglect of ſigning, and reſting only upon the authenticity of ſeals, remained very long among us; for it was held in all our books, that ſealing alone was ſufficient to authenticate a deed: and ſo the common form of atteſting deeds, "ſealed and delivered," continues to this day; notwithſtanding the ſtatute 29th Car. II. c. 3. revives the Saxon cuſtom, and expreſsly directs the ſigning in all grants of lands and many other ſpecies of deeds: in which, therefore, ſigning ſeems to be now as neceſſary as ſealing, though it hath been ſometimes held that the one includes the other.

The king's *great ſeal* is that whereby all patents, commiſſions, warrants, &c. coming down from the king are ſealed; the keeping whereof is in the hands of the lord chancellor. The king's *privy-ſeal* is a ſeal that is uſually firſt ſet to grants that are to paſs the great ſeal.

Seal is alſo uſed for the wax or lead, and the impreſſion thereon, affixed to the thing ſealed.

An amalgam of mercury with gold, reduced to a butyraceous conſiſtence by ſtraining off part of the mercury through leather, has been recommended as a proper material for taking off the impreſſion of ſeals in wax. In this ſtate, the compound ſcarce contains one part of mercury to two of gold; yet is of a ſilver whiteneſs, as if there was none of the precious metal in it. In this ſtate it grows ſoft on being warmed or worked between the fingers; and is therefore proper for the purpoſe above-mentioned, but is not ſuperior to ſome amalgams made with the inferior metals, as is well known to ſome impoſtors, who have ſold for this uſe amalgams of the baſe metals as curious preparations of gold.

SEALER, an officer in chancery appointed by the lord chancellor or keeper of the great ſeal to ſeal the writs and inſtruments there made, in his preſence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaſter, mortar, cement, lead, or other ſolid binding. For ſtaples, hinges, and joints, plaſter is very proper.

Sealing-*Wax*. See Wax.

SEAM or Seme of corn, is a meaſure of eight buſhels.

Seam *of Glaſs*, the quantity of 120 pound, or 24 ſtones, each five pounds weight. The ſeam of wood is an horſe-load.

Seam, in mines, the ſame with a vein or ſtratum of metal.

SEAMEN, ſuch perſons as are reſerved to ſerve the king or others, at ſea; who may not depart without licence, &c. See Maritime *State*.

Seamen fighting, quarrelling, or making any diſturbance, may be puniſhed by the commiſſioners of the navy with fine and impriſonment. Regiſtered ſeamen are exempted from ſerving in any pariſh, office, &c. and are allowed bounty-money beſide their pay. By the law of merchants, the ſeamen of a veſſel are accountable to the maſter or commander, the maſter to the owners, and the owners to the merchants, for damage ſuſtained either by negligence or otherwiſe. Where a ſeaman is hired for a voyage, and he deſerts before it is ended, he ſhall loſe his wages; and in caſe a ſhip be loſt in a ſtorm, the ſeamen loſe their wages, as well as the owners their freight.

Means of preſerving the Health of Seamen. There is ſcarce any article of more importance to a commercial nation than this, as by means of its ſeamen every ſuch nation is not only enriched, but defended from its enemies. Seamen are ſubject to putrid diſorders from many cauſes, the principal of which are the want of cleanlineſs, the bad air in ſhips, and the putrid proviſions which they are often obliged in long voyages to feed upon. So exceedingly fatal were the diſeaſes produced from theſe cauſes formerly, that when the firſt Eaſt-India veſſels ſailed, three of them ſuffered ſo much from the ſcurvy by the time they had got only three degrees beyond the line, that the merchants who had embarked on this adventure were obliged to do duty as common ſailors; and out of their complement of 480 men there died in all 105. Sir Richard Hawkins alſo, an intelligent and experienced officer who lived about that time, relates, that "in 20 years, during which he had uſed the ſea, he could give an account of 10,000 mariners who had periſhed by the ſcurvy alone." We have alſo a ſtriking inſtance of the fatal effects of the ſcurvy in lord Anſon's celebrated voyage round the world. Soon after he had paſſed the ſtraits of Le Maire, this diſeaſe began to appear among his men; and by the time that the Centurion had advanced a little way on her voyage, 47 had died of it in his ſhip; and there were but few on board who had not in ſome degree been affected, though they had ſcarce been eight months from England. In the ninth month, when ſtanding for the iſland of Juan Fernandez, the Centurion loſt double that number; and the mortality went on at ſo great a rate, that, before they arrived there, ſhe had loſt upwards of 200, and at laſt could muſter no more than ſix men in a watch capable of doing duty. The other ſhips ſuffered in the ſame proportion. After having reached the iſland, the crews quickly recovered their health: but they had continued only a ſhort time at ſea when the ſame fatal diſtemper broke out again; and before the Centurion, which now contained the ſurvivors of all the three crews, had got the length of the iſland of Tinian, more than four-fifths of the original complement were deſtroyed. However, it is probable that this extreme mortality was not occaſioned by the ſcurvy alone; but that it was conjoined with that putrid and peſtilential diſtemper called the *jail* or *hoſpital fever*[*]. But whether this was the caſe or not, it is certain that both theſe diſtempers originate from putrefaction, and the ſame cauſes which prevent the ſcurvy will alſo prevent the jail-fever.

How great is the contraſt between this fatal voyage of lord Anſon, and that of captain Cook, who, "with a company of 118 men, performed a voyage of three years and 18 days, throughout all the climates, from 52° north to 71° ſouth, with the loſs of only one man by a diſtemper;" and even this one, of a phthiſis pulmonalis, or conſumption of the lungs, of which he would in all probability have died though he had remained at land! As this far exceeds any thing of the kind ever known before, it is evident, that the means uſed by captain Cook for the preſervation of his mariners muſt be looked upon as the beſt for preſerving the health of ſeamen that ever have been found out; for which reaſon we ſhall in this article give a ſummary account of theſe means.

The ſhips, beſides being fitted up in the completeſt manner for reſiſting the dangers of the ſea, were ſupplied with ſeveral kinds of proviſions different from thoſe uſually furniſhed. They had wheat inſtead of oatmeal; ſugar inſtead of oil: they had alſo malt; ſour krout, ſalted cabbage; portable broth; ſalep; marmalade of carrots; and inſpiſſated juice of wort and beer. Some of theſe had before been found highly antiſcorbutic; and others were ſent out by way of experiment, particularly the two laſt. From the malt was made ſweet wort, which by Dr Macbride was recommended as a powerful antiſcorbutic; and was given from five to ſix pints a-day, as the ſurgeon thought neceſſary. Sour krout is cabbage cut ſmall; to which is put a little ſalt, ſome juniper-berries, and anniſeeds. It is then fermented, and afterwards packed cloſe in caſks; in which ſtate it will keep good for a long time. The allowance for each man was two pounds a-week; but was increaſed or diminiſhed according to circumſtances. Salted cabbage is the vegetable cut to pieces and ſalted down in caſks, by which means it may be preſerved for a long time. Portable broth is made from the ligamentous and mucilaginous parts of beef boiled down into a kind of glue, and afterwards diluted with boiling water. Salep and rob of lemons and oranges were uſed only for the ſick and ſcorbutic who were under the care of the ſurgeon. Marmalade of carrots is the juice of yellow carrots inſpiſſated till it becomes of the conſiſtence of honey or treacle, which laſt it reſembles both in taſte and colour. It was recommended by baron Storſch of Berlin as a very great antiſcorbutic. The inſpiſſated juice of wort and beer were invented ſome years ago by Mr Pelham ſecretary to the commiſſioners of the victualling-office. This gentleman conſidered, that if the juice of malt, either as beer or wort, was inſpiſſated by evaporation, it was probable that it would keep good at ſea; and if ſo, that a ſupply of beer might be had at any time, by mixing it with water. Mr Pelham's experiments ſucceeded ſo well, that the commiſſioners cauſed 31 half-barrels of this juice to be prepared, and ſent out along with captain Cook's ſhips for a trial; 19 on board the Reſolution, and 12 on board the Adventure. They were alſo provided with fiſhing-nets, lines, and hooks of every kind, for catching fiſh, wherever that was practicable.

The general ſucceſs of theſe articles and precautions has already been mentioned. With regard to particulars, captain Cook tells us, that to ſuch of the men as ſhowed the leaſt ſymptom of the ſcurvy, and even to ſuch as ſeemed inclined to it, ſweet wort was given from one to two or three pints a-day each man; or in ſuch proportion as the ſurgeon thought neceſſary, which ſometimes amounted to three quarts. "This," ſays he, "is without doubt one of the beſt antiſcorbutic medicines hitherto diſcovered; and will, with proper attention to other things, I am perſuaded, prevent the ſcurvy from making any great progreſs for a conſiderable while. But I am not altogether of opinion that it will cure it at ſea. Sour krout is not only a wholeſome vegetable food, but in my opinion highly antiſcorbutic, and it ſpoils not by keeping. A pound of this was ſerved to each man, when at ſea, twice a-week, or oftener, as was thought neceſſary. —An ounce of portable broth for each man, or ſuch other proportion as circumſtances pointed out, was boiled in their peaſe, three days in the week; and when we were in places where vegetables were to be got, it was boiled with them and wheat or oatmeal every morning for breakfaſt, and alſo with peaſe and freſh vegetables for dinner. It enabled us to make ſeveral nouriſhing and wholeſome meſſes, and was the means of making the people eat a greater quantity of vegetables than otherwiſe they would have done. The ſurgeon made uſe of rob of lemons and oranges in many caſes with great ſucceſs. We were certainly gainers by the exchange of wheat inſtead of oatmeal, and ſugar inſtead of oil. Sugar, I apprehend, is a very good antiſcorbutic; whereas oil, ſuch as the navy is uſually ſupplied with, I am of opinion, has a contrary effect.

"But the introduction of the moſt ſalutary articles, either as proviſions or medicines, will generally prove unſucceſsful, unleſs ſupported by certain regulations. On this principle, many years experience, together with ſome hints I had from Sir Hugh Palliſer, captains Campbell, Wallis, and other intelligent officers, enabled me to lay a plan whereby all was to be governed.

"The crew were at three watches, except upon ſome extraordinary occaſions. By this means they were not ſo much expoſed to the weather as if they had been at watch and watch; and had generally dry clothes to ſhift themſelves when they happened to get wet. Care was alſo taken to expoſe them as little as poſſible to wet weather. Proper methods were uſed to keep their perſons, hammocks, bedding, cloaths, &c. conſtantly clean and dry. Equal care was taken to keep the ſhip clean and dry between decks. Once or twice a-week ſhe was aired with fires; and when this could not be done, ſhe was ſmoked with gunpowder, mixed with vinegar or water. I had alſo frequently a fire made in an iron pot at the bottom of the well, which was of great uſe in purifying the air in the lower parts of the ſhip. To this and to cleanlineſs, as well in the ſhip as among the people, too great attention cannot be paid; the leaſt neglect occaſions a putrid and diſagreeable ſmell below, which nothing but fires will remove. Proper attention was paid to the ſhip's coppers, ſo that they were kept conſtantly clean. The fat which boiled out of the ſalt-beef and pork I never ſuffered to be given to the people, being of opinion that it promotes the ſcurvy.

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[*] See *Medicine*, nº 277.

“I was careful to take in water wherever it was to be got, even when we did not want it; becauſe I look upon freſh water from the ſhore to be more wholeſome than that which has been kept for ſome time on board a ſhip. Of this eſſential article we were never at an allowance, but had always plenty for every neceſſary purpoſe. Navigators, indeed, cannot in general expect, nor would they wiſh to meet, with ſuch advantages in this reſpect as fell to my lot. The nature of our voyage carried us into very high latitudes: but the hardſhips and dangers inſeparable from that ſituation were in ſome degree compenſated by the ſingular felicity we enjoyed of extracting inexhauſtible ſupplies of freſh water from an ocean ſtrewed with ice.

“We came to few places where either the art of man, or the bounty of nature, had not provided ſome ſort of refreſhment or other, either in the animal or vegetable way. It was my firſt care to procure whatever of any kind could be met with, by every means in my power, and to oblige our people to make uſe thereof both by my example and authority; but the benefits ariſing from refreſhments of any kind ſoon became ſo obvious, that I had little occaſion to recommend the one or to exert the other.”

In lord Anſon's voyage, thoſe who were ill of the ſcurvy found themſelves ſo much refreſhed with the oranges and lemons they met with on the iſland of Tinian, that theſe fruits have ſince been reckoned the beſt antiſcorbutics in the world, and vaſt advantages were imagined to ariſe from the rob or extract of the juices of theſe fruits, if ſhips could be ſupplied with them in ſufficient quantity. Captain Cook was ſupplied with ſome quantity; but his opinion is very different. In a letter to Sir John Pringle, dated July 7th 1776, he has the following paragraph: “I entirely agree with you, that the dearneſs of the rob of lemons and of oranges will hinder them from being furniſhed in large quantities: but I do not think this ſo neceſſary; for though they may aſſiſt other things, I have no great opinion of them alone. Nor have I a higher opinion of vinegar: my people had it very ſparingly during the laſt voyage; and towards the latter part of it, none at all; and yet we experienced no ill effects from the want of it. The cuſtom of waſhing the inſide of the ſhip with vinegar I ſeldom obſerved, thinking that fire and ſmoke anſwered the purpoſe much better.”—For further particulars relating to the means of prevention and cure of the ſcurvy, ſee the article MEDICINE, n° 448.

On the whole, it is eaſy to obſerve, that the ſame means which are neceſſary for the preſervation of health at land, will alſo preſerve it at ſea; and without theſe the beſt medicines are ineffectual. The whole indeed may be comprehended under the following articles. 1. Plenty of wholeſome food and drink. 2. Pure air. 3. Dry and warm lodging. 4. Moderate exerciſe, without exceſſive fatigue or want of ſleep. If the proviſions which ſhips carry out along with them would keep ſound throughout the whole time of the voyage, there would be no more occaſion for an exact regimen at ſea than at land; but as the proviſions neceſſarily ſpoil and become putrid in long ſea-voyages, we are thence obliged to uſe large quantities of antiſeptics, in order to correct that putrid tendency.—On land there is commonly a free circulation of air; and therefore the maladies which partly enſue from confined and putrid air in ſhips, have been thought to ariſe from ſome malignant quality in the ſea-air itſelf: but if a proper circulation of air is produced throughout all the parts of the ſhip, either by ventilation or otherwiſe, the ſea-air is found to be equally wholeſome with that of land; nay, where the land-air is confined, as in jails and hoſpitals, it is found to produce diſeaſes worſe than even the ſcurvy. Laſtly, if a perſon at land indulges himſelf in ſloth and uncleanneſs, if his habitation is damp and dirty, he will very probably loſe his health; and it is not to be wondered at if he ſhould do the ſame in ſimilar circumſtances at ſea. The means, then, of preſerving the health of ſeamen are, beſides an attention to the purity of the air, the cleanlineſs of the ſhip and crew, the laying in a ſufficient ſtock of wholeſome proviſions, which will keep as long as poſſible, and renewing them as frequently as an opportunity can be found. And as drink is an article as eſſential to the preſervation of health as food, a method of procuring a conſtant ſupply of pure uncorrupted water at ſea muſt certainly be an object of the utmoſt importance; for which ſee the articles (*Freſhening*) SEA-*Water*, and WATER (*preſerving it from putrefaction at ſea*).

SEAPOYS, a name given to Indian ſoldiers who ſerve after the European manner. It is applied only to the natives of the Eaſt Indies.

SEARCLOTH, or CERECLOTH, in ſurgery, a form of external remedy ſomewhat harder than an unguent, yet ſofter than an emplaſter, though it is frequently uſed both for the one and the other. The cerecloth is always ſuppoſed to have wax in its compoſition, which diſtinguiſhes and even denominates it. In effect, when a liniment or unguent has wax enough in it, it does not differ from a cerecloth.

SEASIN, in a ſhip, the name of a rope by which the boat rides by the ſhip's ſide when in harbour, &c.

SEASONS, in coſmography, certain portions or quarters of the year diſtinguiſhed by the ſigns which the ſun then enters, or by the meridian altitudes of the ſun; conſequent on which are different temperatures of the air, different works in tillage, &c. The year is divided into four ſeaſons; ſpring, ſummer, autumn, and winter.

SEBASTIAN, ST. a handſome, populous, and ſtrong town of Spain, in the province of Guipuſcoa, with a good and well-frequented harbour. It is ſeated at the foot of a mountain; and the harbour ſecured by two moles, and a narrow entrance for the ſhips. The town is ſurrounded with a double wall, and to the ſea-ſide is fortified with baſtions and half-moons. The ſtreets are long, broad, and ſtraight, and paved with white flag-ſtones. At the top of the mountain is a citadel, with a garriſon well-furniſhed with cannon.

The town carries on a conſiderable trade, the greateſt part of which conſiſts of iron and ſteel, which ſome reckon to be the beſt in Europe. They alſo deal in wool, which comes from old Caſtile. W. Long. 1. 59. N. Lat. 43. 23. The capital of Braſil in South America is likewiſe called Sebaſtian.

SEBASTIANO, called *Del Piombo*, from an office in the lead mines given him by Pope Clement VII. was an eminent Venetian painter, born in 1485. He was firſt a diſciple of old Giovanni Bellino; continued his ſtudies under Giorgione; and having attained an excellent manner of colouring, went to Rome, where he inſinuated himſelf into the favour of Michael Angelo. He has the name of being the firſt who invented the art of preparing plaſter-walls for oil-painting; but was ſo ſlow and lazy in his work, that other hands were often employed to finiſh what he began. He died in 1547.

SECALE, RYE; a genus of the digynia order, belonging to the triandria claſs of plants. There are four ſpecies, the moſt remarkable of which is the cerealia, or common rye cultivated in our fields. See AGRICULTURE, nº 112.—114.

Rye is next in price to wheat, which, though inferior to it in many reſpects, in ſome others it very much reſembles. It riſes higher than wheat; the ear is ſmaller, with ſhorter, ſharper, and rougher awns; the grain is leſs in ſize, thinner and darker; the root not ſo buſhy as that of wheat, and therefore does not ſo much exhauſt the ſoil; it is earlier in the ear by a month. It is next in weight to wheat, the buſhel being from 56 to 59 pounds; where they allow nine pecks to a buſhel, it ſometimes reaches to 67 pounds. In ſeveral places this grain with an early kind of wheat are ſown and reaped together. This mixed corn is commonly called *maſlin* (*wiſcellane*) and alſo *mung corn* or *munk-corn*, corruptly for *monk-corn*, becauſe bread made of it was commonly eat in monaſteries. Profeſſor Bradley aſſures us, that this was the ſweeteſt and moiſteſt bread he ever taſted. Many others are of the ſame opinion in this reſpect. But in the article of bread, we are at preſent rather governed by the ſight than the taſte. The general uſe of rye is for bread, of which there was much more formerly eaten than at preſent, and yet there is ſtill more of it conſumed in this way than of barley. Mr King eſtimates the produce of rye in his time at 10,000,000 of buſhels. We grow at preſent 8,509,216 buſhels, of which 7,992,000 are ſpent in bread, 284,000 are conſumed in other uſes, and 269,216 buſhels are annually exported. This amounts to 283,798 l.; whereas in the laſt century, though we grew more, we imported conſiderable quantities, and conſequently the nation gains very conſiderably by this grain. Rye-bread, in the opinion of good judges, is rather unwholeſome than unpleaſant. It is conceived to be of very difficult digeſtion, and therefore only fit for hard-working and laborious people. Beſides this, it is black, heavy, and by no means pleaſing to thoſe who are not uſed to it; but, as appears from their continuing in the uſe of it, very acceptable, and agrees with ſuch as have been accuſtomed to it from their youth. But this grain, being mixed with wheat, is thought from its clammineſs, to contribute to keep the bread made of it long moiſt, to give it an agreeable flavour, and to make it go farther, and to ſave the trouble of frequent baking. It yields a great deal of fine and ſtrong ſpirit, and ſome uſe is made of it by the tanners.

Upon the whole, as the chief conſumption of rye was in bread, and as for more than half a century paſt this has been continually diminiſhing, ſo we at preſent grow leſs of it than in times paſt, though we export more of it than we formerly did. It may, however, deſerve ſome conſideration, whether for ſeveral weighty reaſons the culture of this grain ſhould not be more attended to and encouraged; and, amongſt others, for theſe that follow: Becauſe it will grow almoſt every where, and on any ſoil, not only with little trouble, but, which is a circumſtance not unworthy of notice, with leſs danger of failing than any other crop: Becauſe, though leſs eaten than in former times, yet it is ſtill in great eſteem abroad, and eſpecially in the northern parts of Europe, where the conſumption of it is large, and it ſells at a conſiderable price: and, laſtly, Becauſe our rye is thought wholeſome, and much leſs, if indeed at all, expoſed to that dreadful and deplorable malady the French call *ergot* (A), which frequently renders the eating it very dangerous and deſtructive, not to man only, but to all animals; and of courſe our rye from this fortunate circumſtance will preſerve a preference in foreign markets.

SECANT, in geometry, is a line that cuts another, or divides it into two parts.

SECEDERS, a ſect of Preſbyterians, who diſſented from the eſtabliſhed church of Scotland in the year 1733. The following circumſtance gave riſe to this ſect. Meſſrs Erſkine, Wilſon, Moncrieff, and Fiſher, miniſters of the church of Scotland, obſtinately refuſed, for ſeveral years, to obey the deciſions of the General Aſſembly with regard to the ſettlement of miniſters agreeably to the law of patronage: For this open contempt of authority, the aſſembly, after many and repeated admonitions, were at laſt obliged to eject them from their reſpective charges. Theſe four clergymen, when they ſaw matters carried this length, immediately complained of perſecution; profeſſed uncommon ſanctity and auſterity of manners; and cried out that the church was over-run with various errors, ſuch as, a compliance with the law of patronage; the tenderneſs of the aſſembly to profeſſors Simpſon and Campbell, who were accuſed of Arian and Arminian hereſies; and a number of practical deviations from the covenanted reformation of Scotland: They even inveighed againſt the conduct of the government for their ready admiſſion of malignant and wicked men into places of truſt in the army and ſtate; for the looſe and unlimited reſtoration of Charles II. to the throne; for the reſtoration of Prelacy in England, which had been ſolemnly abjured: for reſtoring the ſuperſtitious Chriſtmas vacance; for the repeal of the penal laws againſt witches, &c. &c. Theſe things, joined to the popular talents of ſome of the above miniſters, alarmed the minds of many well-meaning people, and in a few years procured a numerous train of followers. Elated with this unexpected ſucceſs, they ſoon ſplit into two parties. The chief point of conteſt among the leaders of this ſect was concerning the lawfulneſs of what is called the *burgeſs-oath*; and hence the one party have

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(A) See Phil. Tranſ. Nº 130. p. 758. It is a moſt horrid diſtemper, ending frequently in an incurable gangrene.

have ever ſince been called *Burghers*, and the other *Antiburghers*.

SECKENDORF (Guy Lewis de), a very learned German, deſcended from ancient and noble families, was born at Aurache in Franconia in 1626. He was a good linguiſt, learned in law, hiſtory, and divinity; and is ſaid to have been a tolerable painter and engraver. He was honourably employed by ſeveral of the German princes; and died counſellor of ſtate to Frederic III. elector of Brandenburg, and chancellor of the univerſity of Halle, in 1692. He wrote many books, particularly, "A hiſtory and defence of the Lutheran religion," 2 vols folio, Frankfort, 1602, in Latin.

SECOMIÆ, in natural hiſtory, the name of a genus of foſſils, of the claſs of ſeptariæ; the characters of which are, That they are bodies of a duſky hue; divided, by ſepta or partitions of a ſparry matter, into ſeveral more or leſs regular portions; of a moderately firm texture; not giving fire with ſteel; but fermenting with acid menſtrua, and eaſily calcining. The ſeptariæ of this genus are of all others the moſt common, and are what have been known by the little expreſſive or miſtaken names of the waxen vein, or ludus Helmontii. We have many ſpecies of theſe bodies known among us. Of the whitiſh or browniſh, we have 13; of the yellowiſh, five; and of the ferrugineous ones, four.

SECOND, in geometry, chronology, &c. the 60th part of a prime or minute, whether of a degree or of an hour.

SECOND, in muſic, one of the muſical intervals; being only the difference between any ſound and the next neareſt ſound, whether above or below it.

SECOND *Major*, in muſic. See INTERVAL.

SECOND *Minor*, in muſic. See INTERVAL.

SECOND-*Sight*, a peculiar faculty, aſcribed to ſome of the inhabitants of the Highlands of Scotland, by which they are ſaid to foretel certain events before they come to paſs. Some have denied, and others affirmed, the exiſtence of this gift; inſtead of troubling our readers with the various accounts which they give of it, we ſhall preſent them with the following obſervations upon this ſubject by Dr Beattie of Aberdeen, whoſe account of the ſecond-ſight appears to us rational and well founded.

The Highlands of Scotland are a pictureſque, but a melancholy country. Long tracts of mountainous deſart, covered with dark heath, and often obſcured by miſty weather; narrow valleys, thinly inhabited, and bounded by precipices reſounding with the fall of torrents; a ſoil ſo rugged, and a climate ſo dreary, as in many parts to admit neither the amuſements of paſturage, nor the labours of agriculture; the mournful daſhing of waves along the friths and lakes that interſect the country; the portentous noiſes which every change of the wind and every increaſed diminution of the waters is apt to raiſe in a lonely region full of echoes and rocks and caverns; the groteſque and ghaſtly appearance of ſuch a landſcape by the light of the moon: objects like theſe diffuſe a gloom over the fancy, which may be compatible enough with occaſional and ſocial merriment, but cannot fail to tincture the thoughts of a native in the hour of ſilence and ſolitude. If theſe people, notwithſtanding their reformation in religion, and more frequent intercourſe with ſtrangers, do ſtill retain many of their old ſuperſtitions, we need not doubt but in former times they muſt have been much more enſlaved to the horrors of imagination, when beſet with the bugbears of Popery and Paganiſm. Moſt of their ſuperſtitions are of a melancholy caſt. That of *ſecond-ſight*, by which ſome are ſtill ſuppoſed to be haunted, is conſidered by themſelves as a misfortune, on account of the many dreadful images it is ſaid to obtrude upon the fancy. It is ſaid that ſome of the Alpine regions do likewiſe lay claim to a ſort of ſecond-ſight. Nor is it wonderful, that perſons of a lively imagination, immured in deep ſolitude, and ſurrounded with the ſtupendous ſcenery of clouds, precipices, and torrents, ſhould dream (even when they think themſelves awake) of thoſe few ſtriking ideas with which their lonely lives are diverſified; of corpſes, funeral proceſſions, and other ſubjects of terror; or of marriages, and the arrival of ſtrangers, and ſuch like matters of more agreeable curioſity.

Let it be obſerved alſo, that the ancient Highlanders of Scotland had hardly any other way of ſupporting themſelves than by hunting, fiſhing, or war, profeſſions that are continually expoſed to fatal accidents. And hence, no doubt, additional horrors would often haunt their ſolitude, and a deeper gloom overſhadow the imagination even of the hardieſt native.

A ſufficient evidence can hardly be found for the reality of the *ſecond-ſight*, or at leaſt of what is commonly underſtood by that term. A treatiſe on the ſubject was publiſhed in the year 1762, in which many tales were told of perſons whom the author believed to have been favoured, or haunted, with theſe illuminations; but moſt of the tales were trifling and ridiculous: and the whole work betrayed, on the part of the compiler, ſuch extreme credulity, as could not fail to prejudiſe many readers againſt his ſyſtem.

That any of theſe viſionaries are apt to be ſwayed in their declarations by ſiniſter views, we will not ſay; but this may be ſaid with confidence, that none but ignorant people pretend to be gifted in this way. And in them it may be nothing more, perhaps, than ſhort fits of ſudden ſleep or drowſineſs, attended with lively dreams, and ariſing from ſome bodily diſorder, the effect of idleneſs, low ſpirits, or a gloomy imagination. For it is admitted, even by the moſt credulous Highlanders, that as knowledge and induſtry are propagated in their country, the ſecond-ſight diſappears in proportion; and nobody ever laid claim to the faculty who was much employed in the intercourſe of ſocial life. Nor is it at all extraordinary, that one ſhould have the appearance of being awake, and ſhould even think one's ſelf ſo, during thoſe fits of doſing; that they ſhould come on ſuddenly, and while one is engaged in ſome buſineſs. The ſame thing happens to perſons much fatigued, or long kept awake, who frequently fall aſleep for a moment, or for a long ſpace, while they are ſtanding, or walking, or riding on horſeback. Add but a lively dream to this ſlumber, and (which is the frequent effect of diſeaſe) take away the conſciouſneſs of having been aſleep, and a ſuperſtitious man may eaſily miſtake his dream for a waking viſion; which, however, is ſoon forgotten when no ſubſequent occurrence recals it to his memory; but which, if it ſhall be thought to reſemble any future event, exalts the poor dreamer into a Highland prophet. This conceit makes him more recluſe and more melancholy than ever; and ſo feeds his diſeaſe, and multiplies his viſions: which, if they are not diſſipated by buſineſs or ſociety, may continue to haunt him as long as he lives; and which, in their progreſs through the neighbourhood, receive ſome new tinctures of the marvellous from every mouth that promotes their circulation. As to the prophetical nature of this ſecond-ſight, it cannot be admitted at all. That the Deity ſhould work a miracle in order to give intimation of the frivolous things that theſe tales are made up of, the arrival of a ſtranger, the nailing of a coffin, or the colour of a ſuit of cloaths; and that theſe intimations ſhould be given for no end, and to thoſe perſons only who are idle and ſolitary, who ſpeak Galic, or who live among mountains and deſarts, is like nothing in nature or providence that we are acquainted with; and muſt therefore, unleſs it were confirmed by ſatisfactory proof (which is not the caſe), be rejected as abſurd and incredible.

Theſe viſions, ſuch as they are, may reaſonably enough be aſcribed to a diſtempered fancy. And that in them, as well as in our ordinary dreams, certain appearances ſhould, on ſome rare occaſions, reſemble certain events, is to be expected from the laws of chance; and ſeems to have in it nothing more marvellous or ſupernatural, than that the parrot, who deals out his ſcurrilities at random, ſhould ſometimes happen to ſalute the paſſenger by his right appellation.

SECONDARY, in general, ſomething that acts as ſecond or in ſubordination to another.

SECONDARY *Qualities of Bodies*. See METAPHYSICS, n° 32, 35.

SECONDAT. See MONTESQUIEU.

SECRETARY, an officer who, by his maſter's orders, writes letters, diſpatches, and other inſtruments, which he renders authentic by his ſignet. Of theſe there are ſeveral kinds; as, 1. Secretaries of ſtate, who are officers that have under their management and direction the moſt important affairs of the kingdom, and are obliged conſtantly to attend on the king: they receive and diſpatch whatever comes to their hands, either from the crown, the church, the army, private grants, pardons, diſpenſations, &c. as likewiſe petitions to the ſovereign, which, when read, are returned to them; all which they diſpatch according to the king's direction. They have authority to commit perſons for treaſon, and other offences againſt the ſtate, as conſervators of the peace at common law, or as juſtices of the peace throughout the kingdom. They are members of the privy-council, which is ſeldom or never held without one of them being preſent. As to the buſineſs and correſpondence in all parts of this kingdom, it is managed by either of the ſecretaries without any diſtinction; but with reſpect to foreign affairs, the buſineſs is divided into two provinces or departments, the ſouthern and the northern, comprehending all the kingdoms and ſtates that have any intercourſe with Great Britain; each ſecretary receiving all letters and addreſſes from, and making all diſpatches to, the ſeveral princes and ſtates comprehended in his province. Ireland and the Plantations are under the direction of the elder ſecretary, who has the ſouthern province, which alſo comprehends France, Italy, Switzerland, Spain, Portugal, and Turkey: the northern province includes the Low Countries, Germany, Denmark, Sweden, Poland, and Muſcovy. Each of the ſecretaries has an apartment in all the royal houſes, both for their own accommodation and their officers; they have alſo a table at the king's charge, or elſe board-wages. The two ſecretaries for Britain have each two under ſecretaries, and one chief clerk; with an uncertain number of other clerks and tranſlators, all wholly depending on them. To the ſecretaries of ſtate belong the cuſtody of that ſeal properly called the *ſignet*, and the direction of two other offices, one called the *paper-office*, and the other the *ſignet-office*. 2. Secretary of an embaſſy, a perſon attending an ambaſſador, for writing diſpatches relating to the negociation. There is a great difference between the ſecretary of an embaſſy, and the ambaſbaſſador's ſecretary; the laſt being a domeſtic or menial of the ambaſſador, and the firſt a ſervant or miniſter of the prince. 3. The ſecretary of war, an officer of the war-office, who has two chief clerks under him, the laſt of which is the ſecretary's meſſenger. There are alſo ſecretaries in moſt of the other offices.

SECRETION, in the animal œconomy, the ſeparation of ſome fluid mixed with the blood by means of the glands. See the article GLAND.—In the bodies of animals we obſerve a great number of juices of different natures, viz. the blood, lympha, ſaliva, ſtomach-liquor, inteſtinal juices, pancreatic juice, bile, urine, &c. and the blood is the general ſource of all. See the articles BLOOD, LYMPH, SALIVA, &c.

SECT, a collective term, comprehending all ſuch as follow the doctrines and opinions of ſome famous divine, philoſopher, &c.

SECTION, in general, denotes a part of a divided thing, or the diviſion itſelf. Such, particularly, are the ſubdiviſions of a chapter; called alſo *paragraphs*, and *articles*: the mark of a ſection is §.

SECTION, in geometry, denotes a ſide or ſurface appearing of a body or figure cut by another; or the place where lines, planes, &c. cut each other.

SECTOR, in geometry, is a part of a circle, comprehended between two radii and the arch; or it is a mixed triangle, formed by two radii and the arch of a circle.

SECTOR, is alſo a mathematical inſtrument of great uſe in finding the proportion between quantities of the ſame kind, as between lines and lines, ſurfaces and ſurfaces, &c. for which reaſon the French call it the *compaſs of proportion*.

The great advantage of the ſector above common ſcales, &c. is, that it is adapted to all radii, and all ſcales. For, by the line of chords, ſines, tangents, &c. adapted to any radius betwixt the length and breadth of the ſector, when opened.

The ſector is founded on the fourth propoſition of the ſixth book of Euclid, where it is demonſtrated, that ſimilar triangles have their homologous ſides proportional; an idea of its foundation or theory may be conceived from what follows. Let the lines AB, AC, repreſent the two legs of the ſector, and AD, AE, two equal ſections from the centre. If now the points BC and DE be connected, the lines BC and DE will be

Plate CCLXVII. fig. 6.

be parallel: therefore the triangles ADE, and ABC, will be ſimilar, and conſequently the ſides AD, DE, AB, BC, proportional; that is, as AD : DE : : AB : BC; whence, if AD be the half, third, or fourth part of AB, DE will be a half, third, or fourth part BC. Whence it follows, that if AD be the chord, ſine, tangent, &c. of any number of deegres to the radius AB, DE will be the ſame to the radius BC.

Plate CCLXVII. fig. 7, 8.

Deſcription of the Sector. This inſtrument conſiſts of two equal legs or rules of braſs, &c. riveted together, but ſo as to move eaſily on the rivet: on the faces of the inſtrument are placed ſeveral lines; the principal of which are the line of equal parts, line of chords, line of ſines, line of tangents, line of ſecants, and line of polygons.

The line of equal parts, called alſo the *line of lines*, marked L, is a line divided into 100 equal parts, and where the length of the leg will allow it, each of theſe is ſubdivided into halves and quarters. It is found on each leg, on the ſame ſide, and the diviſions numbered 1, 2, 3, 4, 5, &c. to 10, which is near the extremity of each leg. Note, in practice, 1 repreſents either 1, 10, 100, 1000, 10000, &c. as occaſion requires; in which caſe, 2 repreſents 2, 20, 200, 2000, 20000, &c. and ſo of the reſt. The line of chords, marked C on each leg, is divided after the uſual manner, and numbered 10, 20, 30, &c. to 60. The line of ſines, denoted on each leg by the letter S, is a line of natural ſines, numbered 10, 20, 30, &c. to 90. The line of tangents, denoted on each leg by the letter T, is a line of natural tangents, numbered 10, 20, 30, &c. to 45. Beſides which, there is another little line of tangents on each leg, commencing at 45°, and extending to 75°, denoted by the letter *t*. Line of ſecants, denoted on each leg by the letter *ſ*, is a line of natural ſecants, numbered 10, 20, 30, &c. to 75, not commencing at the centre of the inſtrument, but at ſome diſtance therefrom. The line of polygons, denoted by the letter P on each leg, is numbered 4, 6, 5, &c. to 12, which falls conſiderably ſhort of the centre of the inſtrument.

Beſides theſe lines, which are eſſential to the ſector, there are others placed near the outward edges on both ſides, and parallel thereto; which are in all reſpects the ſame as thoſe on Gunter's ſcale, and uſed after the ſame manner. Such are the lines of artificial ſines marked S, of artificial tangents marked T, and Gunter's line of numbers marked N; theſe lines do not extend to the end of the inſtrument. There are ſometimes other lines placed, to fill the vacant ſpaces, as the lines of hours, latitudes, and inclination of meridians, which are uſed the ſame as on the common ſcales.

The lines found by the ſector are of two kinds, lateral and parallel; the firſt are ſuch as are found by the ſides of the ſector, as AB, AC, (fig. 6.) the latter ſuch as go acroſs from one leg to the other, as DE, BC. Note, the lines are not placed in the ſame order on all ſectors, but they may be eaſily found by the above directions.

Uſe of the Line of Equal Parts on the Sector. 1. To divide a given line into any number of equal parts, ſuppoſe ſeven. Take the given line in your compaſſes; and ſetting one foot in a diviſion of equal parts, that may be divided by ſeven, for example, 70, whoſe ſeventh part is 10, open the ſector till the other point fall exactly on 70, in the ſame line on the other leg. In this diſpoſition, applying one point of the compaſſes to 10, in the ſame line, ſhut them till the other fall in 10, in the ſame line, on the other leg, and this opening will be the ſeventh part of the given line. Note, if the line to be divided be too long to be applied to the legs of the ſector, divide only one half or one fourth by 7, and the double or quadruple thereof will be the ſeventh part of the whole.

2. To meaſure the lines of the perimeter of a polygon, one of which contains a given number of equal parts. Take the given line in your compaſſes, and ſet it parallel, upon the line of equal parts, to the number on each leg expreſſing its length. The ſector remaining thus, ſet off the length of each of the other lines parallel to the former, and the numbers each of them falls on will expreſs their lengths.

3. A right line being given, and the number of parts it contains, ſuppoſe 120, to take from it a ſhorter line, containing any number of the ſame parts, ſuppoſe 25. Take the given line in your compaſſes, open the ſector till the two feet fall on 120 on each leg; then will the diſtance between 25 on one leg, and the ſame number on the other, give the line required.

4. To multiply by the line of equal parts on the ſector. Take the lateral diſtance from the centre of the line to the given multiplicator; open the ſector till you fit that lateral diſtance to the parallel of 1 and 1, or 10 and 10, and keep the ſector in that diſpoſition; then take in the compaſſes the parallel diſtance of the multiplicand, which diſtance, meaſured laterally on the ſame line, will give the product required. Thus, ſuppoſe it were required to find the product of 8, multiplied by 4: take the lateral diſtance from the centre of the line to 4 in your compaſſes, *i. e.* place one foot of the compaſſes in the beginning of the diviſions, and extend the other along the line to 4. Open the ſector till you fit this lateral diſtance to the parallel of 1 and 1, or 10 and 10. Then take the parallel diſtance of 8, the multiplicand; *i. e.* extend the compaſſes from 8, in this line, on one leg, to 8 in the ſame line on the other; and that extent, meaſured laterally, will give the product required.

5. To divide by the line of equal parts on the ſector. Extend the compaſſes laterally from the beginning of the line to 1, and open the ſector till you fit that extent to the parallel of the diviſor; then take the parallel diſtance of the dividend, which extent, meaſured in a lateral direction, will give the quotient required. Thus, ſuppoſe it was required to divide 36 by 4; extend the compaſſes laterally, the beginning of the line to 1, and fit to that extent the parallel of 4, the diviſor; then extend the compaſſes parallel, from 36 on one leg to 36 on the other, and that extent, meaſured laterally, will give 9, the quotient reqnired.

Uſe of the Sine of Chords on the Sector. 1. To open the ſector ſo as the two lines of chords may make an angle or number of degrees, ſuppoſe 40. Take the diſtance from the joint to 40, the number ot the degrees propoſed, on the line of chords; open the ſector till the diſtance from 60 to 60, on each leg, be equal to the given diſtance of 40; then will the two

Sector.

lines on the ſector form an angle of 40 degrees, as was required.

2. The ſector being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the line of chords from the centre; the number whereon it terminates will ſhow the degrees, &c. required.

3. To lay off any number of degrees upon the circumference of a circle. Open the ſector till the diſtance between 60 and 60 be equal to the radius of the given circle; then take the parallel extent of the chord of the number of degrees on each leg of the ſector, and lay it off on the circumference of the given circle. Hence any regular polygon may be eaſily inſcribed in a given circle.

Uſe of the Line of Polygons on the SECTOR. 1. To inſcribe a regular polygon in a given circle. Take the ſemidiameter of the given circle in the compaſſes, and adjuſt it to the number 6, on the line of polygons, on each leg of the ſector: then, the ſector remaining thus opened, take the diſtance of the two equal numbers, expreſſing the number of ſides the polygon is to have; *e. gr.* the diſtance from 5 to 5 for a pentagon, from 7 to 7 for a heptagon, &c. Theſe diſtances carried about the circumference of the circle, will divide it into ſo many equal parts.

2. To deſcribe a regular polygon, *e. gr.* a pentagon, on a given right line. Take the length of the line in the compaſſes, and apply it to the extent of the number 5, 5, on the lines of polygons. The ſector thus opened, upon the ſame lines take the extent from 6 to 6; this will be the ſemi-diameter of the circle the polygon is to be inſcribed in. If then, with this diſtance, from the ends of the given line, you deſcribe two arches of a circle, their interſection will be the centre of the circle.

3. On a right line, to deſcribe an iſoſceles triangle, having the angles at the baſe double that at the vertex. Open the ſector, till the ends of the given line fall on 10 and 10 on each leg; then take the diſtance from 6 to 6. This will be the length of the two equal ſides of the triangle.

Uſe of the Lines of Sines, Tangents, and Secants, on the SECTOR. By the ſeveral lines diſpoſed on the ſector, we have ſcales to ſeveral radiuſes; ſo that having a length or radius given, not exceeding the length of the ſector when opened, we find the chord, ſine, &c. thereto. *e. gr.* Suppoſe the chord, ſine, or tangent, of 10 degrees, to a radius of 3 inches required; make 3 inches the aperture, between 60 and 60, on the lines of chords of the two legs; then will the ſame extent reach from 45 to 45 on the line of tangents, and from 90 to 90 on the line of the ſines on the other ſide; ſo that to whatever radius the line of chords is ſet, to the ſame are all the others ſet. In this diſpoſition, therefore, if the aperture between 10 and 10, on the lines of chords, be taken with the compaſſes, it will give the chord of 10 degrees. If the aperture of 10 and 10 be in like manner taken on the lines of ſines, it will be the ſine of 10 degrees. Laſtly, if the aperture of 10 and 10 be in like manner taken on the lines of tangents, it gives the tangent of 10 degrees.

If the chord, or tangent, of 70 degrees were required; for the chord, the aperture of half the arch, viz. 35, muſt be taken, as before; which diſtance, repeated twice, gives the chord of 70 degrees. To find the tangent of 70 degrees to the ſame radius, the ſmall line of tangents muſt be uſed, the other only reaching to 45: making, therefore, 3 inches the aperture between 45 and 45 on the ſmall line; the extent between 70 and 70 degrees on the ſame, will be the tangent of 70 degrees to 3 inches radius.

Secular, Secularization.

To find the ſecant of an arch, make the given radius the aperture between 0 and 0 on the line of ſecants: then will the aperture of 10 and 10, or 70 and 70, on the ſaid lines, give the tangent of 10°, or 70°.

If the converſe of any of theſe things were required, that is, if the radius be required, to which a given line is the ſine, tangent, or ſecant, it is but making the given line, if a chord, the aperture on the line of chords, between 10 and 10, and then the ſector will ſtand at the radius required; that is, the aperture between 60 and 60 on the ſaid line is the radius. If the given line were a ſine, tangent, or ſecant, it is but making it the aperture of the given number of degrees; then will the diſtance of 90 and 90 on the ſines, of 45 and 45 on the tangents, of 0 and 0 on the ſecants, be the radius.

Aſtronomical SECTOR. See ASTRONOMICAL *Sector*.

SECULAR, ſomething which is temporal; in which ſenſe the word ſtands oppoſed to eccleſiaſtical: thus we ſay, ſecular power, ſecular juriſdiction, &c.

Secular is more peculiarly uſed for a perſon who lives at liberty in the world, not ſhut up in a monaſtery, nor bound by vows, or ſubjected to the particular rules of any religious community; in which ſenſe it ſtands oppoſed to *regular*. The Romiſh clergy are divided into ſecular and regular.

SECULAR *Games*, in antiquity, ſolemn games held among the Romans once in an age. Theſe games laſted three days and as many nights; during which time ſacrifices were performed, theatrical ſhews exhibited, with combats, ſports, &c. in the circus. The occaſion of theſe games, according to Valerius Maximus, was to ſtop the progreſs of a plague. The firſt who had them celebrated at Rome was Valerius Publicola, the firſt conſul created after the expulſion of the kings. The ceremonies to be obſerved therein were found preſcribed in one of the books of the Sibyls. At the time of the celebration of the ſecular games, heralds were ſent throughout all the empire, to intimate that every one might come and ſee thoſe ſolemnities which he never yet had ſeen, nor was ever to ſee again. Authors are not agreed as to the number of years wherein theſe games returned, partly becauſe the quantity of an age or *ſeculum* among the ancients is not known, and partly on other accounts: ſome will have it that they were held every hundred years, and that the *ſeculum* or age was our century.

SECULAR *Poem*, a poem ſung or rehearſed at the ſecular games; of which kind we have a very fine piece among the works of Horace, being a ſapphic ode at the end of his epodes.

SECULARIZATION, the act of converting a regular perſon, place, or benefice, into a ſecular one. Almoſt all the cathedral churches were anciently regular, that is, the canons were to be religious; but they have been ſince ſecularized. For the ſecularization of a regular church, there is required the authority of the pope, that of the prince, the biſhop of the place, the patron, and even the conſent of the people. Religious that want to be releaſed from their vow, obtain briefs of ſecularization from the pope.

SECUNDINES, in anatomy, the ſeveral coats or membranes wherein the fœtus is wrapped up in the mother's womb; as the chorion and amnios, with the placenta, &c.

SECUTORES, in antiquity, a kind of gladiators among the Romans, who fought againſt the retiarii. The ſecutores were armed with a ſword and a buckler, to keep off the net or nooſe of their antagoniſts, and they wore a caſk on their head.

This was alſo a name given to ſuch gladiators as took the place of thoſe killed in the combat, or who fought the conqueror.

SEDAN, a ſtrong town of France in the province of Champagne, on the confines of Luxemburg. It is one of the keys to the kingdom; and there is a well-furniſhed arſenal, and a fine manufactory of woolen clothes and ſtuffs. It is ſeated on the river Marſe, in E. Long. 5. 2. N. Lat. 49. 12.

SEDATIVES, in medicine, a general name for ſuch medicines as weaken the powers of nature, ſuch as veneſection, cooling ſalts, purgatives, &c.

SE DEFENDENDO, in law, a plea uſed for him that is charged with the death of another, by alleging that he was under a neceſſity of doing what he did in his own defence: as that the other aſſaulted him in ſuch a manner, that if he had not done what he did, he muſt have been in hazard of his own life. See HOMICIDE, and MURDER.

SEDIMENT, the ſettlement or dregs of any thing; or that groſs, heavy part of a fluid body, which, upon reſting, ſinks to the bottom of the veſſel.

SEDLEY (Sir Charles), an Engliſh poet and wit, the ſon of Sir John Sedley of Aylesford in Kent, was born about the year 1639. At the reſtoration he came to London to join the general jubilee; and commenced wit, courtier, poet, and gallant. He was ſo much admired, that he became a kind of oracle among the poets; which made king Charles tell him, that Nature had given him a patent to be Apollo's viceroy. The productions of his pen were ſome plays, and ſeveral delicately tender amorous poems, in which the ſoftneſs of the verſes was ſo exquiſite, as to be called by the duke of Buckingham *Sedley's witchcraft*. "There were no marks of genius or true poetry to be deſcried, (ſay the authors of the *Biographia Britannica*;) the art wholly conſiſted in raiſing looſe thoughts and lewd deſires, without giving any alarm; and ſo the poiſon worked gently and irreſiſtibly. Our author, we may be ſure, did not eſcape the infection of his own art, or rather was firſt tainted himſelf before he ſpread the infection to others."—A very ingenious writer of the preſent day, however, ſpeaks much more favourably of Sir Charles Sedley's writings. "He ſtudied human nature; and was diſtinguiſhed for the art of making himſelf agreeable, particularly to the ladies: for the verſes of Lord Rocheſter, beginning with, *Sedley has that prevailing gentle art*, &c. ſo often quoted, allude not to his *writings*, but to his *perſonal addreſs*." [*Langhorne's Effuſions*, &c.]—But while he thus grew in reputation for wit and in favour with the king, he grew poor and debauched; his eſtate was impaired, and his morals were corrupted. One of his frolics, however, iſſuing in an indictment and a heavy fine, Sir Charles took a more ſerious turn, applied himſelf to buſineſs, and became a member of parliament, in which he was a frequent ſpeaker. We find him alſo in the Houſe of Commons in the reign of James II. whoſe attempts upon the conſtitution he vigorouſly withſtood; and he was very active in bringing on the revolution. This was thought more extraordinary, as he had received favours from James. But that prince had taken a fancy to Sir Charles's daughter, (though it ſeems ſhe was not very handſome), and, in conſequence of his intrigues with her, he created Miſs Sedley counteſs of Dorcheſter. This honour, ſo far from pleaſing, greatly ſhocked Sir Charles. However libertine he himſelf had been, yet he could not bear the thoughts of his daughter's diſhonour; and with regard to her exaltation, he only conſidered it as rendering her more conſpicuouſly infamous. He therefore conceived a hatred for the king; and from this, as well as other motives, readily joined to diſpoſſeſs him of the throne. A witty ſaying of Sedley's, on this occaſion, is recorded. "I hate ingratitude, (ſaid Sir Charles); and therefore, as the king has made my daughter a counteſs, I will endeavour to make his daughter a queen;" meaning the princeſs Mary, married to the prince of Orange, who diſpoſſeſſed James of the throne at the revolution. He lived to the beginning of queen Anne's reign; and his works were printed in 2 vols 8vo, 1719.

SEDR, or SEDRE, the high-prieſt of the ſect of Ali among the Perſians. The ſedre is appointed by the emperor of Perſia, who uſually confers the dignity on his neareſt relation. The juriſdiction of the ſedre extends over all effects deſtined for pious purpoſes, over all moſques, hoſpitals, colleges, ſepulchres, and monaſteries. He diſpoſes of all eccleſiaſtical employments, and nominates all the ſuperiors of religious houſes. His deciſions in matters of religion are received as ſo many infallible oracles; he judges of all criminal matters in his own houſe without appeal. His authority is balanced by that of the mudſitehid, or firſt theologue of the empire.

SEDUCTION, the act of ſeducing, corrupting, or drawing aſide.

SEDUCTION *of Women-children.* By 4 and 5 of *Ph. and Mary, c.* 8. if any perſon, above the age of fourteen, unlawfully ſhall convey or take away any *woman-child unmarried* (which is held to extend to baſtards as well as to legitimate children) within the age of 16 years, from the poſſeſſion and againſt the will of her father, &c. he ſhall be impriſoned two years, or fined at the diſcretion of the juſtices. See the ſtatute, and *Blackſt. Comment.* vol. iv. p. 108, 209.

SEDUM, ORPINE; a genus of the pentagynia order, belonging to the decandria claſs of plants. There are 19 ſpecies; of which the moſt remarkable are,

1. The telephium, common orpine, or live-long, hath a perennial root, compoſed of many knobbed tubercles, ſending up erect, round, ſucculent ſtalks, branching half a yard or two feet high, garniſhed with oblong, plane, ſerrated, ſucculent leaves, and the ſtalks terminated by a leafy corymbus of flowers, of

different colours in the varieties. This ſpecies is an inhabitant of woods and dry places in England, &c. but has been long a reſident of gardens for variety and medical uſe.

2. The anacampſeros, or decumbent ever-green Italian orpine, hath a fibrous perennial root, decumbent or trailing ſtalks, wedge-ſhaped entire leaves, and the ſtalks terminated by a corymbus of purple flowers. 3. The rupeſtre, rock ſedum, or ſtone-crop of St Vincent's rock, hath ſlender, trailing, purple ſtalks; ſhort, thick, awl-ſhaped, ſucculent, glaucous leaves in cluſters, quinquefariouſly imbricated round the ſtalks, and the ſtalks terminated by roundiſh cymoſe bunches of bright yellow flowers. It grows naturally on St Vincent's rock near Briſtol, and other rocky places in Europe. 4. The aizoon, or Siberian yellow orpine, hath a tuberculate, fibrous perennial root; many upright, round, ſucculent ſtalks, a foot high; lanceolated, plane, ſerrated, thickiſh leaves; and the ſtalks terminated by a cloſe-fitting cymoſe cluſter of bright yellow flowers. 5. The reflexum, reflexed ſmall yellow ſedum, or prick-madam, hath a ſlender fibrous perennial root; ſmall trailing ſucculent ſtalks, garniſhed with thick, awl-ſhaped, ſucculent leaves ſparſedly, the lower ones recurved, and the ſtalks terminated by reflexed ſpikes of bright yellow flowers. It grows naturally on old walls and buildings in England, &c. 6. The acre, acrid ſedum, common ſtone-crop of the wall, or wall-pepper, hath ſmall fibry roots, very ſlender ſucculent ſtalks four or five inches high, very ſmall, ſub-oval, gibbous, erect, alternate leaves, cloſe together, and the ſtalks terminated by trifid-cymoſe bunches of ſmall yellow flowers. This ſort grows abundantly on rocks, old walls, and tops of buildings, almoſt every where, which often appear covered with the flowers in ſummer. 7. The ſexangularis, or ſexangular ſtone-crop, hath a fibry perennial root; thick, ſhort, ſucculent ſtalks; ſmall, ſub-oval, gibbous, erect leaves cloſe together, arranged ſix ways imbricatim, and the ſtalks terminated by bunches of yellow flowers. It grows on rocky and other dry places in England, &c. 8. The album, or white ſtone-crop, hath fibry perennial roots; trailing ſlender ſtalks, ſix or eight inches long; oblong, obtuſe, ſeſſile, ſpreading leaves; and the ſtalks terminated by branchy cymoſe bunches of white flowers. This grows on old walls, rocks, and buildings in England, &c. 9. The hiſpanicum, or Spaniſh ſedum, hath fibrous perennial roots, crowned with cluſters of taper, acute, ſucculent leaves; ſlender ſucculent ſtalks, four or five inches high, garniſhed alſo with taper leaves, and terminated by downy cymoſe cluſters of white flowers.

All theſe ſpecies of ſedum are hardy herbaceous ſucculent perennials, durable in root, but moſtly annual in ſtalk, &c. which, riſing in ſpring, flower in June, July, and Auguſt, in different ſorts; the flowers conſiſting univerſally of five ſpreading petals, generally crowning the ſtalks numerouſly in corymboſe and cymoſe bunches and ſpikes, appearing tolerably conſpicuous, and are ſucceeded by plenty of ſeeds in autumn, by which they may be propagated, alſo abundantly by parting the roots, and by ſlips or cuttings of the ſtalks in ſummer; in all of which methods they readily grow and ſpread very faſt into tufted bunches; being all of ſucculent growth, they conſequently delight moſt in dry ſoils, or in any dry rubbiſhy earth.

Uſes. As flowering plants, they are moſtly employed to embelliſh rock-work, ruins, and the like places, planting either the roots, or cuttings of the the ſhoots, in a little mud or any moiſt ſoil at firſt, placing it in the crevices, where they will ſoon root and fix themſelves, and ſpread about very agreeably. For œconomical purpoſes, the reflexum and rupeſtre are cultivated in Holland and Germany, to mix with lettuce in ſalads. The wall-pepper is ſo acrid, that it bliſters the ſkin when applied externally. Taken inwardly, it excites vomiting. In ſcorbutic caſes and quartan agues, it is ſaid to be an excellent medicine under proper management. Goats eat it; cows, horſes, ſheep, and ſwine, refuſe it.

SEED, in phyſiology, a ſubſtance prepared by nature for the reproduction and conſervation of the ſpecies both in animals and plants. See GENERATION, PLANTS, SEMEN, and BOTANY, ſect. v.

SEEDLINGS, among gardeners, denote ſuch roots of gilliflowers, &c. as come from ſeed ſown. Alſo the young tender ſhoots of any plants that are newly ſown.

SEEDY, in the brandy trade, a term uſed by the dealers to denote a fault that is found in ſeveral parcels of French brandy, which renders them unſaleable. The French ſuppoſe that theſe brandies obtain the flavour which they expreſs by this name, from weeds that grow among the vines from whence the wine of which this brandy is preſſed was made.

SEEING, the art of perceiving objects by the organ of ſight; or it is the ſenſe we have of external objects by means of the eye. See ANATOMY, n° 406 *et ſeq.*; and OPTICS, n° 115 *et ſeq.*

SEGEBERG, a town of Germany, in the duchy of Holſtein, and in Wagria; with a caſtle ſtanding on a high mountain, conſiſting of limeſtone, large quantities of which are carried to Hamburg and Lubeck. It belongs to Denmark, and is ſeated on the river Treve; in E. Long. 10. 23. N. Lat. 54. 5.

SEGEDIN, a ſtrong town of Lower Hungary, in the county of Czongrad, with a caſtle. The Imperialiſts took it from the Turks in 1686. It is ſeated at the confluence of the rivers Teiſſe and Maſroch, in E. Long. 20. 25. N. Lat. 46. 15.

SEGMENT *of a* CIRCLE, in geometry, is that part of the circle contained between a chord and an arch of the ſame circle.

SEGNA, or SEGNI, a ſtrong town of Croatia, with a ſtrong fort, a good harbour, and a biſhop's ſee. It belongs to the houſe of Auſtria, and is ſeated on the coaſt of the Gulph of Venice. E. Long. 15. 2. N. Lat. 45. 4.

SEGNI, an ancient town of Italy, in the Campagna of Rome, with a biſhop's ſee, and the title of duchy. It is ſaid that organs were firſt invented here. It is ſeated on a mountain. E. Long. 13. 5. N. Lat. 41. 40.

SEGORBE, a town of Spain, in the kingdom of Valencia, with the title of a duchy, and a biſhop's ſee. It is ſeated on the ſide of a hill, between the mountains, in a ſoil very fertile in corn and wine, and where there are quarries of fine marble. It was taken from the Moors in 1245; and the Romans thought it worth their while to carry ſome of the marble to Rome. W. Long. 0. 22. N. Lat. 32. 54.

SEGOVIA, an ancient, large, rich, populous, and handſome city of Spain, in Old Caſtile, with a biſhop's ſee, and a ſtrong caſtle called *Alcazar*. It is adorned with handſome ſtructures; and there are about 7000 houſes, comprehending the ſuburbs. It is ſurrounded with a ſtrong wall, flanked with towers and ramparts. Here the beſt cloth in Spain is made from the fine Spaniſh wool ſo much eſteemed in other countries. This is one part of their trade, and another is very fine paper. The cathedral church ſtands on one ſide of the great ſquare, and contains the ſtatue of the Virgin Mary in maſſy ſilver. The alcazar is ſeated in the higheſt part of the town, is covered with lead, and has 16 rooms very richly adorned with tapeſtry, a great deal of gilding, and very fine ornaments of marble and porphyry. The royal chapel is magnificently gilded, and embelliſhed with very fine paintings. The next moſt remarkable ſtructure is the Caſa de la Moneda, or the mint, whoſe towers are all covered with lead. It is ſeated in a valley, ſurrounded with a river, on which are mills, employed in coining, and by which every thing is done in an inſtant; for they can coin as much money here in a day as at other places in a month. The aqueduct is a work of the Romans, and ſerves to bring water into the town, being 3000 paces in length, and ſupported by 177 arches of a prodigious height. They conſiſt of two rows, one placed above the other. It is ſeated on a mountain between two hills, near the river Arayada. W. Long. 3. 21. N. Lat. 40. 56.

SEGOVIA (New), a town of North America, in New Spain, and in the audience of Guatimala; ſeated on the river Yare, on the confines of the province of Honduras. W. Long. 84. 35. N. Lat. 13. 25.

SEGOVIA, a town of America in Terra Firma, and in the province of Venezuela, ſeated on a river, near a very high mountain, where there are mines of gold. W. Long. 65. 45. N. Lat. 7. 55.

SEGOVIA, a town of Aſia, in the iſland of Manila, and one of the largeſt of the Philippines, ſeated at the north end of the iſland, 240 miles north of Manila, and ſubject to Spain. E. Long. 109. 0. N. Lat. 18. 30.

SEGRAIS (John Renaud de), a French poet, born at Caen in 1624. Poetry was far from proving unprofitable to him; for it enabled him to reſcue himſelf, four brothers, and two ſiſters, from the unhappy circumſtances in which the extravagance of a father had left them. His proſe writings, as novels and romances, though for the moſt part frivolous enough, have great merit as to their ſtyle, which may be conſidered as a ſtandard. Of this kind are his *Nouvelles Francoiſes*, and the romances called *La Princeſſe de Cleves*, and *Zayde*; the latter of which has been often printed, with Mr Huet's *Origine des Romans* prefixed. This piece was written on purpoſe for it; and is, ſays Voltaire, a work of great uſe. But it is principally for his poetical works that Segrais is diſtinguiſhed. Theſe conſiſt of, 1. *Diverſes Poeſies*, 4to, Paris 1658; 2. Athis, a paſtoral; and, 3. A tranſlation of Virgil's Georgics and Eneid.

SEGREANT, is the herald's word for a griffin when drawn in a leaping poſture and diſplaying his wings as if ready to fly.

SEGUE, in the Italian muſic, is often found before *aria*, *alleluja*, *amen*, &c. to ſhow that thoſe portions or parts are to be ſung immediately after the laſt note of that part over which it is writ; but if theſe words *ſi place*, or *ad libitum*, are joined therewith, it ſignifies, that theſe portions may be ſung or not, at pleaſure.

SEJANT, a term uſed in heraldry, when a lion, or other beaſt, is drawn in an eſcutcheon ſitting like a cat with his fore-feet ſtraight.

SEJANUS, the ſon of a Roman knight, by his political talents became prime miniſter to the emperor Tiberius, over whom he gained for ſome time ſuch an aſcendency that he governed the empire, till his cruelties and ambitious deſigns opened the eyes of Tiberius, and he was condemned and executed in the ſame day, A. D. 51.

SEIGNIOR, is, in its general ſignification, as much as *lord*; but is particularly uſed for the lord of the fee or of a manor, as *ſeigneur* among the feudiſts is he who grants a fee or benefit out of the land to another; and the reaſon is, becauſe having granted away the uſe and profit of the land, the property or dominion he ſtill retains in himſelf.

SEIGNIORAGE, is a royalty or prerogative of the king, whereby he claims an allowance of gold and ſilver bought in the maſs to be exchanged for coin. As ſeigniorage, out of every pound weight of gold, the king had for his coin 5 s. of which he paid to the maſter of the mint ſometimes 1 s. and ſometimes 1 s. 6 d. Upon every pound weight of ſilver, the ſeigniorage anſwered to the king in the time of Edward III. was 18 penny-weight, which then amounted to about 1 s. out of which he ſometimes paid 8 d. at others 9 d. to the maſter. In the reign of king Henry V. the king's ſeigniorage of every pound of ſilver was 15 d. &c.

SEIGNIORY, is borrowed from the French *ſeigneurie*, i. e. *dominatus*, *imperium*, *principatus*; and ſignifies with us a manor or lordſhip, *ſeigniory de ſokemans*. *Seigniory in groſs*, ſeems to be the title of him who is not lord by means of any manor, but immediately in his own perſon; as *tenure in capite*, whereby one holds of the king as of his crown, is *ſeigniory in groſs*.

SEISIN, in law, ſignifies poſſeſſion. See the next article.—In this ſenſe we ſay, *premier ſeiſin*, for the firſt poſſeſſion, &c.

Seiſin is divided into that *in deed* or *in fact*, and that *in law*. A ſeiſin in *deed* is where a poſſeſſion is actually taken: but a ſeiſin in *law* is, where lands deſcend, and the party has not entered thereon; or in other words, it is where a perſon has a right to lands, &c. and is by wrong diſſeiſed of them. A ſeiſin in law is held to be ſufficient to avow on; tho' to the bringing of an aſſiſe, actual ſeiſin is required; and where ſeiſin is alleged, the perſon pleading it muſt ſhow of what eſtate he is ſeiſed, &c.

Seiſin of a ſuperior ſervice is deemed to be a ſeiſin

ſin of all ſuperior and caſual ſervices that are incident thereto; and ſeiſin of a leſſee for years, is ſufficient for him in reverſion.

Livery of SEISIN, in law, an eſſential ceremony in the conveyance of landed property; being no other than the pure feodal inveſtiture, or delivery of corporal poſſeſſion of the land or tenement. This was held abſolutely neceſſary to complete the donation; *Nam feudum ſine inveſtitura nullo modo conſtitui potuit:* and an eſtate was then only perfect when, as Fleta expreſſes it in our law, *fit juris et ſeiſinæ conjunctio.* See FEOFFMENT, in APPENDIX.

Inveſtitures, in their original riſe, were probably intended to demonſtrate in conquered countries the actual poſſeſſion of the lord; and that he did not grant a bare litigious right, which the ſoldier was ill qualified to proſecute, but a peaceable and firm poſſeſſion. And, at a time when writing was ſeldom practiſed, a mere oral gift, at a diſtance from the ſpot that was given, was not likely to be either long or accurately retained in the memory of byſtanders, who were very little intereſted in the grant. Afterwards they were retained as a public and notorious act, that the country might take notice of and teſtify the transfer of the eſtate; and that ſuch as claimed title by other means might know againſt whom to bring their actions.

Blackſt. Comment.

In all well-governed nations, ſome notoriety of this kind has been ever held requiſite, in order to acquire and aſcertain the property of lands. In the Roman law, *plenum dominium* was not ſaid to ſubſiſt, unleſs where a man had both the *right* and the *corporal poſſeſſion;* which poſſeſſion could not be acquired without both an actual intention to poſſeſs, and an actual ſeiſin, or entry into the premiſſes, or part of them in the name of the whole. And even in eccleſiaſtical promotions, where the freehold paſſes to the perſon promoted, corporal poſſeſſion is required at this day, to veſt the property completely in the new proprietor; who, according to the diſtinction of the canoniſts, acquires the *jus ad rem,* or inchoate and imperfect right, by nomination and inſtitution; but not the *jus in re,* or complete and full right, unleſs by corporal poſſeſſion. Therefore in dignities poſſeſſion is given by inſtallment; in rectories and vicarages by induction, without which no temporal rights accrue to the miniſter, though every eccleſiaſtical power is veſted in him by inſtitution. So alſo even in deſcents of lands, by our law, which are caſt on the heir by act of the law itſelf, the heir has not *plenum dominium,* or full and complete ownerſhip, till he has made an actual corporal entry into the lands: for if he dies before *entry* made, *his* heir ſhall not be entitled to take the poſſeſſion, but the heir of the perſon who was laſt actually ſeiſed. It is not therefore only a mere right to enter, but the actual entry, that makes a man complete owner; ſo as to tranſmit the inheritance to his own heirs: *non jus, ſed ſeiſina, facit ſtipitem.*

Yet, the corporal tradition of lands being ſometimes inconvenient, a ſymbolical delivery of poſſeſſion was in many caſes anciently allowed; by transferring ſomething near at hand, in the preſence of credible witneſſes, which by agreement ſhould ſerve to repreſent the very thing deſigned to be conveyed; and an occupancy of this ſign or ſymbol was permitted as equivalent to occupancy of the land itſelf. Among the Jews we find the evidence of a purchaſe thus defined in the book of Ruth: "Now this was the manner in former time in Iſrael, concerning redeeming and concerning changing, for to confirm all things: a man plucked off his ſhoe, and gave it to his neighbour; and this was a teſtimony in Iſrael." Among the ancient Goths and Swedes, contracts for the ſale of lands were made in the preſence of witneſſes, who extended the cloak of the buyer, while the ſeller caſt a clod of the land into it, in order to give poſſeſſion; and a ſtaff or wand was alſo delivered from the vender to the vendee, which paſſed through the hands of the witneſſes. With our Saxon anceſtors the delivery of a turf was a neceſſary ſolemnity to eſtabliſh the conveyance of lands. And, to this day, the conveyance of our copyhold eſtates is uſually made from the ſeller to the lord or his ſteward by delivery of a rod or verge, and then from the lord to the purchaſer by re-delivery of the ſame in the preſence of a jury of tenants.

Conveyances in writing were the laſt and moſt refined improvement. The mere delivery of poſſeſſion, either actual or ſymbolical, depending on the ocular teſtimony and remembrance of the witneſſes, was liable to be forgotten or miſrepreſented, and became frequently incapable of proof. Beſides, the new occaſions and neceſſities, introduced by the advancement of commerce, required means to be deviſed of charging and incumbering eſtates, and of making them liable to a multitude of conditions and minute deſignations, for the purpoſes of raiſing money, without an abſolute ſale of the land; and ſometimes the like proceedings were found uſeful in order to make a decent and competent proviſion for the numerous branches of a family, and for other domeſtic views. None of which could be effected by a mere, ſimple, corporal transfer of the ſoil from one man to another, which was principally calculated for conveying an abſolute unlimited dominion. Written deeds were therefore introduced, in order to ſpecify and perpetuate the peculiar purpoſes of the party who conveyed: yet ſtill, for a very long ſeries of years, they were never made uſe of, but in company with the more ancient and notorious method of transfer by delivery of corporal poſſeſſion.

Livery of ſeiſin, by the common law, is neceſſary to be made upon every grant of an eſtate of freehold in hereditaments corporeal, whether of inheritance or for life only. In hereditaments incorporeal it is impoſſible to be made; for they are not the object of the ſenſes: and in leaſes for years, or other chattel intereſts, it is not neceſſary. In leaſes for years indeed an actual *entry* is neceſſary, to veſt the eſtate in the leſſee: for a bare leaſe gives him only a right to enter, which is called his intereſt in the term, or *intereſſe termini:* and when he enters in purſuance of that right, he is then, and not before, in poſſeſſion of his term, and complete tenant for years. This entry by the tenant himſelf ſerves the purpoſe of notoriety, as well as livery of ſeiſin from the grantor could have done; which it would have been improper to have given in this caſe, becauſe that ſolemnity is appropriated to the conveyance of a freehold. And this is one reaſon why freeholds cannot be made to commence *in futuro,* becauſe they cannot (at the common law) be made but by livery of ſeiſin; which livery, being an actual manual tradition of the land, muſt take effect in *præſenti*, or not at all.

Livery of ſeiſin is either in *deed* or in *law*.

Livery in *deed* is thus performed. The feoffor, leſſor, or his attorney, together with the feoffee, leſſee, or his attorney, (for this may as effectually be done by deputy or attorney, as by the principals themſelves in perſon), come to the land or to the houſe; and there, in the preſence of witneſſes, declare the contents of the feoffment or leaſe on which livery is to be made. And then the feoffor, if it be of land, doth deliver to the feoffee, all other perſons being out of the ground, a clod or turf, or a twig or bough there growing, with words to this effect: "I deliver theſe to you in the name of ſeiſin of all the lands and tenements contained in this deed." But, if it be of a houſe, the feoffer muſt take the ring or latch of the door, the houſe being quite empty, and deliver it to the feoffee in the ſame form; and then the feoffee muſt enter alone, and ſhut the door, and then open it, and let in the others. If the conveyance or feoffment be of divers lands, lying ſcattered in one and the ſame county, then in the feoffor's poſſeſſion, livery of ſeiſin of any parcel, in the name of the reſt, ſufficeth for all; but if they be in ſeveral counties, there muſt be as many liveries as there are counties. For, if the title to theſe lands comes to be diſputed, there muſt be as many trials as there are counties, and the jury of one county are no judges of the notoriety of a fact in another. Beſides, anciently, this ſeiſin was obliged to be delivered *coram paribus de vicineto*, before the peers or freeholders of the neighbourhood, who atteſted ſuch delivery in the body or on the back of the deed; according to the rule of the feodal law, *Pares debent intereſſe inveſtituræ feudi, et non alii:* for which this reaſon is expreſsly given; becauſe the peers or vaſſals of the lord, being bound by their oath of fealty, will take care that no fraud be committed to his prejudice, which ſtrangers might be apt to connive at. And though, afterwards, the ocular atteſtation of the *pares* was held unneceſſary, and livery might be made before any credible witneſſes, yet the trial, in caſe it was diſputed, (like that of all other atteſtations), was ſtill reſerved to the *pares* or jury of the county. Alſo, if the lands be out on leaſe, though all lie in the ſome county, there muſt be as many liveries as there are tenants: becauſe no livery can be made in this caſe, but by the conſent of the particular tenant; and the conſent of one will not bind the reſt. And in all theſe caſes it is prudent, and uſual, to endorſe the livery of ſeiſin on the back of the deed, ſpecifying the manner, place, and time, of making it; together with the names of the witneſſes. And thus much for livery in deed.

Livery in *law* is where the ſame is not made *on* the land, but *in ſight of it* only; the feoffor ſaying to the feoffee, "I give you yonder land, enter and take poſſeſſion." Here, if the feoffee enters during the life of the feoffor, it is a good livery, but not otherwiſe; unleſs he dares not enter, thro' fear of his life or bodily harm: and then his continual claim, made yearly in due form of law, as near as poſſible to the lands, will ſuffice without an entry. This livery in law cannot, however, be given or received by attorney, but only by the parties themſelves.

SEIZE, in the ſea-language, is to make faſt or bind, particularly to faſten two ropes together with rope-yarn. The ſeizing of a boat is a rope tied to a ring or little chain in the fore-ſhip of the boat, by which means it is faſtened to the ſide of the ſhip.

SEIZURE, in commerce, an arreſt of ſome merchandiſe, moveable, or other matter, either in conſequence of ſome law or of ſome expreſs order of the ſovereign. Contraband goods, thoſe fraudulently entered, or landed without entering at all, or at wrong places, are ſubject to ſeizure. In ſeizures, among us, one half goes to the informer, and the other half to the king.

SELDEN (John), called by Grotius *the glory of England*, was born at Salvington in Suſſex in 1584. He was educated at the free-ſchool at Chicheſter; whence he was ſent to Hart-Hall in the univerſity of Oxford, where he ſtaid four years. In 1612, he entered himſelf in Clifford's Inn, in order to ſtudy the law; and about two years after removed to the Inner Temple, where he ſoon acquired great reputation by his learning. He had already publiſhed ſeveral of his works; and this year wrote verſes in Latin, Greek, and Engliſh, upon Mr William Browne's Britannia's Paſtorals. In 1614, he publiſhed his Titles of Honour; and in 1616, his Notes on Sir John Forteſcue's book *De Laudibus Legum Angliæ*. In 1618, he publiſhed his Hiſtory of Tythes; which gave great offence to the clergy, and was animadverted upon by ſeveral writers; and for that book he was called before the high-commiſſion court, and obliged to make a public acknowledgment of his ſorrow for having publiſhed it. In 1621, being ſent for by the parliament, though he was not then a member of that houſe, and giving his opinion very ſtrongly in favour of their privileges in oppoſition to the court, he was committed to the cuſtody of the ſheriff of London; but was ſet at liberty after five weeks confinement. In 1623, he was choſen burgeſs for Lancaſter; but, amidſt all the diviſions of the nation, kept himſelf neuter, proſecuting his ſtudies with ſuch application, that though he was the next year choſen reader of Lyon's Inn, he refuſed to perform that office. In 1625, he was choſen burgeſs for Great Bedwin in Wiltſhire, to ſerve in the firſt parliament of king Charles I. in which he declared himſelf warmly againſt the duke of Buckingham; and on his Grace's being impeached by the Houſe of Commons, was appointed one of the managers of the articles againſt him. In 1627 and 1628, he oppoſed the court-party with great vigour. The parliament being prorogued to January 20. 1629, Mr Selden retired to the earl of Kent's houſe at Wreſt, in Bedfordſhire, where he finiſhed his *Marmora Arundeliana*. The parliament being met, he, among others, again diſtinguiſhed himſelf by his zeal againſt the court; when the king diſſolving the parliament, ordered ſeveral of the members to be brought before the King's-Bench bar, and committed to the Tower. Among theſe was Mr Selden, who inſiſting on the benefit of the laws, and refuſing to make his ſubmiſſion, was removed to the King's Bench priſon. Being here in danger of his life on account of the plague then raging in Southwark, he petitioned the lord high treaſurer, at the end of Trinity-term, to intercede with his Majeſty that he might be removed to the Gate-Houſe, Weſtminſter,

minſter; which was granted: but in Michaelmas term following, the judges objecting to the lord treaſurer's warrant, by which he had been removed to the Gate-Houſe, an order was made for conveying him back to the King's Bench, whence he was releaſed in the latter end of the ſame year; but fifteen years after, the parliament ordered him 5000 l. for the loſſes he had ſuſtained on this occaſion. He was afterwards committed with ſeveral other gentlemen for diſperſing a libel; but the author, who was abroad, being diſcovered, they were at length ſet at liberty. In 1634, a diſpute ariſing between the Engliſh and Dutch concerning the herring-fiſhery on the Britiſh coaſt, he was prevailed upon by archbiſhop Laud to draw up his *Mare Clauſum*, in anſwer to Grotius's *Mare Liberum;* which greatly recommended him to the favour of the court. In 1640, he was choſen member for the univerſity of Oxford; when he again oppoſed the court, though he might, by complying, have raiſed himſelf to very conſiderable poſts. In 1643, he was appointed one of the lay-members to ſit in the aſſembly of divines at Weſtminſter, and was the ſame year appointed keeper of the records in the Tower. In 1645, he was made one of the commiſſioners of the admiralty. The ſame year he was unanimouſly elected maſter of Trinity-college, Cambridge; but declined accepting. He died in 1654; and was interred in the Temple-church, where a monument is erected to his memory.—Dr Wilkes obſerves, that he was a man of uncommon gravity and greatneſs of ſoul, averſe to flattery, liberal to ſcholars, charitable to the poor; and though he had great latitude in his principles with regard to eccleſiaſtical power, yet he had a ſincere regard for the church of England. He wrote many learned works beſides thoſe already mentioned; the principal of which are, 1. *De Jure Naturali & Gentium juxta Diſciplinam Hebræorum.* 2. *De Nuptiis & Divorciis.* 3. *De Anno Civili veterum Hebræorum.* 4. *De Nummis.* 5. *De Diis Syris.* 6. *Uxor Hebraica.* 7. *Jani Anglorum Facies altera*, &c. All his works were printed together in 1726, in 3 vols folio.

SELENITÆ, MOON-STONE, in natural hiſtory, a claſs of foſſils, naturally and eſſentially ſimple; not inflammable, nor ſoluble in water; compoſed of ſlender filaments, ranged into fine and even thin flakes, and thoſe diſpoſed into regular figures, in the different genera, approaching to a rhomboide, a hexangular column, or a rectangled inequilateral parallelogram; fiſſile like the talcs, but that not only horizontally, but perpendicularly alſo; flexile in a ſmall degree, but not at all elaſtic; not fermenting with acid menſtrua, and readily calcining in the fire.

Of this claſs Dr Hill makes ſeven orders, and under theſe orders ten genera. The firſt order is the ſelenitæ, with horizontal plates, approaching to a rhomboidal form; the ſecond order is the ſelenitæ with horizontal plates, of a columnar and angular form; the third order comprehends thoſe ſelenitæ whoſe filaments are viſibly arranged into plates, but in the whole maſſes appear ſtriated, not tabulated; of the fourth order, are the flat ſelenitæ, of no determinately angular figure; of the fifth order are the ſelenitæ formed of plates perpendicularly arranged; of the ſixth order are thoſe ſelenitæ formed of a congeries of plates, ranged in form of a ſtar; and of the ſeventh order are thoſe ſelenitæ of a complex and indeterminate figure.

This foſſile is found in ſtrata of clay, uſually of the blue tough kind; we have it in many parts in England, particularly about Shotover hills in Oxfordſhire; in ſeveral places of Northamptonſhire, Leiceſterſhire, and about Epſom in Surry. In medicine, it is a very powerful aſtringent; and is of effect in diarrhœas, dyſenteries, and hæmorrhagies. It ſtands alſo recommended as a coſmetic. The people of Northamptonſhire call it *ſtaunch*, and uſe it in hæmorrhagies of all kinds with ſucceſs.

SELENOGRAPHY, a branch of coſmography, which deſcribes the moon and all the parts and appearances thereof, as geography does thoſe of the earth. See the references at MOON, and Plate XLII.

SELEUCIDÆ, in chronology. Æra of the Seleucidæ, or the Syro-Macedonian æra, is a computation of time, commencing from the eſtabliſhment of the Seleucidæ, a race of Greek kings, who reigned as ſucceſſors of Alexander the Great, in Syria, as the Ptolemies did in Egypt. This æra we find expreſſed in the book of the Maccabees, and on a great number of Greek medals ſtruck by the cities of Syria, &c. The Rabbins call it the *æra of contracts;* and the Arabs, *therik dilkarnain*, that is, the "æra of the two horns." According to the beſt accounts, the firſt year of this æra falls in the year 311 B. C. being 12 years after Alexander's death.

SELEUCUS (Nicanor), one of the chief generals under Alexander the Great, and, after his death, founder of the race of princes called *Seleucidæ*. He is equally celebrated as a renowned warrior, and as the father of his people; yet his virtues could not protect him from the fatal ambition of Ceraunus, one of his courtiers, by whom he was aſſaſſinated 280 B. C.

SELF-MURDER, the pretended heroiſm, but real cowardice, of the Stoic philoſophers, who deſtroyed themſelves to avoid thoſe ills which they had not the fortitude to endure, though the attempting it ſeems to be countenanced by the civil law, yet was puniſhed by the Athenian law with cutting off the hand which committed the deſperate deed. And alſo the law of England wiſely and religiouſly conſiders, that no man hath a power to deſtroy life but by commiſſion from God the author of it: and as the ſuicide is guilty of a double offence; one ſpiritual, in invading the prerogative of the Almighty, and ruſhing into his immediate preſence uncalled for; the other temporal, againſt the king, who hath an intereſt in the preſervation of all his ſubjects; the law has therefore ranked this among the higheſt crimes, making it a peculiar ſpecies of felony, a felony committed on one's ſelf. And this admits of acceſſories before the fact, as well as other felonies; for if one perſuades another to kill himſelf, and he does ſo, the adviſer is guilty of murder. A *felo de ſe*, therefore, is he that deliberately puts an end to his own exiſtence, or commits any unlawful malicious act, the conſequence of which is his own death: as if, attempting to kill another, he runs upon his antagoniſt's ſword; or, ſhooting at another, the gun burſts and kills himſelf. The party muſt be of years of diſcretion, and in his ſenſes, elſe it is no crime. But this excuſe ought not to be reſtrained to that length to which our coroners juries are apt to carry it, viz. that the very act of ſuicide is an evidence of inſanity; as if every man, who acts contrary to reaſon, had no reaſon at all: for the ſame argument would prove every other criminal *non compos*, as well as the ſelf-murderer. The law very rationally judges, that every melancholy or hypochondriac fit does not deprive a man of the capacity of diſcerning right from wrong; which is neceſſary to form a legal excuſe. And therefore, if a real lunatic kills himſelf in a lucid interval, he is a *felo de ſe* as much as another man.

But now the queſtion follows, What puniſhment can human laws inflict on one who has withdrawn himſelf from their reach? They can only act upon what he has left behind him, his reputation and fortune: on the former, by an ignominious burial in the highway, with a ſtake driven through his body; on the latter, by a forfeiture of all his goods and chattels to the king: hoping, that his care for either his own reputation, or the welfare of his family, would be ſome motive to reſtrain him from ſo deſperate and wicked an act. And it is obſervable, that this forfeiture has relation to the time of the act, done in the felon's lifetime, which was the cauſe of his death. As if huſband and wife be poſſeſſed jointly of a term of years in land, and the huſband drowns himſelf; the land ſhall be forfeited to the king, and the wife ſhall not have it by ſurvivorſhip. For by the act of caſting himſelf into the water he forfeits the term; which gives a title to the king, prior to the wife's title by ſurvivorſhip, which could not accrue till the inſtant of her huſband's death. And tho' it muſt be owned that the letter of the law herein borders a little upon ſeverity; yet it is ſome alleviation, that the power of mitigation is left in the breaſt of the ſovereign, who upon this (as on all other occaſions) is reminded by the oath of his office, to execute judgment in mercy.

SELEUCIA, (anc. geogr.) ſurnamed *Babylonia*, becauſe ſituate on its confines, at the confluence of the Euphrates and Tigris. Ptolemy places it in Meſopotamia. It is called alſo *Seleucia ad Tigrim*, (Polybius, Strabo, Iſidorus, Characenus); waſhed on the ſouth by the Euphrates, on the eaſt by the Tigris, (Theophylactus); generally agreed to have been built or enlarged by Seleucus Nicanor, maſter of the eaſt after Alexander; by means of which Babylon came to be deſerted. It is ſaid to have been originally called *Coche*, (Ammian, Eutropius); though others, as Arrian, diſtinguiſh it, as a village, from *Selucia*; and, according to Zoſimus, the ancient name of *Selucia* was *Zochaſia*. Now called *Bagdad*. E. Long. 44. 21. N. Lat. 33. 10. There were many other cities of the ſame name, all built by Seleucus Nicanor.

SELKIRKSHIRE, called alſo the *Sheriffdom of Ettrick Foreſt*, a county of Scotland, extending about 20 miles in length from eaſt to weſt, and about 12 in breadth from ſouth to north. It borders on the north with part of Tweedale and Mid-Lothian; on the ſouth and eaſt with Teviotdale; and on the weſt with Annandale. This county was formerly reſerved by the Scottiſh princes for the pleaſure of the chace, and where they had houſes for the reception of their train. At that time the face of the country was covered with woods, in which there were great numbers of red and fallow deer, whence it had the name of *Ettrick Foreſt*. The woods, however, are now almoſt entirely cut down, and the county is chiefly ſupported by the breed of ſheep. They are generally ſold into the ſouth, but ſometimes into the Highlands, about the month of March, where they are kept during ſummer; and after being improved by the mountain-graſs, are returned into the Lowlands in the beginning of winter.

SELLA TURCICA, is a deep depreſſion between the elinoid apophyſes of the ſphenoid bone. See ANATOMY, n° 15, d.

SELTZER WATER, is a mineral water which ſprings up at Lower Seltzer, a village in the electorate of Triers, about 10 miles from Frankfort on the Mayne. It is a very uſeful medicinal water. It contains a very ſmall portion of a calcareous earth, of a native mineral alkali, and an acid; but of theſe the quantity is too ſmall to attribute any medicinal virtues to; but it it contains alſo near 1-7th of its bulk of fixed air, which is more than is found in any other mineral water, and to this it owes its principal virtues.

SEM, or SHEM, the ſon of Noah, memorable for his filial piety in concealing the folly and diſgrace of his father; for which he received a remarkable benediction; about 2476 B. C. He lived to the age of 600 years.

SEMEN, in botany, the SEED; the eſſence of the fruit of every vegetable; defined by Linnæus to be a deciduous part of the plant, containing the rudiments of a new vegetable, and fertilized by the aſperſion or ſprinkling of the male-duſt. The parts of a ſeed, properly ſo called, enumerated by Linnæus, are as follows: 1. CORCULUM, the *punctum vitæ*, or eſſence of the ſeed. 2. COTYLEDONES, the lobes. 3. HILUM, a mark or ſcar in the ſeed. 4. ARILLUS, Lin. the proper covering: *calyptra* of Tournefort. 5. CORONULA, PAPPUS, the crown of the ſeed. 6. ALA, the wing of the ſeed.

Beſides the ſeed properly ſo called, two other terms are referred by Linnæus to the general article of SEMEN, viz. 7. NUX, a nut, or ſeed covered with a hard bony ſkin. 8. PROPAGO, the ſeed of the moſſes.

With reſpect to number, plants are either furniſhed with one ſeed, as ſea-pink and biſtort; two, as woodroof and the umbelliferous plants; three, as ſpurge; four, as the lip-flowers of Tournefort and rough-leaved plants of Ray; or many, as ranunculus, anemone, and poppy.

The form of ſeeds is likewiſe extremely various, being either large or ſmall, round, oval, heart-ſhaped, kidney-ſhaped, angular, prickly, rough, hairy, wrinkled, ſleek, or ſhining, black, white, or brown. Moſt ſeeds have only one cell, or internal cavity; thoſe of leſſer burdock, valerian, lamb's lettuce, cornelian cherry, and ſebeſten, have two.

With reſpect to ſubſtance, ſeeds are either ſoft, membranaceous, or of a hard bony ſubſtance; as in gromwell, tamarind, and all the nuciferous plants.

In point of magnitude, ſeeds are either very large, as in cocoa-nut; or very ſmall, as in campanula, *ammannia*, rampions, and throat-wort.

With reſpect to ſituation, they are either diſperſed promiſcuouſly through the pulp, (*ſemina nidulantia*), as in water-lily; affixed to a ſuture or joining of the valves of the ſeed-veſſel, as in the croſs-ſhaped and pea-bloom flowers; or placed upon a *placenta*, or receptacle within the ſeed-veſſel, as in tobacco, and thorn-apple.

Seeds are ſaid to be naked (*ſemina nuda*) which are not contained in a cover, or veſſel: ſuch are thoſe of the lip and compound flowers, the umbelliferous and rough-leaved plants; covered ſeeds (*ſemina tecta*) are contained in ſome veſſel, whether of the capſule, pod, berry, apple, or cherry kind.

A ſimple ſeed is ſuch as bears neither crown, wing, nor downy *pappus*; the varieties in ſeeds, ariſing from theſe circumſtances, are particularly enumerated under their reſpective heads.

In aſſimilating the animal and vegetable kingdoms, Linnæus denominates ſeeds the eggs of plants. The fecundity of plants is frequently marvellous: from a ſingle plant or ſtalk of Indian Turkey wheat, are produced, in one ſummer, 2000 ſeeds; of elecampane, 3000; of ſun-flower, 4000; of poppy, 32,000; of a ſpike of cat's-tail, 10,000 and upwards: a ſingle fruit, or ſeed-veſſel, of tobacco, contains 1000 ſeeds; that of white poppy, 8000. Mr Ray relates, from experiments made by himſelf, that 1012 tobacco-ſeeds are equal in weight to one grain; and that the weight of the whole quantum of ſeeds in a ſingle tobacco-plant, is ſuch as muſt, according to the above proportion, determine their number to be 360,000. The ſame author eſtimates the annual produce of a ſingle ſtalk of ſpleen-wort to be upwards of one million of ſeeds.

The diſſemination of plants reſpects the different methods or vehicles by which nature has contrived to diſperſe their ſeeds for the purpoſe of increaſe. Theſe by naturaliſts are generally reckoned four.

1. Rivers and running waters. 2. The wind. 3. Animals. 4. An elaſtic ſpring, peculiar to the ſeeds themſelves.

1. The ſeeds which are carried along by rivers and torrents are frequently conveyed many hundreds of leagues from their native ſoil, and caſt upon a very different climate, to which, however, by degrees, they render themſelves familiar.

2. Thoſe which are carried by the wind, are either *winged*, as in fir-tree, trumpet-flower, tulip-tree, birch, arbor-vitæ, meadow-rue, and jeſſamine, and ſome umbelliferous plants; furniſhed with a *pappus*, or downy crown, as in valerian, poplar, reed, ſucculent ſwallow-wort, cotton-tree, and many of the compound flowers; placed within a winged *calix*, or ſeed-veſſel, as in ſcabious, ſea-pink, dock, *dioſcorea*, aſh, maple, and elm-trees, logwood and woad; or laſtly, contained within a ſwelled *calix* or ſeed-veſſel, as in winter-cherry, cucubalus, melilot, bladder-nut, fumatory, bladder-ſena, heart-ſeed, and chick-peaſe.

3. Many birds ſwallow the ſeeds of vanelloe, juniper, miſletoe, oats, millet, and other graſſes, and void them entire. Squirrels, rats, parrots, and other animals, ſuffer many of the ſeeds which they devour to eſcape, and thus in effect diſſeminate them. Moles, ants, earth-worms, and other inſects, by ploughing up the earth, admit a free paſſage to thoſe ſeeds which have been ſcattered upon its ſurface. Again, ſome ſeeds attach themſelves to animals, by means of hooks, crotchets, or hairs, which are either affixed to the ſeeds themſelves, as in hound's tongue, mouſe-ear, vervain, carrot, baſtard-parſly, ſanicle, water hemp-agrimony, *arctopus* and *verbeſina*; to their calix, as in burdock, agrimony, *rhexia*, ſmall wild bugloſs, dock, nettle, pellitory, and lead-wort; or to their fruit or ſeed-veſſel, as in liquorice, enchanter's night-ſhade, croſs-wort, clivers, French honeyſuckle, and arrow-headed graſs.

4. The ſeeds which diſperſe themſelves by an elaſtic force, have that force reſident either in their *calix*, as in oats and the greater number of ferns; in their *pappus*, as in centaurea crupina; or in their *capſule*, as in geranium, herb-bennet, African ſpiræa, fraxinella, horſe-tail, balſam, Malabar nut, cucumber, elaterium, and male balſam apple.

SEMEN *Maſculinum*, in the animal œconomy, is a white, liquid matter or humour, the thickeſt of any in the body, ſeparated from the blood in the teſticles, and reſerved in proper veſſels, to be the means of generation. By chemical analyſis it is found to conſiſt almoſt entirely of oil and volatile ſalts blended together by the mediation of a little phlegm. See ANIMALCULE, n° 48 *et ſeq*.

SEMENDRIAH, a town of Turkey in Europe, in the province of Servia, with a good citadel. It is the capital of a ſangiacate, was taken by the Turks in 1690, and is ſeated on the Danube in E. Long. 21. 25. N. Lat. 45. 4.

SEMENTINÆ FERIÆ, in antiquity, feaſts held annually among the Romans, to obtain of the gods a plentiful harveſt. They were celebrated in the temple of Tellus, where ſolemn ſacrifices were offered to Tellus and Ceres. Theſe feaſts were held about ſeed-time, uſually in the month of January; for, as Macrobius obſerves, they were moveable feaſts.

SEMI, a word borrowed from the Latin, ſignifying *half*; but only uſed in compoſition with other words, as in the following articles.

SEMICIRCLE, in geometry, half a circle, or that figure comprehended between the diameter of the circle and half its circumference.

SEMICOLON, in grammar, one of the points or ſtops uſed to diſtinguiſh the ſeveral members of a ſentences from each other.

The mark or character of the ſemicolon is (;), and has its name as being of ſomewhat leſs effect than a colon; or as demanding a ſhorter pauſe.

The proper uſe of the ſemi-colon is to diſtinguiſh the conjunct members of a ſentence. Now, by a conjunct member of a ſentence is meant, ſuch a one as contains at leaſt two ſimple members.—Whenever, then, a ſentence can be divided into ſeveral members of the ſame degree, which are again diviſible into other ſimple members, the former are to be ſeparated by a ſemi-colon. For inſtance: "If fortune bear a great ſway over him, who has nicely ſtated and concerted every circumſtance of an affair; we muſt not commit every thing, without reſerve, to fortune, leſt ſhe have too great a hold of us." Again: *Si quantum in agro lociſque deſertis audacia poteſt, tantum in foro atque judi-*

ciis impudentia valeret; non minus in cauſa cederet Aulus Cæcinna Sexta Æbutii impudentiæ, quam tum in vi facienda ceſſit audaciæ. An inſtance in a more complex ſentence we have in Cicero; *Res familiaris primum bene parta ſit, nulloque turpi quæſtu; tum quam plurimis, modo dignis, ſe utilem prebeat; deinde augeatur ratione, diligentia, parſimonia; nec libidini potius luxuriæque, quam liberalitati & beneficientiæ pareat.*

But though the proper uſe of the ſemi-colon be to diſtinguiſh conjunct members, it is not neceſſary that all the members divided hereby be conjunct. For upon dividing a ſentence into great and equal parts, if one of them be conjunct, all thoſe other parts of the ſame degree are to be diſtinguiſhed by a ſemi-colon.—Sometimes alſo it happens, that members that are oppoſite to each other, but relate to the ſame verb, are ſeparated by a ſemi-colon. Thus Cicero: *Ex hac parte pudor, illinc petulantia; hinc fides, illinc fraudatio; hinc pietas, illinc ſcelus,* &c. Hither likewiſe may be referred ſuch ſentences, where the whole going before, the parts follow; as, "The parts of oratory are four; invention, diſpoſition, elocution, and pronunciation."

Semicupium, in medicine, an half-bath, wherein the patient is only placed up to the navel.

Semidiameter, half the diameter, or a right line drawn from the centre of a circle or ſphere to its circumference; being the ſame with what is otherwiſe called the *radius*.

Semi-flosculus, in botany, a term uſed to expreſs the flowers of the ſyngeneſia claſs. Theſe ſemifloſculi are petals, hollow in their lower part, but in their upper flat, and continued in the ſhape of a tongue.

Semi-pelagians, in church-hiſtory, a branch of the Pelagians, ſo called becauſe they pretended to keep a medium between the Pelagians and the orthodox.

Semi-tone, in muſic. See **Interval**.

SEMINAL, ſomething belonging to the ſemen or ſeed.

SEMINARY, in its primary ſenſe, the ground where any thing is ſown, to be afterwards tranſplanted.

Seminary, in a figurative ſenſe, is frequently applied to places of education, whence ſcholars are tranſplanted into life.—In Catholic countries it is particularly uſed for a kind of college or ſchool, where youth are inſtructed in the ceremonies, &c. of the ſacred miniſtry. Of theſe are great numbers; it being ordained by the council of Trent, that there be a ſeminary belonging to each cathedral, under the direction of the biſhop.

SEMINATION, denotes the manner or act of ſhedding and diſperſing the ſeeds of plants. See **Semen**.

SEMIRAMIS, a famous queen of Aſſyria and Babylonia, concerning whom many fables are related, and to whom the wonderful works about the city of Babylon are by many attributed. Her birth is ſaid to have been ſupernatural, ſpringing from a goddeſs, by name *Darceto*, who had a temple not far from Aſcalon, near a fiſhy lake; and who is thought to have been the ſame with the Philiſtine Dagon. When Semiramis grew up, ſhe ſo far exceeded all women in beauty and other qualifications, that Menon, the prime miniſter to Ninus king of Aſſyria, took her to wife. Ninus was at that time beſieging the capital of Bactria unſucceſsfully; and Semiramis happening to pay a viſit to her huſband before the camp, put the beſiegers on ſuch an excellent plan, that the city was quickly obliged to capitulate. Ninus was ſo charmed with the beauty and addreſs diſplayed by Semiramis on this occaſion, that he ſoon after married her; upon which Menon her former huſband killed himſelf. Ninus alſo did not long ſurvive him, and was buried by her at a vaſt expence.

Semiramis, thus advanced to the imperial dignity, reſolved to build the city of Babylon*; which accordingly ſhe did in the moſt magnificent manner. Several other cities alſo ſhe built on the banks of the Tigris and Euphrates, for the ſake of commerce and communication between the remote parts of the empire. She invaded and conquered Media and Ethiopia; but having undertaken an expedition againſt India, was defeated, and obliged to fly, after having loſt the greateſt part of her army. She is ſaid to have vaniſhed from the ſight of men, after her ſon Ninyas had attempted to aſſaſſinate her; but moſt probably ſhe was murdered by the conſpirators.

* See *Babylon*.

SEMPERVIVUM, **live-ever**, or *Houſe-leek;* a genus of the dodecagynia order, belonging to the dodecandria claſs of plants. There are twelve ſpecies, four of which are natives of Britain; all of them hardy ever-green perennials, formed of roundiſh cluſters of ſucculent ſmooth leaves in expanded open heads, producing very ſpreading off-ſets, and erect ſucculent ſtalks from ſix to twelve inches high, with flowers of a deep-red or yellow colour.—Beſides theſe, there are two ſpecies, natives of warm countries; the arboreum, or tree houſe-leek; and the canarienſe, or Canary ſhrubby houſe-leek. The former riſes with an upright ſmooth fleſhy ſtem, ſix or eight feet high, with the branches terminated by large cluſtering heads of ſpear-ſhaped bright-green leaves; and from the centre of the heads large pyramidal ſpikes of bright yellow flowers. There is a variety with variegated leaves and white flowers, exceedingly ornamental. The canarienſe riſes with an upright ſucculent rugged ſtalk, half a yard or more high, appearing ragged with the rudiments of paſt foliage, having the top crowned by large globular heads of retuſe ſucculent leaves; and from the centre of the head a long pyramidal ſpike of greeniſh-coloured flowers.—They are all eaſily propagated by off-ſets, cuttings, or ſeeds. The four hardy ſpecies will thrive on any old wall; but the other two being tender, muſt be ſheltered in the green-houſe. The leaves of the common houſe-leek have been recommended as refrigerant, though their ſenſible qualities diſcover no great ſigns of any virtue of this kind; their taſte being herbaceous, with a ſlight degree of pungency. It is remarkable of this plant, that its juice, purified by filtration, when it appears of a dilute yellowiſh colour, upon the admixture of an equal quantity of rectified ſpirit of wine, forms a beautiful white, light coagulum, like the finer kinds of pomatum, which proves extremely volatile; ſo that, when freed from the aqueous phlegm, and expoſed to the air, it in a very little time totally exhales. Hence ſome have concluded that the juice contained a volatile alkaline ſalt; but nothing of this kind is diſcovered by any other trial, and there are many ſubſtances beſides theſe ſalts which coagulate with ſpirit of wine.

SENA, the leaf of the CASSIA ſena of Linnæus, a very common and uſeful purgative. It is produced from a ſhrub about a foot high, growing naturally in Egypt and ſeveral parts of the Levant. The fineſt is that from Alexandria, called by the Turks *palte*, which pays a conſiderable tribute to the grand ſignior. The leaves are of an oblong figure, ſharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, of a lively yellowiſh green colour, a faint not very diſagreeable ſmell, and a ſubacrid, bitteriſh, nauſeous taſte. Some inferior ſorts are brought from Tripoli and other places; theſe may be eaſily diſtinguiſhed by their being either narrower, longer, and ſharper-pointed; or larger, broader, and round-pointed, with ſmall prominent veins; or large and obtuſe, of a freſh green colour, without any yellow caſt.

Sena is a very uſeful cathartic, operating mildly, and yet effectually; and, if judiciouſly doſed and managed, rarely occaſioning the ill conſequences which too frequently follow the exhibition of the ſtronger purges. The only inconveniences complained of in this drug are, its being apt to gripe, and its nauſeous flavour. The griping quality depends upon a reſinous ſubſtance, which, like the other bodies of this claſs, is naturally diſpoſed to adhere to the coats of the inteſtines; the more this reſin is divided by ſuch matters as take off its tenacity, the leſs adheſive, and conſequently the leſs irritating and griping it will prove; and the leſs it is divided, the more griping: hence ſena given by itſelf, or infuſions made in a very ſmall quantity of fluid, gripe ſeverely, and purge leſs than when diluted by a large portion of ſuitable menſtruum, or divided by mixing the infuſion with oily emulſions. The ill flavour of this drug is ſaid to be abated by the greater water-figwort; but we cannot conceive that this plant, whoſe ſmell is manifeſtly fetid, and its taſte nauſeous and bitter, can at all improve thoſe of ſena: others recommend bohea tea, though neither has this any conſiderable effect. The ſmell of ſena reſides in its more volatile parts, and may be diſcharged by lightly boiling infuſions of it made in water; the liquor thus freed from the peculiar flavour of the ſena, may be eaſily rendered grateful to the taſte, by the addition of any proper aromatic tincture or diſtilled water. The colleges both of London and Edinburgh, have given ſeveral very elegant infuſions of this drug*. The doſe of ſena in ſubſtance is from a ſcruple to a dram; in infuſion, from one to three or four drams.—It has been cuſtomary to reject the pedicles of the leaves of ſena as of little or no uſe; Geoffroy, however, obſerves, that they are not much inferior in efficacy to the leaves themſelves. The pods, or ſeed-veſſels, met with among the ſena brought to us, are by the college of Bruſſels preferred to the leaves; they are leſs apt to gripe, but proportionably leſs purgative.

SENATE, in general, is an aſſembly or council of ſenators; that is, of the principal inhabitants of a ſtate, who have a ſhare in the government.

The ſenate of ancient Rome is, of all others, the moſt celebrated. It exerciſed no contentious juriſdiction; but appointed judges, either from among the ſenators or knights, to determine proceſſes: it alſo appointed governors of provinces, and diſpoſed of the revenues of the commonwealth, &c. Yet did not the whole ſovereign power reſide in the ſenate, ſince it could not elect magiſtrates, make laws, or decide of war and peace; in all which caſes the ſenate was obliged to conſult the people.

According to Dr Middleton, the conſtant and regular ſupply of the ſenate was from the annual magiſtrates; who, by virtue of their ſeveral offices, acquired a right to ſit and vote in that aſſembly: the uſual gradation of theſe offices being that of quæſtor, tribune of the people, ædile, prætor, and conſul.—But though theſe offices gave both an immediate right, and actual entrance into the ſenate; yet the ſenatorial character was not eſteemed complete, till the new ſenators had been enrolled by the cenſors, at the next general luſtrum, or review of all the orders of the people.

The ſenate always met of courſe on the 1ſt of January, for the inauguration of the new conſuls; and in all months, univerſally, there were three days, viz. the kalends, nones, and ides, on which it regularly met: but it always met on extraordinary occaſions, when called together by conſul, tribune, or dictator.

SENATOR, in general, denotes a member of ſome ſenate.

Among us, ſenator is a member of parliament. In the laws of king Edward the Confeſſor, we are told, that the Britons called thoſe *ſenators*, whom the Saxons called afterwards *aldermen* and *borough-maſters*; tho' not for their age, but their wiſdom; for ſome of them were young men, but very well ſkilled in the laws. Kenulph king of the Mercians granted a charter, which ran thus, viz. *Conſilio et conſenſu* epiſcoporum *et* ſenatorum *gentis ſuæ largitus fuit dicto monaſterio*, &c.

In Scotland, the lords of ſeſſion are called *ſenators* of the college of juſtice.

SENATUS AUCTORITAS, a vote of the Roman ſenate, drawn up in the ſame form with a decree, but without its force, as having been hindered from paſſing into a decree by ſome of the tribunes of the people.

SENATUS-*Conſultum*, a decree of the Roman ſenate, pronounced on ſome queſtion or point of law; which, when pronounced, made part of the Roman law.

SENECA (Lucius Annæus), a ſtoic philoſopher, was born at Corduba in Spain, about the beginning of the Chriſtian æra, of an Equeſtrian family, which had probably been tranſplanted thither in a colony from Rome. He was the ſecond ſon of Marcus Annæus Seneca, commonly called the *rhetorician*, whoſe remains are printed under the title of *Suaſoriæ & Controverſiæ, cum Declamationum excerptis*; and his youngeſt brother, Annæus Mela, for there were three of them, was memorable for being the father of the poet Lucan. He was removed to Rome, together with his father and the reſt of his family, while he was yet in his infancy. There he was educated in the moſt liberal manner, and under the beſt maſters. He learned eloquence from his father; but his genius rather leading him to philoſophy, he put himſelf under the ſtoics Attalus, Sotion, and Papirius Fabianus; men famous in their way, and of whom he has made honourable mention in his writings. It is probable, too, that he travelled when he was young, ſince we find him, in ſeveral parts of his works, particularly in his *Queſtiones Naturales*, making very exact and cu-

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* See Pharmacy, n° 320, &c.

Seneca. rious obſervations upon Egypt and the Nile. But this, though entirely agreeable to his own humour, did not at all correſpond with that ſcheme or plan of life which his father had drawn out for him; who therefore forced him to the bar, and put him upon ſoliciting for public employments; ſo that he afterwards became quæſtor, prætor, and, as Lipſius will have it, even conſul.

In the firſt year of the reign of Claudius, when Julia the daughter of Germanicus was accuſed of adultery by Meſſalina, and baniſhed, Seneca was baniſhed too, being charged as one of the adulterers. Corſica was the ſeat of his exile, where he lived eight years; "happy in the midſt of thoſe things which uſually make other people miſerable; *inter eas res beatus, quæ ſolent miſeros facere:*" and where he wrote his books of conſolation, addreſſed to his mother Helvia, and to his friend Polybius, and perhaps ſome of thoſe tragedies which go under his name; for he ſays, *modo ſe levioribus ſtudiis ibi oblectaſſe.* When Agrippina was married to Claudius, as ſhe was upon the death of Meſſalina, ſhe prevailed with the emperor to recal Seneca from baniſhment; and afterwards procured him to be tutor to her ſon Nero, whom ſhe deſigned for the empire. By the bounty and generoſity of his royal pupil, he acquired that prodigiuos wealth which rendered him in a manner equal to kings. His houſes and walks were the moſt magnificent in Rome. His villas were innumerable: and he had immenſe ſums of money placed out at intereſt in almoſt every part of the world. The hiſtorian Dio reports him to have had 250,000 l. Sterling at intereſt in Britain alone; and reckons his calling it in all at a ſum, as one of the cauſes of a war with that nation.

All this wealth, however, together with the luxury and effeminacy of a court, does not appear to have had any ill effect upon the temper and diſpoſition of Seneca. He continued abſtemious, exact in his manners, and, above all, free from the vices ſo commonly prevalent in ſuch places, flattery and ambition. "I had rather (ſaid he to Nero) offend you by ſpeaking the truth, than pleaſe you by lying and flattery: *maluerim veris offendere, quam placere adulando.*" How well he acquitted himſelf in quality of preceptor to his prince, may be known from the five firſt years of Nero's reign, which have always been conſidered as a perfect pattern of good government; and if that emperor had but been as obſervant of his maſter through the whole courſe of it, as he was at the beginning, he would have been the delight, and not, as he afterwards proved, the curſe and deteſtation, of mankind. But when Poppæa and Tigellinus had got the command of his humour, and hurried him into the moſt extravagant and abominable vices, he ſoon grew weary of his maſter, whoſe life muſt indeed have been a conſtant rebuke to him. Seneca, perceiving that his favour declined at court, and that he had many accuſers about the prince, who were perpetually whiſpering in his ear the great riches of Seneca, his magnificent houſes, and fine gardens, and what a favourite through means of theſe he was grown with the people, made an offer of them all to Nero. Nero refuſed to accept them: which however did not hinder Seneca from changing his way of life; for, as Tacitus relates, he "kept no more levees, declined the uſual civilities which had been paid to him, and, under a pretence of indiſpoſition or ſome engagement or other, avoided as much as poſſible appearing in public." Seneca, Senega.

Nero, in the mean time, who, as it is ſuppoſed, had diſpatched Burrhus by poiſon, could not be eaſy till he had rid himſelf of Seneca alſo: for Burrhus and Seneca were, the one the manager of his military concerns, the other of his civil. Accordingly he attempted, by means of Cleonicus, a freedman of Seneca, to take him off by poiſon; but this not ſucceeding, he ordered him to be put to death, upon an information that he was privy to Piſo's conſpiracy againſt his perſon. Not that he had any real proof of Seneca's being at all concerned in this plot, but only that he was glad to lay hold of any pretence for deſtroying him. He left Seneca, however, at liberty to chooſe his manner of dying; who cauſed his veins to be opened immediately. His wife Paulina, who was very young in compariſon of himſelf, had yet the reſolution and affection to bear him company, and thereupon ordered her veins to be opened at the ſame time; but as Nero was not willing to make his cruelty more odious and inſupportable than there ſeemed occaſion for, he gave orders to have her death prevented: upon which her wounds were bound up, and the blood ſtopped, in juſt time enough to ſave her; though, as Tacitus ſays, ſhe looked ſo miſerably pale and wan all her life after, that it was eaſy to read the loſs of her blood and ſpirits in her countenance. In the mean time, Seneca, finding his death ſlow and lingering, deſired Statius Annæus his phyſician to give him a doſe of poiſon, which had been prepared ſome time before in caſe it ſhould be wanted; but this not having its uſual effect, he was carried to a hot bath, where he was at length ſtifled with the ſteams. He died, as Lipſius conjectures, in the 63d or 64th year of his age, and in about the 10th or 11th of Nero's reign. Tacitus, on mentioning his death, obſerves, that, as he entered the bath, he took of the water, and with it ſprinkled ſome of his neareſt domeſtics, ſaying, "That he offered thoſe libations to Jupiter the Deliverer." Theſe words are an evident proof that Seneca was not a Chriſtian, as ſome have imagined him to have been; and that the 13 epiſtles from Seneca to St Paul, and from St Paul to Seneca, are ſuppoſititious pieces. His philoſophical works are well known.

SENEGA, or SENEGAL, a kingdom of Africa, in Negroland, ſeated on a river of the ſame name, which ſome ſuppoſe to be a branch of the Niger; but this is very uncertain, no European having travelled ſo far up as to determine this aſſertion. However, it overflows like the Nile, and much about the ſame time of the year. It is 40 days before it comes to the height; when the river overflows its banks, and the channel is difficult to find by thoſe who go up it in boats. The French once ſent 30 men up this river, who rowed 1000 miles, undergoing great hardſhips, inſomuch that only five returned back alive; their boat once ſtuck faſt on the tops of trees, and they got it off with a great deal of difficulty. The kingdom of Senegal was formerly very conſiderable, but it is now reduced into a very narrow compaſs: it is populous and full of trees, but the ſoil is ſandy and barren; for which reaſon they never ſow till the rainy ſeaſon comes on, in June, and get in their harveſt in September. The French had a fort and factory in an iſland at the mouth of this river, and were entire maſters of the gum-trade. It was called *Fort-Louis*, and was taken by the Britiſh on the 1ſt of May 1758, and ceded to Great Britain by the peace of 1763.

SENESCHAL, (*Seneſchallus*,) derived from the German *ſein* "a houſe or place," and *ſcale* "an officer," is a ſteward, and ſignifies one who has the diſpenſing of juſtice in ſome particular caſes: As the high ſeneſchal or ſteward of England; *ſeneſchal de la hotel de roy*, "ſteward of the king's houſehold, ſeneſchal, or ſteward of courts, &c." *Co. Lit.* 61. *Croke's Juriſd.* 102. *Kitch.* 83. See STEWARD.

SENNERTUS (Daniel), an eminent phyſician, was born in 1572 at Breſlaw; and in 1593 he was ſent to Wittemberg, where he made a great progreſs in philoſophy and phyſic. He viſited the univerſities of Leipſic, Jena, Francfort upon the Oder, and Berlin; but ſoon returned to Wittemberg, where he was promoted to the degree of doctor of phyſic, and ſoon after to a profeſſorſhip in the ſame faculty. He was the firſt who introduced the ſtudy of chemiſtry into that univerſity; he gained a great reputation by his works and practice, and was very generous to the poor. He died of the plague at Wittemberg in 1637. He raiſed himſelf enemies by contradicting the ancients. He thought the ſeed of all living creatures animated, and that the ſoul of this ſeed produces organization. He was accuſed of impiety for aſſerting that the ſouls of beaſts are not material; for this was affirmed to be the ſame thing with aſſerting that they are imortal: but he rejected this conſequence.

SENONES, (anc. geog.), a people of Gallia Celtica, ſituate on the Sequana to the ſouth of the Pariſii, near the confluence of the Jeauna or Yonne with the above-mentioned river. Their moſt conſiderable exploit was their invaſion of Italy, and taking and burning ROME, as related under that article. This was done by a colony of them long before tranſported into Italy, and ſettled on the Adriatic. Their capital, Agendicum in Gaul, was in the lower age called *Senones*, now *Sens*. In Italy the Senones extended themſelves as far as the river Aeſis; but were afterwards driven beyond the Rubicon, which became the boundary of Gallia Ciſalpina, (Polybius, Strabo.)

SENSATION, in philoſophy, the perception of external object by means of the ſenſes. See METAPHYSICS, n° 21, &c.

SENSE, a faculty of the ſoul whereby it perceives external objects by means of the impreſſions they make on certain organs of the body. Theſe organs of ſenſation are commonly reckoned five, *viz.* the eye, whereby we ſee objects; the ear, which enables us to hear ſounds; the noſe, by which we receive the ideas of different ſmells; the palate, by which we judge of taſtes; and the cutis or ſkin, which enables us to feel the different forms, hardneſs, or ſoftneſs of bodies.

SENSIBLE NOTE, in muſic, is that which conſtitutes a third major above the dominant, and a ſemitone beneath the tonic. *Si*, or B, is the ſenſible note in the tone of *ut* or C *ſol*♯; or G ſharp, in the tone of *la* or A.

They call it the *ſenſible note* on this account, that it cauſes to be perceived the tone or natural ſeries of the key and the tonic itſelf, upon which, after the chord of the dominant, the ſenſible note taking the ſhorteſt road, is under a neceſſity of riſing; which has made ſome authors treat this ſenſible note as a major diſſonance, for want of obſerving, that diſſonance, being a relation, cannot be conſtituted unleſs by two notes between which it ſubſiſts.

It is not meant that the ſenſible note is the ſeventh of the tone, becauſe, in the minor mode, this ſeventh cannot be a ſenſible note but in aſcending; for, in deſcending, it is at the diſtance of a full note from the tonic, and of a third minor from the dominant.

SENSITIVE PLANT. See MIMOSA and DIONÆA *Muſcipula*.

The ſenſitive and humble plants are arranged by Linnæus under the ſame genius with the acacias. Theſe are well known to poſſeſs a kind of muſcular motion, by which the leaves and ſtalks are contracted and fall down upon being ſlightly touched, or ſhaken with ſome degree of violence. The ſenſibility of theſe plants is lodged in the young branches, in the common foot-ſtalk of the winged leaves, and in the nerve or middle rib to which the lobes or leſſer leaves are attached. Theſe different motions, which ſeem to be totally independent of each other, may be aptly enough compared, by analogy, with the irritability of certain parts in animals.

The ſenſitive plant has two kinds of motion; the one natural, occaſioned by the action of warm nouriſhing vapours; the other artificial, in conſequence of being touched or ſhaken.

Mr Duhamel having obſerved, about the 15th of September, in moderate weather, the natural motion of a branch of ſenſitive plant, remarked, that at nine in the morning, it formed with the ſtem an angle of 100 degrees; at noon, 112 degrees; at three afternoon, it returned to 100; and after touching the branch, the angle was reduced to 90. Three quarters of an hour after, it had mounted to 112; and, at eight at night, it deſcended again, without being touched, to 90. The day after, in finer weather, the ſame branch, at eight in the morning, made an angle of 135 degrees with the ſtem; after being touched, the angle was diminiſhed to 80; an hour after, it roſe again to 135; being touched a ſecond time, it deſcended again to 80; an hour and a half after, it had riſen to 145; and upon being touched a third time, deſcended to 135; and remained in that poſition till five o'clock in the afternoon; when being touched a fourth time, it fell to 110.

With whatever body the ſenſitive plant is touched or irritated, it is remarkable that the ſenſibility reſides particularly in the articulation or joining either of the branches of the common foot-ſtalk, or of the particular foot-ſtalk of each wing.

The time which a branch requires to recover itſelf after being touched, varies according to the vigour of the plant, the hour of the day, the ſeaſon of the year, or the heat and other circumſtances of the atmoſphere.

The order in which the parts recover themſelves varies in like manner: ſometimes it is the common foot-ſtalk; ſometimes the rib to which the lobes are attached; and ſometimes the lobes themſelves are expanded, before the other parts have made any attempt to be reinſtated in their former poſition.

If, without ſhaking the other ſmaller leaves, we cut off the half of a lobe belonging to the laſt pair, at the extremity or ſummit of a wing, the leaf cut, and its antagoniſt, that is to ſay, the firſt pair, begin to approach each other; then the ſecond; and ſo on ſucceſſively, till all the leſſer leaves, or lobes of that wing, have collapſed in like manner. Frequently, after 12 or 15 ſeconds, the lobes of the other wings which were not immediately affected by the ſtroke, ſhut; whilſt the ſtalk and its wing, beginning at the bottom, and proceeding in order to the top, gradually recover themſelves. If, inſtead of one of the leſſer extreme leaves, we cut off one belonging to the pair that is next the foot-ſtalk, its antagoniſt ſhuts, as do the other pairs ſucceſſively, from the bottom to the top. If all the lobes of one ſide of a wing be cut off, the oppoſite lobes are not affected, but remain expanded. With ſome addreſs, it is poſſible even to cut off a branch without hurting the leaves or making them fall. The common foot-ſtalk of the winged leaves being cut as far as three-fourths of its diameter, all the parts which hang down collapſe, but quickly recover without appearing to have ſuffered any conſiderable violence by the ſhock. An inciſion being made into one of the principal branches, to the depth of one half the diameter, the branches ſituated betwixt the ſection and the root will fall down; thoſe above the inciſion remain as before, and the leſſer leaves continue open; but this direction is ſoon deſtroyed, by cutting off one of the lobes at the extremity, as was obſerved above. Laſtly, a whole wing being cut off with precaution near its inſertion into the common foot-ſtalk, the other wings are not affected by it, and its own lobes do not ſhut. No motion, likewiſe, enſues from piercing the branch with a needle or other ſharp inſtrument.

Milne's Bot. Dict.

From the preceding experiments, to omit many others which might be mentioned, theſe inferences are clearly to be deduced. 1. That when the plant is in its greateſt vegetative force, its motions are greater and more ſenſible. 2. That when the ſky is ſerene, and the ſun bright during the whole day, the plant is more ſenſible in the morning than at noon. 3. That in the circumſtances in which they are leſs ſenſible, the leaves continue to fold and collapſe, although the foot-ſtalks, which through age become ſtiff and woody, have loſt their motion. 4. That a ſtroke, or an irritation, produces a more forcible effect than an inciſion or even an entire ſection. 5. That a ſlight irritation only acts upon the neighbouring parts, and extends its influence in proportion to its force. 6. That any given irritation acts more ſtrongly upon ſome parts than on others. 7. That whatever can produce any effect upon the organs of animals, acts upon the ſenſitive plant; as a ſtroke, exceſs of heat or cold, the ſteam of boiling water, that of ſulphur and volatile ſpirits, &c. 8. That plunging it in water, or lodging it in the exhauſted receiver of an air-pump, ſeem to have no other effect than that of diminiſhing its vigour. 9. That there appears to be no more intimate a communication betwixt the oppoſite lobes of a winged or pinnated leaf, than betwixt the other parts of the plant. 10. That the muſcular motion of the ſenſitive plant is owing to a ſtrong contraction: each foot-ſtalk ſeems to be terminated with a kind of joint, on which the leaves turn in all directions with ſurpriſing facility.

Different from all the kinds of ſenſitive plants hitherto known, is the *dionæa muſcipula*, or Venus's mouſe-trap, a plant lately diſcovered in the ſwamps of North America; for a deſcrption of which, ſee Dionæa *Muſcipula*.—The negroes in Senegal call a large ſpecies of ſenſitive plant which grows in that country, *guerackiao*, that is, "good-morrow;" becauſe, ſay they, when you touch it, or draw near to ſpeak to it, the plant immediately inclines its leaves, to wiſh you, as it were, a good-morrow, and to ſhow you that it is ſenſible of the politeneſs done it. In the ſame country is produced a ſmall ſenſitive plant, that is rampant, not ſpinous, and which Mr Adanſon affirms to be infinitely more delicate and ſenſible than all the other ſpecies.

To conclude, the cauſe of this and the other motions of plants is merely external. The motions themſelves, therefore, are not ſpontaneous as in perfect animals, which have that cauſe dependent on their choice and will. How many imperfect animals, however, are there, ſuch as thoſe in animal and vegetable infuſions, the polypes and animalcules in ſeed, whoſe certain motions, like thoſe of the plants in queſtion, are perhaps to be attributed to heat, light, and other external cauſes? and again, how many, as the gall-inſects, the oyſter, and other ſhell-fiſh, have not a motion ſo perceptible nor rapid as that of Venus's mouſe-trap and the ſenſitive plant!

SENTENCE, in law, a judgment paſſed in court by the judge on ſome proceſs, either civil or criminal. See Judgment.

Sentence, in grammar, denotes a period; or a ſet of words comprehending ſome perfect ſenſe or ſentiment of the mind.

The buſineſs of pointing is to diſtinguiſh the ſeveral parts and members of ſentences, ſo as to render the ſenſe thereof the cleareſt, apteſt, and fulleſt poſſible. See Punctuation.

In every ſentence there are two parts neceſſarily required; a noun for the ſubject, and a definite verb: whatever is found more than theſe two, affects one of them, either immediately, or by the intervention of ſome other, whereby the firſt is affected.

Again, every ſentence is either ſimple or conjunct: a ſimple ſentence is that conſiſting of one ſingle ſubject, and one finite verb.—A conjunct ſentence contains ſeveral ſubjects and finite verbs, either expreſsly or implicitly.

A ſimple ſentence needs no point or diſtinction; only a period to cloſe it: as, "A good man loves virtue for itſelf."—In ſuch a ſentence, the ſeveral adjuncts affect either the ſubject or the verb in a different manner. Thus the word *good*, expreſſes the quality of the ſubject, *virtue* the object of the action, and *for itſelf* the end thereof.—Now none of theſe adjuncts can be ſeparated from the reſt of the ſentence: for if one be, why ſhould not all the reſt? and if all be, the ſentence will be minced into almoſt as many parts as there are words.

But if ſeveral adjuncts be attributed in the ſame manner either to the ſubject or the verb, the ſentence becomes conjunct, and is to be divided into parts.

In every conjunct ſentence, as many ſubjects, or as many finite verbs as there are, either expreſsly or implied, ſo many diſtinctions may there be. Thus, "My hopes, fears, joys, pains, all centre in you." And thus

Cicero, *Catilina abiit, exceſſit, evaſit, erupit.*——The reaſon of which pointing is obvious; for as many ſubjects or finite verbs as there are in a ſentence, ſo many members does it really contain. Whenever, therefore, there occur more nouns than verbs, or contrariwiſe, they are to be conceived as equal. Since, as every ſubject requires its verb, ſo every verb requires its ſubject, wherewith it may agree: excepting, perhaps, in ſome figurative expreſſions.

SENTENCE, is alſo uſed, in rhetoric and poetry, for a ſhort pithy remark, or reflection, containing ſome ſentiment of uſe in the conduct of life. See APOPHTHEGM, ADAGE, PROVERB, &c.

SENTICOSÆ, (from *ſentis*, a "briar or bramble;") the name of the 35th order in Linnæus's fragments of a natural method, conſiſting of roſe, bramble, and other plants which reſemble them in port and external ſtructure. See BOTANY, p. 1312.

SENTIMENT, according to Lord Kaims, is a term appropriated to ſuch thoughts as are prompted by paſſion. It differs from a perception; for a perception ſignifies the act by which we become conſcious of external objects. It differs from conſciouſneſs of an internal action, ſuch as thinking, ſuſpending thought, inclining, reſolving, willing, &c. And it differs from the conception of a relation among objects; a conception of that kind being termed *opinion*.

Elements of Criticiſm.

SENTIMENTS, in poetry. To talk in the language of muſic, each paſſion hath a certain tone, to which every ſentiment proceeding from it ought to be tuned with the greateſt accuracy: which is no eaſy work, eſpecially where ſuch harmony ought to be ſupported during the courſe of a long theatrical repreſentation. In order to reach ſuch delicacy of execution, it is neceſſary that a writer aſſume the preciſe character and paſſion of the perſonage repreſented; which requires an uncommon genius. But it is the only difficulty; for the writer, who, annihilating himſelf, can thus become another perſon, need be in no pain about the ſentiments that belong to the aſſumed character: theſe will flow without the leaſt ſtudy, or even preconception; and will frequently be as delightfully new to himſelf as to his reader. But if a lively picture even of a ſingle emotion, require an effort of genius, how much greater the effort to compoſe a paſſionate dialogue with as many different tones of paſſion as there are ſpeakers? With what ductility of feeling muſt that writer be endued, who approaches perfection in ſuch a work; when it is neceſſary to aſſume different and even oppoſite characters and paſſions, in the quickeſt ſucceſſion? Yet this work, difficult as it is, yields to that of compoſing a dialogue in genteel comedy, exhibiting characters without paſſion. The reaſon is, that the different tones of character are more delicate, and leſs in ſight, than thoſe of paſſion; and, accordingly, many writers, who have no genius for drawing characters, make a ſhift to repreſent, tolerably well, an ordinary paſſion in its ſimple movements. But of all works of this kind, what is truly the moſt difficult, is a characteriſtical dialogue upon any philoſophical ſubject: to interweave characters with reaſoning, by ſuiting to the character of each ſpeaker a peculiarity not only of thought but of expreſſion, requires the perfection of genius, taſte, and judgment.

How hard dialogue-writing is, will be evident, even without reaſoning, from the miſerable compoſitions of that kind found without number in all languages. The art of mimicking any ſingularity in geſture or in voice, is a rare talent, though directed by ſight and hearing, the acuteſt and moſt lively of our external ſenſes: how much more rare muſt that talent be, of imitating characters and internal emotions, tracing all their different tints, and repreſenting them in a lively manner by natural ſentiments properly expreſſed? The truth is, ſuch execution is too delicate for an ordinary genius; and for that reaſon the bulk of writers, inſtead of expreſſing a paſſion as one does who feels it, content themſelves with deſcribing it in the language of a ſpectator. To awake paſſion by an internal effort merely, without any external cauſe, requires great ſenſibility; and yet that operation is neceſſary, not leſs to the writer than to the actor: becauſe none but thoſe who actually feel a paſſion can repreſent it to the life. The writer's part is the more complicated: he muſt add compoſition to paſſion; and muſt, in the quickeſt ſucceſſion, adopt every different character. But a very humble flight of imagination may ſerve to convert a writer into a ſpectator, ſo as to figure, in ſome obſcure manner, an action as paſſing in his ſight and hearing. In that figured ſituation, being led naturally to write like a ſpectator, he entertains his readers with his own reflections, with cool deſcription, and florid declamation; inſtead of making them eye-witneſſes, as it were, to a real event, and to every movement of genuine paſſion. Thus moſt of our plays appear to be caſt in the ſame mould; perſonages without character, the mere outlines of paſſion, a tireſome monotony, and a pompous declamatory ſtyle.

This deſcriptive manner of repreſenting paſſion is a very cold entertainment; our ſympathy is not raiſed by deſcription; we muſt firſt be lulled into a dream of reality, and every thing muſt appear as paſſing in our ſight. Unhappy is the player of genius who acts a part in what may be termed a *deſcriptive tragedy:* after aſſuming the very paſſion that is to be repreſented, how is he cramped in action, when he muſt utter, not the ſentiments of the paſſion he feels, but a cold deſcription in the language of a byſtander? It is that imperfection, undoubtedly, in the bulk of our plays, which confines our ſtage almoſt entirely to Shakeſpeare, notwithſtanding his many irregularities. In our late Engliſh tragedies, we ſometimes find ſentiments tolerably well adapted to a plain paſſion: but we muſt not in any of them expect a ſentiment expreſſive of character; and, upon that very account, our late performances of the dramatic kind are for the moſt part intolerably inſipid.

But it may be proper to illuſtrate this ſubject by examples. The firſt examples ſhall be of ſentiments that appear the legitimate offspring of paſſion; to which ſhall be oppoſed what are deſcriptive only, and illegitimate: and in making this compariſon, the inſtances ſhall be borrowed from Shakeſpeare and Corneille, who for genius in dramatic compoſition ſtand uppermoſt in the rolls of fame.

I. Shakeſpear ſhall furniſh the firſt example, being of ſentiments dictated by a violent and perturbed paſſion:

Lear. ————————Filial ingratitude!

Sentiments.

Is it not as if this mouth ſhould tear this hand
For lifting food to't?—But I'll puniſh home;
No, I will weep no more.——In ſuch a night,
To ſhut me out!——Pour on, I will endure.
In ſuch a night as this! O Regan, Gonerill,
Your old kind father, whoſe frank heart gave all—
O! that way madneſs lies; let me ſhun that;
No more of that.————

Kent. Good, my lord, enter here.

Lear. Pr'ythee, go in thyſelf, ſeek thine own eaſe,
This tempeſt will not give me leave to ponder
On things would hurt me more:—but I'll go in;
In, boy, go firſt. You houſeleſs poverty——
Nay, get thee in; I'll pray, and then I'll ſleep—
Poor naked wretches, whereſoe'er you are,
That bide the pelting of this pitileſs ſtorm!
How ſhall your houſeleſs heads, and unfed ſides,
Your loop'd and window'd raggedneſs defend you
From ſeaſons ſuch as theſe?——O I have ta'en
Too little care of this! take phyſic, Pomp;
Expoſe thyſelf to feel what wretches feel,
That thou may'ſt ſhake the ſuperflux to them,
And ſhow the heavens more juſt.

King Lear, act 3. *ſc.* 5.

The following is an example of the ſame kind, expreſſing ſentiments ariſing from remorſe and deſpair:

Othello. Lo! I have a weapon:
A better never did itſelf ſuſtain
Upon a ſoldier's thigh. I've ſeen the day,
That with this little arm, and this good ſword,
I've made my way through more impediments
Than twenty times your ſtop. But, oh vain boaſt!
Who can controul his fate? 'tis not ſo now.
Be not afraid, though you do ſee me weapon'd;
Here is my journey's end, here is my butt,
The very ſea-mark of my utmoſt ſail.
Do you go back diſmay'd? 'tis a loſt fear.
Man but a ruſh againſt Othello's breaſt,
And he retires. Where ſhould Othello go?
Now—how doſt thou look now! Oh ill-ſtarr'd wench!
Pale as thy ſmock! when we ſhall meet at compt,
This look of thine will hurl my ſoul from heav'n,
And fiends will ſnatch at it. Cold, cold, my girl;
Ev'n like thy chaſtity. O curſed ſlave!
Whip me, ye devils,
From the poſſeſſion of this heav'nly ſight:
Blow me about in winds, roaſt me in ſulphur,
Waſh me in ſteep-down gulfs of liquid fire——
Oh, Deſdemona! Deſdemona! dead! dead! oh! oh!

Othello, act 5. *ſc.* 9.

The ſentiments here diſplayed flow ſo naturally from the paſſions repreſented, that we cannot conceive any imitation more perfect.

With regard to the French author, truth obliges us to acknowledge, that he deſcribes in the ſtyle of a ſpectator, inſtead of expreſſing paſſion like one who feels it; which naturally betrays him into a tireſome monotony, and a pompous declamatory ſtyle. It is ſcarce neceſſary to give examples, for he never varies from that tone. We ſhall, however, take two paſſages at a venture, in order to be confronted with thoſe tranſcribed above. In the tragedy of Cinna, Æmilia, after the conſpiracy was diſcovered, having nothing in view but racks and death to herſelf and her lover, receives a pardon from Auguſtus, attended with the brighteſt circumſtances of magnanimity and tenderneſs. This is a lucky ſituation for repreſenting the paſſions of ſurpriſe and gratitude in their different ſtages, which ſeem naturally to be what follow. Theſe paſſions, raiſed at once to the utmoſt pitch, and being at firſt too big for utterance, muſt, for ſome moments, be expreſſed by violent geſtures only: ſo ſoon as there is vent for words, the firſt expreſſions are broken and interrupted: at laſt, we ought to expect a tide of intermingled ſentiments, occaſioned by the fluctuation of the mind between the two paſſions. Æmilia is made to behave in a very different manner: with extreme coolneſs ſhe deſcribes her own ſituation, as if ſhe were merely a ſpectator; or rather the poet takes the taſk off her hands:

Et je me rens, Seigneur, à ces hautes bontés:
Je recouvre la vûe auprès de leurs clartés.
Je connois mon forfait qui me ſembloit juſtice;
Et ce que n'avoit pû la terreur du ſupplice,
Je ſens naitre en mon ame un repentir puiſſant,
Et mon cœur en ſecret me dit, qu'il y conſent.
Le ciel a réſolu votre grandeur ſuprême;
Et pour preuve, Seigneur, je n'en veux que moi-même.
J'oſe avec vanité me donner cet éclat,
Puiſqu'il change mon cœur, qu'il veut changer l'état.
Ma haine va mourir, que j'ai crue immortelle;
Elle eſt morte, et ce cœur devient ſujet fidele;
Et prenant déſormais cette haine en horreur,
L'ardeur de vous ſervir ſuccede à ſa fureur.

Act 5. *ſc.* 3.

In the tragedy of Sertorius, the queen, ſurpriſed with the news that her lover was aſſaſſinated, inſtead of venting any paſſion, degenerates into a cool ſpectator, and undertakes to inſtruct the byſtanders how a queen ought to behave on ſuch an occaſion.

Viriate. Il m'en fait voir enſemble, et l'auteur, et la cauſe.
Par cet aſſaſſinat c'eſt de moi qu'on diſpoſe,
C'eſt mon trône, c'eſt moi qu'on pretend conquerir;
Et c'eſt mon juſte choix qui ſeul l'a fait perir.
Madame, après ſa perte, et parmi ces alarmes,
N'attendez point de moi de ſoupirs, ni de larmes;
Ce ſont amuſemens que dédaigne aiſement
Le prompt et noble orgueil d'un vif reſſentiment.
Qui pleure, l'affoiblit; qui ſoupire, l'exhale:
Il faut plus de fierté dans une ame royale;
Et ma douleur ſoumiſe aux ſoins de le venger, &c.

Act 5. *ſc.* 3.

So much in general upon the genuine ſentiments of paſſion. We proceed to particular obſervations. And, firſt, paſſions ſeldom continue uniform any conſiderable time: they generally fluctuate, ſwelling and ſubſiding by turns, often in a quick ſucceſſion; and the ſentiments cannot be juſt unleſs they correſpond to ſuch fluctuation. Accordingly, a climax never ſhows better than in expreſſing a ſwelling paſſion: the following paſſages may ſuffice for an illuſtration.

Oroonoko. ——Can you raiſe the dead?
Purſue and overtake the wings of time?
And bring about again the hours, the days,
The years, that made me happy!

Oroonoko, act 2. *ſc.* 2.

Almeria. ——How haſt thou charm'd

The wildneſs of the waves and rocks to this;
That thus relenting they have giv'n thee back
To earth, to light and life, to love and me?
Mourning Bride, act 1. *ſc.* 7.

I would not be the villain that thou think'ſt
For the whole ſpace that's in the tyrant's graſp,
And the rich earth to boot.
Macbeth, act 4. *ſc.* 4.

The following paſſage expreſſes finely the progreſs of conviction.

Let me not ſtir, nor breathe, leſt I diſſolve
That tender, lovely form, of painted air,
So like Almeria. Ha! it ſinks, it falls;
I'll catch it ere it goes, and graſp her ſhade.
'Tis life! 'tis warm! 'tis ſhe! 'tis ſhe herſelf!
It is Almeria! 'tis, it is my wife!
Mourning Bride, act 2. *ſc.* 6.

In the progreſs of thought, our reſolutions become more vigorous as well as our paſſions.

If ever I do yield or give conſent,
By any action, word, or thought, to wed
Another lord; may then juſt heav'n ſhow'r down, &c.
Mourning Bride, act 1. *ſc.* 1.

And this leads to a ſecond obſervation, That the different ſtages of a paſſion, and its different directions, from birth to extinction, muſt be carefully repreſented in their order; becauſe otherwiſe the ſentiments, by being miſplaced, will appear forced and unnatural. Reſentment, for example, when provoked by an atrocious injury, diſcharges itſelf firſt upon the author: ſentiments therefore of revenge come always firſt, and muſt in ſome meaſure be exhauſted before the perſon injured think of grieving for himſelf. In the Cid of Corneille, Don Diegue having been affronted in a cruel manner, expreſſes ſcarce any ſentiment of revenge, but is totally occupied in contemplating the low ſituation to which he is reduced by the affront:

O rage! ô deſeſpoir! ô vieilleſſe ennemie!
N'ai-je donc tant vecu que pour cette infamie?
Et ne ſuis-je blanchi dans les travaux guerriers,
Que pour voir en un jour fletrir tant de lauriers?
Mon bras, qu'avec reſpect tout l'Eſpagne admire,
Mon bras, qui tant de fois a ſauvé cet empire,
Tant de fois affermi le trône de ſon Roi,
Trahit donc ma querelle, et ne fait rien pour moi!
O cruel ſouvenir de ma gloire paſſée!
Oeuvre de tant de jours en un jour effacée!
Nouvelle dignité fatale à mon bonheur!
Precipice élevé d'où tombe mon honneur!
Faut-il de votre éclat voir triompher le comte,
Et mourir ſans vengeance, ou vivre dans la honte?
Comte, ſois de mon prince à preſent governeur,
Ce haut rang n'admet point un homme ſans honneur;
Et ton jaloux orgueil par cet affront inſigne,
Malgré le chiox du Roi, m'en a ſû rendre indigne.
Et toi, de mes exploits glorieux inſtrument,
Mais d'un corps tout de glace inutile ornement,
Fer jadis tant à craindre, et qui dans cette offenſe,
M'as ſervi de parade, et non pas de defenſe,
Va, quitte deſormais le dernier des humains,
Paſſe pour me venger en de meilleures mains.
Le Cid, act 1. *ſc.* 7.

Theſe ſentiments are certainly not the firſt that are ſuggeſted by the paſſion of reſentment. As the firſt movements of reſentment are always directed to its object, the very ſame is the caſe of grief. Yet with relation to the ſudden and ſevere diſtemper that ſeized Alexander bathing in the river Cydnus, Quintus Curtius deſcribes the firſt emotions of the army as directed to themſelves, lamenting that they were left without a leader, far from home, and had ſcarce any hopes of returning in ſafety: their king's diſtreſs, which muſt naturally have been their firſt concern, occupies them but in the ſecond place according to that author. In the Aminta of Taſſo, Sylvia, upon a report of her lover's death, which ſhe believed certain, inſtead of bemoaning the loſs of her beloved, turns her thoughts upon herſelf, and wonders her heart does not break:

Ohime, ben ſon di ſaſſo,
Poi che queſta novella non m'uccide. *Act* 4. *ſc.* 2.

In the tragedy of Jane Shore, Alicia, in the full purpoſe of deſtroying her rival, has the following reflection:

Oh Jealouſy! thou bane of pleaſing friendſhip,
Thou worſt invader of our tender boſoms;
How does thy rancour poiſon all our ſoftneſs,
And turn our gentle nature into bitterneſs!
See where ſhe comes! Once my heart's deareſt bleſſing,
Now my chang'd eyes are blaſted with her beauty,
Loathe that known face, and ſicken to behold her.
Act 3. *ſc.* 1.

Theſe are the reflections of a cool ſpectator. A paſſion, while it has the aſcendant, and is freely indulged, ſuggeſts not to the perſon who feels it any ſentiment to its own prejudice: reflections like the foregoing occur not readily till the paſſion has ſpent its vigour.

A perſon ſometimes is agitated at once by different paſſions; and the mind in that caſe, vibrating like a pendulum, vents itſelf in ſentiments that partake of the ſame vibration. This we give as a third obſervation:

Queen. Would I had never trod this Engliſh earth,
Or felt the flatteries that grow upon it!
Ye've angels faces, but heav'n knows your hearts.
What ſhall become of me now? wretched lady!
I am the moſt unhappy woman living.
Alas! poor wenches, where are now your fortunes?
[*To her women.*
Shipwreck'd upon a kingdom, where no pity,
No friends, no hope, no kindred, weep for me!
Almoſt, no grave allow'd me.
Henry VIII. *act* 3. *ſc.* 1.

Othello. Oh devil, devil!
If that the earth could teem with woman's tears,
Each drop ſhe falls would prove a crocodile.
Out of my ſight!
Deſdemona. I will not ſtay t'offend you. [*Going.*
Lodovico. Truly, an obedient lady:
I do beſeech your lordſhip, call her back.
Oth. Miſtreſs——
Deſ. My lord.
Oth. What would you with her, Sir?
Lod. Who, I, my lord?
Oth. Ay; you did wiſh that I would make her turn:
Sir, ſhe can turn and turn, and yet go on;
And turn again. And ſhe can weep, Sir, weep;
And ſhe's obedient: as you ſay, obedient:

Very obedient—proceed you in your tears—
——— Concerning this, Sir,—oh well-painted paſſion!—
I am commanded home—get you away,
I'll ſend for you anon—Sir, I obey the mandate,
And will return to Venice.——Hence, avaunt!
[*Exit* Deſdemona.
Othello, act 4. *ſc.* 6.

Æmilia. Oh! my good lord, I would ſpeak a word with you.
Othello. Yes, 'tis Æmilia—By and by.—She's dead.
'Tis like ſhe comes to ſpeak of Caſſio's death;
The noiſe was high.—Ha! no more moving?
Still as the grave. Shall ſhe come in? were't good?
I think ſhe ſtirs again—No—what's the beſt?
If ſhe come in, ſhe'll, ſure, ſpeak to my wife:
My wife! my wife! What wife? I have no wife;
Oh inſupportable! oh heavy hour!
Othello, act 5. *ſc.* 7.

A fourth obſervation is, That nature, which gave us paſſions, and made them extremely beneficial when moderate, intended undoubtedly that they ſhould be ſubjected to the government of reaſon and conſcience. It is therefore againſt the order of nature, that paſſion in any caſe ſhould take the lead in contradiction to reaſon and conſcience: ſuch a ſtate of mind is a ſort of anarchy which every one is aſhamed of, and endeavours to hide or diſſemble. Even love, however laudable, is attended with a conſcious ſhame when it becomes immoderate: it is covered from the world, and diſcloſed only to the beloved object:

Et que l'amour ſouvent de remors combattu
Paroiſſe une foibleſſe, et non une vertu.
Boileau, l'Art poet. chant. 3. *l.* 101.

O, they love leaſt that let men know they love.
Two Gentlemen of Verona, act 1. *ſc.* 3.

Hence a capital rule in the repreſentation of immoderate paſſions, that they ought to be hid or diſſembled as much as poſſible. And this holds in an eſpecial manner with reſpect to criminal paſſions: one never counſels the commiſſion of a crime in plain terms; guilt muſt not appear in its native colours, even in thought; the propoſal muſt be made by hints, and by repreſenting the action in ſome favourable light. Of the propriety of ſentiment upon ſuch an occaſion, Shakeſpeare, in the Tempeſt, has given us a beautiful example, in a ſpeech by the uſurping duke of Milan, adviſing Sebaſtian to murder his brother the king of Naples:

Antonio. ——————What might,
Worthy Sebaſtian,—O, what might—no more.
And yet, methinks, I ſee it in thy face
What thou ſhouldſt be: the occaſion ſpeaks thee, and
My ſtrong imagination ſees a crown
Dropping upon thy head. *Act* 2. *ſc.* 1.

There cannot be a finer picture of this kind, than that of king John ſoliciting Hubert to murder the young prince Arthur:

K. John. Come hither, Hubert. O my gentle Hubert,
We owe thee much; within this wall of fleſh
There is a ſoul counts thee her creditor,
And with advantage means to pay thy love.
And, my good freind, thy voluntary oath
Lives in this boſom, dearly cheriſhed.
Give me thy hand, I had a thing to ſay——
But I will fit it with ſome better time.
By heav'n, Hubert, I'm almoſt aſham'd
To ſay what good reſpect I have of thee.
Hubert. I am much bounden to your majeſty.
K. John. Good friend, thou haſt no cauſe to ſay ſo yet——
But thou ſhalt have—and creep time ne'er ſo ſlow,
Yet it ſhall come for me to do thee good.
I had a thing to ſay——but, let it go:
The ſun is in the heav'n, and the proud day,
Attended with the pleaſures of the world,
Is all too wanton and too full of gawds
To give me audience. If the midnight-bell
Did with his iron-tongue and brazen mouth
Sound one into the drowſy race of night;
If this ſame were a church-yard where we ſtand,
And thou poſſeſſed with a thouſand wrongs;
Or if that ſurly ſpirit Melancholy
Had bak'd thy blood, and made it heavy-thick,
Which elſe runs tickling up and down the veins,
Making that idiot Laughter keep mens eyes,
And ſtrain their cheeks to idle merriment,
(A paſſion hateful to my purpoſes);
Or if that thou couldſt ſee me without eyes,
Hear me without thine ears, and make reply
Without a tongue, uſing conceit alone,
Without eyes, ears, and harmful ſounds of words;
Then, in deſpite of broad-ey'd watchful day,
I would into thy boſom pour my thoughts.
But ah, I will not.—Yet I love thee well;
And, by my troth, I think thou lov'ſt me well.
Hubert. So well, that what you bid me undertake,
Though that my death were adjunct to my act,
By heav'n, I'd do't.
K. John. Do not I know thou wouldſt?
Good Hubert, Hubert, Hubert, throw thine eye
On yon young boy. I'll tell thee what, my friend;
He is a very ſerpent in my way.
And, whereſoe'er this foot of mine doth tread,
He lies before me. Doſt thou underſtand me?
Thou art his keeper. *King John, act* 3. *ſc.* 5.

II. As things are beſt illuſtrated by their contraries, we proceed to faulty ſentiments, diſdaining to be indebted for examples to any but the moſt approved authors. The firſt claſs ſhall conſiſt of ſentiments that accord not with the paſſion; or, in other words, ſentiments that the paſſion does not naturally ſuggeſt. In the ſecond claſs, ſhall be ranged ſentiments that may belong to an ordinary paſſion, but unſuitable to it as tinctured by a ſingular character. Thoughts that properly are not ſentiments, but rather deſcriptions, make a third. Sentiments that belong to the paſſion repreſented, but are faulty as being introduced too early or too late, make a fourth. Vicious ſentiments expoſed in their native dreſs, inſtead of being concealed or diſguiſed, make a fifth. And in the laſt claſs ſhall be collected ſentiments ſuited to no character nor paſſion, and therefore unnatural.

The *firſt* claſs contains faulty ſentiments of various kinds, which we ſhall endeavour to diſtinguiſh from each other.

1. Sentiments that are faulty by being above the tone of the paſſion:

Othello. ——————O my ſoul's joy !
If after every tempeſt come ſuch calms,
May the winds blow till they have waken'd death :
And let the labouring bark climb hills of ſeas
Olympus high, and duck again as low
As hell's from heaven ? *Othello, act.* 2. *ſc.* 6.

This ſentiment may be ſuggeſted by violent and inflamed paſſion ; but is not ſuited to the ſatisfaction, however great, that one feels upon eſcaping danger.

Philaſter. Place me, ſome god, upon a pyramid
Higher than hills of earth, and lend a voice
Loud as your thunder to me, that from thence
I may diſcourſe to all the under-world
The worth that dwells in him.
Philaſter of Beaumont and Fletcher, act 4.

2. Sentiments below the tone of the paſſion. Ptolemy, by putting Pompey to death, having incurred the diſpleaſure of Cæſar, was in the utmoſt dread of being dethroned : in that agitating ſituation, Corneille makes him utter a ſpeech full of cool reflection, that is in no degree expreſſive of the paſſion.

Ah ! ſi je t'avois crû, je n'aurois pas de maitre,
Je ſerois dans le trône où le ciel m'a fait naître ;
Mais c'eſt une imprudence aſſez commune aux rois,
D'écouter trop d'avis, et ſe tromper au choix.
Le Deſtin les aveugle au bord du précipice,
Ou ſi quelque lumiere en leur ame ſe gliſſe,
Cette fauſſe clarté dont il les eblouit,
Le plonge dans une gouffre, et puis s'evanouit.
La mort de Pompé, act 4. *ſc.* 1.

In *Les Freres Ennemies* of Racine, the ſecond act is opened with a love-ſcene : Hemon talks to his miſtreſs of the torments of abſence, of the luſtre of her eyes, that he ought to die nowhere but at her feet, and that one moment of abſence is a thouſand years. Antigone on her part acts the coquette ; pretends that ſhe muſt be gone to wait on her mother and brother, and cannot ſtay to liſten to his courtſhip. This is odious French gallantry, below the dignity of the paſſion of love : it would ſcarce be excuſable in painting modern French manners ; and is inſufferable where the ancients are brought upon the ſtage. The manners painted in the *Alexandre* of the ſame author are not more juſt : French gallantry prevails there throughout.

3. Sentiments that agree not with the tone of the paſſion ; as where a pleaſant ſentiment is grafted upon a painful paſſion, or the contrary. In the following inſtances the ſentiments are too gay for a ſerious paſſion.

No happier taſk theſe faded eyes purſue ;
To read and weep is all they now can do.
Eloiſa to Abelard, l. 47.

Again,

Heav'n firſt taught letters for ſome wretch's aid,
Some baniſh'd lover, or ſome captive maid :
They live, they ſpeak, they breathe what love inſpires,
Warm from the ſoul, and faithful to its fires ;
The virgin's wiſh without her fears impart,
Excuſe the bluſh, and pour out all the heart ;
Speed the ſoft intercourſe from ſoul to ſoul,
And waft a ſigh from Indus to the pole.
Eloiſa to Abelard, l. 51.

Theſe thoughts are pretty : they ſuit Pope, but not Eloiſa.

Satan, enraged by a threatening of the angel Gabriel, anſwers thus :

Then when I am thy captive, talk of chains,
Proud limitary cherub ; but ere then
Far heavier load thyſelf expect to feel
From my prevailing arm, though heaven's King
Ride on thy wings, and thou with thy compeers,
Us'd to the yoke, draw'ſt his triumphant wheels
In progreſs thro' the road of heav'n *ſtar-pav'd.*
Paradiſe Loſt, book 4.

The concluding epithet forms a grand and delightful image, which cannot be the genuine offspring of rage.

4. Sentiments too artificial for a ſerious paſſion. The firſt example is a ſpeech of Piercy expiring.

O, Harry, thou haſt robb'd me of my growth :
I better brook the loſs of brittle life,
Than thoſe proud titles thou haſt won of me ; [fleſh.
They wound my thoughts, worſe than thy ſword my
But thought's the ſlave of life, and life time's fool ;
And time, that takes ſurvey of all the world,
Muſt have a ſtop.
Firſt Part, Henry IV. act 5. *ſc.* 9.

Livy inſerts the following paſſage in a plaintive oration of the Locrenſes, accuſing Pleminius the Roman legate of oppreſſion.

In hoc legato veſtro, nec hominis quicquam eſt, Patres Conſcripti, præter figuram et ſpeciem ; neque Romani civis, præter habitum veſtitumque, et ſonum linguæ Latinæ. Peſtis et bellua immanis, quales fretum, quondam, quo ab Sicilia dividimur, ad perniciem, nigantium circumſediſſe, fabulæ ferunt.
Livy, l. xxix. § 17.

The ſentiments of the *Mourning Bride* are for the moſt part no leſs delicate than juſt copies of nature : in the following exception the picture is beautiful, but too artful to be ſuggeſted by ſevere grief.

Almeria. O no ! Time gives increaſe to my afflictions.
The circling hours, that gather all the woes
Which are diffus'd through the revolving year,
Come heavy laden with th' oppreſſive weight
To me ; with me, ſucceſſively, they leave
The ſighs, the tears, the groans, the reſtleſs cares,
And all the damps of grief, that did retard their flight ;
They ſhake their downy wings, and ſcatter all
The dire collected dews on my poor head ;
Then fly with joy and ſwiftneſs from me. *Act* 1. *ſc.* 1.

In the ſame play, Almeria ſeeing a dead body, which ſhe took to be Alphonſo's, expreſſes ſentiments ſtrained and artificial, which nature ſuggeſts not to any perſon upon ſuch an occaſion :

Had they or hearts or eyes, that did this deed ?
Could eyes endure to guide ſuch cruel hands ?
Are not my eyes guilty alike with theirs,
That thus can gaze, and yet not turn to ſtone ?
—I do not weep ! The ſprings of tears are dry'd,
And of a ſudden I am calm, as if [der'd !
All things were well ; and yet my huſband's mur-

Yes, yes, I know to mourn: I'll ſluice this heart,
The ſource of wo, and let the torrent in.
Act 5. *ſc*. 11.

Lady Trueman. How could you be ſo cruel to defer giving me that joy which you knew I muſt receive from your preſence? You have robb'd my life of ſome hours of happineſs that ought to have been in it.
Drummer, act 5.

Pope's elegy to the memory of an unfortunate lady, expreſſes delicately the moſt tender concern and ſorrow that one can feel for the deplorable fate of a perſon of worth. Such a poem, deeply ſerious and pathetic, rejects with diſdain all fiction. Upon that account, the following paſſage deſerves no quarter; for it is not the language of the heart, but of the imagination indulging its flights at eaſe, and by that means is eminently diſcordant with the ſubject. It would be a ſtill more ſevere cenſure, if it ſhould be aſcribed to imitation, copying indiſcreetly what has been ſaid by others:

What tho' no weeping loves thy aſhes grace,
Nor poliſh'd marble emulate thy face?
What though no ſacred earth allow thee room,
Nor hallow'd dirge be mutter'd o'er thy tomb?
Yet ſhall thy grave with riſing flow'rs be dreſt,
And the green turf lie lightly on thy breaſt:
There ſhall the morn her earlieſt tears beſtow,
There the firſt roſes of the year ſhall blow;
While angels with their ſilver wings o'erſhade
The ground, now ſacred by thy relics made.

5. Fanciful or finical ſentiments. Sentiments that degenerate into point or conceit, however they may amuſe in an idle hour, can never be the offspring of any ſerious or important paſſion. In the *Jeruſalem* of Taſſo, Tancred, after a ſingle combat, ſpent with fatigue and loſs of blood, falls into a ſwoon; in which ſituation, underſtood to be dead, he is diſcovered by Erminia, who was in love with him to diſtraction. A more happy ſituation cannot be imagined, to raiſe grief in an inſtant to its higheſt pitch; and yet, in venting her ſorrow, ſhe deſcends moſt abominably into antitheſis and conceit, even of the loweſt kind:

E in lui verſò d'inefficabil vena
Lacrime, e voce di ſoſpiri miſta.
In che miſero punto hor qui me mena
Fortuna? a che veduta amara e triſta?
Dopo gran tempo i' ti ritrovo à pena
Tancredi, e ti riveggio, e non ſon viſta
Viſta non ſon da te, benche preſente
T trovando ti perdo eternamente.
Canto 19. *ſt*. 105.

Armida's lamentation reſpecting her lover Rinaldo is in the ſame vicious taſte. *Vid.* canto 20. ſtan. 124, 125, 126.

Queen. Give me no help in lamentation,
I am not barren to bring forth complaints:
All ſprings reduce their currents to mine eyes,
That I, being govern'd by the wat'ry moon,
May ſend forth plenteous tears to drown the world,
Ah, for my huſband, for my dear lord Edward.
King Richard III. act 2. *ſc*. 2.

Jane Shore. Let me be branded for the public ſcorn,
Turn'd forth, and driven to wander like a vagabond,
Be friendleſs and forſaken, ſeek my bread
Upon the barren wild and deſolate waſte,
Feed on my ſighs, and drink my falling tears;
Ere I conſent to teach my lips injuſtice,
Or wrong the orphan who has none to ſave him.
Jane Shore, act 4.

Give me your drops, ye ſoft-deſcending rains;
Give me your ſtreams, ye never ceaſing ſprings;
That my ſad eyes may ſtill ſupply my duty,
And feed an everlaſting flood of ſorrow.
Ibid. act 5.

Jane Shore utters her laſt breath in a witty conceit:

Then all is well, and I ſhall ſleep in peace——
'Tis very dark, and I have loſt you now——
Was there not ſomething I would have bequeath'd you?
But I have nothing left me to beſtow,
Nothing but one ſad ſigh. Oh mercy, Heav'n! [*Dies.*
Act 5.

Gilford to Lady Jane Gray, when both were condemned to die:

Thou ſtand'ſt, unmov'd;
Calm temper ſits upon thy beauteous brow;
Thy eyes that flow'd ſo faſt for Edward's loſs,
Gaze unconcern'd upon the ruin round thee,
As if thou hadſt reſolv'd to brave thy fate,
And triumph in the midſt of deſolation.
Ha! ſee, it ſwells, the liquid cryſtal riſes,
It ſtarts in ſpite of thee——but I will catch it,
Nor let the earth be wet with dew ſo rich.
Lady Jane Gray, act 4. *near the end.*

The concluding ſentiment is altogether finical, unſuitable to the importance of the occaſion, and even to the dignity of the paſſion of love.

Corneille, in his *Examen of the Cid*, anſwering an objection, That his ſentiments are ſometimes too much refined for perſons in deep diſtreſs, obſerves, that if poets did not indulge ſentiments more ingenious or refined than are prompted by paſſion, their performances would often be low, and extreme grief would never ſuggeſt but exclamations merely. This is in plain language to aſſert, that forc'd thoughts are more agreeable than thoſe that are natural, and ought to be preferred.

The *ſecond* claſs is of ſentiments that may belong to an ordinary paſſion, but are not perfectly concordant with it, as tinctured by a ſingular character.

In the laſt act of that excellent comedy, *The Careleſs Huſband*, Lady Eaſy, upon Sir Charles's reformation, is made to expreſs more violent and turbulent ſentiments of joy than are conſiſtent with the mildneſs of her character:

Lady Eaſy. O the ſoft treaſure! O the dear reward of long-deſiring love.——Thus! thus to have you mine, is ſomething more than happineſs; 'tis double life, and madneſs of abounding joy.

If the ſentiments of a paſſion ought to be ſuited to a peculiar character, it is ſtill more neceſſary that actions be ſuited to the character. In the 5th act of the *Drummer*, Addiſon makes his gardener act even below the character of an ignorant credulous ruſtic: he gives him the behaviour of a gaping idiot.

The following inſtances are deſcriptions rather than ſentiments, which compoſe a *third* claſs.

Of this deſcriptive manner of painting the paſſions, there is in the *Hippolytus* of Euripides, *act* 5. an illuſtrious inſtance, viz. the ſpeech of Theſeus, upon hearing of his ſon's diſmal exit. In Racine's tragedy of *Eſther*, the queen hearing of the decree iſſued againſt her people, inſtead of expreſſing ſentiments ſuitable to the occaſion, turns her attention upon herſelf, and deſcribes with accuracy her own ſituation:

Juſte ciel! tout mon ſang dans mes veines ſe glace.
Act 1. *ſc*. 3.

Again,

Aman. C'en eſt fait. Mon orgueil eſt forcé de plier.
L'inexorable Aman eſt reduit à prier.
Eſther, act 3. *ſc*. 5.

Athalie. Quel prodige nouveau me trouble et m'embarraſſe?
La douceur de ſa voix, ſon enfance, ſa grace,
Font inſenſiblement à mon inimitié
Succeder——Je ſerois ſenſible à la pitié?
Athalie, act 2. *ſc*. 7.

Titus. O de ma paſſion fureur deſeſperée!
Brutus of Voltaire, act 3. *ſc*. 6.

What other are the foregoing inſtances but deſcribing the paſſion another feels?

Captain Flaſh, in a farce compoſed by Garrick, endeavours to hide his fear by ſaying, "What a damn'd paſſion I am in."

An example is given above of remorſe and deſpair expreſſed by genuine and natural ſentiments. In the fourth book of *Paradiſe Loſt*, Satan is made to expreſs his remorſe and deſpair in ſentiments which, tho' beautiful, are not altogether natural: they are rather the ſentiments of a ſpectator than of a perſon who actually is tormented with theſe paſſions.

The *fourth* claſs is of ſentiments expreſſed too early or too late.

Some examples mentioned above belong to this claſs. Add the following from *Venice Preſerv'd, act* 5. at the cloſe of the ſcene between Belvidera and her father Priuli. The account given by Belvidera of the danger ſhe was in, and of her huſband's threatening to murder her, ought naturally to have alarmed her relenting father, and to have made him expreſs the moſt perturbed ſentiments. Inſtead of which, he diſſolves into tenderneſs and love for his daughter, as if he had already delivered her from danger, and as if there were a perfect tranquillity:

Canſt thou forgive me all my follies paſt!
I'll henceforth be indeed a father; never,
Never more thus expoſe, but cheriſh thee,
Dear as the vital warmth that feeds my life,
Dear as thoſe eyes that weep in fondneſs o'er thee:
Peace to thy heart.

Immoral ſentiments expoſed in their native colours, inſtead of being concealed or diſguiſed, compoſe the *fifth* claſs.

The Lady Macbeth, projecting the death of the king, has the following ſoliloquy.

———— The raven himſelf 's not hoarſe
That croaks the fatal entrance of Duncan
Under my battlements. Come, all you ſpirits
That tend on mortal thoughts, unſex me here,
And fill me from the crown to the toe, top-full
Of direct cruelty; make thick my blood,
Stop up th' acceſs and paſſage to remorſe,
That no compunctious viſitings of nature
Shake my fell purpoſe. *Macbeth, act* 1. *ſc*. 7.

This ſpeech is not natural. A treacherous murder was never perpetrated even by the moſt hardened miſcreant without compunction: and that the lady here muſt have been in horrible agitation, appears from her invoking the infernal ſpirits to fill her with cruelty, and to ſtop up all avenues to remorſe. But in that ſtate of mind, it is a never-failing artifice of ſelf-deceit to draw the thickeſt veil over the wicked action, and to extenuate it by all the circumſtances that imagination can ſuggeſt: and if the crime cannot bear diſguiſe, the next attempt is to thruſt it out of mind altogether, and to ruſh on to action without thought. This laſt was the huſband's method.

Strange things I have in head, that will to hand;
Which muſt be acted ere they muſt be ſcann'd.
Act 3. *ſc*. 5.

The lady follows neither of theſe courſes, but in a deliberate manner endeavours to fortify her heart in the commiſſion of an execrable crime, without even attempting to colour it. This, we think, is not natural; we hope there is no ſuch wretch to be found as is here repreſented.

In the *Pompey* of Corneille, Photine counſels a wicked action in the plaineſt terms without diſguiſe; *act* 1. *ſc*. 1.

In the tragedy of *Eſther*, (*act*. 2. *ſc*. 1.) Haman acknowledges without diſguiſe his cruelty, inſolence, and pride. And there is another example of the ſame kind in the *Agamemnon* of Seneca (beginning of *act* 2.) In the tragedy of *Athalie*, Mathan, in cool blood, relates to his friend many black crimes he had been guilty of, to ſatiſfy his ambition. (*Act* 2. cloſe of *ſc*. 3.)

In Congreve's *Double-dealer*, Maſkwell, inſtead of diſguiſing or colouring his crimes, values himſelf upon them in a ſoliloquy:

Cynthia, let thy beauty gild my crimes; and whatſoever I commit of treachery or deceit, ſhall be imputed to me as a merit. —— Treachery! what treachery? Love cancels all the bonds of friendſhip, and ſets men right upon their firſt foundations.
Act. 2. *ſc* 8.

In French plays, love, inſtead of being hid or diſguiſed, is treated as a ſerious concern, and of greater importance than fortune, family, or dignity. The reaſon may be, that, in the capital of France, love, by the eaſineſs of intercourſe, has dwindled down from a real paſſion, to be a connection that is regulated entirely by the mode or faſhion. This may in ſome meaſure excuſe their writers, but will never make their plays be reliſhed among foreigners.

The *laſt* claſs comprehends ſentiments that are unnatural, as being ſuited to no character nor paſſion. Theſe may be ſubdivided into three branches: firſt, ſentiments unſuitable to the conſtitution of man, and to the laws of his nature; ſecond, inconſiſtent ſentiments; third, ſentiments that are pure rant and extravagance.

When the fable is of human affairs, every event, every incident, and every circumſtance, ought to be natural, otherwiſe the imitation is imperfect. But an imperfect imitation is a venial fault, compared with that of running croſs to nature. In the *Hippolytus* of Euripides, (*act* iv. *ſc.* 5.) Hippolytus, wiſhing for another ſelf in his own ſituation, "How much (ſays he) "ſhould I be touched with his misfortune!" as if it were natural to grieve more for the misfortunes of another than for one's own.

Oſmyn. Yet I behold her—yet—and now no more.
Turn your lights inward, Eyes, and view my thought;
So ſhall you ſtill behold her—'Twill not be.
O impotence of ſight! mechanic ſenſe,
Which to exterior objects ow'ſt thy faculty,
Not ſeeing of election, but neceſſity.
Thus do our eyes, as do all common mirrors,
Succeſſively reflect ſucceeding images.
Nor what they would, but muſt; a ſtar or toad;
Juſt as the hand of chance adminiſters!
Mourning Bride, act 2. *ſc.* 8.

No man, in his ſenſes, ever thought of applying his eyes to diſcover what paſſes in his mind; far leſs of blaming his eyes for not ſeeing a thought or idea. In Moliere's *l'Avare,* (*act* iv. *ſc.* 7.) Harpagon being robbed of his money, ſeizes himſelf by the arm, miſtaking it for that of the robber. And again he expreſſes himſelf as follows:

Je veux aller querir la juſtice, et faire donner la queſtion à toute ma maiſon; à ſervantes, à valets, à fils, à fille, et à moi auſſi.

This is ſo abſurd as ſcarce to provoke a ſmile, if it be not at the author.

Of the ſecond branch the following are examples.

————————Now bid me run,
And I will ſtrive with things impoſſible,
Yea, get the better of them.
Julius Cæſar, act 2. *ſc.* 3.
Vos mains ſeules ont droit de vaincre un invincible.
Le Cid, act 5. *ſc. laſt.*
Que ſon nom ſoit beni. Que ſon nom ſoit chanté.
Que l'on celebre ſes ouvrages
Au de la de l'eternité. *Eſther, act* 5. *ſc. laſt.*

Me miſerable! which way ſhall I fly
Infinite wrath and infinite deſpair?
Which way I fly is hell: myſelf am hell;
And in the *loweſt* deep, a *lower* deep,
Still threat'ning to devour me, opens wide;
To which the hell I ſuffer ſeems a heav'n.
Paradiſe Loſt, book 4.

Of the third branch, take the following ſamples. Lucan talking of Pompey's ſepulchre,

———————— Romanum nomen, et omne
Imperium magno eſt tumuli modus. Obrue ſaxa
Crimine plena deûm. Si tota eſt Herculis Oete,
Et juga tota vacant Bromio Nyſeia; quare
Unus in Egypto Magno lapis? Omnia Lagi
Rura tenere poteſt, ſi nullo ceſpite nomen
Hæſerit. Erremus populi, cinerumque tuorum,
Magne, metu nullas Nili calcemus arenas.
L. viii. *l.* 798.

Thus, in Rowe's tranſlation:

Where there are ſeas, or air, or earth, or ſkies,
Where-e'er Rome's empire ſtretches, Pompey lies.
Far be the vile memorial then convey'd!
Nor let this ſtone the partial gods upbraid.
Shall Hercules all Oeta's heights demand,
And Nyſa's hill for Bacchus only ſtand;
While one poor pebble is the warrior's doom
That fought the cauſe of liberty and Rome?
If Fate decrees he muſt in Egypt lie,
Let the whole fertile realm his grave ſupply,
Yield the wide country to his awful ſhade,
Nor let us dare on any part to tread,
Fearful we violate the mighty dead.

The following paſſages are pure rant. Coriolanus, ſpeaking to his mother,

What is this?
Your knees to me? to your corrected ſon?
Then let the pebbles on the hungry beach
Fillop the ſtars: then let the mutinous winds
Strike the proud cedars 'gainſt the fiery ſun:
Murd'ring impoſſibility, to make
What cannot be, ſlight work.
Coriolanus, act 5. *ſc.* 3.
Cæſar. —— Danger knows full well,
That Cæſar is more dangerous than he.
We were two lions litter'd in one day,
And I the elder and more terrible.
Julius Cæſar, act 2. *ſc.* 4.
Almahide. This day ———
I gave my faith to him, he his to me.
Almanzor. Good Heaven, thy book of fate before me lay
But to tear out the journal of this day.
Or if the order of the world below,
Will not the gap of one whole day allow,
Give me that minute when ſhe made that vow.
That minute ev'n the happy from their bliſs might give,
And thoſe who live in grief a ſhorter time would live,
So ſmall a link, if broke, th' eternal chain
Would like divided waters join again.
Conqueſt of Granada, act 3.
Almanzor. —— ——— ——— I'll hold it faſt
As life; and when life's gone, I'll hold this laſt.
And if thou tak'ſt it after I am ſlain,
I'll ſend my ghoſt to fetch it back again.
Conqueſt of Grenada, part 2. *act* 3.
Lyndiraxa. A crown is come, and will not fate allow,
And yet I feel ſomething like death is near.
My guards, my guards ———
Let not that ugly ſkeleton appear.
Sure Deſtiny miſtakes; this death's not mine;
She doats, and meant to cut another line.
Tell her I am a queen—but 'tis too late;
Dying, I charge rebellion on my fate;
Bow down, ye ſlaves———
Bow quickly down, and your ſubmiſſion ſhow;
I'm pleaſed to taſte an empire ere I go. [*Dies.*
Conqueſt of Granada, part 2. *act* 5.
Ventidius. But you, ere love miſled your wand'ring eyes,
Were ſure the chief and beſt of human race,
Fram'd in the very pride and boaſt of nature,
So perfect, that the gods who form'd you wonder'd
At their own ſkill, and cry'd, A lucky hit
Has mended our deſign. *Dryden, All for Love, act* 1.

Not to talk of the impiety of this ſentiment, it is ludicrous inſtead of being lofty.

The famous epitaph on Raphael is not leſs abſurd than any of the foregoing paſſages:

> Raphael, timuit, quo ſoſpite, vinci,
> Rerum magna parens, et moriente mori.

Imitated by Pope, in his epitaph on Sir Godfrey Kneller:

> Living, great Nature fear'd he might outvie
> Her works; and dying, fears herſelf may die.

Such is the force of imitation; for Pope of himſelf would never have been guilty of a thought ſo extravagant.

SENTINEL, or SENTRY, in military affairs, a private ſoldier placed in ſome poſt to watch the approach of the enemy, to prevent ſurpriſes, to ſtop ſuch as would paſs without orders or diſcovering who they are. They are placed before the arms of all guards, at the tents and doors of general officers, officers, colonels of regiments, &c.

SENTINEL *Perdu*, a ſoldier poſted near an enemy, or in ſome very dangerous poſt where he is in hazard of being loſt.

All ſentinels are to be vigilant on their poſts; neither are they to ſing, ſmoke tobacco, nor ſuffer any noiſe to be made near them. They are to have a watchful eye over the things committed to their charge. They are not to ſuffer any light to remain, or any fire to be made, near their poſts in the night-time; neither is any ſentry to be relieved or removed from his poſt but by the corporal of the guard. They are not to ſuffer any one to touch or handle their arms, or in the night-time to come within ten yards of their poſt.

No perſon is to ſtrike or abuſe a ſentry on his poſt; but when he has committed a crime, he is to be relieved, and then puniſhed according to the rules and articles of war.

A ſentinel, on his poſt in the night, is to know nobody but by the counter-ſign: when he challenges, and is anſwered, *Relief*, he calls out, *Stand, relief! advance, corporal!* upon which the corporal halts his men, and advances alone within a yard of the ſentry's firelock, (firſt ordering his party to reſt, on which the ſentry does the ſame), and gives him the counter-ſign, taking care that no one hear it.

SEPIA, the CUTTLE-FISH, a genus belonging to the order of vermes molluſca. There are eight brachia interſperſed on the interior ſide, with little round ſerrated cups, by the contraction of which the animal lays faſt hold of any thing. Beſides theſe eight arms, it has two tentacula longer than the arms, and frequently pedunculated. The mouth is ſituated in the centre of the arms, and is horny and hooked, like the bill of a hawk. The eyes are below the tentacula, towards the body of the animal. The body is fleſhy, and received into a ſheath as far as the breaſt. There are five ſpecies. See Plate CCLXII.

1. The loligo, or great cuttle, with ſhort arms and long tentacula; the lower part of the body rhomboid and pinnated, the upper thick and cylindric. Inhabit all our ſeas: are gregarious; ſwift in their motions: take their prey by means of their arms; and embracing it, bring it to their central mouth. Adhere to the rocks, when they wiſh to be quieſcent, by means of the concave diſcs that are placed along their arms.

2. The octopodia, with eight arms, connected at their bottom by a membrane. This is the polypus of Pliny, which he diſtinguiſhes from the loligo and ſepia by the want of tentacula. Inhabits our ſeas. In hot climates theſe are found of an enormous ſize. The Indians affirm, that ſome have been ſeen two fathoms broad over their centre, and each arm nine fathoms long. When the Indians navigate their little boats, they go in dread of them; and leſt theſe animals ſhould fling their arms over and ſink them, they never ſail without an ax to cut them off.

3. The media, or middle cuttle, with a long, ſlender, cylindric body; tail finned, pointed, and carinated on each ſide; two long tentacula; the body almoſt tranſparent, green, but convertible into a dirty brown; confirming the remark of Pliny †, that they change their colour through fear, adapting it, chameleon-like, to that of the place they are in. The eyes are large and ſmaragdine.

4. The ſepiola, or ſmall cuttle, with a ſhort body, rounded at the bottom; a round fin on each ſide; two tentacula. Taken off Flintſhire.

5. The officinalis, or official cuttle, with an ovated body; fins along the whole of the ſides, and almoſt meeting at the bottom; two long tentacula; the body contains the bone, the cuttle-bone of the ſhops, which was formerly uſed as an abſorbent. The bones are frequently flung on all our ſhores; the animal very rarely. This emits, (in common with the other ſpecies) when frighted or purſued, the black liquor which the ancients ſuppoſed darkened the circumambient wave, and concealed it from the enemy.

> Th' endanger'd cuttle thus evades his fears,
> And native hoards of fluid ſafety bears.
> A pitchy ink peculiar glands ſupply,
> Whoſe ſhades the ſharpeſt beam of light defy.
> Purſu'd, he bids the ſable fountains flow,
> And, wrapt in clouds, eludes th' impending foe.
> The fiſh retreats unſeen, while ſelf-born night,
> With pious ſhade befriends her parent's flight.

The ancients ſometimes made uſe of it inſtead of ink. Perſius mentions the ſpecies in his deſcription of the noble ſtudent.

> *Jam liber, et bicolor poſitis membrana capillis,*
> *Inque manus chartæ, nodaſque venit arundo.*
> *Tum querimur, craſſus calamo quod pendeat humor;*
> *Nigra quod infuſa veneſcat ſepia lympha.*
> At length, his book he ſpreads, his pen he takes;
> His papers here in learned order lays,
> And there this parchment's ſmoother ſide diſplays.
> But oh! what croſſes wait on ſtudious men!
> The *cuttle's* juice hangs clotted at our pen.
> *In all my life ſuch ſtuff I never knew,*
> *So gummy thick*—Dilute it, it will do.
> *Nay, now 'tis water!* DRYDEN.

This animal was eſteemed a delicacy by the ancients, and is eaten even at preſent by the Italians. Rondeletius gives us two receipts for the dreſſing, which may be continued to this day. Athenæus alſo leaves us the method of making an antique cuttle-fiſh ſauſage; and we learn from Ariſtotle, that thoſe animals are in higheſt ſeaſon when pregnant.

SEPIARIÆ, (from *ſepes*, "a hedge"), the name of the 44th order of Linnæus's Fragments of a Natural Method, conſiſting of a beautiful collection of woody plants, ſome of which, from their ſize and elegance, are

† *Lib.* ix. c. 29.

are very proper furniture for hedges. See Botany, p. 315.

SEPS, in zoology. See Lacerta.

SEPTARIÆ, in natural hiſtory, a large claſs of foſſils, commonly known by the names of *ludus Helmontii* and *waxen veins*.

They are defined to be foſſils not inflammable, nor ſoluble in water; of a moderately firm texture and duſky hue, divided by ſeveral ſepta or thin partitions, and compoſed of a ſparry matter greatly debaſed by earth; not giving fire with ſteel; fermenting with acids, and in great part diſſolved by them; and calcining in a moderate fire.

Of this claſs there are two diſtinct orders of bodies, and under thoſe ſix genera. The ſeptariæ of the firſt order are thoſe which are uſually found in large maſſes, of a ſimple uniform conſtruction, but divided by large ſepta either into larger and more irregular portions, or into ſmaller and more equal ones, called *talc*. The genera of this order are four: 1. Thoſe divided by ſepta or ſpar, called *ſecomiæ*: 2. Thoſe divided by ſepta of earthy matter, called *gaiophragmia*: 3. Thoſe divided by ſepta of the matter of the pyrites, called *pyritercia*: And, 4. Thoſe divided by ſepta of ſpar, with an admixture of cryſtal, called *diaugophragmia*.

Thoſe of the ſecond order are ſuch as are uſually found in ſmaller maſſes, of a cruſtated ſtructure, formed by various incruſtations round a central nucleus, and divided by very thin ſepta. Of this order are only two genera. 1. Thoſe with a ſhort roundiſh nucleus, incloſed within the body of the maſs; and, 2. Thoſe with a long nucleus, ſtanding out beyond the ends of the maſs.

SEPTEMBER, the ninth month of the year, conſiſting of only thirty days: it took its name as being the ſeventh month, reckoning from March, with which the Romans began their year.

SEPTENNIAL, any thing laſting ſeven years.

Septennial *Elections*. Blackſtone, in his Commentaries, Vol. I. p. 189. ſays, (after obſerving that the utmoſt extent of time allowed the ſame parliament to ſit by the ſtat. 6 W. and M. c. 2. was three years), "But, by the ſtatute 1 Geo. I. ſt. 2. c. 38. (in order *profeſſedly* to prevent the great and continued expences of frequent elections, and the violent heats and animoſities conſequent thereupon, and for the peace and ſecurity of the government, juſt then recovering from the late rebellion), this term was prolonged to ſeven years; and what alone is an inſtance of the vaſt authority of parliament, the very ſame houſe that was choſen for three years enacted its own continuance for ſeven."

SEPTENTRIO, in aſtronomy, a conſtellation, more uſually called *urſa minor*.

In coſmography, the term *ſeptentrio* denotes the ſame with *north*: and hence ſeptentrional is applied to any thing belonging to the north; as *ſeptentrional ſigns, parallels*, &c.

SEPTICS, are thoſe ſubſtances which promote putrefaction, chiefly the calcareous earths, magneſia, and teſtaceous powders. Dr Pringle has reckoned common ſalt among the ſeptic ſubſtances; but later obſervations give reaſon to believe, that it is only in conſequence of its impurities that ſalt acts in this manner, it being highly probable that all pure ſalts are antiſeptic.

SEPTIZON, or Septizonium, in Roman antiquity, a celebrated mauſoleum, built by Septimus Severus, in the tenth region of the city of Rome: it was ſo called from *ſeptem* and *zona*, by reaſon it conſiſted of ſeven ſtories, each of which was ſurrounded by a row of columns.

SEPTUAGESIMA, in the kalendar, denotes the third Sunday before Lent, or before Quadrageſima Sunday: ſuppoſed by ſome to take its name from its being about ſeventy days before Eaſter.

SEPTUAGINT, the name given to a Greek verſion of the books of the Old Teſtament, from its being ſuppoſed to be performed by ſeventy-two Jews, who are uſually called the *ſeventy interpreters*, becauſe ſeventy is a round number.

The hiſtory of this verſion is expreſsly written by Ariſtæas, an officer of the guards to Ptolemy Philadelphus, the ſubſtance of whoſe account is as follows: Ptolemy having erected a fine library at Alexandria, which he took care to fill with the moſt curious and valuable books from all parts of the world, was informed that the Jews had one containing the laws of Moſes, and the hiſtory of that people; and being deſirous of enriching his library with a Greek tranſlation of it, applied to the high-prieſt of the Jews; and to engage him to comply with his requeſt, ſet at liberty all the Jews whom his father Ptolemy Soter had reduced to ſlavery. After ſuch a ſtep, he eaſily obtained what he deſired; Eleazar the Jewiſh high-prieſt ſent back his ambaſſadors with an exact copy of the moſaical law, written in letters of gold, and ſix elders of each tribe, in all ſeventy-two; who were received with marks of reſpect by the king, and then conducted into the iſle of Pharos, where they were lodged in a houſe prepared for their reception, and ſupplied with every thing neceſſary in abundance. They ſet about the tranſlation without loſs of time, and finiſhed it in ſeventy-two days: and the whole being read in the preſence of the king, he admired the profound wiſdom of the laws of Moſes; and ſent back the deputies laden with preſents, for themſelves, the high-prieſt, and the temple.

This verſion was in uſe to the time of our bleſſed Saviour, and is that out of which all the citations in the New Teſtament, from the Old, are taken. It was alſo the ordinary and canonical tranſlation made uſe of by the Chriſtian church in the earlieſt ages; and it ſtill ſubſiſts in the churches both of the eaſt and weſt. It is however obſervable, that the chronology of the ſeptuagint is different from the Hebrew text.

SEPTUM, in anatomy, an incloſure, or partition; a term applied to ſeveral parts of the body, which ſerve to ſeparate one part from another; as, *ſeptum narium*, or partition between the noſtrils, &c.

SEPULCHRAL, ſomething belonging to ſepulchres or tombs: thus a ſepulchral column is a column erected over a tomb, with an inſcription on its ſhaft; and ſepulchral lamps, thoſe ſaid to have been found burning in the tombs of ſeveral martyrs and others. See Lamp.

SEPULCHRE, a tomb or place deſtined for the interment of the dead. This term is chiefly uſed in ſpeaking of the burying-places of the ancients, thoſe of the moderns being uſually called *tombs*.

Sepulchres were held ſacred and inviolable; and the care taken of them has always been held a religious duty, grounded on the fear of God, and the belief of the ſoul's immortality. Thoſe who have ſearched or violated them, have been thought odious by all nations, and were always ſeverely puniſhed.

The Egyptians called ſepulchres *eternal houſes*, in contradiſtinction to their ordinary houſes or palaces, which they called *inns*, on account of their ſhort ſtay in the one, in compariſon of their long abode in the other.

Regular Canons of St SEPULCHRE, a religious order, formerly inſtituted at Jeruſalem, in honour of the holy ſepulchre, or the tomb of Jeſus Chriſt.

Many of theſe canons were brought from the Holy Land into Europe, particularly into France, by Lewis the younger; into Poland, by Jaxa a Poliſh gentleman; and into Flanders, by the counts thereof; many alſo came into England. This order was, however, ſuppreſſed by pope Innocent VIII. who gave its revenues and effects to that of our Lady of Bethlehem: which alſo becoming extinct, they were beſtowed on the knights of St John of Jeruſalem. But the ſuppreſſion did not take effect in Poland, where they ſtill ſubſiſt, as alſo in ſeveral provinces of Germany. Theſe canons follow the rule of St Auguſtine.

Knights of the Holy SEPULCHRE, a military order, eſtabliſhed in Paleſtine about the year 1114.

The knights of this order in Flanders choſe Philip II. king of Spain, for their maſter, in 1558, and afterwards his ſon; but the grand-maſter of the order of Malta prevailed on the laſt to reſign: and when afterwards the duke of Nevers aſſumed the ſame quality in France, the ſame grand-maſter, by his intereſt and credit, procured a like renunciation of him, and a confirmation of the union of this order to that of Malta.

SEQUANI, a people anciently forming a part of Gallia Celtica, but annexed to Belgica by Auguſtus, ſeparated from the Helvetii by mount Jura, with the Rhine on the eaſt (Strabo), bordering on the Ædui, and Seguſtiano to the ſouth, and Lingones to the weſt, (Tacitus). Now the Franche Comte.

SEQUESTRATION, in common law, is ſetting aſide the thing in controverſy from the poſſeſſion of both the parties that contend for it. In which ſenſe it is either voluntary, as when done by the conſent of the parties; or neceſſary, as where it is done by the judge, of his own authority, whether the parties will or not.

A ſequeſtration is alſo a kind of extent on an execution for debt, in the caſe of a beneficed clergyman, of the profits of his living, directed to the churchwardens to receive the ſame to ſatisfy the judgment.

Sequeſtration is granted on a perſon's ſtanding out, and all the proceſſes of contempt for non-appearance in the court of chancery, or exchequer, upon a bill exhibited; and alſo where obedience is not yielded to a decree, in which caſe the court grants a ſequeſtration of the party's lands.

A ſequeſtration is alſo made, in London, upon an action of debt; the courſe of proceeding in which caſe is this: The action being entered, the officer goes to the defendant's ſhop or warehouſe, when no perſon is there, and takes a padlock, and hangs it on the door, uttering theſe words: "I do ſequeſter this warehouſe, and the goods and merchandiſe therein, of the defendant in this action, to the uſe of the plaintiff," &c. after which he ſets on his ſeal, and makes a return of the ſequeſtration in the compter; and four days being paſſed after the return made, the plaintiff may, at the next court, have judgment to open the ſhop or warehouſe, and to have the goods appraiſed by two freemen, who are to be ſworn at the next court held for that compter; and then the ſerjeant puts his hand to the bill of appraiſement, and the court grants judgment thereon: but yet the defendant may put in bail before ſatisfaction, and by that means diſſolve the ſequeſtration; and after ſatisfaction, may put in bail to diſprove the debt, &c.

In the time of the civil wars, ſequeſtration was uſed for a ſeizing of the eſtates of delinquents for the uſe of the commonwealth.

SEQUESTRATION, in Scots law. See LAW, N° clxxii. 10. and clxxiii. 12.

SEQUIN, a gold coin, ſtruck at Venice, and in ſeveral parts of the grand ſignior's dominions. See the article COIN.

SERAGLIO, a Perſian word, which ſignifies the "palace of a prince or lord;" in which ſenſe the houſes of the ambaſſadors of Britain, France, &c. are, at Conſtantinople, called their *ſeraglios*. But the term *ſeraglio* is uſed, by way of eminence, for the palace of the grand ſignior at Conſtantinople, where he keeps his court, in which his concubines are lodged, and where the youth are trained up for the principal poſts of the empire. It is in form of a triangle, about two miles round, at the end of the promontory Chryſoceras, now called the *ſeraglio point*: the buildings extend to the top of the hill, and from thence there are gardens that reach to the ſea. The outward appearance is not very beautiful, the architecture being irregular, conſiſting of ſeparate edifices in the manner of pavilions and domes. The old ſeraglio is the palace where the grand ſignior's old miſtreſſes are kept.

The ladies of the haram, which is the part allotted to the women, are a collection of young beautiful girls, who, on their admiſſion, are committed to the charge of ſome old lady, and taught muſic, dancing, and other accompliſhments. Theſe frequently play and dance before the grand ſignior, while others entertain him with their converſation. Beſides theſe ladies, there are a great many black eunuchs and female ſlaves in the ſeraglio, whoſe buſineſs it is to guard and wait upon them.

SERAPH, or SERAPHIM, a ſpirit of the higheſt rank in the hierarchy of angels; who are thus called from their being ſuppoſed to be moſt inflamed with divine love, by their nearer and more immediate attendance at the throne of God, and to communicate their fervour to the remoter and inferior orders. See ANGEL.

SERAPHIC, burning or inflamed with love or zeal, like a ſeraphim: thus St Bonaventure is called the *ſeraphic doctor*, from his abundant zeal and fervour.

SERAPION, a phyſician of Alexandria. He and

Philinus of the iſle of Cos were both ſcholars of Herophilus, and were founders of the Empiric ſect; which happened about 287 B. C.

SERENADE, a kind of concert given in the night by a lover to his miſtreſs, under her window. Theſe ſometimes only conſiſt of inſtrumental muſic, but at other times voices are added: the muſic and ſongs compoſed for theſe occaſions are alſo called *ſerenades*.

SERENE, a title of honour given to ſeveral princes, and to the principal magiſtrates of republics. The king of England, the republic and doge of Venice, and the children of the king of Spain, are called *moſt ſerene*; and when the pope or the ſacred college write to the emperor, to kings, or to the doge, they give them no other title. In like manner, the emperor gives no other title to any king, except to the king of France.

SERENUS (Sammonicus), a celebrated phyſician in the reigns of the emperors Severus and Caracalla, in and about the year 200. He wrote ſeveral treatiſes on hiſtory and the works of nature; but there is only one of them extant, which is a very indifferent poem on the Remedies of Diſeaſes. He was murdered at a feſtival by the order of Caracalla. He had a library that contained 62,000 volumes, which Quintus Serenus Sammonicus his ſon gave to Gordian the Younger, to whom he was preceptor.

SERES, (Ptolemy); a people of the Farther Aſia; bounded on the weſt by Scythia extra Imaum; on the north and eaſt, by Terra Incognita; and on the ſouth, by India extra Gangem. According to theſe limits, their country anſwers nearly to Cathoy or North China. Other authors vary greatly in placing them, though the generality agree in placing them far to the eaſt. Mela places them between the Indi and Scythæ; and perhaps beyond the Indi, if we diſtinguiſh the Sinæ from them. The ancients commend them for their cotton manufactures, different from the produce of the bombyces or ſilk-worms, called *ſeres* by the Greeks; whence *ſerica*, "ſilk."

SERGE, a woollen ſtuff, manufactured in a loom; of which there are various kinds, denominated either from their different qualities, or from the places where they are wrought. The moſt conſiderable is the London ſerge, which is highly valued abroad; and of which a manufacture has for ſome years been carried on in France.

SERGEANT, or SERJEANT *at Law*, or *of the Coif*, is the higheſt degree taken at the common law, as that of Doctor is of the civil law; and as theſe are ſuppoſed to be the moſt learned and experienced in the practice of the courts, there is one court appointed for them to plead in by themſelves, which is the common pleas, where the common law of England is moſt ſtrictly obſerved: but they are not reſtricted from pleading in any other court, where the judges, who cannot have that honour till they have taken the degree of ſerjeant at law, call them *brothers*.

SERGEANT *at Arms*, or *Mace*, an officer appointed to attend the perſon of the king; to arreſt traitors, and ſuch perſons of quality as offend; and to attend the lord high ſteward, when ſitting in judgment on a traitor.—The number of theſe officers is by ſtatute limited to 30.

SERGEANT, in war, is an inferior officer in a company of foot or troop of dragoons, armed with an halbert, and appointed to ſee diſcipline obſerved, to teach the ſoldiers the exerciſe of their arms, to order, ſtraiten, and form their ranks, files, &c. He receives the orders from the adjutant, which he communicates to his officers. Each company generally has two ſergeants.

SERGEANTY (*Serjeantia*), ſignifies, in law, a ſervice that cannot be due by a tenant to any lord but the king; and this is either *grand ſerjeanty*, or *petit*. The firſt is a tenure by which the one holds his lands of the king by ſuch ſervices as he ought to do in perſon to the king at his coronation; and may alſo concern matters military, or ſervices of honour in peace; as to be the king's butler, carver, &c. *Petit ſerjeanty* is where a man holds lands of the king to furniſh him yearly with ſome ſmall thing towards his wars; and in effect payable as rent. Though all tenures are turned into *ſocage* by the 12 Car. II. cap. 24; yet the honorary ſervices of grand ſerjeanty ſtill remain, being therein excepted. See KNIGHT-*Service*.

SERIES, in general, denotes a continued ſucceſſion of things in the ſame order, and having the ſame relation or connection with each other: in this ſenſe we ſay, a ſeries of emperors, kings, biſhops, &c.

In natural hiſtory, a ſeries is uſed for an order or ſubdiviſion of ſome claſs of natural bodies; comprehending all ſuch as are diſtinguiſhed from the other bodies of that claſs, by certain characters which they poſſeſs in common, and which the reſt of the bodies of that caſt have not.

SERIES, in mathematics, is a number of terms, whether of numbers or quantities, increaſing or decreaſing in a given proportion.

SERIPHUS (anc. geog.) one of the Cyclades or iſlands in the Egean ſea, called *Saxum Seriphium* by Tacitus, as if all a rock; one of the uſual places of baniſhment among the Romans. The people, *Seriphii*; who, together with the Siphnii, joined Greece againſt Xerxes, and were almoſt the only iſlanders who refuſed to give him earth and water in token of ſubmiſſion, (Herodotus). *Seriphia Rena*, a proverbial ſaying concerning a perſon who can neither ſing nor ſay; frogs in this iſland being ſaid to be dumb, (Pliny).

SEROSITY, in medicine, denotes an over-abundance of ſerum.

SERPENS, in aſtronomy, a conſtellation of the northern hemiſphere, conſiſting of 17 ſtars, according to Ptolemy; of 19, according to Tycho; and of 59 in the Britannic catalogue.

SERPENS *Biceps*, or *Double-headed Snake*; a monſter of the ſerpent kind, there being no permanent ſpecies of this conformation. That repreſented on Plate CCLXII. and copied from Edwards, came from the iſland of Barbadoes; and was ſaid to have been taken out of an egg of the ſize of a ſmall pullet's egg, by a man who found it under-ground as he was digging. The heads were not in an horizontal poſition when the ſnake lay on its belly, but inclined to each other on their under-ſides, leaving an opening for the throat to come in between the two heads underneath, as is expreſſed at A. The upper-ſide, for the whole length, was covered with ſmall ſcales, falling one over another; the belly was covered with ſingle ſcales running acroſs it, in the form of half rings. It was all over of a yellowiſh

lowiſh colour, without any ſpots or variation. Mr Edwards alſo informs us that a perſon brought to him a common Engliſh ſnake, which had two heads quite ſeparate from each other, the necks parting about an inch from the head.

SERPENT, *Serpens*, in zoology, a general term for all amphibious animals without legs. See Coluber, Boa, Anguis, Cæcilia, Amphisbæna, Crotalus, &c.

The ſerpent has from the beginning been the enemy of man; and it has hitherto continued to terrify and annoy him, notwithſtanding all the arts which have been practiſed to deſtroy it. Formidable in itſelf, it deters the invader from the purſuit; and from its figure, capable of finding ſhelter in a little ſpace, it is not eaſily diſcovered by thoſe who would venture to try the encounter. Thus poſſeſſed at once of potent arms and inacceſſible or ſecure retreats, it baffles all the arts of man, though ever ſo earneſtly bent upon its deſtruction. For this reaſon, there is ſcarce a country in the world that does not ſtill give birth to this poiſonous brood, that ſeem formed to quell human pride, and repreſs the boaſts of ſecurity. Mankind have driven the lion, the tiger, and the wolf, from their vicinity; but the ſnake and the viper ſtill defy their power.

Their numbers, however, are thinned by human aſſiduity; and it is poſſible ſome of the kinds are wholly deſtroyed. In none of the countries of Europe are they ſufficiently numerous to be truly terrible. The various malignity that has been aſcribed to European ſerpents of old, is now utterly unknown; there are not above three or four kinds that are dangerous, and their poiſon operates in all in the ſame manner †. The drowſy death, the ſtarting of the blood from every pore, the inſatiable and burning thirſt, the melting down the ſolid maſs of the whole form into one heap of putrefaction, ſaid to be occaſioned by the bites of African ſerpents, are horrors with which we are entirely unacquainted.

But though we have thus reduced theſe dangers, having been incapable of wholly removing them, in other parts of the world they ſtill rage with all their ancient malignity. In the warm countries that lie within the tropic, as well as in the cold regions of the north, where the inhabitants are few, the ſerpents propagate in equal proportion. But of all countries, thoſe regions have them in the greateſt abundance where the fields are unpeopled and fertile, and where the climate ſupplies warmth and humidity. All along the ſwampy banks of the river Niger or Oroonoko, where the ſun is hot, the foreſts thick, and the men but few, the ſerpents cling among the branches of the trees in infinite numbers, and carry on an unceaſing war againſt all other animals in their vicinity. Travellers have aſſured us, that they have often ſeen large ſnakes twining round the trunk of a tall tree, encompaſſing it like a wreath, and thus riſing and deſcending at pleaſure. We are not, therefore, to reject as wholly fabulous the accounts left us by the ancients of the terrible devaſtations committed by a ſingle ſerpent. It is probable, in early times, when the arts were little known, and mankind were but thinly ſcattered over the earth, that ſerpents, continuing undiſturbed poſſeſſors of the foreſt, grew to an amazing magnitude; and every other tribe of animals fell before them. It then might have happened, that ſerpents reigned the tyrants of a diſtrict for centuries together. To animals of this kind, grown by time and rapacity to 100 or 150 feet in length, the lion, the tiger, and even the elephant itſelf, were but feeble opponents. That horrible fætor, which even the commoneſt and the moſt harmleſs ſnakes are ſtill found to diffuſe, might, in theſe larger ones, become too powerful for any living being to withſtand; and while they preyed without diſtinction, they might thus alſo have poiſoned the atmoſphere around them. In this manner, having for ages lived in the hidden and unpeopled foreſt, and finding, as their appetites were more powerful, the quantity of their prey decreaſing, it is poſſible they might venture boldly from their retreats into the more cultivated parts of the country, and carry conſternation among mankind, as they had before deſolation among the lower ranks of nature. We have many hiſtories of antiquity, preſenting us ſuch a picture; and exhibiting a whole nation ſinking under the ravages of a ſingle ſerpent. At that time man had not learned the art of uniting the efforts of many to effect one great purpoſe. Oppoſing multitudes only added new victims to the general calamity, and increaſed mutual embarraſſment and terror. The animal was therefore to be ſingly oppoſed by him who had the greateſt ſtrength, the beſt armour, and the moſt undaunted courage. In ſuch an encounter, hundreds muſt have fallen; till one, more lucky than the reſt, by a fortunate blow, or by taking the monſter in its torpid interval, and ſurcharged with ſpoil, might kill, and thus rid his country of the deſtroyer. Such was the original occupation of heroes; and thoſe who firſt obtained that name, from their deſtroying the ravagers of the earth, gained it much more deſervedly than their ſucceſſors, who acquired their reputation only for their ſkill in deſtroying each other. But as we deſcend into more enlightened antiquity, we find theſe animals leſs formidable, as being attacked in a more ſucceſsful manner. We are told, that while Regulus led his army along the banks of the river Bagrada in Africa, an enormous ſerpent diſputed his paſſage over. We are aſſured by Pliny, who ſays that he himſelf ſaw the ſkin, that it was 120 feet long, and that it had deſtroyed many of the army. At laſt, however, the battering engines were brought out againſt it; and theſe aſſailing it at a diſtance, it was ſoon deſtroyed. Its ſpoils were carried to Rome, and the general was decreed an ovation for his ſucceſs. There are, perhaps, few facts better aſcertained in hiſtory than this: an ovation was a remarkable honour; and was given only for ſome ſignal exploit that did not deſerve a triumph: no hiſtorian would offer to invent that part of the ſtory at leaſt, without being ſubject to the moſt ſhameful detection. The ſkin was kept for ſeveral years after in the Capitol; and Pliny ſays he ſaw it there. At preſent, indeed, ſuch ravages from ſerpents are ſcarce ſeen in any part of the world; not but that, in Africa and America, ſome of them are powerful enough to brave the aſſaults of men to this day.

Nequent expleri corda tuendo
Terribiles occulos villoſaque ſetis pectore.

If we take a ſurvey of ſerpents in general, they have marks by which they are diſtinguiſhed from all the reſt of animated nature. They have the length and the ſuppleneſs of the eel, but want fins to ſwim with; they

† See *Poiſon*.

Serpent.

have the ſcaly covering and pointed tail of the lizard, but they want legs to walk with; they have the crawling motion of the worm, but, unlike that animal, they have lungs to breathe with: like all the reptile kind, they are reſentful when offended; and nature has ſupplied them with terrible arms to revenge every injury.

Though they are poſſeſſed of very different degrees of malignity, yet they are all formidable to man, and have a ſtrong ſimilitude of form to each other. With reſpect to their conformation, all ſerpents have a very wide mouth in proportion to the ſize of the head; and what is very extraordinary, they can gape and ſwallow the head of another animal which is three times as big as their own. However, it is no way ſurpriſing that the ſkin of the ſnake ſhould ſtretch to receive ſo large a morſel; the wonder ſeems how the jaws could take it in. To explain this, it muſt be obſerved, that the jaws of this animal do not open as ours, in the manner of a pair of hinges, where bones are applied to bones and play upon one another: on the contrary, the ſerpent's jaws are held together at the roots by a ſtretching muſcular ſkin; by which means they open as widely as the animal chooſes to ſtretch them, and admit of a prey much thicker than the ſnake's own body. The throat, like ſtretching leather, dilates to admit the morſel; the ſtomach receives it in part, and the reſt remains in the gullet, till putrefaction and the juices of the ſerpent's body unite to diſſolve it.

Some ſerpents have fangs or canine teeth, and others are without them. The teeth in all are crooked and hollow; and, by a peculiar contrivance, are capable of being erected or depreſſed at pleaſure.

The eyes of all ſerpents are ſmall, if compared to the length of the body; and though differently coloured in different kinds, yet the appearance of all is malign and heavy; and, from their known qualities, they ſtrike the imagination with the idea of a creature meditating miſchief. In ſome, the upper eye-lid is wanting, and the ſerpent winks only with that below; in others, the animal has a nictitating membrane or ſkin, reſembling that which is found in birds, which keeps the eye clean and preſerves the ſight. The ſubſtance of the eye in all is hard and horny; the cryſtalline humour occupying a great part of the globe.

The holes for hearing are very viſible in all: but there are no conduits for ſmelling; though it is probable that ſome of them enjoy that ſenſe in tolerable perfection.

The tongue in all theſe animals is long and forky. It is compoſed of two long fleſhy ſubſtances, which terminate in ſharp points, and are very pliable. At the root it is connected very ſtrongly to the neck by two tendons, that give it a variety of play. Some of the viper kind have tongues a fifth part of the length of their bodies; they are continually darting them out; but they are entirely harmleſs, and only terrify thoſe who are ignorant of the real ſituation of their poiſon.

If from the jaws we go on to the gullet, we ſhall find it very wide for the animal's ſize, and capable of being diſtended to a great degree; at the bottom of this lies the ſtomach, which is not ſo capacious, and receives only a part of the prey, while the reſt continues in the gullet for digeſtion. When the ſubſtance in the ſtomach is diſſolved into chyle, it paſſes into the inteſtines, and from thence goes to nouriſhment, or to be excluded by the vent.

Serpent.

Like moſt other animals, ſerpents are furniſhed with lungs, which we ſuppoſe are ſerviceable in breathing, though we cannot perceive the manner in which this operation is performed; for though ſerpents are often ſeen apparently to draw in their breath, yet we cannot find the ſmalleſt ſigns of their ever reſpiring it again. Their lungs, however, are long and large, and doubtleſs are neceſſary to promote their languid circulation. The heart is formed as in the tortoiſe, the frog, and the lizard kinds, ſo as to work without the aſſiſtance of the lungs. It is ſingle; the greateſt part of the blood flowing from the great vein to the great artery by the ſhorteſt courſe. By this contrivance of nature we eaſily gather two conſequences; that ſnakes are amphibious, being equally capable of living on land and in the water; and that alſo they are torpid in winter, like the bat, the lizard, and other animals formed in the ſame manner.

The vent in theſe animals ſerves for the emiſſion of the urine and the fæces, and for the purpoſes of generation. The inſtrument of generation in the male is double, being forked like the tongue: the ovaries in the female are double alſo; and the aperture is very large, in order to receive the double inſtrument of the male. They copulate in their retreats; and it is ſaid by the ancients, that in this ſituation they appear like one ſerpent with two heads.

As the body of this animal is long, ſlender, and capable of bending in every direction, the number of joints in the back-bone are numerous beyond what one would imagine. In the generality of quadrupeds, they amount to not above 30 or 40; in the ſerpent kind they amount to 145 from the head to the vent, and 25 more from that to the tail. The number of theſe joints muſt give the back-bone a ſurpriſing degree of pliancy; but this is ſtill increaſed by the manner in which each of theſe joints are locked into the other. In man and quadrupeds, the flat ſurfaces of the bones are laid one againſt the other, and bound tight by ſinews; but in ſerpents, the bones play one within the other like ball and ſocket, ſo that they have full motion upon each other in every direction.

Though the number of joints in the back-bone is great, yet that of the ribs is ſtill greater; for, from the head to the vent, there are two ribs to every joint, which makes their number 290 in all. Theſe ribs are furniſhed with muſcles, four in number; which being inſerted into the head, run along to the end of the tail, and give the animal great ſtrength and agility in all its motions.

The ſkin alſo contributes to its motions, being compoſed of a number of ſcales, united to each other by a tranſparent membrane, which grows harder as it grows older, until the animal changes, which is generally done twice a-year. This cover then burſts near the head, and the ſerpent creeps from it by an undulatory motion, in a new ſkin, much more vivid than the former. If the old ſlough be then viewed, every ſcale will be diſtinctly ſeen like a piece of net-work, and will be found greateſt where the part of the body they covered was largeſt.

There is much geometrical neatneſs in the diſpoſal of the ſerpent's ſcales, for aſſiſting the animal's ſinuous motion. As the edges of the foremoſt ſcales lie over the ends of their following ſcales, ſo thoſe edges, when the ſcales are erected, which the animal has a power of doing in a ſmall degree, catch in the ground, like the nails in the wheel of a chariot, and ſo promote and facilitate the animal's progreſſive motion. The erecting theſe ſcales is by means of a multitude of diſtinct muſcles with which each is ſupplied, and one end of which is tacked each to the middle of the foregoing.

In ſome of the ſerpent kind there is the exacteſt ſymmetry in theſe ſcales; in others they are diſpoſed more irregularly. In ſome there are larger ſcales on the belly, and often anſwering to the number of ribs; in others, however, the animal is without them. Upon this ſlight difference, Linnæus has founded his diſtinctions of the various claſſes of the ſerpent tribe.

When we come to compare ſerpents with each other, the firſt great diſtinction appears in their ſize; no other tribe of animals differing ſo widely in this particular. This tribe of animals, like that of fiſhes, ſeems to have no bounds put to their growth: their bones are in a great meaſure cartilaginous, and they are conſequently capable of great extenſion: the older, therefore, a ſerpent becomes, the larger it grows; and as they ſeem to live to a great age, they arrive at an enormous ſize.

Leguat aſſures us, that he ſaw one in Java that was 50 feet long. Carli mentions their growing to above 40 feet; and we have now the ſkin of one in the Britiſh Muſæum that meaſures 32. Mr Wentworth, who had large concerns in the Berbices in America, aſſures us, that in that country they grow to an enormous length. He one day ſent out a ſoldier, with an Indian, to kill wild-fowl for the table; and they accordingly went ſome miles from the fort: in purſuing their game, the Indian, who generally marched before, beginning to tire, went to reſt himſelf upon the fallen trunk of a tree, as he ſuppoſed it to be; but when he was juſt going to ſit down, the enormous monſter began to move; and the poor ſavage perceiving that he had approached a boa, the greateſt of all the ſerpent kind, dropped down in an agony. The ſoldier, who perceived at ſome diſtance what had happened, levelled at the ſerpent's head, and by a lucky aim ſhot it dead: however, he continued his fire until he was aſſured that the animal was killed; and then going up to reſcue his companion, who was fallen motionleſs by its ſide, he, to his aſtoniſhment, found him dead likewiſe, being killed by the fright. Upon his return to the fort, and telling what had happened, Mr Wentworth ordered the animal to be brought up, when it was meaſured, and found to be 36 feet long. He had the ſkin ſtuffed, and then ſent to Europe as a preſent to the prince of Orange, in whoſe cabinet it is now to be ſeen at the Hague; but the ſkin is ſhrunk, by drying, two or three feet. In the Eaſt Indies they grow alſo to an enormous ſize, particularly in the iſland of Java, where, we are aſſured, that one of them will deſtroy and devour a buffalo. See Boa.

But it is happy for mankind that the rapacity of theſe frightful creatures is often their puniſhment; for whenever any of the ſerpent kind have gorged themſelves in this manner, whenever their body is ſeen particularly diſtended with food, they then become torpid, and may be approached and deſtroyed with ſafety. Patient of hunger to a ſurpriſing degree, whenever they ſeize and ſwallow their prey, they ſeem, like ſurfeited gluttons, unwieldy, ſtupid, helpleſs, and ſleepy: they at that time ſeek ſome retreat, where they may lurk for ſeveral days together, and digeſt their meal in ſafety: the ſmalleſt effort at that time is capable of deſtroying them; they can ſcarce make any reſiſtance; and they are equally unqualified for flight or oppoſition: that is the happy opportunity of attacking them with ſucceſs; at that time the naked Indian himſelf does not fear to aſſail them. But it is otherwiſe when this ſleepy interval of digeſtion is over; they then iſſue, with famiſhed appetites, from their retreats, and with accumulated terrors, while every animal of the foreſt flies before them.

Carli deſcribes the long ſerpent of Congo, making its track through the tall graſs, like mowers in a ſummer's day. He could not without terror behold whole lines of graſs lying levelled under the ſweep of its tail. In this manner it moved forward with great rapidity, until it found a proper ſituation frequented by its prey: there it continued to lurk, in patient expectation; and would have remained for weeks together, had it not been diſturbed by the natives.

Other creatures have a choice in their proviſion: but the ſerpent indiſcriminately preys upon all; the buffalo, the tiger, and the gazelle. One would think that the porcupine's quills might be ſufficient to protect it; but whatever has life, ſerves to appeaſe the hunger of theſe devouring creatures: porcupines, with all their quills, have frequently been found in their ſtomachs when killed and opened; nay, they moſt frequently are ſeen to devour each other.

A life of ſavage hoſtility in the foreſt, offers the imagination one of the moſt tremendous pictures in nature. In thoſe burning countries, where the ſun dries up every brook for hundreds of miles round; when what had the appearance of a great river in the rainy ſeaſon, becomes, in ſummer, one dreary bed of ſand; in thoſe countries, a lake that is never dry, or a brook that is perennial, is conſidered by every animal as the greateſt convenience of nature. When they have diſcovered this, no dangers can deter them from attempting to ſlake their thirſt. Thus the neighbourhood of a rivulet, in the heart of the tropical continents, is generally the place where all the hoſtile tribes of nature draw up for the engagement. On the banks of this little envied ſpot, thouſands of animals of various kinds are ſeen venturing to quench their thirſt, or preparing to ſeize their prey. The elephants are perceived in a long line, marching from the darker parts of the foreſt; the buffalos are there, depending upon numbers for ſecurity; the gazells relying ſolely upon their ſwiftneſs; the lion and tiger waiting a proper opportunity to ſeize; but chiefly the larger ſerpents are upon guard there, and defend the acceſſes of the lake. Not an hour paſſes without ſome dreadful combat; but the ſerpent, defended by its ſcales, and naturally capable of ſuſtaining a multitude of wounds, is, of all others, the moſt formidable. It is the moſt wakeful alſo; for the whole tribe ſleep with their eyes open, and are conſequently for ever upon the watch; ſo that, till their rapacity is ſatisfied, few other animals will venture to approach their ſtation.

But though theſe animals are of all others the moſt voracious; and though the morſel which they ſwallow without chewing, is greater than what any other creature, either by land or water, can devour; yet no animals upon earth bear abſtinence ſo long as they. A ſingle meal, with many of the ſnake kind, ſeems to be the adventure of a ſeaſon; it is an occurrence, of which they have been for weeks, nay ſometimes for months, in patient expectation. When they have ſeized their prey, their induſtry for ſeveral weeks is entirely diſcontinued; the fortunate capture of an hour often ſatisfies them for the remaining period of their annual activity. As their blood is colder than that of moſt other terreſtrial animals, and as it circulates but ſlowly through their bodies, ſo their powers of digeſtion are but feeble. Their prey continues, for a long time, partly in the ſtomach, partly in the gullet, and is often ſeen in part hanging out of the mouth. In this manner it digeſts by degrees; and in proportion as the part below is diſſolved, the part above is taken in. It is not therefore till this tedious operation is entirely performed, that the ſerpent renews its appetite and its activity. But ſhould any accident prevent it from iſſuing once more from its cell, it ſtill can continue to bear famine, for weeks, months, nay for years together. Vipers † are often kept in boxes for ſix or eight months, without any food whatever; and there are little ſerpents ſometimes ſent over to Europe from Grand Cairo, that live for ſeveral years in glaſſes, and never eat at all, nor even ſtain the glaſs with their excrements.

If, leaving the conſideration of their appetites, we come to compare ſerpents as to their voices, ſome are found ſilent, ſome have a peculiar cry; but hiſſing is the ſound which they moſt commonly ſend forth, either as a call to their kind, or as a threat to their enemies. In the countries where they abound, they are generally ſilent in the middle of the day, when they are obliged to retire from the heat of the climate; but as the cool of the evening approaches, they are then heard iſſuing from their cells, with continued hiſſings; and ſuch is the variety of their notes, that ſome have aſſured us they very much reſemble the muſic of an Engliſh grove. This ſome will hardly credit: at any rate, ſuch notes, however pleaſing, can give but very little delight, when we call to mind the malignity of the minſtrel. If conſidered, indeed, as they anſwer the animal's own occaſions, they will be found well adapted to its nature, and fully anſwering the purpoſes of terrifying ſuch as would venture to offend it.

With reſpect to motion, ſome ſerpents, particularly thoſe of the viper kind, move ſlowly; while others dart with amazing ſwiftneſs. The motion in all is ſimilar; but the ſtrength of body in ſome gives a very different appearance. The viper, that is but a ſlow feeble-bodied animal, makes way in a heavy undulating manner; advancing its head, then drawing up its tail behind, and bending the body into a bow; then from the ſpot where the head and tail were united, advancing the head forward as before. This, which is the motion of all ſerpents, is very different from that of the earth-worm or the naked ſnail. The ſerpent, as was ſaid above, has a back-bone, with numerous joints; and this bone the animal has a power of bending in every direction, but without being able to ſhorten or lengthen it at pleaſure. The earth-worm, on the other hand, has no back-bone; but its body is compoſed of rings, which, like a barber's puff, it can lengthen or ſhorten as it finds neceſſary. The earth-worm, therefore, in order to move forward, lengthens the body; then by the fore part clings to the ground where it has reached, and then contracts and brings up its rear: then, when the body is thus ſhortened, the fore-part is lengthened again for another progreſſion, and ſo on. The ſerpent, inſtead of ſhortening the body, bends it into an arch; and this is the principal difference between ſerpentine and vermicular progreſſion.

We have inſtanced this motion in the viper, as moſt eaſily diſcerned; but there are many ſerpents that dart with ſuch amazing ſwiftneſs, that they appear rather to leap than crawl. It is moſt probable, however, that no ſerpent can dart upon even ground farther than its own length at one effort. Our fears indeed may increaſe the force of their ſpeed, which is ſometimes found ſo fatal. We are told by ſome, that they will dart to a very great diſtance; but this we have never been able to aſcertain. The manner of progreſſion in the ſwifteſt ſerpent we know, which is the jaculus, is by inſtantly coiling itſelf upon its tail, and darting from thence to its full extent; then carrying the tail, as quick as lightning, to the head; coiling and darting again: and by this means proceeding with extreme rapidity, without ever quitting the ground. Indeed, if we conſider the length and the weakneſs of the back-bone in all theſe animals; if we regard the make of the vertebræ, in which we ſhall find the junctures all formed to give play, and none to give power; we cannot be of opinion that they have a faculty of ſpringing from the ground, as they entirely want a *fulcrum*, if we may ſo expreſs it, from whence to take their ſpring; the whole body being compoſed of unſupported muſcles and joints that are yielding.

Though all ſerpents are amphibious, ſome are much fonder of the water than others; and, though deſtitute of fins or gills, remain at the bottom, or ſwim along the ſurface with great eaſe. From their internal ſtructure, we ſee how well adapted they are for either element; and how capable their blood is of circulating at the bottom, as freely as in the frog or the tortoiſe. They can, however, endure to live in freſh water only; for ſalt is an effectual bane to the whole tribe. The greateſt ſerpents are moſt uſually found in freſh water, either chooſing it as their favourite element, or finding their prey in ſuch places in the greateſt abundance. But that all will live and ſwim in liquids, appears from an experiment of Redi; who put a ſerpent into a large glaſs veſſel of wine, where it lived ſwimming about ſix hours; though, when it was by force immerſed and put under that liquid, it lived only one hour and an half. He put another in common water where it lived three days; but when it was kept under water, it lived only about 12 hours. Their motion there, however, is perfectly the reverſe of what it is upon land; for, in order to ſupport themſelves upon an element lighter than their bodies, they are obliged to increaſe their ſurface in a very artificial

† See *Abſtinence.*

manner. On earth their windings are perpendicular to the ſurface; in water they are parallel to it: in other words, if a perſon ſhould wave his hand up and down, it will give an idea of the animal's progreſs on land; if to the right and left, it will give ſome idea of its progreſs on the water.

Some ſerpents have a moſt horrible fœtor attending them, which is alone capable of intimidating the brave. This proceeds from two glands near the vent, like thoſe in the weaſel or polecat; and, like thoſe animals, in proportion as they are excited by rage or by fear, the ſcent grows ſtronger. It would ſeem, however, that ſuch ſerpents as are moſt venomous are leaſt offenſive in this particular; ſince the rattleſnake and the viper have no ſmell whatever; nay, we are told, that at Calecut and Cranganon, in the Eaſt Indies, there are ſome very noxious ſerpents, who are ſo far from being diſagreeable, that their excrements are ſought after, and kept as the moſt pleaſing perfume. The Eſculapian ſerpent is alſo of this number.

Some ſerpents bring forth their young alive, as the viper; ſome bring forth eggs, which are hatched by the heat of their ſituation, as the common black ſnake, and the majority of the ſerpent tribe. When a reader, ignorant of anatomy, is told, that ſome of thoſe animals produce their young alive, and that ſome produce eggs only, he is apt to ſuppoſe a very great difference in the internal conformation, which makes ſuch a variety in the manner of bringing forth. But this is not the caſe: theſe animals are internally alike, in whatever manner they produce their young; and the variety in their bringing forth is rather a ſlight than a real diſcrimination. The only difference is, that the viper hatches her eggs, and brings them to maturity, within her body; the ſnake is more premature in her productions, and ſends her eggs into the light ſome time before the young ones are capable of leaving the ſhell. Thus, if either are opened, the eggs will be found in the womb, covered with their membranous ſhell, and adhering to each other like large beads on a ſtring. In the eggs of both, the young ones will be found, though at different ſtages of maturity: thoſe of the viper will crawl and bite in the moment the ſhell that incloſes them is broke open; thoſe of the ſnake are not yet arrived at their perfect form.

Father Labat took a ſerpent of the viper kind that was nine feet long, and ordered it to be opened in his preſence. He then ſaw the manner in which the eggs of theſe animals lie in the womb. In this creature there were ſix eggs, each of the ſize of a gooſe egg, but longer, more pointed, and covered with a membranous ſkin, by which alſo they were united to each other. Each of theſe eggs contained from 13 to 15 young ones, about ſix inches long, and as thick as a gooſe-quill. Though the female from whence they were taken was ſpotted, the young ſeemed to have a variety of colours very different from the parent; and this led the traveller to ſuppoſe that the colour was no characteriſtic mark among ſerpents. Theſe little miſchievous animals were no ſooner let looſe from the ſhell, than they crept about, and put themſelves into a threatening poſture, coiling themſelves up and biting the ſtick with which he was deſtroying them. In this manner he killed 74 young ones; thoſe that were contained in one of the eggs eſcaped at the place where the female was killed, by the burſting of the egg and their getting among the buſhes.

The laſt diſtinction that we ſhall mention, but the moſt material among ſerpents is, that ſome are venomous, and ſome inoffenſive. The various calamities that the poiſon of ſerpents is capable of producing, are not only inflicted by the animal itſelf, but by men more miſchievous even than ſerpents, who prepare their venom to deſtroy each other. With this the ſavages poiſon their arms, and alſo prepare their revengeful potions. The ancients were known to preſerve it for the purpoſes of ſuicide; and even among ſemi-barbarous countries at this day, the venom of ſnakes is uſed as a philtre.

But though the poiſon be juſtly terrible to us, it has been given to very good purpoſes for the animal's own proper ſupport and defence. Without this, ſerpents, of all other animals, would be the moſt expoſed and defenceleſs; without feet for eſcaping a purſuit, without teeth capable of inflicting a dangerous wound, or without ſtrength for reſiſtance; incapable, from their ſize, of finding ſecurity in very ſmall retreats like the earth-worm, and diſguſting all from their deformity, nothing was left for them but a ſpeedy extirpation. But furniſhed as they are with powerful poiſon, every rank of animals approach them with dread, and never ſeize them but at an advantage. Nor is this all the benefit they derive from it. The malignity of a few ſerves for the protection of all. Tho' not above a tenth of their number are actually venomous, yet the ſimilitude they all bear to each other, excites a general terror of the whole tribe; and the uncertainty of their enemies in which the poiſon chiefly reſides, makes even the moſt harmleſs formidable. Thus Providence ſeems to have acted with double precaution: it has given ſome of them poiſon for the general defence of a tribe naturally feeble; but it has thinned the numbers of thoſe which are venomous, leſt they ſhould become too powerful for the reſt of animated nature.

From theſe noxious qualities in the ſerpent kind, it is no wonder that not only man, but beaſts and birds, carry on an unceaſing war againſt them. The ichneumon of the Indians, and the peccary † of America, deſtroy them in great numbers. Theſe animals have the art of ſeizing them near the head; and it is ſaid that they can ſkin them with great dexterity. The vulture and the eagle alſo prey upon them in great abundance; and often, ſouſing down from the clouds, drop upon a long ſerpent, which they ſnatch up ſtruggling and writhing in the air. Dogs alſo are bred up to oppoſe them. Father Feuillée tells us, that being in the woods of Martinico, he was attacked by a large ſerpent, which he could not eaſily avoid, when his dog immediately came to his relief, and ſeized the aſſailant with great courage. The ſerpent entwined him, and preſſed him ſo violently, that the blood came out of his mouth, and yet the dog never ceaſed till he had tore it to pieces. The dog was not ſenſible of his wounds during the fight; but ſoon after his head ſwelled prodigiouſly, and he lay on the ground as dead. But his maſter having found hard by a banana tree, he applied its juice, mixed with treacle, to the wounds; which recovered the dog, and quickly healed his ſores.

† See the articles Sus and Viverra.

The Pſylli of old were famous for charming and deſtroying ſerpents †. Some moderns pretend to the ſame art. Caſaubon ſays that he knew a man who could at any time ſummon 100 ſerpents together, and draw them into the fire. Upon a certain occaſion, when one of them, bigger than the reſt, would not be brought in, he only repeated his charm, and it came forward, like the reſt, to ſubmit to the flames. Philoſtratus deſcribes particularly how the Indians charm ſerpents. "They take a ſcarlet robe, embroidered with golden letters, and ſpread it before a ſerpent's hole. The golden letters have a faſcinating power; and by looking ſtedfaſtly, the ſerpent's eyes are overcome and laid aſleep." Theſe and many other feats have been often practiſed upon theſe animals by artful men, who had firſt prepared the ſerpents for their exerciſe, and then exhibited them as adventitiouſly aſſembled at their call. In India there is nothing ſo common as dancing ſerpents, which are carried about in a broad flat veſſel, ſomewhat reſembling a ſieve. Theſe erect and put themſelves in motion at the word of command. When their keeper ſings a ſlow tune, they ſeem by their heads to keep time; when he ſings a quicker meaſure, they appear to move more briſk and lively. All animals have a certain degree of docility; and we find that ſerpents themſelves can be brought to move and approach at the voice of their maſter. From this trick, ſucceſsfully practiſed before the ignorant, it is moſt probable has ariſen moſt of the boaſted pretenſions which ſome have made to charming of ſerpents; an art to which the native Americans pretend at this very day, but the exiſtence of which we are aſſured of by Mr Haſſelquiſt amongſt the native Egyptians.

Though the generality of mankind regard this formidable race with horror, yet there have been ſome nations, and there are ſome at this day, that conſider them with veneration and regard. The adoration paid by the ancient Egyptians to a ſerpent, is well known: many of the nations at preſent along the weſtern coaſt of Africa retain the ſame unaccountable veneration. Upon the gold and ſlave coaſts, a ſtranger, upon entering the cottages of the natives, is often ſurpriſed to ſee the roof ſwarming with ſerpents, that cling there without moleſting and unmoleſted by the natives. But his ſurpriſe will increaſe upon going farther ſouthward to the kingdom of Widah, when he finds that a ſerpent is the god of the country. This animal, which travellers deſcribe as a huge overgrown creature, has its habitation, its temple, and its prieſts. Theſe impreſs the vulgar with an opinion of its virtues; and numbers are daily ſeen to offer not only their goods, their proviſions, and their prayers, at the ſhrine of their hideous deity, but alſo their wives and daughters. Theſe the prieſts readily accept of, and after ſome days of penance, return them to their ſuppliants, much benefited by the ſerpent's ſuppoſed embraces.

SERPENT, a muſical inſtrument, ſerving as a baſs to the cornet or ſmall ſhawm, to ſuſtain a chorus of ſingers in a large edifice.—It has its name *ſerpent*, from its figure; as conſiſting of ſeveral folds or wreaths, which ſerve to reduce its length, which would otherwiſe be ſix or ſeven feet.—It is uſually covered with leather; and conſiſts of three parts, a mouth-piece, a neck, and a tail. It has ſix holes, by means whereof it takes in the compaſs of two octaves.

SERPENT-*Stones*. See CORNU *Ammonis*.

Sea-SERPENT. See SEA-*Serpent*.

SERPENTARIA, SNAKE-ROOT; a ſpecies of ARISTOLOCHIA.

SERPENTARIUS, in aſtronomy, a conſtellation of the northern hemiſphere, conſiſting, according to different authors, of 25, 29, or even 69 ſtars.

SERPENTINE, in general, denotes any thing that reſembles a ſerpent; hence the worm or pipe of a ſtill, twiſted in a ſpiral manner, is termed a *ſerpentine worm*.

SERRATED, in general, ſomething indented or notched in the manner of a ſaw; a term much uſed in the deſcription of the leaves of plants. See BOTANY, p. 1296.

SERRATULA, SAW-WORT; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants. There are 16 ſpecies; the moſt remarkable of which are, 1. The tinctoria, or dyer's ſaw-wort, growing naturally in woods and paſtures in many places of Britain. The leaves are lyre-ſhaped, with winged clefts; the terminating ſegment very large; the florets uniform: bloſſoms purple, but ſometimes white. This is much uſed by the dyers to give a yellow colour; but being inferior to the yellow-weed, its uſe is confined to the coarſer woollen cloths. —Goats eat it; horſes are not fond of it; ſheep, ſwine, and cows, refuſe it. 2. The arvenſis, corn ſaw-wort, or way-thiſtle, has toothed, thorny leaves; bloſſoms, pale purple. It grows wild in corn-fields and road-ſides, and is ſaid to yield a very pure fixed alkali when burnt. Goats eat it; neither cows, horſes, ſheep, nor ſwine, are fond of it.

SERRATUS, in anatomy, a name given to ſeveral muſcles, from their reſemblance to a ſaw. See ANATOMY, *Table of the Muſcles*.

SERVANT, a term of relation, ſignifying a perſon who owes and pays obedience for a certain time to another in quality of a maſter.

As to the ſeveral ſorts of ſervants: It was obſerved, under the article LIBERTY, that pure and proper ſlavery does not, nay cannot, ſubſiſt in Britain; ſuch, we mean, whereby an abſolute and unlimited power is given to the maſter over the life and fortune of the ſlave. And indeed it is repugnant to reaſon, and the principles of natural law, that ſuch a ſtate ſhould ſubſiſt any where. The three origins of the right of ſlavery, aſſigned by Juſtinian, are all of them built upon falſe foundations. As, firſt, ſlavery is held to ariſe *jure gentium*, from a ſtate of captivity in war; whence ſlaves are called *mancipia, quaſi manu capti*. The conqueror, ſay the civilians, had a right to the life of his captive; and, having ſpared that, has a right to deal with him as he pleaſes. But it is an untrue poſition, when taken generally, that, by the law of nature or nations, a man may kill his enemy: he has only a right to kill him in particular caſes; in caſes of abſolute neceſſity, for ſelf-defence; and it is plain this abſolute neceſſity did not ſubſiſt, ſince the victor did not actually kill him, but made him priſoner. War is itſelf juſtifiable only on principles of ſelf-preſervation; and therefore it gives no other right over priſoners, but merely to diſable them from doing harm to us, by confining their perſons: much leſs can it give a right to kill, torture, abuſe, plunder, or even to enſlave, an enemy, when the war is over. Since, therefore, the right of making ſlaves by captivity, depends on a ſuppoſed right of ſlaughter, that foundation failing, the conſequence drawn from it muſt fail likewiſe. But, 2dly, it is ſaid, that ſlavery may begin *jure civili;* when one man ſells himſelf to another. This, if only meant of contracts to ſerve or work for another, is very juſt: but when applied to ſtrict ſlavery, in the ſenſe of the laws of old Rome or modern Barbary, is alſo impoſſible. Every ſale implies a price, a *quid pro quo*, an equivalent given to the ſeller in lieu of what he transfers to the buyer: but what equivalent can be given for life and liberty, both of which (in abſolute ſlavery) are held to be in the maſter's diſpoſal? His property alſo, the very price he ſeems to receive, devolves *ipſo facto* to his maſter, the inſtant he becomes his ſlave. In this caſe, therefore, the buyer gives nothing, and the ſeller receives nothing: of what validity, then, can a ſale be, which deſtroys the very principles upon which all ſales are founded? Laſtly, we are told, that beſides theſe two ways by which ſlaves *fiunt*, or are acquired, they may alſo be hereditary: *ſervi naſcuntur*, the children of acquired ſlaves are, *jure naturæ*, by a negative kind of birthright, ſlaves alſo. But this, being built on the two former rights, muſt fall together with them. If neither captivity, nor the ſale of one's ſelf, can by the law of nature and reaſon reduce the parent to ſlavery, much leſs can they reduce the offspring.

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† See *Pſylli*.

Blackſt. Comment.

Upon theſe principles the law of England abhors, and will not endure the exiſtence of, ſlavery within this nation: ſo that, when an attempt was made to introduce it, by ſtatute 1 Edw. VI. c. 3. which ordained, that all idle vagabonds ſhould be made ſlaves, and fed upon bread, water, or ſmall drink, and refuſe-meat; ſhould wear a ring of iron round their necks, arms, or legs; and ſhould be compelled, by beating, chaining, or otherwiſe, to perform the work aſſigned them, were it ever ſo vile; the ſpirit of the nation could not brook this condition, even in the moſt abandoned rogues; and therefore this ſtatute was repealed in two years afterwards. And now it is laid down, that a ſlave or negro, the inſtant he lands in Britain, becomes a freeman; that is, the law will protect him in the enjoyment of his perſon, and his property. Yet, with regard to any right which the maſter may have lawfully acquired to the perpetual ſervice of John or Thomas, this will remain exactly in the ſame ſtate as before: for this is no more than the ſame ſtate of ſubjection for life, which every apprentice ſubmits to for the ſpace of ſeven years, or ſometimes for a longer term. Hence, too, it follows, that the infamous and unchriſtian practice of with-holding baptiſm from negro-ſervants, leſt they ſhould thereby gain their liberty, is totally without foundation, as well as without excuſe. The law of England acts upon general and extenſive principles: it gives liberty, rightly underſtood, that is, protection, to a Jew, a Turk, or a Heathen, as well as to thoſe who profeſs the true religion of Chriſt; and it will not diſſolve a civil obligation between maſter and ſervant, on account of the alteration of faith in either of the parties: but the ſlave is entitled to the ſame protection in England before, as after baptiſm; and, whatever ſervice the Heathen negro owed of right to his American maſter, by general, not by local law, the ſame (whatever it be) is he bound to render when brought to England and made a Chriſtian.

1. The firſt ſort of ſervants, therefore, acknowledged by the laws of England, are *menial ſervants;* ſo called from being *intra mœnia*, or domeſtics. The contract between them and their maſters ariſes upon the hiring. If the hiring be general, without any particular time limited, the law conſtrues it to be a hiring for a year; upon a principle of natural equity, that the ſervant ſhall ſerve, and the maſter maintain him, throughout all the revolutions of the reſpective ſeaſons; as well when there is work to be done, as when there is not: but the contract may be made for any larger or ſmaller term. All ſingle men between 12 years old and 60, and married ones under 30 years of age, and all ſingle women between 12 and 40, not having any viſible livelihood, are compellable by two juſtices to go out to ſervice in huſbandry or certain ſpecific trades, for the promotion of honeſt induſtry: and no maſter can put away his ſervant, or ſervant leave his maſter, after being ſo retained, either before or at the end of his term, without a quarter's warning; unleſs upon reaſonable cauſe, to be allowed by a juſtice of the peace: but they may part by conſent, or make a ſpecial bargain.

2. Another ſpecies of ſervants are called *apprentices*, (from *apprendre*, to learn); and are uſually bound for a term of years, by deed indented or indentures, to ſerve their maſters, and be maintained and inſtructed by them. This is uſually done to perſons of trade, in order to learn their art and myſtery; and ſometimes very large ſums are given with them, as a premium for ſuch their inſtruction: but it may be done to huſbandmen, nay to gentlemen, and others. And children of poor perſons may be apprenticed out by the overſeers, with conſent of two juſtices, till 24 years of age, to ſuch perſons as are thought fitting; who are alſo compellable to take them: and it is held, that gentlemen of fortune, and clergymen, are equally liable with others to ſuch compulſion: for which purpoſes our ſtatutes have made the indentures obligatory, even though ſuch pariſh-apprentice be a minor. Apprentices to trades may be diſcharged on reaſonable cauſe, either at the requeſt of themſelves or maſters, at the quarter-ſeſſions, or by one juſtice, with appeal to the ſeſſions; who may, by the equity of the ſtatute, if they think it reaſonable, direct reſtitution of a rateable ſhare of the money given with the apprentice: and pariſh-apprentices may be diſcharged in the ſame manner, by two juſtices. But if an apprentice, with whom leſs than 10 pounds hath been given, runs away from his maſter, he is compellable to ſerve out his time of abſence, or make ſatisfaction for the ſame, at any time within ſeven years after the expiration of his original contract.

3. A third ſpecies of ſervants are *labourers*, who are only hired by the day or the week, and do not live *intra mœnia*, as part of the family; concerning whom the ſtatutes before-cited have made many very good regulations; 1. Directing that all perſons who have no viſible effects may be compelled to work: 2. Defining how long they muſt continue at work in ſummer and in winter: 3. Puniſhing ſuch as leave or deſert their work: 4. Empowering the juſtices at ſeſſions, or the ſheriff of the county, to ſettle their wages:

and, 5. Inflicting penalties on ſuch as either give or exact more wages than are ſo ſettled.

4. There is yet a fourth ſpecies of ſervants, if they may be ſo called, being rather in a ſuperior, a miniſterial, capacity; ſuch as *ſtewards, factors,* and *bailiffs:* whom, however, the law conſiders as ſervants *pro tempore*, with regard to ſuch of their acts as affect their maſter's or employer's property.

As to the manner in which this relation affects the maſter, the ſervant himſelf, or third parties, ſee the article Master *and Servant*.

For the condition of ſervants by the law of Scotland, ſee Law, N° clxi. 34, 35.

SERVETISTS, a name given to the modern Antitrinitarians, from their being ſuppoſed to be the followers of Michael Servetus; who, in the year 1553, was burnt at Geneva, together with his books.

SERVETUS (Michael), an ingenious and learned Spaniard, born in 1509 at Villeneuva in Arragon. He ſtudied the civil law at Toulouſe, where he began to read the Scriptures, and to be fond of Antitrinitarian notions; ſo that after he had been two or three years there, he reſolved to retire into Germany and ſet up for a reformer. He there printed two tracts, *De Trinitatis erroribus*, and *Dialogorum de Trinitate libri duo;* which raiſed a great tumult among the German divines, and ſpread his name throughout Europe. After publiſhing theſe works, Servetus returned to Paris, where he ſtudied phyſic, and was admitted a doctor of phyſic into the univerſity there. All this while Calvin the reformer, who was the head of the church at Geneva, kept up a correſpondence with Servetus by letters; for he tells us, that he endeavoured for the ſpace of ſixteen years to reclaim that phyſician from his errors. Servetus conſulted him on many occaſions, and ſent him a MS. to have his opinion of it; a confidence which Calvin made an ungenerous and baſe uſe of: for he ſent this MS. together with the letters he had received from him, containing heretical opinions, to the magiſtrates of Lyons, where Servetus reſided, who thereupon diſtreſſed him. This unfortunate man made his eſcape, and fled to Vienne in Dauphiny; but there, by means of Calvin's correſpondence with ſome principal divines, he was put in priſon. Calvin now, under pretence of a reconciliation, invited him, when he was ſet at liberty, to retire to Geneva: but he was ſcarce arrived there, when, to the eternal diſgrace of that reformer, he accuſed him of hereſy; and by continual preachings and declamations on the danger the true religion was in from ſuch impoſtors, he hurried the magiſtrates into an unjuſt ſentence againſt him; which was as cruelly executed, for he was burnt alive in 1553. —Servetus was a man of great acuteneſs, of prodigious learning, and ſo admirably ſkilled in his own profeſſion, that he appears to have had ſome obſcure conception of the circulation of the blood. There are ſeveral of his books extant; the ſcarceſt of which are, 1. *De Trinitatis Erroribus*, lib. vii. 2. *Dialogorum de Trinitate*, lib. ii. 3. *De Juſtitia Regni Chriſti Capitula*, lib. iv. Theſe works are very ſcarce, becauſe both Calvin and the Papiſts took great pains in burning all the copies they could find.

SERVIA, a province of Turkey in Europe, bounded on the north by the rivers Danube and Save, which ſeparate it from Hungary; on the eaſt, by Bulgaria; on the weſt, by Boſnia; and on the ſouth, by Albania and Macedonia. It is about 190 miles in length from eaſt to weſt; 95 in breadth from north to ſouth; and is divided into four ſangiacates. Two of theſe were ceded to the Chriſtians in 1718, who united them into one. This continued till 1739, when the Turks were victorious; and then they were abandoned to the Turks by the treaty of Belgrade. Belgrade is the capital town.

SERVICE, in law, is a duty which a tenant, on account of his fee, owes to his lord.

There are many diviſions of ſervices; as, 1. Into perſonal, where ſomething is to be done by the tenant in perſon, as homage and fealty. 2. Real, ſuch as wards, marriages, &c. 3. Accidental, including heriots, reliefs, and the like. 4. Entire, where, on the alienation of any part of the lands by a tenant, the ſervices become multiplied. 5. Frank-ſervice, which was performed by freemen, who were not obliged to perform any baſe ſervice, but only to find a man and horſe to attend the lord into the army or to court. 6. Knight's ſervice, by which lands were anciently held of the king, on paying homage, ſervice in war, &c.

Service-*Tree*. See Sorbus.

SERVITES, a religious order in the church of Rome, founded about the year 1233, by ſeven Florentine merchants, who, with the approbation of the biſhop of Florence, renounced the world, and lived together in a religious community on mount Senar, two leagues from that city.

SERVITOR, in the univerſity of Oxford, a ſtudent who attends on another for his maintenance and learning.

SERVITUDE, the condition of a ſervant, or rather ſlave.

Servitude, in Scots law. See there, N° clxx.

SERVIUS (Maurus Honoratus), a celebrated grammarian and critic of antiquity, who flouriſhed about the time of Arcadius and Honorius; now chiefly known by his *Commentaries on Virgil*. There is alſo extant a piece of Servius upon the feet of verſes and the quantity of ſyllables, called *Centimetrum*.

SERUM, a thin, tranſparent, ſaltiſh liquor, which makes a conſiderable part of the maſs of blood. See Anatomy, n° 389, Air, n° 48, and Blood.

SESAMOIDEA ossa, certain ſmall bones ſomewhat reſembling the ſeeds of ſeſamum, whence their name. They are placed at the under part of the bones of the laſt joints of the fingers and toes.

SESAMUM, oily grain, in botany, a genus of the angioſpermia order, belonging to the didynamia claſs of plants. The ſpecies are, 1. The orientale, with oblong, oval, entire baſes: it is cultivated in great plenty in the Levant, but is ſuppoſed to have been brought there from India. It is an annual plant, riſing with an herbaceous four-cornered ſtalk, two feet high, ſending out a few ſhort ſide-branches; the leaves are oblong, oval, a little hairy, and ſtand oppoſite. The flowers terminate the ſtalks in looſe ſpikes; they are ſmall, of a dirty white colour, ſhaped ſomewhat like thoſe of the foxglove. After the flowers are paſt, the germen turns to an oval acute-pointed capſule with four cells, filled with oval compreſſed ſeeds, which ripen in autumn. 2. The indicum, with trifid lower leaves, grows naturally in India: this is alſo an annual plant; the ſtalk riſes taller than that of the former; the lower leaves are cut into three parts, which is the only difference between them. 3. The trifoliatum, with all the leaves trifid; grows naturally in Africa. This is alſo an annual plant, with a taller and more branched ſtalk than that of the former, in which it differs from both the other.

The firſt ſort is frequently cultivated in all the eaſtern countries, and alſo in Africa, as a pulſe; and of late years the ſeeds have been introduced into Carolina by the African negroes, where they ſucceed extremely well. The inhabitants of that country make an oil from the ſeed, which will keep good many years, without having any rancid ſmell or taſte, but in two years becomes quite mild; ſo that when the warm taſte of the ſeed, which is in the oil when firſt drawn, is worn off, they uſe it as a ſalad-oil, and for all the purpoſes of ſweet oil. The ſeeds of this plant are alſo uſed by the negroes for food; which ſeeds they parch over the fire, and then mix them with water, and ſtew other ingredients with them, which makes an hearty food. Sometimes a ſort of pudding is made of theſe ſeeds, in the ſame manner as with millet or rice, and is by ſome perſons eſteemed, but is rarely uſed for theſe purpoſes in Europe. This is called *benny*, or *bonny*, in Carolina. In England theſe plants are preſerved in botanic gardens as curioſities. Their ſeeds muſt be ſown in the ſpring upon a hot-bed; and when the plants are come up, they muſt be tranſplanted into a freſh hot-bed to bring them forward. After they have acquired a tolerable degree of ſtrength, they ſhould be planted into pots, and plunged into another hot-bed, managing them as hath been directed for amaranthuſes; for if theſe plants are not thus brought forward in the former part of the ſummer, they will not produce good ſeeds in this country.

The ſeeds of the firſt ſort is mentioned in the liſt of officinal ſimples in the college diſpenſatory, but is rarely uſed in medicine in England. From nine pounds of this ſeed which came from Carolina, there were upwards of two quarts of oil drawn, which is as great a quantity as hath been obtained from any vegetable whatever. This might occaſion its being called the *oily grain*.

SESOSTRIS, king of Egypt or Rameſes. Of the eight kings of the 16th dynaſty there were ſix of the name of Seſoſtris or Rameſes; and it was upon the death of Rameſes Miriam, the great perſecutor of the Jews in Egypt, that they were delivered from their firſt captivity: but it is ſuppoſed that the Egyptian prieſts have aſcribed the various, real or fictitious, exploits of ſeveral of theſe princes to one man, under the name of *Seſoſtris Rameſes Miriam*. Sir Iſaac Newton ſuppoſes the great Seſoſtris to have been the ſame with Shiſhak, who plundered Jeruſalem after the death of Solomon. See EGYPT, nº 3—5.

SESQUI, a Latin particle, ſignifying a whole and a half; which, joined with *altera*, *terza*, *quarta*, &c. is much uſed in the Italian muſic to expreſs a kind of ratios, particularly ſeveral ſpecies of triples.

SESSILE, among botaniſts. See BOTANY, p. 1296.

SESSION, in general, denotes each ſitting or aſſembly of a council, &c.

SESSION *of Parliament*, is the ſeaſon or ſpace from its meeting to its prorogation. See PARLIAMENT,

Court of SESSION. See LAW, Nº clvii. 4.

Court of Quarter-SESSIONS, an Engliſh court that muſt be held in every county once in every quarter of a year; which, by ſtatute 2 Hen. V. c. 4. is appointed to be in the firſt week after Michaelmas-day, the firſt week after the epiphany, the firſt week after the cloſe of Eaſter, and in the week after the tranſlation of St Thomas the martyr, or the 7th of July. It is held before two or more juſtices of the peace, one of which muſt be of the quorum. The juriſdiction of this court, by 34 Edw. III. c. 1. extends to the trying and determining all felonies and treſpaſſes whatſoever: though they ſeldom, if ever, try any greater offence than ſmall felonies within the benefit of clergy; their commiſſion providing, that if any caſe of difficulty ariſes, they ſhall not proceed to judgment; but in the preſence of one of the juſtices of the courts of king's-bench or common-pleas, or one of the judges of aſſiſe: and therefore murders, and other capital felonies, are uſually remitted for a more ſolemn trial to the aſſiſes. They cannot alſo try any new-created offence, without expreſs power given them by the ſtatute which creates it. But there are many offences and particular matters which, by particular ſtatutes, belong properly to this juriſdiction, and ought to be proſecuted in this court; as, the ſmaller miſdemeanors againſt the public or commonwealth, not amounting to felony; and eſpecially offences relating to the game, highways, alehouſes, baſtard children, the ſettlement and proviſion for the poor, vagrants, ſervants wages, and Popiſh recuſants. Some of theſe are proceeded upon by indictment: others in a ſummary way, by motion, and order thereupon; which order may for the moſt part, unleſs guarded againſt by particular ſtatutes, be removed into the court of king's bench by writ of *certiorari facias*, and be there either quaſhed or confirmed. The records or rolls of the ſeſſions are committed to the cuſtody of a ſpecial officer, denominated *cuſtos rotulorum*, who is always a juſtice of the quorum; and among them of the quorum (ſaith Lambard) a man for the moſt part eſpecially picked out, either for wiſdom, countenance, or credit. The nomination of the *cuſtos rotulorum* (who is the principal officer in the county, as the lord lieutenant is chief in military command) is by the king's ſign-manual: and to him the nomination of the clerk of the peace belongs; which office he is expreſsly forbidden to ſell for money.

In moſt corporation-towns there are quarter-ſeſſions kept before juſtices of their own, within their reſpective limits; which have exactly the ſame authority as the general quarter-ſeſſions of the county, except in a very few inſtances; one of the moſt conſiderable of which is the matter of appeals from orders of removal of the poor, which, though they be from the orders of corporation-juſtices, muſt be to the ſeſſions of the county, by ſtatute 8 and 9 W. III. c. 30. In both corporations and counties at large, there is ſometimes kept a ſpecial or petty ſeſſion, by a few juſtices, for diſpatching ſmaller buſineſs in the neighbourhood between the times of the general ſeſſions; as for licenſing alehouſes, paſſing the account of pariſh-officers, and the like.

SESTERCE, *ſeſtertius*, a ſilver coin in uſe among the Romans.

Some authors make two kinds of ſeſterces; the leſs, called *ſeſtertius*, in the maſculine gender; and the great one, called *ſeſtertium*, in the neuter; the latter containing a thouſand of the other. Others will have any ſuch diſtinction of great and little ſeſterces unknown to the Romans. *Seſtertius*, ſay they, was an adjective, and ſignified *as ſeſtertius*, or two aſes and an half; and when uſed plurally, as in *quinquaginta ſeſtertium*, or *ſeſtertia*, it was only by way of abbreviation, and there was always underſtood *millia* or thouſands.

Sesterce, or *ſeſtertius*, was alſo uſed by the ancients for a thing containing two wholes and an half of another, as *as* was taken for any whole or integer.

SESTOS, a noted fortreſs of European Turkey, ſituated at the entrance of the Helleſpont or Dardanelles, 24 miles ſouth-weſt of Gallipoli. This place is famous for the loves of Hero and Leander, ſung by the poet Muſæus.

SET, or Sets, a term uſed by the farmers and gardeners to expreſs the young plants of the white thorn and other ſhrubs, with which they uſe to raiſe their quick or quickſet hedges.

SETACEOUS worm, in natural hiſtory, a name given by Dr Liſter to that long and ſlender water-worm, which ſo much reſembles a horſe-hair, that it has been ſuppoſed by the vulgar to be an animated hair of that creature. Theſe creatures, ſuppoſed to be living hairs, are a peculiar ſort of inſects, which are bred and nouriſhed within the bodies of other inſects, as the worms of the ichneumon flies are in the bodies of the caterpillars.

Aldrovand deſcribes the creature, and tells us it was unknown to the ancients; but called *ſeta aquatica*, and *vermis ſetarius*, by the moderns, either from its figure reſembling that of a hair, or from the ſuppoſition of its once having been the hair of ſome animal. We generally ſuppoſe it, in the imaginary ſtate of the hair, to have belonged to a horſe; but the Germans ſay it was once the hair of a calf, and call it by a name ſignifying *vitulus aquaticus*, or the "water-calf."

Albertus, an author much reverenced by the common people, has declared that this animal is generated of a hair; and adds, that any hair thrown into a ſtanding water, will, in a very little time, obtain life and motion. Other authors have diſſented from this opinion, and ſuppoſed them generated of the fibrous roots of water-plants; and others, of the parts of graſshoppers fallen into the water. This laſt opinion is rejected by Aldrovand as the moſt improbable of all; yet in reality it comes neareſt the truth of any of them. Standing and foul waters are moſt plentifully ſtored with them; but they are ſometimes found in the cleareſt and pureſt ſprings, and ſometimes out of the water, on the leaves of trees and plants, as on the fruit-trees in our gardens, and the elms in hedges. They are from three to five inches long, of the thickneſs of a large hair; and are brown upon the back, and white under the belly, and the tail is white on every part.

SETH, the third ſon of Adam, the father of Enos, was born 3874 B.C. and lived 912 years.

SETHIANS, in church-hiſtory, Chriſtian heretics; ſo called becauſe they paid divine worſhip to Seth, whom they looked upon to be Jeſus Chriſt the ſon of God, but who was made by a third divinity, and ſubſtituted in the room of the two families of Abel and Cain, which had been deſtroyed by the deluge. Theſe heretics appeared in Egypt in the ſecond century; and as they were addicted to all ſorts of debauchery, they did not want for followers; and continued in Egypt above 200 years.

SETIMO, a town of Italy in the province of Piedmont, ſituated on the river Po, eight miles north of Turin.

SETON, in ſurgery, a few horſe-hairs, ſmall threads, or large packthread, drawn through the ſkin, chiefly the neck, by means of a large needle or probe, with a view to reſtore or preſerve health.

We find by experience, that ſetons are very uſeful in catarrhs, inflammations, and other diſorders, particularly thoſe of the eyes, as a gutta ſerena, cataract, and incipient ſuffuſion; to thoſe we may add intenſe headachs, with ſtupidity, drowſineſs, epilepſies, and even the apoplexy itſelf.

SETTING, in aſtronomy, the withdrawing of a ſtar or planet, or its ſinking below the horizon. Aſtronomers and poets make three different kinds of ſetting of the ſtars, *viz.* the Cosmical, Acronycal, and Heliacal. See theſe articles.

Setting, in the ſea-language. To ſet the land or the ſun by the compaſs, is to obſerve how the land bears on any point of the compaſs, or on what point of the compaſs the ſun is. Alſo when two ſhips ſail in ſight of one another, to mark on what point the chaſed bears, is termed *ſetting the chaſe by the compaſs*.

Setting, among ſportſmen, a term uſed to expreſs the manner of taking partridges by means of a dog peculiarly trained to that purpoſe. See Shooting.

SEVENTH, in muſic, an interval called by the Greeks *heptachordon*. See Interval.

SEVERIA, a province of the Ruſſian empire, with the title of a duchy, bounded on the north by Smolenſko and Muſcovy, on the eaſt by Vorotinſbi and the country of the Coſſacks, on the ſouth by the ſame, and on the weſt by Zernegovia. It is a country overrun with woods, and on the ſouth part is a foreſt of great length. Novogrodec, or Novogorod, is the capital town.

SEVERINA (St), a town of Italy, in the kingdom of Naples, and in Lower Calabria, with an archbiſhop's ſee. It is very well fortified, and ſeated on a craggy rock, on the river Neeto; in E. Long. 17. 20. N. Lat. 39. 15.

SEVERINO, a town of Italy, in the territory of the church, and in the Marche of Ancona, with a biſhop's ſee. It has fine vineyards, and is ſeated between two hills on the river Petenza, in E. Long. 13. 20. N. Lat. 43. 10.

SEVERN, a river of England, which riſes near Plinnilliom-hill in Montgomeryſhire, and before it enters Shropſhire receives about 30 ſtreams, and paſſes down to Laudring, where it receives the Morda, that flows from Oſweſtry. When it arrives at Monford, it receives the river Mon; paſſing on to Shrewſbury, which it almoſt ſurrounds; then to Bridgnorth; afterwards it runs through the ſkirts of Staffordſhire, enters Worceſterſhire, and paſſes by Worceſter: then it runs to Tewkſbury, where it joins the Avon; and from thence to Glouceſter, keeping a north-weſterly courſe till it falls into the Briſtol channel. It begins to be navigable for boats at Welch Pool in Montgomeryſhire,

ſhire, and takes in ſeveral other rivers in its courſe beſides thoſe already mentioned; it is the ſecond in England.

SEVERUS (Cornelius), an ancient Latin poet of the Auguſtan age; whoſe *Ætna*, together with a fragment *De morte Ciceronis*, were publiſhed, with notes and a proſe interpretation, by Le Clerc, 12mo, Amſterdam, 1703. They were before inſerted among the *Catalecta Virgilii* publiſhed by Scaliger; whoſe notes, with others, Le Clerc has received among his own.

SEVERUS (Septimius), a Roman emperor, born at Leptis in Africa. On pretence of revenging the death of the emperor Pertinax, he ſtept into his room in 193. He next overcame Peſcentius Niger, who was declared emperor by the legions of Syria; and took Byzantium. He conquered the Parthians, Medes, Arabians, &c. and puniſhed the rebelling Jews. After this, he defeated Albinus near Lyons He began the fifth perſecution againſt the Chriſtians; quelled the Britons rebelling againſt him, and built the wall that bears his name. He had two ſons, Antoninus Caracalla and Geta, both Cæſars. Caracalla had deſigned, one day as he was marching behind his father, to have ſtabbed him, and drew his ſword to that intent; but was hindered by ſome that were near him. Severus himſelf took notice of it, but diſſembled his knowledge; yet the horror of ſo unnatural an attempt caſt him into a deep melancholy, of which he died at York in 211. He was a man of wit, underſtanding, and ability; underſtood mathematics and hiſtory; loved learned men; and writ the hiſtory of his own life.

SEVERUS'*s-Wall*, in Britiſh topography, the fourth and laſt barrier erected by the Romans againſt the incurſions of the North Britons. See the articles AGRICOLA, ADRIAN, and ANTONINUS'*s Wall*.

We learn from ſeveral hints in the Roman hiſtorians, that the country between the walls of Hadrian and Antoninus continued to be a ſcene of perpetual war and ſubject of contention between the Romans and Britons, from the beginning of the reign of Commodus to the arrival of the emperor Septimius Severus in Britain, A. D. 206. This laſt emperor having ſubdued the Maeatæ, and repulſed the Caledonians, determined to erect a ſtronger and more impenetrable barrier than any of the former, againſt their future incurſions.

Though neither Dio nor Herodian make any mention of a wall built by Severus in Britain for the protection of the Roman province, yet we have abundant evidence from other writers of equal authority, that he really built ſuch a wall. "He fortified Britain (ſays Spartian) with a wall drawn croſs the iſland from ſea to ſea; which is the greateſt glory of his reign. After the wall was finiſhed, he retired to the next ſtation (York), not only a conqueror, but founder of an eternal peace." To the ſame purpoſe, Aurelius Victor and Oroſius, to ſay nothing of Eutropius and Caſſiodorus. "Having repelled the enemy in Britain, he fortified the country, which was ſuited to that purpoſe, with a wall drawn croſs the iſland from ſea to ſea."—"Severus drew a great ditch, and built a ſtrong wall, tified with ſeveral turrets, from ſea to ſea, to protect that part of the iſland which he had recovered, from the yet unconquered nations." As the reſidence of the emperor Severus in Britain was not quite four years, it is probable that the two laſt of them were employed in building this wall; according to which account, it was begun A. D. 209, and finiſhed A. D. 210.

This wall of Severus was built nearly on the ſame tract with Hadrian's rampart, at the diſtance only of a few paces north. The length of this wall, from Couſins-houſe near the mouth of the river Tyne on the eaſt, to Boulneſs on the Solway frith on the weſt, hath been found, from two actual menſurations, to be a little more than 68 Engliſh miles, and a little leſs than 74 Roman miles. To the north of the wall was a broad and deep ditch, the original dimenſions of which cannot now be aſcertained, only it ſeems to have been larger than that of Hadrian. The wall itſelf, which ſtood on the ſouth brink of the ditch, was built of ſolid ſtone, ſtrongly cemented with the beſt mortar; the ſtones which formed both the faces being ſquare aſhlers, and the filling ſtones large flags, ſet a little ſlanting. The height of this wall was 12 feet beſides the parapet, and its breadth 8 feet, according to Bede, who lived only at a ſmall diſtance from the eaſt end of it, and in whoſe time it was almoſt quite entire in many places. Such was the wall erected by the command and under the direction of the emperor Severus in the north of England; and, conſidering the length, breadth, heighth, and ſolidity, it was certainly a work of great magnificence and prodigious labour. But the wall itſelf was but a part, and not the moſt extraordinary part, of this work. The great number and different kinds of fortreſſes which were built along the line of it for its defence, and the military-ways with which it was attended, are ſtill more worthy of our admiration, and come now to be deſcribed.

The fortreſſes which were erected along the line of Severus's wall for its defence, were of three different kinds, and three different degrees of ſtrength; and were called by three different Latin words, which may be tranſlated *ſtations*, *caſtles*, and *turrets*. Of each of theſe in their order.

The *ſtationes*, ſtations, were ſo called from their ſtability and the ſtated reſidence of garriſons. They were alſo called *caſtra*, which hath been converted into *cheſtres*, a name which many of them ſtill bear. Theſe were by far the largeſt, ſtrongeſt, and moſt magnificent of the fortreſſes which were built upou the wall, and were deſigned for the head-quarters of the cohorts of troops which were placed there in garriſon, and from whence detachments were ſent into the adjoining caſtles and turrets. Theſe ſtations, as appears from the veſtiges of them which are ſtill viſible, were not all exactly of the ſame figure nor of the ſame dimenſions; ſome of them being exactly ſquares, and others oblong, and ſome of them a little larger than others. Theſe variations were no doubt occaſioned by the difference of ſituation and other circumſtances. The ſtations were fortified with deep ditches and ſtrong walls, the wall itſelf coinciding with and forming the north wall of each ſtation. Within the ſtations were lodgings for the officers and ſoldiers in garriſon; the ſmalleſt of them being ſufficient to contain a cohort, or 600 men. Without the walls of each ſtation was a town, inhabited by labourers, artificers, and others, both Romans and Britons, who choſe to dwell under the protection of theſe fortreſſes. The number of the ſtations upon the wall was exactly 18; and if they had been placed at equal diſtances, the interval between every two of them would have been four miles and a few paces: but the intervention of rivers, marſhes, and mountains; the conveniency of ſituation for ſtrength, proſpect, and water; and many other circumſtances to us unknown, determined them to place theſe ſtations at unequal diſtances. The ſituation which was always choſen by the Romans, both here and everywhere elſe in Britain where they could obtain it, was the gentle-declivity of a hill, near a river, and facing the meridian ſun. Such was the ſituation of the far greateſt part of the ſtations on this wall. In general we may obſerve, that the ſtations ſtood thickeſt near the two ends and in the middle, probably becauſe the danger of invaſion was greateſt in theſe places. But the reader will form a clearer idea of the number of theſe ſtations, their Latin and Engliſh names, their ſituation and diſtance from one another, by inſpecting the following table, than we can give him with equal brevity in any other way. The firſt column contains the number of the ſtation, reckoning from eaſt to weſt; the ſecond contains its Latin, and the third its Engliſh name; and the three laſt its diſtance from the next ſtation to the weſt of it, in miles, furlongs, and chains.

Nº	Latin Name.	Engliſh Name.	M.	F.	C.
1	Segedunum	Couſins'-houſe	3	5	1½
2	Pons Ælii	Newcaſtle	2	0	9
3	Condercum	Benwell-hill	6	6	5
4	Vindobala	Rutcheſter	7	0	3½
5	Hunnum	Halton-cheſters	5	1	7
6	Cilurnum	Walwick-cheſters	3	1	8
7	Procolitia	Carrawbrugh	4	5	3½
8	Borcovicus	Houſeſteeds	1	3	8
9	Vindolana	Little-cheſters	3	6	4
10	Æſica	Great-cheſters	2	1	6½
11	Magna	Carrvoran	2	6	0
12	Amboglanna	Burdoſwald	6	2	8
13	Petriana	Cambeck	2	6	6
14	Aballaba	Watchcroſs	5	1	9
15	Congavata	Stanwix	3	3	4
16	Axelodunum	Brugh	4	0	9
17	Gabroſentum	Brumbrugh	3	4	1
18	Tunnocelum	Boulneſs	0	0	0
		Length of the wall	68	3	3

The *caſtella*, or caſtles, were the ſecond kind of fortifications which were built along the line of this wall for its defence. Theſe caſtles were neither ſo large nor ſtrong as the ſtations, but much more numerous, being no fewer than 81. The ſhape and dimenſions of the caſtles, as appears from the foundations of many of them which are ſtill viſible, were exact ſquares of 66 feet every way. They were fortified on every ſide with thick and lofty walls, but without any ditch, except on the north ſide; on which the wall itſelf, raiſed much above its uſual height, with the ditch attending it, formed the fortification. The caſtles were ſituated in the intervals between the ſtations, at the diſtance of about ſeven furlongs from each other; though in this, particular circumſtances ſometimes occaſioned a little variation. In theſe caſtles guards were conſtantly kept by a competent number of men detached from the neareſt ſtations.

The *turres*, or turrets, were the third and laſt kind of fortifications on the wall. Theſe were ſtill much ſmaller than the caſtles, and formed only a ſquare of about 12 feet, ſtanding out of the wall on its ſouth ſide. Being ſo ſmall, they are more entirely ruined than the ſtations and caſtles, which makes it difficult to diſcover their exact number. They ſtood in the intervals between the caſtles; and from the faint veſtiges of a few of them, it is conjectured that there were four of them between every two caſtles, at the diſtance of about 300 yards from one another. According to this conjecture, the number of the turrets amounted to 324. They were deſigned for watch-towers and places for centinels, who, being within hearing of one another. could convey an alarm or intelligence to all parts of the wall in a very little time.

Such were the ſtations, caſtles, and turrets on the wall of Severus; and a very conſiderable body of troops was conſtantly quartered in them for its defence. The uſual complement allowed for this ſervice was as follows:

1. Twelve cohorts of foot, conſiſting of 600 men each - - - -	7,200
2. One cohort of mariners in the ſtation at Boulneſs - - -	600
3. One detachment of Moors, probably equal to a cohort - - - -	600
4. Four alæ or wings of horſe, conſiſting, at the loweſt computation, of 400 each	1,600
	10,000

For the conveniency of marching theſe troops from one part of the wall to another, with the greater eaſe and expedition, on any ſervice, it was attended with two military ways, paved with ſquare ſtones, in the moſt ſolid and beautiful manner. One of theſe ways was ſmaller, and the other larger. The ſmaller military way run cloſe along the ſouth ſide of the wall, from turret to turret, and caſtle to caſtle, for the uſe of the ſoldiers in relieving their guards and centinels, and ſuch ſervices. The larger way did not keep ſo near the wall, nor touch at the turrets or caſtles, but purſued the moſt direct courſe from one ſtation to another, and was deſigned for the conveniency of marching larger bodies of troops.

It is to be regretted, that we cannot gratify the reader's curioſity, by informing him by what particular bodies of Roman troops the ſeveral parts of this great work were executed; as we were enabled to do with regard to the wall of Antoninus Pius from inſcriptions. For though it is probable that there were ſtones with inſcriptions of the ſame kind, mentioning the ſeveral bodies of troops, and the quantity of work performed by each of them, originally inſerted in the face of this wall, yet none of them are now to be found. There have indeed been diſcovered, in or near the ruins of this wall, a great number of ſmall ſquare ſtones, with very ſhort, and generally imperfect, inſcriptions upon them; mentioning particular legions, cohorts, and centuries; but without directly aſſerting that they had built any part of the wall, or naming any number of paces. Of theſe inſcriptions, the

Severus.

reader may ſee no fewer than twenty-nine among the Northumberland and Cumberland inſcriptions in Mr Horſley's Britannia Romana. As the ſtones on which theſe inſcriptions are cut, are of the ſame ſhape and ſize with the other facing-ſtones of this wall, it is almoſt certain that they have been originally placed in the face of it. It is equally certain, from the uniformity of theſe inſcriptions, that they were all intended to intimate ſome one thing, and nothing ſo probable as that the adjacent wall was built by the troops mentioned in them. This was, perhaps, ſo well underſtood, that it was not thought neceſſary to be expreſſed; and the diſtance of theſe inſcriptions from one another ſhowed the quantity of work performed. If this was really the caſe, we know in general, that this great work was executed by the ſecond and ſixth legions, theſe being the only legions mentioned in theſe inſcriptions. Now, if this prodigious wall, with all its appendages of ditches, ſtations, caſtles, turrets, and military ways, was executed in the ſpace of two years by two legions only, which, when moſt complete, made no more than 12,000 men, how greatly muſt we admire the ſkill, the induſtry, and excellent diſcipline of the Roman ſoldiers, who were not only the valiant guardians of the empire in times of war, but its moſt active and uſeful members in times of peace?

This wall of Severus, and its fortreſſes, proved an impenetrable barrier to the Roman territories for near 200 years. But about the beginning of the 5th century, the Roman empire being aſſaulted on all ſides, and the bulk of their forces withdrawn from Britain, the Mæatæ and Caledonians, now called Scots and Picts, became more daring; and ſome of them breaking through the wall, and others ſailing round the ends of it, they carried their ravages into the very heart of Provincial Britain. Theſe invaders were indeed ſeveral times repulſed after this by the Roman legions ſent to the relief of the Britons. The laſt of theſe legions, under the command of Gallio of Ravenna, having, with the aſſiſtance of the Britons, thoroughly repaired the breaches of Severus's wall and its forteſſes, and exhorted the Britons to make a brave defence, took their final farewell of Britain. It ſoon appeared, that the ſtrongeſt walls and ramparts are no ſecurity to an undiſciplined and daſtardly rabble, as the unhappy Britons then were. The Scots and Picts met with little reſiſtance in breaking through the wall, whoſe towns and caſtles were tamely abandoned to their deſtructive rage. In many places they levelled it with the ground, that it might prove no obſtruction to their future inroads. From this time no attempts were ever made to repair this noble work. Its beauty and grandeur procured it no reſpect in the dark and taſteleſs ages which ſucceeded. It became the common quarry for more than a thouſand years, out of which all the towns and villages around were built; and is now ſo entirely ruined, that the penetrating eyes of the moſt poring and patient antiquarian can hardly trace its vaniſhing foundations.

Sevigne, Seville.

SEVIGNE (Marie de Rabutin, Marquiſſe de), a French lady, celebrated for her wit and her fine ſenſe, was born in 1626, and was not above a year old when her father was killed at the deſcent of the Engliſh upon the iſle of Rhee. In 1644, ſhe married the marquis of Sevigne, who was killed in a duel in 1651. She had by him a ſon and a daughter; to the care of whoſe education ſhe afterwards moſt religiouſly devoted herſelf: they became accordingly moſt accompliſhed perſons, as it was reaſonable to expect. This illuſtrious lady was acquainted with all the wits and learned of her time. It is ſaid ſhe decided the famous diſpute between Perrault and Boileau, concerning the preference of the ancients to the moderns, thus: "The ancients are the fineſt, and we are the "pretties." She died in 1696, and left us a moſt valuable collection of letters; the beſt edition of which is that of Paris 1754, in eight volumes 12mo. "Theſe letters," ſays Voltaire, "filled with anecdotes, written with freedom, and in a natural and animated ſtyle, are an excellent criticiſm upon ſtudied letters of wit, and ſtill more upon thoſe fictitious letters which aim to imitate the epiſtolary ſtyle, by a recital of falſe ſentiments and feigned adventures to imaginary correſpondents." A *Sevigniana* was publiſhed at Paris in 1756; which is nothing more than a collection of literary and hiſtorical anecdotes, fine ſentiments, and moral apophthegms, ſcattered throughout theſe letters.

SEVILLE, a large and populous city of Spain, ſituated on the Guadalquiver river, in W. Long. 5. 5. N. Lat. 37. 20. This city is ſuppoſed to have been founded by the Phœnicians, who gave it the name of *Hiſpalis*. When it fell under the power of the Romans, it was called *Julia:* and at laſt, after a variety of corruptions, was called *Sebilla* or *Sevilla;* both of which names are retained by the Spaniards. The Romans embelliſhed it with many magnificent edifices; of which ſcarce any veſtige now remains. The Gothic kings for ſome time made it their reſidence: but in proceſs of time they removed their court to Toledo; and Seville was taken by ſtorm ſoon after the victory obtained at Xeres over the Gothic king Rodrigo. In 1027, Seville became an independent monarchy; but was conquered 70 years afterwards by Yuſef Almoravides, an African prince. At laſt it was taken by Ferdinand III. after a year's ſiege; and 300,000 Moors were then obliged to leave the place. Notwithſtanding this prodigious emigration, Seville continued to be a great and populous city, and ſoon after it was enlarged and adorned with many magnificent buildings, the chief of which is the cathedral. Seville arrived at its utmoſt pitch of grandeur a little after the diſcovery of America, by reaſon that all the valuable productions of the Weſt Indies were brought hither. Its court was then the moſt ſplendid in Europe; but in the courſe of a few years all this grandeur diſappeared, owing to the impediments in navigating the Guadalquivir. The ſuperior excellence of the port of Cadiz induced government to order the galeons to be ſtationed there in time to come.

The ſhape of Seville is circular, without any great riſing in the whole ſpace. The walls ſeem to be of Mooriſh conſtruction, and are about five miles and an half in circumference. The ditch is filled up in many places. On the weſt ſide of the river is a ſuburb called *Triana*, as large as many towns, but remarkable for nothing but its Gothic caſtle; where, in 1482, the inquiſition was firſt eſtabliſhed in Spain.

The ſtreets of Seville are crooked, dirty, and narrow; ſo that two coaches can ſcarcely paſs one another abreaſt. The wideſt and handſomeſt place is called the *Alameda*, or *Great Walk of Old Elms*, in the heart of the city. The length of this is 600 yards, and its breadth 150; decorated with three fountains, the ſtatues of Hercules the ſuppoſed founder, and of Julius Cæſar the reſtorer, of Seville. The cathedral is 420 feet by 273 within, and 126 feet high; the circumference of each cluſter of pillars, 42 feet. It has nine doors, 80 windows, and 80 altars, at which 500 maſſes are daily celebrated. At one angle ſtands the Giralda, a tower 350 feet high, erected by the Moors in the year 1000. The Chriſtians added two ſtones, with a prodigious large weathercock; and as the whole riſes much higher than any other edifice in Seville, it has a noble effect. According to tradition, the Moors, in order to form a ſolid foundation for this edifice, made a deep hole, in which they caſt all the marble and ſtone monuments of the Romans that could be found; and indeed, when repairs have been neceſſary, this tradition ſeems to have been countenanced by the many monuments of antiquity diſcovered on ſuch occaſions. The whole work is brick and mortar; with a winding ſtair-caſe within, ſo eaſy and wide, as to admit two horſemen riding abreaſt above half way up. The other churches are unworthy of notice; and even the cathedral, according to Mr Swinburne, is inferior to York Minſter. This cathedral was begun by Don Sancho the Brave about the cloſe of the 13th century, and finiſhed by John II. about an hundred years after.

The Canos de Carmone, or great aqueduct of Seville, is reckoned, by the hiſtorians of this city, one of the moſt wonderful works of antiquity. Mr Swinburne, however, remarks, that it is ugly, crooked, the arches unequal, and the architecture neglected. The conduit, beſides, is ſo leaky, that a rivulet is formed by the waſte water. Nevertheleſs, it ſtill conveys to the city an ample ſupply of water ſufficient to turn ſeveral mills, and to give almoſt every houſe in town the benefit of it.

The only other remarkable building about Seville is the ſnuff-manufactory. For the more convenient carrying on this branch of commerce, Ferdinand VI. erected a moſt magnificent roomy palace, in a grand, but rather heavy ſtyle of architecture, which was finiſhed in 1756. A thouſand men are employed conſtantly here at about four or ſix reals per day, for nine hours work. One hundred and eighty mules work 28 mills or machines for mixing the tobacco with a red earth from Almazarron. The exceſſive adulteration with this earth, however, has of late occaſioned a prodigious falling off in the exportation of the manufacture: the northern nations have long refuſed to take any off their hands; and unleſs they alter their method, the trade will probably ſoon be confined to Spain and its dominions. The neat profits, for one year, have amounted to more than ſix millions of dollars.

SEWELL (George), an eminent phyſician, elegant writer, and excellent poet, was the eldeſt ſon of Mr John Sewell treaſurer and chapter-clerk of the college of Windſor; and was educated at Eton ſchool, and at Peter-houſe in Cambridge, where he took the degree of bachelor in phyſic. In order to complete his knowledge in medicine, he went to Leyden, and ſtudied under the celebrated Boerhaave; and on his return practiſed phyſic in London with good ſucceſs. Towards the latter part of his life he retired to Hampſtead, where he continued to purſue the buſineſs of his profeſſion till the time of his death, which happened in the year 1726. He wrote ſeveral eſſays in the Spectators and Tatlers; and was concerned in the tranſlation of Ovid's Metamorphoſes, with Dr Garth and others. He likewiſe wrote, 1. The life of Mr John Philips, author of the poem on cyder. 2. A vindication of the Engliſh Stage, exemplified in the Cato of Mr Addiſon, in a letter to a nobleman. 3. Sir Walter Raleigh, a tragedy: and ſeveral miſcellaneous poems.

SEWER, *in the* HOUSEHOLD, an officer who comes in before the meat of a king or nobleman, to place and range it on the table.

SEWER is alſo a paſſage or gutter made to carry water into the ſea or a river, whereby to preſerve the land, &c. from inundations and other annoyances.

Court of Commiſſioners of SEWERS *in England*. A temporary tribunal, erected by virtue of a commiſſion under the great ſeal; which formerly uſed to be granted *pro re nata* at the pleaſure of the crown, but now at the diſcretion and nomination of the lord chancellor, lord treaſurer, and chief juſtices, purſuant to the ſtatute 23 Hen. VIII. c. 5. Their juriſdiction is to overlook the repairs of ſea-banks and ſea-walls, and the cleanſing of rivers, public ſtreams, ditches, and other conduits, whereby any waters are carried off; and is confined to ſuch county or particular diſtrict as the commiſſion ſhall expreſsly name. The commiſſioners are a court of record, and may fine and impriſon for contempts; and in the execution of their duty, may proceed by jury, or upon their own view, and may take order for the removal of any annoyances, or the ſafeguard and conſervation of the ſewers within their commiſſion, either according to the laws and cuſtoms of Romney-marſh, or otherwiſe at their own diſcretion. They may alſo aſſeſs ſuch rates or ſcots upon the owners of lands within their diſtrict, as they ſhall judge neceſſary: and if any perſon refuſes to pay them, the commiſſioners may levy the ſame by diſtreſs of his goods and chattels; or they may, by ſtatute 23 Hen. VIII. c. 5. ſell his freehold-lands, (and by the 7 Ann. c. 10. his copyhold alſo), in order to pay ſuch ſcots or aſſeſſments. But their conduct is under the controul of the court of King's-Bench, which will prevent or puniſh any illegal or tyrannical proceedings. And yet in the reign of king James I. (8 Nov. 1616.) the privy-council took upon them to order, that no action or complaint ſhould be proſecuted againſt the commiſſioners unleſs before that board; and committed ſeveral to priſon who had brought ſuch actions at common law, till they ſhould releaſe the ſame: and one of the reaſons for diſcharging Sir Edward Coke from his office of lord chief-juſtice, was for countenancing thoſe legal proceedings. The pretence for theſe arbitrary meaſures was no other than the tyrant's plea of the *neceſſity* of unlimited powers in works of evident utility to the public, "the ſupreme reaſon above all reaſons, which is the ſalvation of the king's lands and people." But now it is clearly held, that this (as well as all other inferior juriſdictions) is ſubject to the diſcretionary coercion of his majeſty's court of King's-bench.

SEX, ſomething in the body which diſtinguiſhes male from female.

Sex *of Bees*. See Bee.

Sexes *of Plants*. Theophraſtus, the father of botany, frequently mentions the ſexes of plants. He obſerves, that trees may be diſtinguiſhed into ſeveral claſſes, on account of their great variety: but that their moſt common diſtinction is into *male* and *female;* the one of which is fertile; the other, in ſome ſorts, barren. This diſtinction of the ſexes, however, is not ſo much founded upon an analogy betwixt vegetables and animals, as upon the greater or leſs perfection of the fruit in the plants in queſtion. In a ſpecies of palm-tree, mentioned by this author and Ariſtotle, the analogy in queſtion is more ſtrictly preſerved. "If the duſt of a branch of the male palm (ſays Ariſtotle) is ſhaken over the female, the fruit of the latter will quickly ripen; nay, (continues the ſame author), if this male duſt ſhall be carried along with the wind, and diſperſed upon the female, the ſame effect will follow as if a branch of the male had been ſuſpended over it." To the ſame purpoſe Theophraſtus obſerves, that unleſs the duſt or down of the male palm is ſprinkled over the fruit of the female, it will never ripen, but fall off. That theſe naturaliſts, however, were not clear in opinion that the fruit ſo ſprinkled with the male duſt was impregnated by it in the ſame manner as the ovary is fecundated in animals, appears from another paſſage in the laſt quoted author, in which he aſſerts, that though the fact juſt mentioned cannot be denied, yet no reaſon whatever can be aſſigned for the effect of the ſprinkling.

Dioſcorides, the next Greek botaniſt of note after Theophraſtus, denominates many plants male and female, but without regard to analogy, or to their fertility or barrenneſs. Thus his male mercury carries the ſeed, and the female is barren. Theſe ideas of the ſexes of plants have been transferred to our own times; and it is not uncommon to hear peaſants confounding the ſexes of hemp, ſpinage, and hop, by calling the male plant *female*, and the female plant, or that which bears the ſeeds, *male*.

Ariſtotle, as well as Dioſcorides, errs widely in his manner of diſtinguiſhing the male from the female plant; the former of which, in his opinion, is larger and ſtronger; the female weaker, but more fruitful.

"Naturaliſts," ſays Pliny, "admit the diſtinction of ſex, not only in trees, but in herbs and all plants. Yet (continues the ſame author) this is no where more obſervable than in palms, the females of which never propagate but when they are fecundated by the duſt of the male."

The palm-tree is the only inſtance among the ancients where ſexes are attributed to particular plants on account of fertility or barrenneſs; other plants being, as we have ſeen, diſtinguiſhed into male and female, merely for diſtinction's ſake, and often erroneouſly. Cæſalpinus was the firſt who corrected the miſtakes of the ancients with reſpect to the ſex of plants, and eſtabliſhed what are now generally called orthodox opinions on that ſubject. He obſerved, that in ſome trees, as yew; and in ſome herbaceous vegetables, as mercury, hemp, and nettle; the fruit was produced on one root, and flowers only on the other: the laſt being barren, was denominated the *male plant;* the other being fertile, the *female*. The female plants, continues the ſame intelligent author, ſucceed better, that is, become more fruitful, if ſowed in the neighbourhood of the male: certain exhalations from the latter diſperſing themſelves over their ſurface, and, by an operation not to be explained, diſpoſing them to produce riper and more perfect ſeeds.

Cæſalpinus's idea of ſex in plants was reſtricted to a very inconſiderable number; thoſe, to wit, in which the pretended organs are placed apart from each other, on ſeparate roots produced from the ſame ſeed. In plants of this deſcription, their analogy to animals would, in a manner, ſuggeſt itſelf. From the ſame ſeed are produced two different plants; the one barren, the other fertile. The analogy to the ſexes of animals immediately preſents itſelf to the mind, and we denominate that which is barren, or bears no ſeeds, *male;* that which is fertile, or bears ſeeds, *female.* The ſame analogy carries us farther, and induces a conjecture, that theſe male and female plants are connected together in ſuch a manner, that the fecundation of the ſeeds of the female is operated, as in animals, by the male. This conjecture, furniſhed by analogy, leads to obſervations and experiments for its ſupport: and thus the doctrine of the ſexes, ſmall and inconſiderable in its beginnings, becomes enlarged, and, from being confined to a very ſmall number of plants, extends itſelf over the whole vegetable kingdom.

Dr Nehemiah Grew is thought to have firſt ſuggeſted the univerſality of ſexes in plants, and the primary uſe of the *antheræ apices*, or tops of the ſtamina, in impregnating the ſeed. Theſe tops, he obſerves, are chiefly uſeful to the plant itſelf; becauſe all plants, even ſuch as want the foliature or petals, are provided with them: he then plainly aſſerts, as his opinion, that when the tops, which he calls the *attire*, *break* or *open*, their incloſed *pollen*, or duſt, falls down on the ſeed-bud, the vegetable uterus, and endues it with a prolific virtue; not, as he explains himſelf, by entering into it bodily, as the *ſemen maſculinum* in animals, but by communicating to it ſome ſubtle and vivific effluvia.

This opinion of Grew was adopted by ſeveral ſucceeding botaniſts, particularly Mr Ray, Camerarius, Geoffroy, Samuel Morland, Dr Blair, Juſſieu, Bradley, Van Royen, Malpighi, Vaillant, Ludwig, Wolfius, Logan, Monro, and the juſtly celebrated Linnæus.

Ray, at firſt, mentions Grew's doctrine only as probable; but afterwards declares his full aſſent to it, and collects the arguments that are uſed to ſupport it.

Rudolphus Jacobus Camerarius, about the end of the laſt century, endeavoured to demonſtrate the analogy betwixt the generation of plants and animals. Among other arguments for the ſex of plants, he makes uſe of the following: "That copulation (ſays he) is neceſſary in the generation of animals is paſt a doubt: that a ſimilar junction obtains in that of plants appears from this circumſtance, that if either the tops (*antheræ*) of the male, or the ſtyles of the female, or both, are wanting, no fecundation, and conſequently no generation, can take place." This aſſertion he exemplifies in the mulberry-tree, mays, and mercury, in which the ſtamina of the male flowers being either picked off before they had attained maturity, as in the two firſt inſtances, or placed at a diſtance from the female plant, as in the laſt, the buds that ought to have produced fruit came not to maturity. The ſame author ſpeaks of the number of ſtamina in flowers; ſo that in his works we may recognize almoſt the firſt principles of the celebrated ſexual ſyſtem of Linnæus.

However, almoſt a century before Grew, Zaluzianſki, a native of Poland, had clearly diſtinguiſhed the ſexes of plants, and pointed out the difference betwixt male, female, androgynous, and hermaphrodite plants. Grew's improvements on the idea of Cæſalpinus and Zaluzianſki, have made him generally be conſidered as the author of the doctrine alluded to. Certain it is, that he has handled the ſubject with great accuracy, and endeavoured, by repeated microſcopical examinations, to throw light upon this obſcure, but curious inquiry.

Signor Malpighi, who was contemporary with Grew, likewiſe examined by the microſcope the male or fecundating duſt, the ſtyles of the ſeed-bud, and the manner in which the *antheræ* open, or burſt, when ripe.

Morland, Geoffroy, and Vaillant, who have written ſucceſſively upon this ſubject, all concur in aſſerting, that the duſt of the *antheræ* or tops of the ſtamina is entirely analogous to the *ſemen maſculinum* of animals, and abſolutely neceſſary for fecundating the ſeed. Morland, however, differs from Grew, in his conception of the manner in which the fecundation in queſtion is accompliſhed. The latter, as we have ſeen, gave it for his opinion, that the fecundating duſt did not enter bodily into the ovary of the plant, but operated its effect by means of ſome ſpirituous emanations, or vivifying effluvia. Morland, on the other hand, aſſerted, that "the male-duſt is a congeries of ſeminal plants; one of which muſt be conveyed through the ſtyle into every *ovum* or ſeed, before it can become prolific." This hypotheſis, as the reader will eaſily perceive, is analogous to that of animal generation, by means of *animalcula in ſemine maſculino*. Geoffroy, in a memoir preſented to the Academy of Sciences at Paris in 1711, on the ſtructure and uſe of the principal parts of flowers, aſſerts, that the germ, or *punctum vitæ*, is never to be ſeen in the ſeed till the *antheræ* have ſhed their duſt; and that if the ſtamina be cut out before the *antheræ* open, the ſeed will either not ripen, or be barren if it ripens. This laſt is Camerarius's great argument repeated.

In 1717, Mr Vaillant made ſome very ingenious diſcoveries with reſpect to the nature of the fecundating duſt, and the manner of its exploſion. He ſeems, ſays an ingenious French author, to have been the firſt eye-witneſs of this ſecret of nature, this admirable ſport that paſſes in the flowers of plants between the organs of different ſexes. Vaillant is entirely of Grew's opinion, that it is the volatile ſpirit of the male duſt, not its groſs or bodily ſubſtance, that enters the ſeeds of plants; the ſtyle, which leads to the caſe containing the ſeeds, being frequently found perfectly ſolid and impenetrable by that ſubſtance.

Laſtly, the celebrated Sir Charles Linnæus has completed the doctrine of the ſex of plants, by collecting all the arguments in ſupport of it that can poſſibly be advanced †; and by founding upon it a ſyſtem, in which all vegetables are arranged under particular claſſes, diſtinguiſhed by the number and other circumſtances of their ſtamina or male organs. See BOTANY, *paſſim*.

SEXAGENARY, ſomething relating to the number ſixty: thus ſexagenary or ſexageſimal arithmetic, is a method of computation proceeding by ſixties; ſuch is that uſed in the diviſion of a degree into ſixty minutes, of the minute into ſixty ſeconds, of the ſecond into ſixty thirds, &c. Alſo ſexagenary tables are tables of proportional parts, ſhowing the product of two ſexagenaries that are to be multiplied, or the quotient of the two that are to be divided.

SEXAGESIMA, the ſecond Sunday before Lent, or the next to Shrove-Sunday, ſo called as being about the 60th day before Eaſter.

SEXAGESIMALS, or SEXAGESIMAL *Fractions*, fractions whoſe denominators proceed in a ſexagecuple ratio; that is, a prime, or the firſt minute, $=\frac{1}{60}$; a ſecond $=\frac{1}{3600}$; a third $=\frac{1}{216000}$. Anciently, there were no other than ſexageſimals uſed in aſtronomy; and they are ſtill retained in many caſes, though decimal arithmetic begins to grow in uſe now in aſtronomical calculations. In theſe fractions, which ſome call *aſtronomical fractions*, the denominator being always 60, or a multiple thereof, is uſually omitted, and the numerator only written down: thus, 4°, $59'$, $32''$, $50'''$, $16''''$, is to be read, 4 degrees, 59 minutes, 32 ſeconds, 50 thirds, 16 fourths, &c.

SEXTANS, SEXTANT, a ſixth part of certain things. The Romans having divided their *as* into 12 ounces or unica, the ſixth part of that, or two ounces, was the ſextans.—*Sextans* was alſo a meaſure which contained two ounces of liquor, or two cyathi.

SEXTANT, in mathematics, denotes the ſixth part of a circle, or an arch comprehending 60 degrees.

The word *ſextant* is more particularly uſed for an aſtronomical inſtrument made like a quadrant, excepting that its limb only comprehends 60 degrees. The uſe and application of the ſextant is the ſame with that of the quadrant. See QUADRANT.

SEXTILE, *ſextilis*, the poſition or aſpect of two planets when at 60 degrees diſtance, or at the diſtance of two ſigns from one another. It is marked thus (✱). See ASPECT.

SEXTON, a church-officer, whoſe buſineſs is to take care of the veſſels, veſtments, &c. belonging to the church, and to attend the miniſter, church-wardens, &c. at church.

SEXTUPLE, in muſic, denotes a mixed ſort of triple, which is beaten in double time.

SEXTUS EMPIRICUS, a famous Pyrrhonian philoſopher, lived in the ſecond century, under the reign of Antoninus the Debonair. He was a phyſician of the ſect of the Empirics, and is ſaid to have been one of the preceptors of Antoninus the philoſopher. There are ſtill extant his Pyrrhonian Inſtitutions, and a large work

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† See BOTANY, ſect. v.

work againſt the mathematicians, &c. The beſt edition of Sextus Empiricus is that of Fabricius in Greek and Latin, printed at Leipſic in 1718, folio.

SEXUALISTÆ, among botanical writers, thoſe who have eſtabliſhed the claſſes of plants upon the differences of the ſexes and parts of fructification in plants, according to the modern method; as Linnæus, &c.

SEINE, a river of France, which, ariſing near Dijon in Burgundy, runs north-weſt through Champagne and the Iſle of France, through Paris, &c. and, croſſing Normandy, falls into the Britiſh Channel between Havre de Grace and Honfleur.

SFORZA (James), ſtyled the Great, count de Corignoli, a renowned warrior, was born in 1639. He was the ſon of a labourer; but by his military talents he ennobled his family, and was the founder of the illuſtrious houſe of the Sforzas dukes of Milan. Drowned in paſſing the river Peſcara in purſuit of Alphonzo king of Arragon in 1424.

Sforza (Francis), natural ſon to the former; an able ſtateſman, and a renowned general. He ſerved under his father againſt Alphonſus king of Arragon; and, though illegitimate, he ſucceeded to his eſtate, and to his poſt in the army, under Jane II. queen of Naples. He afterwards attached himſelf to René duke of Anjou, her ſucceſſor. The reputation of his valour engaged the pope, the Venetians, and the Florentines, to appoint him their general in the war againſt the duke of Milan, though he had married his daughter. The duke dying in 1447, the Milaneſe choſe Sforza to be their general againſt the Venetians; and, after many ſignal ſervices performed for them, he turned his arms againſt them, laid ſiege to Milan, and obliged them to acknowledge him duke of Milan. The dukedom, by hereditary right, belonged to Charles duke of Orleans; but Louis XI. who hated the duke of Orleans, entered into a treaty with Sforza, and, in 1464, transferred to him all the claims of France to Milan and Genoa; upon which he made himſelf maſter of the latter. Died in 1466.

SHAD, in ichthyology, a ſpecies of Clupea.

SHADDOCK, a ſpecies of Citrus.

SHADOW, in optics, a privation or diminution of light, by the interpoſition of an opaque body; or it is a plane where the light is either altogether obſtructed, or greatly weakened, by the interpoſition of ſome opaque body between it and the luminary.

Shadow, in painting, an imitation of a real ſhadow, effected by gradually heightening and darkening the colours of ſuch figures as by their diſpoſitions cannot receive any direct rays from the luminary that is ſuppoſed to enlighten the piece.

SHADWELL (Thomas), deſcended of an ancient family in Staffordſhire, was born in 1640, and educated at Caius college, Cambridge. He then was placed in the Middle Temple to ſtudy the laws; where having ſpent ſome time, he travelled abroad. Upon his return home, he became acquainted with the moſt celebrated perſons of wit in that age. He applied himſelf chiefly to dramatic writing, in which he had great ſucceſs; and upon the Revolution was made poet-laureat and hiſtoriographer to king William and queen Mary, in the room of Mr Dryden. Theſe employments he enjoyed till his death, which happened in 1692. Beſide his dramatic writings, he compoſed ſeveral other pieces of poetry; the chief of which are his congratulatory poem on the prince of Orange's coming to England; another on queen Mary; his tranſlation of Juvenal's 10th ſatire, &c. Mr Dryden treats him with great contempt, in his ſatire called *Mac-Fleckno*. The beſt judges of that age, however, gave their teſtimony in favour of his comedies; which have in them fine ſtrokes of humour; the characters are often original, ſtrongly marked, and well ſuſtained. An edition of his works, with ſome account of his life and writings prefixed, was publiſhed in 1720, in 4 vols 8vo.

SHAFT *of a* Column, in building, is the body thereof between the baſe and capital; ſo called from its ſtraightneſs. See Architecture.

Shaft, in mining, is the pit or hollow entrance into the mine.

SHAFTESBURY, a town of Dorſetſhire in England, in W. Long. 2. 10. N. Lat. 51. 0. It ſtands on a high hill, and is built in the form of a bow. It enjoys a ſerene wholeſome air, and has a fine proſpect, but has little water. It is a good thoroughfare, is governed by a mayor, and ſends two members to parliament. It gives the title of earl to the noble family of Cooper.

Shaftesbury (earl of). See Cooper.

SHAG, in ornithology, a ſpecies of Pelicanus.

SHAGREEN, or Chagreen, in commerce, a kind of grained leather prepared of the ſkin of a ſpecies of Squalus, much uſed in covering caſes, books, &c.

SHAKE, in ſinging. See Gruppo.

SHAKESPEARE (William), the great poet of nature, and the glory of the Britiſh nation, was deſcended of a reputable family, at Stratford upon Avon. His father was in the wool-trade, and dealt conſiderably that way. He had ten children, of whom our immortal poet was the eldeſt, and was born in April 1564. At a proper age, he was put to the free-ſchool in Stratford, where he acquired the rudiments of grammar-learning. Whether he diſcovered at this time any extraordinary genius or inclination for literature, is uncertain. His father had no deſign to make a ſcholar of him; on the contrary, he took him early from ſchool, and employed him in his own buſineſs: but he did not continue long in it under the controul of his father; for at ſeventeen years of age he married, commenced maſter of a family, and became the father of children before he was out of his minority. He now ſettled in buſineſs for himſelf, and had no other thoughts than of purſuing the wool-trade, when, happening to fall into acquaintance with ſome perſons who followed the practice of deer-ſtealing, he was prevailed upon to engage with them in robbing Sir Thomas Lucy's park, near Stratford. The injury being repeated more than once, that gentleman was provoked to enter a proſecution againſt the delinquents; and Shakeſpeare, in revenge, made him the ſubject of a ballad, which, tradition ſays, (for the piece is loſt), was pointed with ſo much bitterneſs, that it became unſafe for the author to ſtay any longer in the country. To eſcape the law, he fled to London. There, deſtitute of friends and money, he approached the play-houſe, and, for preſent ſupport, engaged in the ſervile employment of holding the horſes of thoſe who rode to the theatre: but converſing accidentally with ſome of the players, he at length gained admittance into the houſe, in the capacity of an inferior actor; nor did his performance entitle him to advancement, ſo that the higheſt character he ever played was that of the Ghoſt in his own Hamlet. The part of an under-actor neither engaged nor deſerved his attention. It was far from filling, or being adequate to the powers of his mind; and therefore he turned the advantage which that ſituation afforded him to a higher and nobler uſe. Having, by practice and obſervation, acquainted himſelf with the mechanical œconomy of the theatre, his native genius ſupplied the reſt: But the whole view of his firſt attempts in ſtage-poetry being to procure a ſubſiſtence, he directed his endeavours ſolely to hit the taſte and humour that then prevailed among the meaner ſort of people, of whom the audience was generally compoſed; and therefore his images of life were drawn from thoſe of that rank. Thus did Shakeſpeare ſet out, without the advantage of education, the advice or aſſiſtance of the learned, the patronage of the better ſort, or any acquaintance among them. But when his performances had merited the protection of his prince, and the encouragement of the court had ſucceeded to that of the town, the works of his riper years were manifeſtly raiſed above the level of his former productions.

In this way of writing he was an abſolute original, and of ſuch a peculiar caſt, as hath perpetually raiſed and confounded the emulation of his ſucceſſors; a compound of ſuch very ſingular blemiſhes, as well as beauties, that theſe latter have not more mocked the toil of every aſpiring undertaker to emulate them, than the former, as flaws intimately united to diamonds, have baffled every attempt of the ableſt artiſts to take them out without ſpoiling the whole. Queen Elizabeth, who ſhowed Shakeſpeare many marks of her favour, was ſo much pleaſed with the delightful character of Sir John Falſtaff, in the two parts of Henry the Fourth, that ſhe commanded the author to continue it for one play more, and to ſhow the knight in love; which he executed inimitably, in the Merry Wives of Windſor.

Among his other patrons, the earl of Southampton is particularly honoured by him, in the dedication of two poems, Venus and Adonis, and Lucrece; in the latter eſpecially, he expreſſes himſelf in ſuch terms as gives countenance to what is related of that patron's diſtinguiſhed generoſity to him. In the beginning of king James I.'s reign (if not ſooner) he was one of the principal managers of the play-houſe, and continued in it ſeveral years afterwards; till, having acquired ſuch a fortune as ſatisfied his moderate wiſhes and views in life, he quitted the ſtage, and all other buſineſs, and paſſed the remainder of his time in an honourable eaſe, at his native town of Stratford, where he lived in a handſome houſe of his own purchaſing, to which he gave the name of *New-Place;* and he had the good fortune to ſave it from the flames in the dreadful fire that conſumed the greateſt part of the town in 1614.

In the beginning of the year 1616, he made his will, wherein he teſtified his reſpect to his quondam partners in the theatre: he appointed his youngeſt daughter, jointly with her huſband, his executors, and bequeathed to them the beſt part of his eſtate, which they came into the poſſeſſion of not long after. He died on the 23d of April following, being the 53d year of his age; and was interred among his anceſtors on the north ſide of the chancel, in the great church of Stratford, where there is a handſome monument erected for him, inſcribed with the following elegiac diſtich in Latin.

Judicio Pylium, genio Socratem, arte Maronem,
Terra tegit, Populus mæret, Olympus habet.

In the year 1740, another very noble one was raiſed to his memory, at the public expence, in Weſtminſter-abbey; an ample contribution for this purpoſe being made upon exhibiting his tragedy of Julius Cæſar, at the theatre-royal in Drury-Lane, April 28th 1738.

Nor muſt we omit mentioning another teſtimony of the veneration paid to his manes by the public in general, which is, that a mulberry-tree, planted upon his eſtate by the hands of this reverend bard, was cut down not many years ago; and the wood being converted to ſeveral domeſtic uſes, was all eagerly bought at a high price, and each ſingle piece treaſured up by its purchaſer as a precious memorial of the planter. The late commemorative jubilee, celebrated at his birth-place by the moſt illuſtrious perſons in the nation, is freſh in every one's memory.

The learned editors of the works of this immortal bard have exerted their utmoſt power in praiſe of his extenſive genius and univerſal knowledge of human nature. If, indeed, there ever exiſted an inſpired writer, (if by inſpiration we mean originality), Shakeſpeare was indiſputably inſpired. "His characters," ſays Mr Pope, "are ſo much nature's ſelf, that it were injurious to call them by ſo diſtant a name as *copies*." It is aſtoniſhing, when we conſider the infinite variety of his characters, that a poet, who from his education had ſo little opportunity of acquiring a knowledge of mankind, ſhould, as it were by intuition, have delineated the whole world with ſuch accuracy and truth! But to an Engliſh reader it is ſufficient, independent of his judgment, to appeal to his feelings. Some foreigners have fooliſhly attempted to ridicule particular ſcenes, and to condemn his inattention to their rules of the drama; but ſuch criticiſms ſerve only to expoſe their total ignorance of his capacity, his deſign, his invention. He deſpiſed their rules as he would have deſpiſed their criticiſms. Some of his plays are intentionally neither tragedies nor comedies, but a natural mixture of both: others are profeſſedly hiſtorical: but they are always juſt repreſentations of human nature, call them by what name you will. They ſay Shakeſpeare was illiterate. The ſuppoſition implies more than panegyric with a hundred tongues could have expreſſed. If he was unlearned, he was the only inſtance of a human being to whom learning was unneceſſary; the favourite child of Nature, produced and educated entirely by herſelf; but ſo educated, that the pedant Art had nothing new to add.

The following is a liſt of his works. 1. The tempeſt, a comedy. 2. The two gentlemen of Verona, C. 3. Henry IV. hiſtorical play, 2 parts. 4. Merry wives of Windſor, C. 5. Meaſure for meaſure, C. 6. The comedy of errors. 7. Much ado about nothing, C.

8. Love's labour loſt, C. 9. The midſummer night's dream, C. 10. The merchant of Venice, C. 11. As you like it, C. 12. The taming of the ſhrew, C. 13. All's well that ends well, C. Taken from the ninth novel of day iii. of Boccace's Decameron. 14. The twelfth night, or What you will. 15. The winter's tale, tragi-com. The plot from Robert Green's novel of Doraſtus and Faunia. 16. King John, tragedy. 17. King Richard II. T. 18. King Henry V. hiſtorical play. 19. King Henry VI. hiſtorical play, in three parts. 20. King Richard III. T. 21. King Henry VIII. T. 22. Troilus and Creſſida, T. From Chaucer. 23. Coriolanus, T. 24. Romeo and Juliet, T. 25. Timon of Athens, T. The ſtory is in Lucian's dialogues, Plutarch's Life of Anthony, &c. 26. Julius Cæſar, T. 27. Macbeth, T. 28. Hamlet prince of Denmark, T. 29. King Lear, T. The ſtory originally from Geoffroy of Monmouth, but immediately from an old ballad. Vide Johnſon's Shakeſpeare, vol. vi. 30. Othello the Moor of Venice, T. The ſtory from Cinthio's novels. 31. Anthony and Cleopatra, T. 32. Cymbeline, T. The plot partly from Boccace's Decameron, day ii. nov. 9. 33. Titus Andronicus, T. This tragedy, being ſuppoſed ſpurious, is rejected by the later editors of Shakeſpeare. It is however in Theobald's edition.—Eleven of theſe plays only were printed during Shakeſpeare's life, and thoſe not corrected by himſelf, nor publiſhed under his inſpection.

The ſeveral editions of Shakeſpeare's plays are, by Hemmings and Condel, Lond. 1623, 1632, 1663, 1685.—Nic. Rowe, 1714, 8vo, 9 vol.—Alex. Pope, 1721, 1725, 4to.—Mr Theobald, 1733, 8vo. 1740, 1757, 1762, 1773, 12mo.—Sir Tho. Hanmer, Oxf. 1744, 4to, 6 vol. 1745, 1749, 1771, 8vo.—Mr Warburton, Lond. 1747, 8vo, 8 vol.—Dr Johnſon, 1765, 1768, 8vo. 8 vol.—G. Steevens, 20 plays, 1766, 4 vol. 8vo.—Mr Capel, 1768, 8vo. 10 vol.—Johnſon and Steevens, 1773, 10 vol. 8vo.

Beſides his dramatic works, Shakeſpeare is ſaid to have written ſeveral poems, which are publiſhed in a ſingle 8vo volume. His ſonnets were publiſhed in 1609, 4to.

SHAKLES, in a ſhip, are the rings with which the ports are ſhut faſt, by laſhing the port-bar to them. There are alſo ſhakles put upon bilbow-bolts, for confining the men who have deſerved corporal puniſhment.

SHALLOP, a ſort of large boat with two maſts, and uſually rigged like a ſchooner. See SCHOONER.

SHAMBLES, among miners, a ſort of niches or landing-places, left at ſuch diſtances in the adits of the mines, that the ſhovel-men may conveniently throw up the ore from ſhamble to ſhamble, till it comes to the top of the mine.

SHAMMY, or CHAMOIS-LEATHER, a kind of leather, either dreſſed in oil or tanned; and much eſteemed for its ſoftneſs, pliancy, and being capable of bearing ſoap without hurt.—The true ſhammy is prepared of the ſkin of the chamois-goat, a ſpecies of CAPRA.

SHANK, in the manege, that part of a horſe's fore-leg which lies between the knee and the fetlock.

SHANKER, or CHANCRE, in medicine, a malignant ulcer, uſually occaſioned by ſome venereal diſorder. See MEDICINE, n° 447.

SHANNON, a river of Ireland, and the largeſt in that iſland. It riſes in the county of Leitrim, running from north to ſouth, and divides the provinces of Leinſter and Connaught; it then turns ſouth-weſt, runs through the province of Munſter, paſſes by the city of Limerick, and falls into the weſtern ocean between the counties of Clare and Limerick.

SHARE *of a* PLOUGH, that part which cuts the ground; the extremity forwards being covered with a ſharp-pointed iron, called the *point of the ſhare;* and the end of the wood behind, the *tail of the ſhare.*

SHARK, in ichthyology. See SQUALUS.

SHARP, in muſic. See INTERVAL.

SHARP (Dr John), archbiſhop of York, was deſcended from the Sharps of Little Norton, a family of Bradford Dale in Yorkſhire; and was ſon of an eminent tradeſman of Bradford, where he was born in 1644. He was educated at Cambridge, and in 1667 entered into orders. That ſame year he became domeſtic chaplain to Sir Heneage Finch, then attorney-general. In 1672, he was collated to the archdeaconry of Berkſhire. In 1675, he was inſtalled a prebendary in the cathedral church of Norwich; and the year following, was inſtituted into the rectory of St Bartholomew near the Royal Exchange, London. In 1681, he was, by the intereſt of his patron Sir Heneage Finch, then lord high chancellor of England, made dean of Norwich; but in 1686 was ſuſpended, for taking occaſion, in ſome of his ſermons, to vindicate the doctrine of the church of England in oppoſition to Popery. In 1688, he was ſworn chaplain to king James II. being then probably reſtored after his ſuſpenſion; for it is certain that he was chaplain to king Charles II. and attended as a court-chaplain at the coronation of king James II. In 1689, he was declared dean of Canterbury; but never could be perſuaded to fill up any of the vacancies made by the deprived biſhops. Upon the death of Dr Lamplugh, he was promoted to the ſee of York. In 1702 he preached the ſermon at the coronation of queen Anne; and the ſame year was ſworn of the privy-council, and made lord almoner to her majeſty. He died at Bath in 1713; and was interred in the cathedral of York, where a monument is erected to his memory.—His ſermons, which were collected after his death and publiſhed in 7 vols 8vo, are juſtly admired.

SHASTER, or SHASTRAM, a ſacred book, containing the religion of the Banians: it conſiſts of three tracts; the firſt of which contains the moral law, the ſecond the ceremonial, and the third delivers the peculiar obſervances for each tribe of Indians.—The ſhaſter is looked upon by ſome as a commentary on the vedam, and by others as an original work, an extract of which has been lately publiſhed in England, and has thrown ſome light upon the ſubject. This book teaches, that the Eternal Being, abſorbed in the contemplation of his own eſſence, formed the reſolution of created beings who might partake of his glory. He ſpoke, and angels roſe into exiſtence; they ſang in concert the praiſes of their Creator, and harmony reigned in the celeſtial regions; when two of theſe ſpirits having revolted, drew a legion after them. The Supreme Being drove them into a place of torment, from whence they were releaſed at the interceſſion of the faithful angels, upon conditions which at once inſpired them with joy and terror. The rebels were ſentenced, under different forms, to undergo puniſhments in the loweſt of the 15 planets, in proportion to the enormity of their firſt offence; accordingly each angel underwent 87 tranſmigrations upon earth, before he animated the body of a cow, which holds the higheſt rank among the animal-tribes. Theſe different tranſmigrations are conſidered as ſo many ſtages of expiation, preparatory to a ſtate of probation, which commences as ſoon as the angel tranſmigrates from the body of the cow into a human body: in this ſituation the Creator enlarges his intellectual faculties, and conſtitutes him a free agent; and his good or bad conduct haſtens or retards the time of his pardon. The good are at their death re-united to the Supreme Being, and the wicked begin anew the æra of their expiation.

SHAW (Dr Thomas), known to the learned world by his travels to Barbary and the Levant, was born at Kendal in Weſtmoreland, about the year 1692. He was appointed chaplain to the Engliſh conſul at Algiers, in which ſtation he continued for ſeveral years; and from thence took proper opportunities of travelling into different parts. He returned in 1733; was elected fellow of the royal ſociety; and publiſhed the account of his travels at Oxford, folio, 1738. In 1740 he was nominated principal of St Edmond-hall, which he raiſed from a ruinous ſtate by his munificence; and was regius profeſſor of Greek at Oxford until his death, which happened in 1751. Dr Clayton, biſhop of Clogher, having attacked theſe travels in his "Deſcription of the Eaſt," Dr Shaw publiſhed a ſupplement by way of vindication, which is incorporated into the ſecond edition of his travels, prepared by himſelf, and publiſhed in 4to, 1757.

SHEATHING, in the ſea-language, is the caſing that part of a ſhip which is to be under water with fir-board of an inch thick; firſt laying hair and tar, mixed together, under the boards, and then nailing them on, in order to prevent worms from eating the ſhip's bottom.—Ships of war are now generally ſheathed with copper.

SHEATS, in a ſhip, are ropes bent to the clews of the ſails; ſerving in the lower ſails to haul aft the clews of the ſail; but in top ſails they ſerve to haul home the clew of the ſail cloſe to the yard-arm.

SHEEP, in zoology. See Ovis.

Sheep *Noſe-Worms*, in natural hiſtory, a ſpecies of fly-worm found in the noſes of ſheep, goats, and ſtags, and produced there from the egg of a large two-winged fly.

The frontal ſinuſes above the noſe in ſheep and other animals, are the places where theſe worms live, and attain their full growth. Theſe ſinuſes are always full of a ſoft white matter, which furniſhes theſe worms with a proper nouriſhment, and are ſufficiently large for their habitation; and when they have here acquired their deſtined growth, and come to the condition in which they are fit to undergo their changes for the fly-ſtate, they leave their old habitation, and falling to the earth, bury themſelves there; and when theſe are hatched into flies, the female, when ſhe has been impregnated by the male, knows that the noſe of a ſheep, or other animal, is the only place to depoſit her eggs in order to their coming to good.

Mr Valliſnieri, to whom the world owes ſo many diſcoveries in the inſect-claſs, is the firſt who has given any true account of the origin of theſe worms. Tho' their true hiſtory had been till that time unknown, the creatures themſelves were very early diſcovered, and many ages ſince were eſteemed great medicines in epilepſies.

It is very common to find only one worm in the head of the creature that has them, often two are found, and ſometimes three, but very ſeldom any more than that.

Redi has given a very imperfect figure of this creature, nor is that of Mr Valliſnieri much better. The worm has two brown hooks at the anterior part of its head, placed parallel, or nearly parallel, to one another. It is compoſed of 11 rings, which together form a conic figure, ſomething flatted, of which the head of the worm is the point. When the worm is young, it is very white; but has two brown ſpots placed over-againſt each other, in the hinder part of its body, which are its two poſterior ſtigmata. Each of theſe ſpots is parted into two by a concentric circle, which is ſenſible, as it is whitiſh, the reſt of the ſpot being brown. It is plainly this very ſeparation which gives paſſage to the air. When the creature pleaſes, it ſhows theſe; but it can alſo draw them into a ſort of purſe in its poſterior ring. The anus is juſt below, and is uſually hid by the folds of the ſkin. The hooks are brown and ſtrong; juſt above theſe are two little fleſhy horns, and between them is placed the mouth.

This worm, when at its full growth, is conſiderably large, and becomes browniſh, or of a dirty white. Its belly, examined by the microſcope, is ſeen furniſhed with a number of fine ſhort prickles between the rings: the points of all theſe are turned backward, and one may even feel theſe prickles, in drawing the finger along the belly from the hinder part toward the head.

Theſe worms are capable of moving themſelves very ſwiftly; and it is doubtleſs owing to their motions in the head of the creature, and to the pain that the ſenſible membranes there muſt have from being wounded by the hooks and prickles of this animal, that ſheep are often ſeen to grow outrageous, and ſtrike their heads againſt trees and other hard bodies.

When theſe worms are taken out of the heads of ſheep, if they are put upon the earth, they immediately bury themſelves very deeply in it; and if not yet at their full growth, or in a proper ſtate for their changes, they die there: but if it be near the time that they would naturally have quitted their ancient habitation, which may be known by their being changed from their fine white to a browniſh colour, then they undergo all their proper changes under a ſhell made by the hardening of their own ſkin. This ſhell is of the ſame ſhape with the animal itſelf, but is of a deep brown.

It takes ſome time for the creature to undergo its ſeveral changes, and that more or leſs according to the ſeaſon. Mr Valliſnieri had one produced in the perfect fly-ſtate, after 40 days from the time of its firſt change. Mr Reaumur found thoſe which formed their ſhell on the 24th of April, not to produce the fly before the 27th of June.

The creature, when ready to appear in the fly-ſtate, has no great difficulty in the getting out of its caſe; the ſwelling and inflating its head, and throwing out its bladder, which is the practice of theſe creatures on this occaſion, eaſily detaches a piece of the ſhell, originally looſe, and gives the fly a ſufficient paſſage.

The fly produced from this worm has all the time of its life a very lazy diſpoſition, and does not like to make any uſe either of its legs or wings. Its head and corcelet together are about as long as its body, which is compoſed of five rings, ſtreaked on the back; a pale yellow and brown are there diſpoſed in irregular ſpots: the belly is of the ſame colour; but they are there more regularly diſpoſed, for the brown here makes three lines, one in the middle, and one on each ſide, and all the intermediate ſpaces are yellow. The wings are nearly of the ſame length with the body, and are a little inclined in their poſition, ſo as to lie upon the body; they do not, however, cover it, but a naked ſpace is left between them. The ailerons, or petty wings, which are found under each of the wings, are of a whitiſh colour, and perfectly cover the balancers, ſo that they are not to be ſeen without lifting up theſe. The upper part of the corcelet is full of ſmall black prominences, which, when examined by the microſcope, appear as ſo many corns of gunpowder. Its head is large in proportion to the ſize of the body, and its reticular eyes are of a deep changeable green. Theſe eyes take up leſs ſpace in the head than thoſe of moſt other flies: they leave a conſiderable ſpace between them; and in that are placed the three ſmaller or gloſſy eyes, which are placed in form of a ſmall triangle, and ſtand ſo near as to touch one another. The reſt of the upper part of the head is yellowiſh, and, viewed by the microſcope, appears cavernous like a ſpunge, or morel; and in the bottom of each of theſe ſmall cavities is a little black prominence. There are other two hollows in the anterior part of the head, in which the antennæ are placed; theſe are of the battledoor form, but rather round than flat, and have each a large hair going from them. The under part of the head, which is rounder than the upper, is whitiſh, and very ſmooth; it has two ſorts of bands directed downward, which are the elongations of the rims of the arches where the antennæ are lodged. The ſmoothneſs of the under part of the head makes one ſee very diſtinctly theſe three little tubercles; the upper one brown, the under ones of a pale deadiſh yellow. The mouth of the fly ſeems to be placed between theſe, immediately under the upper tubercle.

The fly will live two months after it is firſt produced from the ſhell, but will take no nouriſhment of any kind; and poſſibly it may be of the ſame nature with the butterflies, which never take any food during the whole time of their living in that ſtate.

SHEEP-*Stealing*. See THEFT.

Compoſition for Marking SHEEP. For this purpoſe Dr Lewis recommends tallow mixed with a certain proportion of tar, and the mixture thickened by powder of charcoal. The proportions he tried were an eighth, a ſixth, and a fourth part of tar. None of theſe could be diſcharged by any waſhing or rubbing with water, but all of them completely by ſoap; that which had the ſmalleſt proportion, eaſily enough; the others more difficultly.

SHEERING, in the ſea-language. When a ſhip is not ſteered ſteadily, they ſay ſhe ſheers, or goes ſheering; or when, at anchor, ſhe goes in and out by means of the current of the tide, they alſo ſay ſhe ſheers.

SHEERNESS, a fort in Kent, ſeated on the point where the river Medway falls into the Thames. It was built by king Charles II. after the inſult of the Dutch, who burnt the men of war at Chatham. The buildings belonging to it, in which the officers lodge, make a pretty little neat town; and there is alſo a yard and a dock, a chapel and a chaplain. Mr Lyons, who ſailed with the Hon. Captain Phipps in his voyage towards the pole, fixed the longitude of Sheerneſs to 0. 31′ E. its latitude 51° 31′ 30″ N.

SHEERS, in a ſhip, are two maſts ſet acroſs at the upper end of each other; a contrivance generally uſed for ſetting or taking out the maſts of a ſhip, where there is no hulk to do that office.

SHEFFIELD, a town in the Weſt Riding of Yorkſhire, with a market on Tueſdays, and two fairs, on Tueſday after Trinity-Sunday and November 28, for cattle and horſes. It is ſeated on the river Don, or Dune; and had a ſtrong caſtle, which was demoliſhed in the late civil wars. It is a large place, whoſe houſes are built of ſtone, and has been long noted for edge-tools, knives, and ſwords; for Chaucer, in one of his tales, takes notice of a man with a Sheffield whittle by his ſide. It is now a place where there is the moſt conſiderable manufactures for hardware in England, next to Birmingham. W. Long. 1. 20. N. Lat. 53. 23.

SHEFFIELD (John) duke of Buckinghamſhire, one of the fineſt writers of the laſt and preſent century, of great perſonal bravery, and an able miniſter of ſtate, was born about 1646. He loſt his father at nine years of age; and his mother marrying with lord Oſſulſton, the care of his education was left entirely to a governor, who did not greatly improve him in his ſtudies. Finding that he was deficient in many parts of literature, he reſolved to devote a certain number of hours every day to his ſtudies; and thereby improved himſelf to the degree of learning he afterwards attained. Though poſſeſſed of a good eſtate, he did not abandon himſelf to pleaſure and indolence, but offered to go a volunteer in the ſecond Dutch war; and accordingly was in that famous naval engagement where the duke of York commanded as admiral: on which occaſion his lordſhip behaved ſo gallantly, that he was appointed commander of the Royal Catherine. He afterward made a campaign in the French ſervice, under M. de Turenne. As Tangier was in danger of being taken by the Moors, he offered to head the forces which were ſent to defend it; and accordingly was appointed commander of them. He was then earl of Mulgrave, and one of the lords of the bedchamber to king Charles II. The Moors retired on the approach of his majeſty's forces; and the reſult of the expedition was the blowing up of Tangier. He continued in ſeveral great poſts during the ſhort reign of king James II. till that unfortunate prince was dethroned. Lord Mulgrave, though he paid his reſpects to king William before he was advanced to the throne, yet he did not accept of any poſt in the government till ſome years after. In the ſixth year of William and Mary, he was created marquis of Normanby in the county of Lincoln. He was one of the moſt active and zealous oppoſers of the bill which took away Sir John Fenwick's life; and exerted the utmoſt vigour in carrying through thoſe two admirable bills, the Treaſon Bill, and that for Triennial Parliaments.

He enjoyed ſome conſiderable poſts under king William, and was generally pretty well in his favour and confidence. In 1702, he was ſworn lord privy-ſeal; and in the ſame year was appointed one of the commiſſioners to treat of an union between England and Scotland. In 1703, he was created duke of Normandy, and ſoon after duke of Buckinghhamſhire. In 1711, he was made ſteward of her majeſty's houſehold, and preſident of the council. During queen Anne's reign he was but once out of employment; and then he reſigned it himſelf, being attached to what were called the *Tory principles*. Her majeſty offered to make him lord chancellor; which poſt he refuſed. He was inſtrumental in the change of the miniſtry in 1710. A circumſtance that reflects the highteſt honour on him is, the vigour with which he acted in favour of the unhappy Catalans, who afterward were ſo inhumanly ſacrificed. He was ſurvived by only one legitimate ſon, (who died at Rome in 1735); but left ſeveral natural children. His worſt enemies allowed him to have lived always very kindly with his laſt wife, natural daughter to king James II. the late ducheſs of Buckingham, a lady who always behaved with a dignity ſuitable to her high birth and quality. He died in 1721, aged 75 years; and his works ſpeak him one of the moſt beautiful proſe-writers and greateſt poets of this age, which is alſo proved by the teſtimonies of the fineſt writers his cotemporaries. His writings were ſplendidly printed in 1723, in two volumes 4to; and have ſince been reprinted in 1729, in two vols 8vo. The firſt contains his poems on various ſubjects: the ſecond, his proſe works; which conſiſt of hiſtorical memoirs, ſpeeches in parliament, characters, dialogues, critical obſervations, eſſays, and letters. It may be proper to obſerve, that the edition of 1729 is caſtrated; ſome particulars relating to the revolution in that of 1723 having given offence.

SHEIK, in the oriental cuſtoms, the perſon who has the care of the moſques in Egypt; his duty is the ſame as that of the imams at Conſtantinople. There are more or fewer of theſe to every moſque, according to its ſize or revenue. One of theſe is head over the reſt, and anſwers to a pariſh-prieſt with us; and has under him, in large moſques, the readers, and people who cry out to go to prayers; but in ſmall moſques the ſheik is obliged to do all this himſelf. In ſuch it is their buſineſs to open the moſque, to cry to prayers, and to begin their ſhort devotions at the head of the congregation, who ſtand rank and file in great order, and make all their motions together. Every Friday the ſheik makes an harangue to his congregation.

SHEIK-*Bellet*, the name of an officer in the Oriental nations. In Egypt the ſheik-bellet is the head of a city, and is appointed by the pacha. The buſineſs of this officer is to take care that no innovations be made which may be prejudicial to the Porte, and that they ſend no orders which may hurt the liberties of the people. But all his authority depends on his credit and intereſt, not his office: for the government of Egypt is of ſuch a kind, that often the people of the leaſt power by their poſts have the greateſt influence; and a caia of the janizaries or Arabs, and ſometimes one of their meaneſt officers, an oda-baſha, finds means, by his parts and abilities, to govern all things.

SHEILDS, or SHEALS, South and North, two ſeaport towns, one in the county of Durham, and the other in Northumberland; neither has market nor fair, but both are remarkable for being the mart where ſhips take in their loading of coals, and where they make large quantities of ſalt. They are ſeated on each ſide of the mouth of the river Tyne, 10 miles eaſt of Newcaſtle, and 188 north by weſt of London. W. Long. 1. 0. N. Lat. 55. 0.

SHEKEL, in Jewiſh antiquity, an ancient coin worth 2 s. 3¼d. Sterling.

SHELF, among miners, the ſame with what they otherwiſe call *faſt ground* or *faſt country*; being that part of the internal ſtructure of the earth which they find lying even and in an orderly manner, and evidently having retained its primitive form and ſituation.

SHELL, in natural hiſtory, a hard, and, as it were, ſtony covering, with which certain animals are defended, and thence called *ſhell-fiſh*.

The ſingular regularity, beauty, and delicacy, in the ſtructure of the ſhells of animals, and the variety and brilliancy in the colouring of many of them, at the ſame time that they ſtrike the attention of the moſt incurious obſervers, have at all times excited philoſophers to inquire into and detect, if poſſible, the cauſes and manner of their formation. But the attempts of naturaliſts, ancient and modern, to diſcover this proceſs, have conſtantly proved unſucceſsful. M. de Reaumur hitherto appears alone to have given a plauſible account, at leaſt, of the formation of the ſhell of the garden-ſnail in particular, founded on a courſe of very ingenious experiments, related in the Paris Memoirs *. He there endeavours to ſhow, that this ſubſtance is produced merely by the perſpirable matter of the animal, condenſing and afterwards hardening on its ſurface, and accordingly taking the figure of its body, which has performed the office of a mould to it; in ſhort, that the ſhell of a ſnail, and, as he ſuppoſed, of all other animals poſſeſſed of ſhells, was only the product of a viſcous tranſudation from the body of the animal, containing earthy particles united by mere juxtapoſition. This hypothesis, however, is liable to very great and inſurmountable difficulties, if we apply it to the formation of ſome of the moſt common ſhells: for how, according to this ſyſtem, it may be aſked, can the oyſter, for inſtance, conſidered ſimply as a mould, form to itſelf a covering ſo much exceeding its own body in dimenſions?

M. Heriſſant, in the memoirs of the academy of ſciences for 1766, has diſcovered the ſtructure of ſhells to be organical. In the numerous experiments that he made on an immenſe number, and a very great variety, of animal-ſhells, he conſtantly found that they were compoſed of two diſtinct ſubſtances; one of which is a cretaceous or earthy matter; and the other appeared, from many experiments made upon it, by burning, diſtillation, and otherwiſe, to be evidently of an animal-nature. Theſe two ſubſtances he dextrouſly ſeparated from each other by a very eaſy chemical analyſis; by the gentle operation of which they were exhibited diſtinctly to view, without any material alteration from the action of the ſolvent, or inſtrument, employed for that purpoſe. On an entire ſhell, or a fragment of one, contained in a glaſs veſſel, he poured a ſufficient quantity of the nitrous acid, conſiderably diluted either with water or ſpirit of wine. After the liquor has diſſolved all the earthy part of the ſhell, (which may be collected, after precipitation by a fixed or volatile alkali), there remains floating in it a ſoft ſubſtance, conſiſting of innumerable membranes of a retiform appearance, and diſpoſed, in different ſhells, in a variety of poſitions, which conſtitutes the animal-part of it. This, as it has not been affected by the ſolvent, retains the exact figure of the ſhell; and, on being viewed through a microſcope, exhibits ſatisfactory proofs of a vaſcular and organical ſtructure. He ſhows that this membranous ſubſtance is an appendix to the body of the animal, or a continuation of the tendinous fibres that compoſe the ligaments by which it is fixed to its ſhell; and that this laſt owes its hardneſs to the earthy particles conveyed through the veſſels of the animal, which fix themſelves into, and incruſt, as it were, the meſhes formed by the reticular filaments of which this membranous ſubſtance is compoſed. In the ſhell called *porcelaine*, in particular, the delicacy of theſe membranes was ſo great, that he was obliged to put it into ſpirit of wine, to which he had the patience to add a ſingle drop of ſpirit of nitre day by day, for the ſpace of two months; leſt the air generated, or let looſe by the action of the acid on the earthy ſubſtance, ſhould tear the compages of its fine membranous ſtructure into ſhatters; as it certainly would have done, in a more haſty and leſs gentle diſſolution. The delicate reticulated film, left after this operation, had all the tenuity of a ſpider's web; and accordingly he does not attempt to delineate its organiſation. In other ſhells, he employed even five or ſix months in demonſtrating the complicated membranous ſtructure of this animal-ſubſtance by this kind of chemical anatomy. In general, however, the proceſs does not require much time.

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* See *Mem. de l'Acad. annee*, 1709. p. 475. *Edit. de Hollande*, in 12*mo*.

Of the many ſingular configurations and appearances of the membranous part of different ſhells, which are deſcribed in this memoir, and are delineated in ſeveral well executed plates, we ſhall mention only, as a ſpecimen, the curious membranous ſtructure obſerved in the laminæ of mother-of-pearl, and other ſhells of the ſame kind, after having been expoſed to the operation of the author's ſolvent. Beſide the great variety of fixed or permanent colours with which he found the animal-filaments of theſe ſhells to be adorned, it is known that the ſhell itſelf preſents to the view a ſucceſſion of rich and changeable colours, the production of which he eaſily explains from the configurations of their membranes. Nature, he obſerves, always magnificent in her deſigns, but ſingularly frugal in the execution of them, produces theſe brilliant decorations at a very ſmall expence. The membranous ſubſtance above-mentioned is plaited and rumpled, as it were, in ſuch a manner, that its exterior laminæ, incruſted with their earthy and ſemi-tranſparent matter, form an infinite number of little priſms, placed in all kinds of directions, which refract the rays of light, and produce all the changes of colour obſervable in theſe ſhells.

Foſſile Shells. Thoſe found buried at great depths in the earth.

Of theſe ſome are found remaining almoſt entirely in their native ſtate, but others are variouſly altered by being impregnated with particles of ſtone and of other foſſils; in the place of others there is found mere ſtone or ſpar, or ſome other native mineral-body, expreſſing all their lineaments in the greateſt nicety, as having been formed wholly from them, the ſhell having been firſt depoſited in ſome ſolid matrix, and thence diſſolved by very ſlow degrees, and this matter left in its place, on the cavities of ſtone and other ſolid ſubſtances, out of which ſhells had been diſſolved and waſhed away, being afterwards filled up leſs ſlowly with theſe different ſubſtances, whether ſpar or whatever elſe: theſe ſubſtances, ſo filling the cavities, can neceſſarily be of no other form than that of the ſhell, to the abſence of which the cavity was owing, though all the nicer lineaments may not be ſo exactly expreſſed. Beſides theſe, we have alſo in many places maſſes of ſtone formed within various ſhells; and theſe having been received into the cavities of the ſhells while they were perfectly fluid, and having therefore nicely filled all their cavities, muſt retain the perfect figures of the internal part of the ſhell, when the ſhell itſelf ſhould be worn away or periſhed from their outſide. The various ſpecies we find of theſe are, in many genera, as numerous as the known recent ones; and as we have in our own iſland not only the ſhells of our own ſhores, but thoſe of many other very diſtant ones, ſo we have alſo many ſpecies, and thoſe in great numbers, which are in their recent ſtate, the inhabitants of other yet unknown or unſearched ſeas and ſhores. The cockles, muſcles, oyſters, and the other common bivalves of our own ſeas, are very abundant: but we have alſo an amazing number of the nautilus kind, particularly of the nautilus græcorum, which though a ſhell not found living in our own or any neighbouring ſeas, yet is found buried in all our clay-pits about London and elſewhere; and the moſt frequent of all foſſile ſhells, in ſome of our counties, are the conchæ anomiæ, which yet we know not of in any part of the world in their recent ſtate. Of this ſort alſo are the cornua ammonis and the gryphitæ, with ſeveral of the echinitæ and others.

The exact ſimilitude of the known ſhells, recent and foſſile, in their ſeveral kinds, will by no means ſuffer us to believe, that theſe, though not yet known to us in their living ſtate, are, as ſome have idly thought, a ſort of *luſus naturæ*. It is certain, that of the many known ſhores, very few, not even thoſe of our own iſland, have been yet carefully ſearched for the ſhell-fiſh that inhabit them; and as we ſee in the nautilus græcorum an inſtance of ſhells being brought from very diſtant parts of the world to be buried here, we cannot wonder that yet unknown ſhores, or the unknown bottoms of deep ſeas, ſhould have furniſhed us with many unknown ſhell-fiſh, which may have been brought with the reſt; whether that were at the time of the general deluge, or the effect of any other cataſtrophe of a like kind, or by whatever other means, to be left in the yet unhardened matter of our ſtony and clayey ſtrata.

Shells, in gunnery, are hollow iron balls to throw out of mortars or howitzers, with a fuſe-hole of about an inch diameter, to load them with powder, and to receive the fuze. The bottom, or part oppoſite to the fuſe, is made thicker than the reſt, that the fuſe may fall uppermoſt. But in ſmall elevations this does not always happen, nor indeed is it neceſſary; for, let the ſhell fall as it will, the fuſe ſets fire to the powder within, which burſts the ſhell, and cauſes great devaſtation. The ſhells had much better be of an equal thickneſs; for then they burſt into more pieces.

Meſſage-SHELLS, are nothing more than howitz-ſhells, in the inſide of which a letter or other papers are put; the fuſe-hole is ſtopped up with wood or cork, and the ſhells are fired out of a royal or howitz, either into a garriſon or camp. It is ſuppoſed, that the perſon to whom the letter is ſent knows the time, and accordingly appoints a guard to look out for its arrival.

SHELL-*Fiſh*. Theſe animals are in general oviparous, very few inſtances having been found of ſuch as are viviparous. Among the oviparous kinds, anatomiſts have found that ſome ſpecies are of different ſexes in the different individuals of the ſame ſpecies; but others are hermaphrodites, every one being in itſelf both male and female. In both caſes their increaſe is very numerous, and ſcarce inferior to that of plants, or of the moſt fruitful of the inſect-claſs. The eggs are very ſmall, and are hung together in a ſort of cluſters by means of a glutinous humour, which is always placed about them, and is of the nature of the gelly of frog's ſpawn. By means of this, they are not only kept together in the parcel, but the whole cluſter is faſtened to the rocks, ſhells, or other ſolid ſubſtances; and thus they are preſerved from being driven on ſhore by the waves and left where they cannot ſucceed.

SHELL-*Gold*. See *Shell* GOLD.

SHELTIE, a ſmall, but ſtrong kind of horſe, ſo called from Shetland, or Zetland, where they are produced.

SHENAN. See *Dying of* LEATHER, (p. 4161. foot-note.)

SHENSTONE (William), an admired Engliſh poet, was the eldeſt ſon of a plain country gentleman who farmed his own eſtate in Shropſhire. The father, ſenſible of his ſon's capacity, placed him in Pembroke college, Oxford; but he could never perſuade him to enter into orders. In his private opinions, our author adhered to no particular ſect, and hated all religious diſputes. Tenderneſs, in every ſenſe of the word, was his peculiar characteriſtic; and his friends, domeſtics, and poor neighbours, daily experienced the effects of his benevolence. This virtue he carried to an exceſs that ſeemed to border upon weakneſs; yet if any of his friends treated him ungenerouſly, he was not eaſily reconciled. On ſuch occaſions, however, he uſed to ſay, "I never will be a revengeful enemy; but I cannot, it is not in my nature, be half a friend." He was no œconomiſt; for the generoſity of his temper prevented his paying a proper regard to the uſe of money: he exceeded therefore the bounds of his paternal fortune. But, if we conſider the perfect paradiſe into which he had converted his eſtate, the hoſpitality with which he lived, his charities to the indigent, and all out of an eſtate that did not exceed 300 l. a-year, one ſhould rather wonder that he left any thing behind him, than blame his want of œconomy: he yet left more than ſufficient to pay all his debts; and, by his will, appropriated his whole eſtate for that purpoſe. Though he had a high opinion of many among the fair ſex, he forbore to marry. A paſſion he entertained in his youth was with difficulty ſurmounted. The lady was the ſubject of that admirable paſtoral, in four parts, which has been ſo univerſally and ſo juſtly admired, and which, one would have thought, muſt have ſoftened the proudeſt and moſt obdurate heart. His works have been publiſhed by Mr Dodſley, in 3 vols 8vo. The firſt volume contains his poetical works, which are particularly diſtinguiſhed by an amiable elegance and beautiful ſimplicity; the ſecond volume contains his proſe works; the third his letters, &c.

SHEPPEY, an iſland at the mouth of the river Medway, about 20 miles in circumference. It is ſeparated from the main land by a narrow channel; and has a fertile ſoil, which feeds great flocks of ſheep. The borough-town of Queenborough is ſeated thereon; beſides which it has ſeveral villages.

SHERIFF, an officer, in each county in England, nominated by the king, inveſted with a judicial and miniſterial power, and who takes place of every nobleman in the county during the time of his office.

The ſheriff is an officer of very great antiquity in this kingdom, his name being derived from two Saxon words, ſignifying the *reeve*, *bailiff*, or *officer* of the ſhire. He is called in Latin *vice-comes*, as being the deputy of the earl or *comes*, to whom the cuſtody of the ſhire is ſaid to have been committed at the firſt diviſion of this kingdom into counties. But the earls, in proceſs of time, by reaſon of their high employments and attendance on the king's perſon, not being able to tranſact the buſineſs of the county, were delivered of that burden; reſerving to themſelves the honour, but the labour was laid on the ſheriff. So that now the ſheriff does all the king's buſineſs in the county; and tho' he be ſtill called *vice-comes*, yet he is entirely independent of, and not ſubject to, the earl; the king, by his letters-patent, committing *cuſtodiam comitatus* to the ſheriff, and him alone.

Sheriffs were formerly choſen by the inhabitants of the ſeveral counties. In confirmation of which it was ordained by ſtatute 28 Edw. I. c. 8. that the people ſhould have election of ſheriffs in every ſhire where the ſhrievalty is not of inheritance. For anciently in ſome counties the ſheriffs were hereditary; as we apprehend they were in Scotland till the ſtatute 20 Geo. II. c. 43; and ſtill continue in the county of Weſtmorland to this day: the city of London having alſo the inheritance of the ſhrievalty of Middleſex veſted in their body by charter. The reaſon of theſe popular elections is aſſigned in the ſame ſtatute, c. 13. "that the commons might chooſe ſuch as would not be a burden to them." and herein appears plainly a ſtrong trace of the democratical part of our conſtitution; in which form of government it is an indiſpenſable requiſite, that the people ſhould chooſe their own magiſtrates. This election was in all probability not abſolutely veſted in the commons, but required the royal approbation. For in the Gothic conſtitution, the judges of their county-courts (which office is executed by the ſheriff) were elected by the people, but confirmed by the king: and the form of their election was thus managed; the people, or *incolæ territorii*, choſe twelve electors, and they nominated three perſons, *ex quibus rex unum confirmabat*. But, with us in England, theſe popular elections, growing tumultuous, were put an end to by the

Blackſt. Comment.

ſtatute 9 Edw. II. ſt. 2. which enacted, that the ſheriffs ſhould from thenceforth be aſſigned by the chancellor, treaſurer, and the judges; as being perſons in whom the ſame truſt might with confidence be repoſed. By ſtatutes 14 Edw. III. c. 7. 23 Hen. VI. c. 8. and 21 Hen. VIII. c. 20. the chancellor, treaſurer, preſident of the king's council, chief juſtices, and chief baron, are to make this election; and that on the morrow of All Souls, in the exchequer. And the king's letters patent, appointing the new ſheriffs, uſed commonly to bear date the ſixth day of November. The ſtatute of Cambridge, 12 Ric. II. c. 2. ordains, that the chancellor, treaſurer, keeper of the privy ſeal, ſteward of the king's houſe, the king's chamberlain, clerk of the rolls, the juſtices of the one bench and the other, barons of the exchequer, and all other that ſhall be called to ordain, name, or make juſtices of the peace, ſheriffs, and other officers of the king, ſhall be ſworn to act indifferently, and to name no man that ſueth to be put in office, but ſuch only as they ſhall judge to be the beſt and moſt ſufficient. And the cuſtom now is, (and has been at leaſt ever ſince the time of Forteſcue, who was chief juſtice and chancellor to Henry the ſixth), that all the judges, together with the other great officers, meet in the exchequer chamber on the morrow of All Souls yearly, (which day is now altered to the morrow of St Martin by the laſt act for abbreviating Michaelmas term), and then and there propoſe three perſons to the king, who afterwards appoints one of them to be ſheriff. This cuſtom, of the twelve judges propoſing three perſons, ſeems borrowed from the Gothic conſtitution before-mentioned; with this difference, that among the Goths the 12 nominors were firſt elected by the people themſelves. And this uſage of ours, at its firſt introduction, there is reaſon to believe, was founded upon ſome ſtatute, tho' not now to be found among our printed laws: firſt, becauſe it is materially different from the direction of all the ſtatutes beforementioned; which it is hard to conceive that the judges would have countenanced by their concurrence, or that Forteſcue would have inſerted in his book, unleſs by the authority of ſome ſtatute: and alſo, becauſe a ſtatute is expreſsly referred to in the record, which Sir Edward Coke tells us he tranſcribed from the council-book of 3d March, 34 Hen. VI. and which is in ſubſtance as follows. The king had of his own authority appointed a man ſheriff of Lincolnſhire, which office he refuſed to take upon him: whereupon the opinions of the judges were taken, what ſhould be done in this behalf. And the two chief juſtices, Sir John Forteſcue and Sir John Priſot, delivered the unanimous opinion of them all; "that the king did an error when he made a perſon ſheriff, that was not choſen and preſented to him according to the ſtatute; that the perſon refuſing was liable to no fine for diſobedience, as if he had been one of the three perſons choſen according to the tenor of the ſtatute; that they would adviſe the king to have recourſe to the three perſons that were choſen according to the ſtatute, or that ſome other thrifty man be intreated to occupy the office for this year; and that, the next year, to eſchew ſuch inconveniences, the order of the ſtatute in this behalf made be obſerved." But, notwithſtanding this unanimous reſolution of all the judges of England, thus entered in the council-book, and the ſtatute 34 & 35 Hen. VIII. c. 26. § 61. which expreſsly recognizes this to be the law of the land, ſome of our writers have affirmed, that the king, by his prerogative, may name whom he pleaſes to be ſheriff, whether choſen by the judges or no. This is grounded on a very particular caſe in the fifth year of queen Elizabeth, when, by reaſon of the plague, there was no Michaelmas term kept at Weſtminſter; ſo that the judges could not meet there *in craſtino animarum* to nominate the ſheriffs: whereupon the queen named them herſelf, without ſuch previous aſſembly, appointing for the moſt part one of two remaining in the laſt year's liſt. And this caſe, thus circumſtanced, is the only authority in our books for the making theſe extraordinary ſheriffs. It is true, the reporter adds, that it was held that the queen by her prerogative might make a ſheriff without the election of the judges, *non obſtante aliquo ſtatuto in contrarium:* but the doctrine of *non obſtante*'s, which ſets the prerogative above the laws, was effectually demoliſhed by the bill of rights at the revolution, and abdicated Weſtminſter-hall when king James abdicated the kingdom. However, it muſt be acknowledged, that the practice of occaſionally naming what are called *pocket-ſheriffs*, by the ſole authority of the crown, hath uniformly continued to the reign of his preſent majeſty; in which, it is believed, (if any) inſtances have occurred.

Sheriffs, by virtue of ſeveral old ſtatutes, are to continue in their office no longer than one year; and yet it hath been ſaid that a ſheriff may be appointed *durante bene placito*, or during the king's pleaſure; and ſo is the form of the royal writ. Therefore, till a new ſheriff be named, his office cannot be determined, unleſs by his own death, or the demiſe of the king; in which laſt caſe it was uſual for the ſucceſſor to ſend a new writ to the old ſheriff: but now, by ſtatute 1 Ann. ſt. 1. c. 8. all officers appointed by the preceding king may hold their offices for ſix months after the king's demiſe, unleſs ſooner diſplaced by the ſucceſſor. We may farther obſerve, that by ſtatute 1 Ric. II. c. 11. no man that has ſerved the office of ſheriff for one year, can be compelled to ſerve the ſame again within three years after.

We ſhall find it is of the utmoſt importance to have the ſheriff appointed according to law, when we conſider his power and duty. Theſe are either as a judge, as the keeper of the king's peace, as a miniſterial officer of the ſuperior courts of juſtice, or as the king's bailiff.

In his judicial capacity he is to hear and determine all cauſes of 40 ſhillings value and under, in his county-court; and he has alſo a judicial power in divers other civil caſes. He is likewiſe to decide the elections of knights of the ſhire, (ſubject to the control of the Houſe of Commons), of coroners, and of verderors; to judge of the qualification of voters, and to return ſuch as he ſhall determine to be duly elected.

As the keepers of the king's peace, both by common law and ſpecial commiſſion, he is the firſt man in the county, and ſuperior in rank to any nobleman therein, during his office. He may apprehend, and commit to priſon, all perſons who break the peace, or attempt to break it; and may bind any one in a recognizance to keep the king's peace. He may, and is bound *ex officio*, to purſue and take all traitors, murderers, felons, and other miſdoers, and commit them to gaol for ſafe cuſtody. He is alſo to defend his county againſt any of the king's enemies when they come into the land: and for this purpoſe, as well as for keeping the peace and purſuing felons, he may command all the people of his county to attend him; which is called the *poſſe comitatus*, or power of the county: which ſummons, every perſon above 15 years old, and under the degree of a peer, is bound to attend upon warning, under pain of fine and impriſonment. But though the ſheriff is thus the principal conſervator of the peace in his county, yet, by the expreſs directions of the great charter, he, together with the conſtable, coroner, and certain other officers of the king, are forbidden to hold any pleas of the crown, or, in other words, to try any criminal offence. For it would be highly unbecoming, that the executioners of juſtice ſhould be alſo the judges; ſhould impoſe, as well as levy, fines and amercements; ſhould one day condemn a man to death, and perſonally execute him the next. Neither may he act as an ordinary juſtice of the peace during the time of his office: for this would be equally inconſiſtent, he being in many reſpects the ſervant of the juſtices.

In his miniſterial capacity, the ſheriff is bound to execute all proceſs iſſuing from the king's courts of juſtice. In the commencement of civil cauſes, he is to ſerve the writ, to arreſt, and to take bail; when the cauſe comes to trial, he muſt ſummon and return the jury; when it is determined, he muſt ſee the judgment of the court carried into execution. In criminal matters, he alſo arreſts and impriſons, he returns the jury, he has the cuſtody of the delinquent, and he executes the ſentence of the court, though it extend to death itſelf.

As the king's bailiff, it is his buſineſs to preſerve the rights of the king within his bailiwick; for ſo his county is frequently called in the writs: a word introduced by the princes of the Norman line; in imitation of the French, whoſe territory is divided into bailiwicks, as that of England into counties. He muſt ſeize to the king's uſe all lands devolved to the crown by attainder or eſcheat; muſt levy all fines and forfeitures, muſt ſeize and keep all waifs, wrecks, eſtrays, and the like, unleſs they be granted to ſome ſubject; and muſt alſo collect the king's rents within his bailiwick, if commanded by proceſs from the exchequer.

To execute theſe various offices, the ſheriff has under him many inferior officers; an under-ſheriff, bailiffs, and gaolers, who muſt neither buy, ſell, nor farm their offices, on forfeiture of 500 l.

The under-ſheriff uſually performs all the duties of the office; a very few only excepted, where the perſonal preſence of the high-ſheriff is neceſſary. But no under-ſheriff ſhall abide in his office above one year; and if he does, by ſtatute 23 Hen. VI. c. 8. he forfeits 200 l. a very large penalty in thoſe early days. And no under-ſheriff or ſheriff's-officer ſhall practiſe as an attorney during the time he continues in ſuch office: for this would be a great inlet to partiality and oppreſſion. But theſe ſalutary regulations are ſhamefully evaded, by practiſing in the names of other attorneys, and putting in ſham deputies by way of nominal under-ſheriffs: by reaſon of which, ſays Dalton, the under-ſheriffs and bailiffs do grow ſo cunning in their ſeveral places, that they are able to deceive, and it may well be feared that many of them do deceive, both the king, the high-ſheriff, and the county.

Sheriff, in Scotland. See Law, N° clviii. 1, 2, 3.

SHERLOCK (William), a learned Engliſh divine in the 17th century, was born in 1641, and educated at Eaton ſchool, where he diſtinguiſhed himſelf by the vigour of his genius and his application to ſtudy. Thence he was removed to Cambridge, where he took his degrees. In 1669, he became rector of the pariſh of St George, Botolph-lane, in London; and in 1681 was collated to the prebend of Pancras, in the cathedral of St Paul's. He was likewiſe choſen maſter of the Temple, and had the rectory of Therfield in Hertfordſhire. After the revolution he was ſuſpended from his preferment, for refuſing the oaths to king William and queen Mary; but at laſt he took them, and publicly juſtified what he had done. In 1691, he was inſtalled dean of St Paul's. His Vindication of the Doctrine of the Trinity, engaged him in a warm controverſy with Dr South and others. Biſhop Burnet tells us, he was "a clear, a polite, and a ſtrong writer; but apt to aſſume too much to himſelf, and to treat his adverſaries with contempt." He died in 1707. His works are very numerous; among theſe are, 1. A Diſcourſe concerning the Knowledge of Jeſus Chriſt, againſt Dr Owen. 2. Several pieces againſt the Papiſts, the Socinians, and Diſſenters. 3. A practical Treatiſe on Death, which is much admired. 4. A practical Diſcourſe on Providence. 5. A practical Diſcourſe on the future Judgment; and many other works.

Sherlock (Dr Thomas), biſhop of London, was the ſon of the preceding Dr William Sherlock, and was born in 1678. He was educated in Catharine-hall, Cambridge, where he took his degrees, and of which he became maſter: he was made maſter of the Temple very young, on the reſignation of his father; and it is remarkable, that this maſterſhip was held by father and ſon ſucceſſively for more than 70 years. He was at the head of the oppoſition againſt Dr Hoadley biſhop of Bangor; during which conteſt he publiſhed a great number of pieces. He attacked the famous Collins's "Grounds and reaſons of the Chriſtian religion," in a courſe of ſix ſermons preached at the Temple-church, which he intitled "The uſe and intent of Prophecy in the ſeveral ages of the world." In 1728, Dr Sherlock was promoted to the biſhopric of Bangor; and was tranſlated to Saliſbury in 1734. In 1747, he refuſed the archbiſhopric of Canterbury, on account of his ill ſtate of health; but recovering in a good degree, accepted the ſee of London the following year. On occaſion of the earthquakes in 1750, he publiſhed an excellent Paſtoral Letter to the clergy and inhabitants of London and Weſtminſter: of which it is ſaid there were printed in 4to, 5000; in 8vo, 20,000; and in 12mo, about 30,000; beſide pirated editions, of which not leſs than 50,000 were ſuppoſed to have been ſold. Under the weak ſtate of body in which he lay for ſeveral years, he reviſed and publiſhed 4 volumes of Sermons in 8vo, which are particularly admired for their ingenuity and elegance. He died in 1762, and by report worth 150,000 l. "His learning," ſays Dr Nicholls, "was very extenſive: God had given him a great and an underſtanding mind, a quick comprehenſion, and a ſolid judgment. Theſe advantages of nature he improved by much induſtry and application. His ſkill in the civil and canon law was very conſiderable; to which he had added ſuch a knowledge of the common law of England, as few clergymen attain to. This it was that gave him that influence in all cauſes where the church was concerned; as knowing preciſely what it had to claim from its conſtitutions and canons, and what from the common law of the land." Dr Nicholls then mentions his conſtant and exemplary piety, his warm and fervent zeal in preaching the duties and maintaining the doctrines of Chriſtianity, and his large and diffuſive munificence and charity; particularly by his having given large ſums of money to the corporation of clergymens ſons, to ſeveral of the hoſpitals, and to the ſociety for propagating the goſpel in foreign parts: alſo his bequeathing to Catharine-hall in Cambridge, the place of his education, his valuable library of books, and his donations for the founding a librarian's place and a ſcholarſhip, to the amount of ſeveral thouſand pounds.

SHETLAND, the name of certain iſlands belonging to Scotland, and lying to the northward of Orkney. There are many convincing proofs that theſe iſlands where very early inhabited by the Picts, or rather by thoſe nations who were the original poſſeſſors of the Orkneys; and at the time of the total deſtruction of theſe nations, if any credit be due to tradition, their woods were entirely ruined (A). It is highly probable that the people in Shetland as well as in the Orkneys, flouriſhed under their own princes dependent upon the crown of Norway; yet this ſeems to have been rather through what they acquired by fiſhing and commerce, than by the cultivation of their lands. It may alſo be reaſonably preſumed, that they grew thinner of inhabitants after they were annexed to the crown of Scotland; and it is likely that they revived again, chiefly by the very great and extenſive improvements which the Dutch made in the herring-fiſhery upon their coaſts, and the trade that the crews of their buſſes, then very numerous, carried on with the inhabitants, neceſſarily reſulting from their want of proviſions and other conveniences, which in thoſe days could not be very conſiderable.

There are many reaſons which may be aſſigned why theſe iſlands, though part of our dominions, have not hitherto been better known to us. They were commonly placed two degrees too far to the north in all the old maps, in order to make them agree with Ptolemy's deſcription of Thule, which he aſſerted to be in the latitude of 63 degrees; which we find urged by Camden as a reaſon why Thule muſt be one of the Shetland iſles, to which Speed alſo agrees, though from their being thus wrong placed he could not find room for them in his maps. Another, and that no light cauſe, was the many falſe, fabulous, and impertinent relations publiſhed concerning them (B), as if they were countries inhoſpitable and uninhabitable; and laſtly, the indolence, or rather indifference, of the natives, who, contenting themſelves with thoſe neceſſaries and conveniences procured by their intercourſe with other nations, and conceiving themſelves neglected by the mother country, have ſeldom troubled her with their applications.

There are few countries that have gone by more names than theſe iſlands; they were called iſlandic, *Hialtlandia*, from *hialt*, the "hilt of a ſword;" this might be poſſibly corrupted into *Hetland*, *Hitland*, or *Hethland*, though ſome tell us this ſignifies a "high land." They have been likewiſe, and are ſtill in ſome maps, called *Zetland* and *Zealand*, in reference, as has been ſuppoſed, to their ſituation. By the Danes, and by the natives, they are ſtyled *Yealtaland*; and notwithſtanding the oddneſs of the orthography, this differs very little, if at all, from their manner of pronouncing Zetland, out of which pronunciation grew the modern names of *Shetland* and *Shotland*.

The iſlands of *Shetland*, as we commonly call them, are well ſituated for trade. The neareſt continent to them is Norway; the port of Bergen lying 44 leagues eaſt, whereas they lie 46 leagues north north-eaſt from Buchanneſs; eaſt north-eaſt from Sanda, one of the Orkneys, about 16 or 18 leagues; ſix or ſeven leagues north-eaſt from Fair Iſle; 58 leagues eaſt from the Ferroe iſles; and at nearly the ſame diſtance north-eaſt from Lewis. The ſouthern promontory of the main land, called *Swinburgh Head*, lies in 50 degrees and 59 minutes of north latitude; and the northern extremity of Uiſt, the moſt remote of them all, in the latitude of 61 degrees 15 minutes. The meridian of London paſſes through this laſt iſland, which lies in the longitude of 2 degrees 30 minutes weſt from Paris, and about 5 degrees 15 minutes eaſt from the meridian of Cape Lizard. According to the old accounts, from which there ſeems no juſt reaſon to vary, there are in all 46 inhabited iſlands of different ſizes, 40 holms, and 30 ſkerries. It is impoſſible to ſpeak with preciſion; but, according to the beſt computation we have been able to form, the Shetland iſles contain near three times as much land as the Orkneys: they are conſidered alſo, in this light, equal in ſize to the iſland of Madeira; and not inferior to the provinces of Utrecht, Zealand, and all the reſt of the Dutch iſlands taken together.

The principal of the Shetland iſlands is ſtyled *Main Land*; which extends in length from north to ſouth about 60 miles, and is in ſome places above 20 broad, in others not more than 2. It is however every where ſo interſected by arms of the ſea, that there is not a ſingle ſpot therein that is full three Engliſh miles from ſalt-water. The whole coaſt, a very few places excepted, is a high, rough, inacceſſible rock; and within land, the country is mountainous, moſſy, and full of moraſſes. Here and there, however, but more eſpecially towards the coaſt, there are little parcels of land that are both ſmooth and fertile. Among the numerous inlets of the ſea that pierce both ſides of the iſland, ſome of which enter ſeveral miles, and in the language of the country are ſtiled *voes*, there are a great many ports, not fewer than

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(A) The tradition is, that this was done by the Scots when they deſtroyed the Picts; but is more probably referred to the Norwegians rooting out the original poſſeſſors of Shetland.

(B) They repreſented the climate as intenſely cold; the ſoil as compoſed of craggs and quagmire, ſo barren as to be incapable of bearing corn; to ſupply which, the people, after drying fiſh-bones, powdered them, then kneaded and baked them for bread. The larger fiſh-bones were ſaid to be all the fuel they had. Yet, in ſo dreary a country, and in ſuch miſerable circumſtances, they were acknowledged to be very long-lived, cheerful, and contented.

than 20 that may be with juſtice ſtyled *harbours;* and amongſt theſe are ſix, three on each ſide of the iſland, that are remarkably good. On the weſt ſide is Scalloway Voe, which flows into the land through ſeveral iſlands of various ſizes, by which there are two entrances that lead to the harbour, which is deep, ſafe, and commodious. The town of Scalloway before which it lies, was formerly the chief, indeed the only one in the iſland. A. D. 1600, Patrick earl of Orkney built a ſtately caſtle here, which is now in ruins; and the place in a courſe of years has ſo much declined, that there are ſcarce 30 houſes. On the ſame ſide of the iſland are Olis Voe and Valley Sound, both fine ports and very capacious. On the other ſide of the iſland, that is, on the eaſt, the town of Lerwick, which is the preſent capital, is ſituated, which conſiſts of upwards of 400 houſes, and is every day increaſing. Oppoſite to this town lies the iſland of Breſſay or Braſſa, and between the iſland and the main runs the famous Braſſa, ſometimes alſo called *Bread*, Sound, in which no leſs than 2000 ſail of veſſels have lain at once ſafe and commodiouſly. It is four miles in length; in ſome places two, in others one mile broad, in ſome others much narrower; but deep and well ſecured from winds. There is towards the north end a rock called the *Unicorn* (c). On the ſame ſide of the iſland with Breſſa Sound, are Dura Voe and Balta, both good ports; and alſo Catford Voe, where in the ſummer ſeaſon a whole navy may ride with great conveniency. There are few or no ſands or ſhoals upon the coaſt, except one on the weſt ſide called *Have de Grind*, and ſome dangerous rocks to the north-weſt.

On the weſt ſide of the main land there are not fewer than 20 iſlands of very different ſizes, beſides holms and ſkerries: neither are either of theſe unprofitable, as the former afford vaſt quantities of fine graſs for the feeding of cattle; on the coaſts of the latter are caught abundance of fine fiſh of different ſorts; and on both there are immenſe quantities of fowl. To the ſouth of Scalloway lies the little iſland of St Ninian, corruptly called *St Ringing's*, in which, though but a mile long and half a mile broad, there is a large well-built church, which ſhows that it was once fully inhabited. Oppoſite to the town of Scalloway lie ſeveral iſlands, which, as we have before obſerved, break the rapidity of the flood, and form ſafe entrances into the harbour. The biggeſt of theſe iſles is Trondra; three miles long and two broad. Burra conſiſts of two iſlands, one called *Houſe*, the other *Kirk Iſland;* in neither which, it is ſaid, mice can live. To the north of theſe lies Papa Stour, or the Great Papa; which, though but two miles long and one broad, is eſteemed the pleaſanteſt, and, for its ſize, the beſt furniſhed with the neceſſaries of life of any of theſe iſles. There are beſides this, Papas, and the little Papa; and to the north of theſe, Rou Stour, or the Great Rou, eight miles long and two broad, with a good port.

There are alſo many iſlands on the eaſt ſide of the main land; ſome of which it may not be improper to mention. To the ſouth of Lerwick lies Mouſa or the Queen's iſland, one mile in length, and about a quarter of a mile broad, and is remarkable for having upon it the moſt complete and entire of thoſe little fortifications called by the natives *brughs*, but by the Scots commonly *Picts Houſes*, that are ſtill remaining in any of theſe iſlands (D). Over-againſt Lerwick lies Breſſay or Braſſa-iſle, five miles from ſouth to north, and two from weſt to eaſt. This iſle for its ſize is very mountainous, and amongſt many hills there are two in it very conſpicuous. One of theſe is on the eaſt ſide, called *Androw's Hill;* the other, which is the higheſt, at the ſouth end, called the *Wart* or *Beacon Hill*. It is in a manner over-run with heath, though there are ſome conſiderable parcels of good paſturage and arable lands near the ſhore. There are alſo eight freſh-water lochs, abounding with fine trout and eels. It muſt have been very populous in former times, ſince there are the ruins of five ſmall forts, and there are ſtill two churches and a chapel. It has likewiſe a good port called *Aiths Voe*. At a ſmall diſtance to the eaſt lies another iſle, called the *Noſs*, two miles long and three quarters of a mile broad: it has a church upon it, is equally fertile and pleaſant; and has a large holm belonging to it, in which there are abundance of ſea-fowls. Whalſey, that is, the iſle of whales, which lies to the north of Breſſay, and to the eaſt of the main land, is about nine miles in circumference. At ſix leagues diſtance from this iſle lie the Skerries, on which, in 1664, the Carmalan of Amſterdam, a very rich Eaſt India ſhip, was loſt. To the north of Whalſey there are many ſmall iſlands, moſt of which are inhabited; and though but inſignificant at preſent, yet, if any change of fortune ſhould happen to the Shetland iſles, they would probably partake of it, and by being turned to uſeful purpoſes, and, in conſequence of that, retaining all the poſterity of their preſent inhabitants, come to be thought of more conſequence.

But beſides theſe, there are two large and conſiderable iſlands belonging to Shetland, with ſeveral ſmall ones in their vicinity. The firſt of theſe is Yell, which anciently was written Zeal, making however, as we have before remarked, no great alteration in the pronunciation. This iſland, in the opinion of the learned Mr Maule, from its nearneſs to Norway, ſeems to have been the firſt inhabited, and to have given name to all the reſt. His opinion has certainly a great degree of probability; for the natives call themſelves, and are called

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(c) When James Hepburn duke of Orkney fled hither, he was purſued by William Kirkcaldie of Grange, in a ſhip called the *Unicorn*, which ſtriking thereon, left its name to this rock. This gave the duke an opportunity of eſcaping, who, after lying many years in priſon in Denmark, periſhed at laſt miſerably in that confinement.

(D) We have an exact deſcription of this brugh in Latin, by the learned Mr Maule, of the noble family of Panmure, one of the ableſt antiquarians his country ever produced. Theſe brughs in their form are not unlike pigeon-houſes: they have a winding ſtair in the wall of each, which reaches quite to the top. Theſe ſerved as watch-towers and beacons, having heaps of peat on the top, which were kindled to give notice of an enemy's appearance; and therefore all the brughs in an iſland were in ſight one of another. There were cells or apartments underneath for ſecuring their perſons or effects; and in ſome of them ſubterraneous paſſages to ſome creek, wherein their boats lay, in which they might eſcape. Whoever attentively conſiders the motives which induced theſe people to raiſe ſuch ſtructures, how well calculated they were to anſwer the ends for which they were built, and for how many ages they have reſiſted the rage of time, will heſitate at calling thoſe who conſtructed them barbarians.

Shetland.

called by all the northern nations, *Yalts*, and their language *Yaltmoll*. Now in the Iſlandic, which was the original language of Norway, *jell* ſignifies a "dark cloud;" and conſequently *jelland*, or *jeltland*, a "rainy country," which it may be preſumed is at leaſt as good an etymology as any that has been hitherto offered. Mr Maule likewiſe thinks that this was the true Thule. This iſland lies north-eaſt-by-eaſt from Mainland, and is divided from it by an arm of the ſea called *Yell Sound*. In the old deſcriptions, Yell is ſaid to be 20 miles long and 8 broad. It is very mountainous, and full of moſs: but there are pretty conſiderable paſtures, in which they feed a great many ſheep; and it alſo affords plenty of peat. It has eight large voes or harbours, beſides many ſmaller bays, which would not be thought deſpicable anchoring-places in other countries. It ſeems to have been populous in ancient times, ſince there are in it 3 churches, 20 chapels, and many brughs or Pictiſh forts. There are dependent upon it Haſcoſea, two miles long and one broad, Samphra, and Bigga; all of them iſlands very fertile in graſs. Beſides theſe, to the ſouth-weſt lies Fetlar, or Theodore's iſle, nine or ten miles in compaſs, with a church, ten chapels, and many brughs; it has ſeveral creeks for ſmall boats, but nothing that can be called a *port*.

The other of theſe two larger iſlands is Unſt, which is alſo the moſt northern of all the Shetland iſles, and at the ſame time the pleaſanteſt, and not the leaſt fertile amongſt them. It lies at a ſmall diſtance eaſt from Yell, having that large iſland between it and the main land, being divided from the firſt mentioned iſland by an arm of the ſea called *Blumel Sound*. Unſt is eight miles long, and between three and four broad, and divided into 24 ſcattalds, 22 of which have each of them a proportion of ſea-coaſt. There is great plenty of hether and peat, with ſome good paſture and a little of very fertile arable ground. Near the middle of this iſle there is a loch three miles in extent, in which there are abundance of trout, eel, and flounders. Here are three churches, 24 chapels, and 11 brughs. There was alſo a caſtle at the ſouthern extremity, called *Mownes*, now in decay. There are two excellent harbours, the one in the ſouth called *Via Bay*, being covered by an iſland of the ſame name, equally commodious and capacious, having nine fathom water, and good anchoring ground. The other is on the eaſt ſide, covered by the iſle of Balta, and from thence called *Balta Voe*, very ſafe and ſpacious, with eight fathom water. There are beſides theſe, bays and roads leſs conſiderable. The number of inhabitants in theſe iſlands, that is Unſt and its dependencies, may be about 1500, and they have 70 fiſhing-boats. Via is a very fair iſland, and produces great plenty of fine and rich graſs. The ſame may be ſaid of Balta, which is alſo well ſtocked with rabbits. There are beſides theſe iſlets four or five holms, which feed ſheep and cattle; and the iſland of Linga, low, flat, covered with moſs, but which would be a very convenient place for ſalt-pans, if the inhabitants were in ſuch a condition as to be capable of carrying on a fiſhery entirely on their own account.

Between ſix and ſeven leagues weſt from the main land lies the iſland of Fula or Foula, commonly called by our ſeamen *Foul Iſland*, in oppoſition to that of which we ſhall ſpeak. It is about three miles long, narrow, and full of rough, ſteep, and bare rocks, one of which is ſo large, and runs up to ſo great a height, as to be clearly ſeen from the Orkneys. This, therefore, may be eſteemed, with the greateſt probability, the Thule of Tacitus, whatever might be the Thule of the Phœnicians and Greeks. It has ſcarce any paſturage, and very little arable land; but that, though ſmall in ſize, is however very fertile, out of the produce of which, with fowl and fiſh, the poor inhabitants ſubſiſt. They have nothing that can be called a port; and the only commodities they have, are ſtock-fiſh, train-oil, and feathers.

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The Fair Iſle lies between Orkney and Shetland, 10 or 12 leagues eaſt-north-eaſt from the former; ſeven, or, as others ſay, 10 leagues ſouth-weſt from the latter; and about 18 or 19 leagues ſouth-eaſt from Foula. It is full three miles long, and ſcarce half a mile broad, very craggy, with three high rocks, which are clearly ſeen both from Orkney and Shetland. There is in this iſland alſo a ſmall quantity of arable land, which is very fruitful and well-manured; they might have conſiderably more, but they are obliged to reſerve this for peat and paſturage. They have, for the ſize of the iſland, a great many ſheep, and thoſe are very good and very fat; but they have no kind of muir-fowl or other game, but very great plenty of ſea and water-fowl, and all kinds of fiſh upon their coaſts. They have a very pretty church, but no miniſter, being annexed to one of the pariſhes of Shetland, or ſerved by an itinerant miniſter, as ſome late accounts aſſert. A layman reads the Scriptures every Sunday in the church, the inhabitants being a very religious, harmleſs, ſober, and honeſt people. They have in effect no port, though they have two that are nominally ſo; one at the ſouth end, which is full of rocks, where only ſmall boats can lie, and that but indifferently; the other at the north-eaſt end, larger and ſafer in the ſummer time, ſo as to ſerve commodiouſly enough for their fiſhery. Small and inſignificant as this iſland may ſeem, there is a very remarkable piece of hiſtory belonging to it. The duke of Medina Sidonia, when commander in chief of the famous Spaniſh Armada in 1588, was wrecked on the eaſt coaſt of this iſland. The ſhip broke to pieces, but the duke and about 200 more eſcaped. They lived there till both themſelves and the inhabitants were very near famiſhed; at length the duke and the poor remains of his people were carried over to the main land of Shetland by Andrew Humphry. He continued ſome time at Quendale, and then embarked on board the ſame ſmall ſhip, and was ſafely conveyed therein to Dunkirk; for which ſervice he rewarded Andrew Humphry with 3000 merks. This iſland produced to its late proprietor between 50 and 60 pound Sterling *per annum;* and was ſold at Edinburgh, on the 20th day of June 1766, for the ſum of 10,200 pounds Scots, or about 850 pounds Sterling, to James Stuart of Burgh, Eſq;

In reſpect to climate, the Shetland iſlands have not much to boaſt, and yet are very far from being ſuch miſerable habitations as ſome have repreſented them. The longeſt day in the iſland of Unſt is 19 hours 15 minutes, and of conſequence the ſhorteſt day 4 hours and 45 minutes. The ſpring is very late, the ſummer very ſhort; the autumn alſo is of no long duration, dark, foggy, and rainy; the winter ſets in about November, and laſts till April, and ſometimes till May. They have frequently in that ſeaſon ſtorms of thunder, much rain, but little froſt or ſnow. High winds are indeed very frequent and very troubleſome, yet they ſeldom produce any terrible effects. The aurora borealis is as common here as in any of the northern countries. In the winter ſeaſon the ſea ſwells and rages in ſuch a manner, that for five or ſix months their ports are inacceſſible, and of courſe the people during that ſpace have no correſpondence with the reſt of the world (A).

The ſoil in the interior part of the main land, for the moſt part, is mountainous, mooriſh, and boggy, yet not to ſuch a degree as to render the country utterly impaſſable; for many of the roads here, and in ſome of the northern iſles, are as good as any other natural roads, and the people travel them frequently on all occaſions. Near the coaſts there are ſometimes for miles together flat pleaſant ſpots, very fertile both in paſture and corn. The mountains produce large crops of very nutritive graſs in the ſummer; and they cut conſiderable quantities of hay, with which they feed their cattle in the winter. They might with a little attention bring more of their country into cultivation; but the people are ſo much addicted to their fiſhery, and feel ſo little neceſſity of having recourſe to this method for ſubſiſtence, that they are content, how ſtrange ſoever that may ſeem to us, to let four parts in five of their land remain in a ſtate of nature.

They want not conſiderable quantities of marle in different iſlands, though they uſe but little; hitherto there has been no chalk found; limeſtone and freeſtone there are in the ſouthern parts of the main land in great quantities, and alſo in the neighbouring iſlands, particularly Fetiar; and conſiderable quantities of ſlate, very good in its kind. No mines have been hitherto wrought, though there are in many places viſible appearances of ſeveral kinds of metal. Some ſolid pieces of ſilver, it is ſaid, have been turned up by the plough. In the iſland of Via, a yellow metal has been met with, which being found difficult to melt, has been neglected. In ſome of the ſmaller iſles there are ſtrong appearances of iron; but, through the want of proper experiments being made, there is, in this reſpect at leaſt, hitherto nothing certain. Their meadows are incloſed with dikes, and produce very good graſs. The little corn they grow is chiefly barley, with ſome oats; and even in the northern extremity of Unſt (as we have hinted before) the little land they have is remarkable for its fertility. The hills abound with medicinal herbs; and their kitchen-gardens thrive as well, and produce as good greens and roots, as any in Britain. Of late years, and ſince this has been attended to, ſome gentlemen have had even greater ſucceſs than they expected in the cultivating tulips, roſes, and many other flowers. It is true, that tho', as has been before obſerved, they have no trees, and hardly any ſhrubs except juniper, yet they have a tradition that their country was formerly overgrown with woods; and it ſeems to be a confirmation of this, that the roots of timber-trees have been and are ſtill dug up at a great depth; and that in ſome, and thoſe too innaceſſible, places, the rodden tree is ſtill found growing wild. That this defect, viz. the want of wood at preſent, does not ariſe entirely from the ſoil or climate, appears from ſeveral late experiments; ſome gentlemen having raiſed aſh, maple, horſe-cheſnuts, &c. in their gardens. Though the inhabitants are without either wood or coals, they are very well ſupplied with fuel, having great plenty of hether and peat. The black cattle in this country are in general of a larger ſort than in Orkney, which is owing to their having more extenſive paſtures; a clear proof that ſtill farther improvements might be made in reſpect to ſize. Their horſes are ſmall, but ſtrong, ſtout, and well-ſhaped, live very hardy, and to a great age. They have likewiſe a breed of ſmall ſwine, the fleſh of which, when fat, is eſteemed very delicious. They have no goats, hares, or foxes; and in general no wild or venomous creatures of any kind, except rats in ſome few iſlands. They have no moor-fowl, which is the more remarkable as there are every where immenſe quantities of hether; but there are many ſorts of wild and water fowl, particularly the dunter-gooſe, clack-gooſe, ſolan-gooſe, ſwans, ducks, teal, whaps, foiſts, lyres, kittiwaiks, maws, plovers, ſcarfs, &c. There is likewiſe the ember-gooſe, which is ſaid to hatch her egg under her wing. Eagles and hawks, as alſo ravens, crows, mews, &c. abound here

All theſe iſlands are well watered; for there are every where excellent ſprings, ſome of them mineral and medicinal. They have indeed no rivers; but many pleaſant rills or rivulets, which they call *burns*, of different ſizes; in ſome of the largeſt they have admirable trouts, ſome of which are of 15 and even of 20 pounds weight. They have likewiſe many freſh-water lakes, well ſtored with trout and eels, and in moſt of them there are alſo large and fine flounders; in ſome very excellent cod. Theſe freſh-water lakes, if the country was better peopled, and the common people more at their eaſe, are certainly capable of great improvements. The ſea-coaſts of the main land of Shetland, in a ſtraight line, are 55 leagues; and therefore there cannot be a country conceived more proper for eſtabliſhing an extenſive fiſhery. What the inhabitants have been hitherto able to do, their natural advantages conſidered, does not deſerve that name, notwithſtanding they export large quantities of cod, tuſk, ling, and ſaſe, inſomuch, that the bounty allowed by acts of parliament amounts from 1400 l. to 2000 l. annually. They have, beſides, codlins, haddocks, whitings, turbot, ſkate, and a variety of other fiſh. In many of the inlets there are prodigious quantities of excellent oyſters, lobſters, muſcles, cockles, and other ſhell-fiſh. As to amphibious creatures, they have multitudes of otters and ſeals; add to theſe, that amber, ambergris, and other ſpoils of the ocean, are frequently found upon the coaſts.

In reſpect to the inhabitants, they are a ſtout, well-made, comely people; the lower ſort of a ſwarthy complexion. The gentry are allowed, by all who have con-

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(E) We muſt by no means ſuppoſe the temper and diſpoſition of the people affected by the dreerineſs of the ſeaſon. Winter, on the contrary, is a kind of carnival in Shetland. All kinds of people eat fleſh and live well during this period of relaxation. Gentlemen of family and fortune, of which there are many here, live ſo hoſpitably and ſo politely, that few ſtrangers regret the length of the winter who happen to ſpend it amongſt them.

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converſed with them, to be moſt of them polite, ſhrewd, ſenſible, lively, active, and intelligent perſons; and theſe, to the number of 100 families, have very handſome, ſtrong, well-built houſes, neatly furniſhed; their tables well ſerved, poliſhed in their manners, and exceedingly hoſpitable and civil to ſtrangers. Thoſe of an inferior rank are a hardy, robuſt, and laborious people, who, generally ſpeaking, get their bread by fiſhing in all weathers in their yawls, which are little bigger than Graveſend wherries; live hardily, and in the ſummer ſeaſon moſtly on fiſh; their drink, which, in reference to the Britiſh dominions, is peculiar to the country, is called *bland*, and is a ſort of butter-milk, long kept, and very ſour. Many live to great ages, though not ſo long as in former times. In reſpect, however, to the bulk of the inhabitants, from the poorneſs of living, from the nature of it, and from the drinking great quantities of corn-ſpirits of the very worſt ſort, multitudes are afflicted with an inveterate ſcurvy; from which thoſe in better circumſtances are entirely free, and enjoy as good health as in any other country in Europe. As they have no great turn to agriculture, and are perſuaded that their country is not fit for it, they do not (tho' probably they might) raiſe corn enough to ſubſiſt them for more than two-thirds of the year. But they are much more ſucceſsful in their paſture-grounds, which are kept well incloſed, in good order, and, together with their commons, ſupply them plentifully with beef and mutton. They pay their rents generally in butter at Lammas, and in money at Martinmas. As to manufactures, they make a ſtrong coarſe cloth for their own uſe, as alſo linen. They make likewiſe of their own wool very fine ſtockings. They export ſalted and dried ling, cod, and tuſk, ſome herrings, a conſiderable quantity of butter and train-oil, otter and ſeal ſkins, and no inconſiderable quantity of the fine ſtockings before-mentioned. Their chief trade is to Leith, London, Hamburgh, Spain, and to the Sraights. They import timbers, deals, and ſome of their beſt oats, from Norway; corn and flour from the Orkneys, and from North Britain; ſpirits and ſome other things from Hamburgh; cloths and better ſort of linen from Leith; grocery, houſehold furniture, and other neceſſaries, from London. The ſuperior-duties to the earl of Morton are generally let in farm; and are paid by the people in butter, oil, and money. The remains of the old Norwegian conſtitution are ſtill viſible in the diviſion of their lands; and they have ſome udalmen or freeholders amongſt them. But the Scots laws, cuſtoms, manners, dreſs, and language, prevail; and they have a ſheriff, magiſtrates for the adminiſtration of juſtice, as well as a cuſtom-houſe, with a proper number of officers. In reference to their eccleſiaſtical concerns, they have a preſbytery, 12 miniſters, and an itinerant for Foula, Fair Iſland, and the Skerries. Each of theſe miniſters has a ſtipend of between 40 and 50 pounds, beſides a houſe and a glebe free from taxes. The number of ſouls in theſe iſlands may be about 20,000.

SHEW-BREAD, among the Hebrews, the name given to thoſe loaves of bread which the prieſts placed every ſabbath-day upon the golden table in the ſanctuary. The ſhew-bread conſiſted of 12 loaves, according to the number of the tribes. Theſe were ſerved up hot on the ſabbath-day; and at the ſame time the ſtale ones, which had been expoſed all the week, were taken away. It was not lawful for any one to eat of theſe loaves but the prieſts only: this offering was accompanied with ſalt and frankincenſe, which was burnt upon the table at the time they ſet on freſh loaves.

Shield || Ship.

SHIELD, an ancient weapon of defence, in the form of a light buckler, borne on the arm, to turn off lances, darts, &c.

Shield, in heraldry, the eſcutcheon or field on which the bearings of coats of arms are placed. See Heraldry.

SHIEL-DRAKE, in ornithology. See Anas.

SHILLING, an Engliſh ſilver coin. See Money-*Table*.

It is obſerved that there were no ſhillings or twelvepenny pieces in England till the year 1504, when they were firſt coined by Henry VIII.

SHINGLES, in building, ſmall pieces of wood, or quartered oaken boards, ſawn to a certain ſcantling, or, as is more uſual, cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long.

Shingles are uſed inſtead of tiles or ſlates, eſpecially for churches and ſteeples; however, this covering is dear; yet, where tiles are very ſcarce, and a light covering is required, it is preferable to thatch; and where they are made of good oak, cleft, and not ſawed, and well ſeaſoned in water and the ſun, they make a ſure, light, and durable covering.

The building is firſt to be covered all over with boards, and the ſhingles nailed upon them.

SHIP, a general name for all large veſſels with ſails, fit for navigation on the ſea; except galleys, which go with oars, and ſmack-ſails.

To whom the world is indebted for the invention of ſhips, is, like all other things of equal antiquity, uncertain.

A very ſmall portion of art or contrivance was ſeen in the firſt ſhips: they were neither ſtrong nor durable; but conſiſted only of a few planks laid together, without beauty or ornament, and juſt ſo compacted as to keep out the water. In ſome places they were only the hulks or ſtocks of trees hollowed, and then conſiſted only of one piece of timber. Nor was wood alone applied to this uſe; but any other buoyant materials, as the Egyptian reed papyrus; or leather, of which the primitive ſhips were frequently compoſed; the bottom and ſides being extended on a frame of thin battens or ſcantlings, of flexible wood, or begirt with wickers, ſuch as we have frequently beheld amongſt the American ſavages. In this manner they were often navigated upon the rivers of Ethiopia, Egypt, and Sabæan Arabia, even in latter times. But in the firſt of them, we find no mention of any thing but leather or hides ſewed together. In a veſſel of this kind, Dardanus ſecured his retreat to the country afterwards called *Troas*, when he was compelled by a terrible deluge to forſake his former habitation of Samothrace. According to Virgil, Charon's infernal boat was of the ſame compoſition.

But as the other arts extended their influence, naval architecture likewiſe began to emerge from the gloom of ignorance and barbariſm; and as the ſhips of thoſe ages were increaſed in bulk, and better proportioned for commerce, the appearance of thoſe floating citadels of unuſual form, full of living men, flying with ſeemingly expanded wings over the ſurface of the untravelled ocean, ſtruck the ignorant people with terror and aſtoniſhment: and hence, as we are told by Ariſtophanes, aroſe the fable of Perſeus flying to the Gorgons, who was actually carried thither in a ſhip! Hence, in all probability, the famous ſtory of Triptolemus riding on a winged dragon is deduced, only becauſe he ſailed from Athens, in the time of a great dearth, to a more plentiful country, to ſupply the neceſſities of his people. The fiction of the flying horſe Pegaſus may be joined with theſe, who, as ſeveral mythologiſts report, was nothing but a ſhip with ſails, and thence ſaid to be the offspring of Neptune the ſovereign of the ſea; nor does there appear any other foundation for the ſtories of griffins, or of ſhips transformed into birds and fiſhes, which we ſo often meet with in the ancient poets. So acceptable to the firſt ages of the world were inventions of this nature, that whoever made any improvements in navigation or naval architecture, building new ſhips better fitted for ſtrength or ſwiftneſs than thoſe uſed before, or rendered the old more commodious by additional contrivances, or diſcovered countries unknown to former travellers, were thought worthy of the greateſt honours, and often aſſociated into the number of their deified heroes. Hence we have in aſtronomy the ſigns of Aries and Taurus, which were no other than two ſhips: the former tranſported Phryxus from Greece to Colchos, and the latter Europa from Phœnicia to Crete. Argo, Pegaſus, and Perſeus's whale, were likewiſe new ſhips of a different ſort from the former, which being greatly admired by the barbarous and uninſtructed people of thoſe times, were tranſlated amongſt the ſtars, in commemoration of their inventors, and metamorphoſed into conſtellations by the poets of their own and of ſucceeding ages.

The chief parts, of which ſhips anciently conſiſted, were three, viz. the belly, the prow, and the ſtern: theſe were again compoſed of other ſmaller parts, which ſhall be briefly deſcribed in their order. In the deſcription, we chiefly follow Scheffer, who hath ſo copiouſly treated this ſubject, and with ſuch induſtry and learning collected whatever is neceſſary to illuſtrate it, that very little room is left for enlargement by thoſe who incline to purſue this inveſtigation.

1. In the belly, or middle part of the ſhip, there was τροϖις, *carina*, or the "keel," which was compoſed of wood: it was placed at the bottom of the ſhip, being deſigned to cut and glide through the waves, and therefore was not broad, but narrow and ſharp; whence it may be perceived that not all ſhips, but only the μακραι, which ſhips of war were called, whoſe bellies were ſtraight and of a ſmall circumference, were provided with keels, the reſt having uſually flat bottoms. Around the outſide of the keel were fixed pieces of wood, to prevent it from being damaged when the ſhip was firſt lanched into the water, or afterwards ſtruck on any rocks; theſe were called χελευσματα, in Latin *cunei*.

Next to the keel was φαλκις, the "pump-well, or well-room," within which was contained the αντλια, or "pump;" through which water was conveyed out of the ſhip.

After this, there was δευτερα τροϖις, or the "ſecond keel," ſomewhat reſembling what is now called the *kelſon;* it was placed beneath the pump, and called λεσϐιον, χαλκηνε, κλειτοϖοδιον: by ſome it is falſely ſuppoſed to be the ſame with φαλκις.

Above the pump was an hollow place, called by Herodotus κοιλη της νηος, by Pollux κυτος and γαστρα, becauſe large and capacious, after the form of a belly; by the Latins, *teſtudo*. This was formed by crooked ribs, with which it was ſurrounded, which were pieces of wood riſing from the keel upwards, and called by Heſychius νομεις, and by others εγκοιλια, the belly of the ſhip being contained within them: in Latin, *coſtæ;* and in Engliſh *timbers*. Upon theſe were placed certain planks, which Ariſtophanes calls εντερωνειας, or εντερωνιδα.

Hence proceed we to the ϖλευραι, *latera*, or "ſides" of the ſhip, which encompaſſed all the former parts on both hands; theſe were compoſed of large rafters extended from prow to ſtern, and called ζωστηρες, and ζωμιαματα, becauſe by them the whole fabric was begirt or ſurrounded.

In both theſe ſides the rowers had their places, called τοιχοι and εδωλια, in Latin *fori* and *tranſtra*, placed above one another: the loweſt was called ϑαλαμος, and thoſe that laboured therein ϑαλαμιοι; the middle ζυγα, and the men ζυγιοι; the uppermoſt ϑρανοι, whence the rowers were termed ϑρανιται. In theſe apartments were ſpaces through which the rowers put their oars: theſe were ſometimes one continued vacuity from one end to the other, called τραφηξ; but more uſually diſtinct holes, each of which was deſigned for a ſingle oar: theſe were ſtiled τρηματα, τρυϖηματα, as alſo οφθαλμοι, becauſe not unlike the eyes of living creatures. All of them were by a more general name termed εγκωπα, from containing the oars; but εγκωϖιν ſeems to have been another thing, ſignifying the ſpaces between the banks of oars on each ſide, where the paſſengers appear to have been placed. On the top of all there was a paſſage or place to walk, called ϖαραδος, and ϖαραθρανος, as joining to the ϑρανοι, or uppermoſt bank of oars.

2. Πρωρα, the "prow or fore-deck," whence it is ſometimes called μετωπον, and commonly diſtinguiſhed by other metaphorical titles taken from human faces. In ſome ſhips there is mention of two prows, as alſo two ſterns; ſuch was Danaus's ſhip adorned by Minerva when he fled from Egypt. It was uſual to beautify the prow with gold and various ſorts of paint and colours: in the primitive times red was moſt in uſe; whence Homer's ſhips were commonly dignified with the titles of μιλτοϖαρηοι, and φοινικοϖαρηοι, or "red-faced:" the blue likewiſe, or ſky-colour, was frequently made uſe of, as bearing a near reſemblance to the colour of the ſea; whence we find ſhips called by Homer κυανοϖρωροι, by Ariſtophanes κυανεμϐολοι. Several other colours were alſo made uſe of; nor were they barely varniſhed over with them, but very often annealed by wax melted in the fire, ſo as neither the ſun winds, nor water, were able to deface them. The art of doing this was called from the wax κηρογραφια, from the fire εγκαυστικη, which is deſcribed by Vitruvius, and mentioned in Ovid.

——————*Picta coloribus uſtis*
Cæruleam matrem concava puppis habet.

The painted ſhip with melted wax anneal'd
Had Tethys for its deity————

In theſe colours the various forms of gods, animals, plants, &c. were uſually drawn, which were likewiſe often added as ornaments to other parts of the ſhips, as plainly appears from the Ancient Monuments preſented to the world by Bayſius.

The ſides of the prow were termed ϖτερα, or "wings," and ϖαρια, according to Scheffer, or rather ϖαρειαι; for ſince the prow is commonly compared to a human face, it will naturally follow that the ſides ſhould be called *cheeks;* theſe are now called *bows* by our mariners.

3. Πρυμνη, the "hind-deck or poop," ſometimes called ȣρα, the "tail," becauſe the hindmoſt part of the ſhip: it was of a figure more inclining to round than the prow, the extremity of which was ſharp, that it might cut the waters; it was alſo built higher than the prow, and was the place where the pilot ſat to ſteer: the outer-bending part of it was called επισειων, anſwering to our term, *quarter*.

They had various ornaments of ſculpture on the prow; as helmets, animals, triumphal wreaths, &c. The ſtern was more particularly adorned with wings, ſhields, &c. Sometimes a little maſt was erected whereon to hang ribbands of divers colours, which ſerved inſtead of a flag to diſtinguiſh the ſhip; and a weathercock, to ſignify the part from whence the wind blew.

On the extremity of the prow was placed a round piece of wood, called the ϖτυχις, from its bending; and ſometimes οφθαλμȣ̑, the "eye" of the ſhip, becauſe fixed in the fore-deck; on this was inſcribed the name of the ſhip, which was uſually taken from the figure painted on the flag. Hence comes the frequent mention of ſhips called *Pegaſi*, *Scyllæ*, *bulls*, *rams*, *tigers*, &c. which the poets took the liberty to repreſent as living creatures that tranſported their riders from one country to another.

The whole fabric being completed, it was fortified with pitch, and ſometimes a mixture of roſin, to ſecure the wood from the waters; whence it comes that Homer's ſhips are every where mentioned with the epithet of μελαιναι, or "black." The firſt that made uſe of pitch were the inhabitants of Phæacia, ſince called *Corſica:* ſometimes wax was employed in the ſame uſe, whence Ovid,

Cærulea ceratas accipit unda rates.

The azure waves receive the waxy ſhips.

After all, the ſhip being bedecked with garlands and flowers, the mariners alſo adorned with crowns, ſhe was launched into the ſea with loud acclamations and other expreſſions of joy; and being purified by a prieſt with a lighted torch, an egg and brimſtone, or after ſome other manner, was conſecrated to the god whoſe image ſhe bore.

The ſhips of war of the ancients were diſtinguiſhed from other kinds of veſſels, by various turrets and acceſſions of building, ſome to defend their own ſoldiers, and others to annoy the enemy; and from one another, in latter ages, by ſeveral degrees or ranks of oars, the moſt uſual number of which was four or five, which appear not to have been arranged, as ſome imagine, on the ſame level in different parts of the ſhip; nor yet, as others have ſuppoſed, directly above one another's heads; but their ſeats being placed one behind another, aſcended gradually, like ſtairs. Ptolemy Philopater, urged by a vain-glorious deſire of exceeding all the world beſides in naval architecture, is ſaid to have farther enlarged the number of banks to 40, and the ſhip being otherwiſe in equal proportion, this raiſed her to ſuch an enormous bulk, that ſhe appeared at a diſtance like a floating mountain or iſland; and, upon a nearer view, like a prodigious caſtle on the ocean. She was 280 cubits long, 38 broad, and 48 high, each cubit being 1 Engliſh foot $5\frac{1}{2}$ inches; and carried 400 rowers, 400 ſailors, and 3000 ſoldiers. Another which the ſame prince made to ſail on the Nile, we are told, was half a ſtadium long. Yet theſe were nothing in compariſon with Hiero's ſhip, built under the direction of Archimedes; on the ſtructure whereof Moſchion wrote a whole volume. There was wood enough employed in it to make 50 galleys: it had all the variety of apartments of a palace; ſuch as banqueting-rooms, galleries, gardens, fiſh-ponds, ſtables, mills, baths, and a temple to Venus: it was encompaſſed with an iron rampart, eight towers, with walls and bulwarks, furniſhed with machines of war, particularly one which threw a ſtone of 300 pounds, or a dart 12 cubits long, the ſpace of half a mile, with many other particulars related by Athenæus. But theſe, and all ſuch monſtrous fabrics, ſerved only for ſhow and oſtentation; being rendered by their vaſt bulk unwieldy and unfit for ſervice. Athenæus informs us, the common names they were known by, were *Cyclades*, or *Ætna*, i. e. "iſlands, or mountains," to which they ſeemed nearly equal in bigneſs; conſiſting, as ſome report, of as many materials as would have compoſed 50 triremes, or ſhips of three banks.

A modern ſhip is undoubtedly the nobleſt machine that ever was invented; and conſiſts of ſo many parts, that it would require a whole volume to deſcribe it minutely. However, we ſhall endeavour to ſatisfy the reader more fully on this head, as it is an article of the utmoſt importance.

The plans, elevations, and ſections, uſed in the conſtruction of a ſhip; the principal pieces of which ſhe is compoſed; and the qualities requiſite to anſwer the ſeveral purpoſes of navigation, are deſcribed, or referred to, in Ship-building, Part I.; and the application of this theory to practice, is treated in Part II.

The machinery and furniture with which ſhe is equipped, are variouſly diffuſed throughout this work. See Mast, Sail, Yard, Rigging, Anchor, &c.

The qualities by which ſhe is enabled to encounter a tempeſtuous ſea, are treated in the article Ballast and Trim; and her ſeveral movements therein, are explained under Navigation, Drift, Sailing, Tacking, Leeway, Pitching, and Rolling.

Conſidered as a moveable fortreſs, or citadel, her military operations are deſcribed in Naval *Tactics*.

To give a collective illuſtration of the ſubject, we have exhibited, in Plate CCLXIII. a repreſentation of a firſt-rate ſhip of war, with all her maſts, yards, and rigging erect, and the ſeveral ſails furled to their reſpective yards and ſtays; and, in Plate CCLXIV. a ſection of the ſame, ſhewing the inſide thereof.

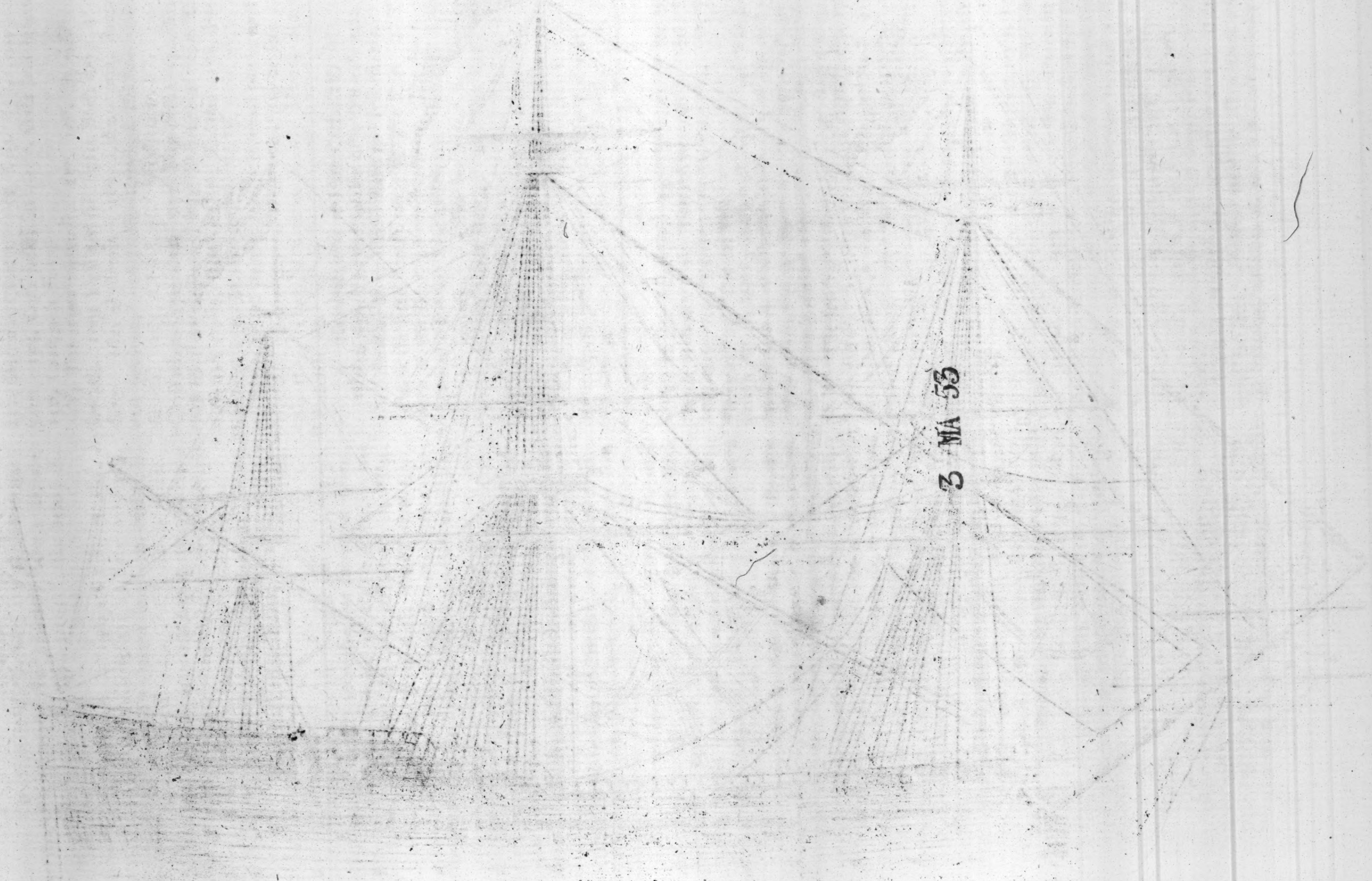

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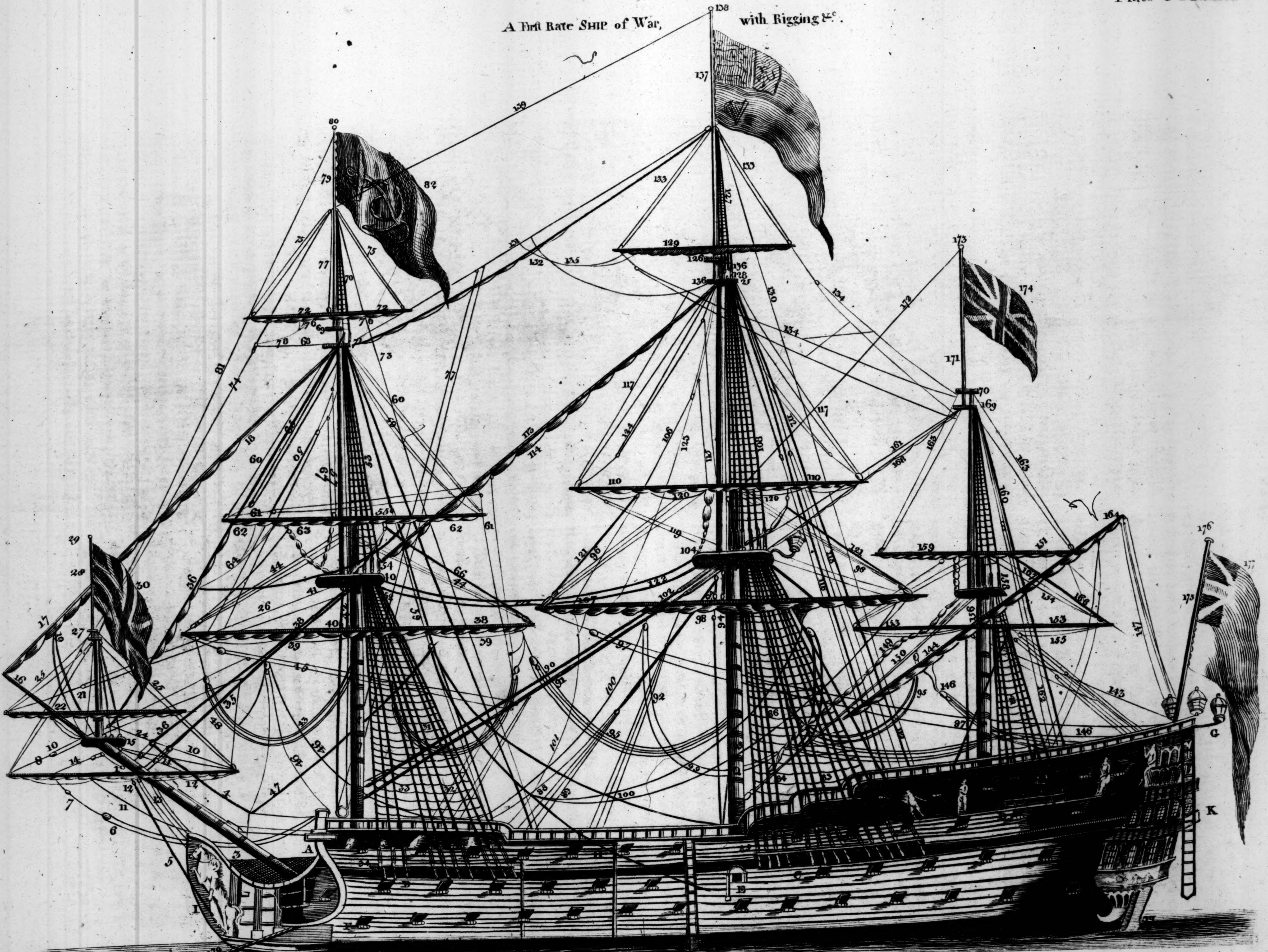
Plate CCLXIII

A First Rate Ship of War, with Rigging &c.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I

Explanation of Plate CCLXIII.

Parts of the hull. A, the cat-head; B, the fore-chains; C, the main-chains; D, the mizzen chains; E, the entering port; F, the hawſe holes; G, the poop lanterns; H, the cheſs-tree; I, the head; K, the ſtern.

L, The bowſprit. 1, 2, Yard and ſail. 3, Gammoning. 4, Horſe. 5, Bob ſtay. 6, Sprit-ſail ſheets. 7, Pendants. 8, Braces and pendants. 9, Halliards. 10, Lifts. 11, Clew-lines. 12, Sprit-ſail horſes. 13, Bunt-lines. 14, Standing lifts. 15, Sprit-ſail top. 16, Flying jib boom. 17, Flying jib ſtay and ſail. 18, Halliards. 19, Sheets. 20, Horſes.

M, The ſprit-ſail top-maſt. 21, Shrouds. 22, 23, Yard and ſail. 24, Sheet. 25, Lifts. 26, Braces and pendants. 27, Cap. 28, Jack-ſtaff. 29, Truck. 30, Jack flag.

N, The fore-maſt. 31, Runner and tackle. 32, 33, Shrouds. 34, Laniards. 35, Stay and laniard. 36, Preventer-ſtay and laniard. 37, Woolding the maſt. 38, Yard and ſail. 39, Horſes. 40, Top. 41, Crow-foot. 42, Jeers. 43, Yard tackles. 44, Lifts. 45, Braces and pendants. 46, Sheets. 47, Fore tacks. 48, Bow-lines and bridles. 49, Fore bunt-lines. 50, Fore leech-lines. 51, Fore top rops. 52, Puttock ſhrouds.

O, The fore top-maſt. 53, 54, Shrouds and laniards. 55, Yard and ſail. 56, Stay and ſail. 57, Runner. 58, Back ſtays. 59. Halliards. 60, Lifts. 61, Braces and pendants. 62, Horſes. 63, Clew-lines. 64, Bow-lines and bridles. 65, Reef-tackles. 66, Sheets. 67, Bunt-lines. 68, Croſs-trees. 69, Cap.

P, The fore top-gallant maſt. 70, 71, Shrouds and laniards. 72, Yard and ſail. 73, Back ſtays. 74, Stay. 75, Lifts. 76, Clew-lines. 77, Braces and pendants. 78, Bow-lines and bridles. 79, Flag ſtaff. 80, Truck. 81, Flag-ſtaff ſtay. 82, Flag of lord high-admiral.

Q, The main maſt. 83, 84, Shrouds. 85, Laniards. 86, Runner and tackle. 87, Pendant of the gornet. 88, Guy of ditto. 89, Sail of ditto. 90, Stay. 91. Preventer-ſtay. 92, Stay tackle. 93, Woolding the maſt. 94, Jeers. 95, Yard tackles. 96, Lifts. 97, Braces and pendants. 98, Horſes. 99, Sheets. 100, Tacks. 101, Bow-lines and bridles. 102, Crow-foot. 103, Top rope. 104, Top. 105, Bunt-lines. 106, Leech-lines. 107, Yard and ſail.

R, The main top-maſt. 108, 109, Shrouds and laniards. 110, Yard and ſail. 111, Puttock ſhrouds. 112, Back-ſtays. 113, Stay. 114, Stay ſail and ſtay halliards. 115, Runnets. 116, Halliards. 117, Lifts. 118, Clew-lines. 119, Braces and pendants. 120, Horſes. 121, Sheets. 122, Bow-lines and bridles. 123, Bunt-lines. 124, Reef-tackles. 125, Croſs trees. 126, Cap.

S, The main top-gallant maſt. 127, 128, Shrouds and laniards. 129, Yard and ſail. 130, Back ſtays. 131, Stay. 132, Stay-ſail and halliards. 133, Lifts. 134, Braces and pendants. 135, Bow-lines and bridles. 136, Clew-lines. 137, Flag ſtaff. 138, Truck. 139, Flag-ſtaff ſtay. 140, Flag ſtandard.

T, The mizen maſt. 141, 142, Shrouds and laniards. 143, Pendants and burtons. 144, Yard and ſail. 145, Crow foot. 146. Sheet. 147, Pendant-lines. 148, Peck brails. 149, Stay-ſail. 150, Stay. 151, Derric and ſpann. 152, Top. 153, Croſs jack yard. 154, Croſs jack lifts. 155, Croſs jack braces. 156, Croſs jack ſlings.

V, The mizen top-maſt. 157, 158, Shrouds and laniards. 159, Yard and ſail. 160, Back ſtays. 161, Stay. 162, Halliards. 163, Lifts. 164, Braces and pendants. 165, Bow-lines and bridles. 166, Sheets. 167, Clew-lines. 168, Stay-ſail. 169, Croſs trees. 170, Cap. 171. Flag ſtaff. 172, Flag ſtaff ſtay. 173, Truck. 174, Flag union. 175, Enſign ſtaff. 176, Truck. 177, Enſign. 178, Poop ladder. 179, Bower cable.

Thus have we pointed out the external parts; maſts, rigging, &c. an account of all which may be ſeen under their reſpective articles MAST, HULL, ROPE, RUDDER, &c.

Explanation of Plate CCLXIV.

Which repreſents the ſection of a firſt-rate man of war, ſhowing its various timbers and apartments.

A is the head; containing, 1, The ſtem. 2. The knee of the head, or cut water. 3, The lower and upper cheek. 4, The tail-board. 5, The figure. 6, The gratings. 7, The brackets. 8, The falſe ſtem. 9, The breaſt hooks. 10, The hauſe hole. 11, The bulk head, forward. 12, The cat-head. 13, The cat-hook. 14, Neceſſary ſeats. 15, The manger within board. 16, The bowſprit.

B, Upon the forecaſtle. 17, The gratings. 18, The partners of the fore maſt. 19, The gun wale. 20, The belfry. 21, The funnel for the ſmoke. 22, The gangway going off the forecaſtle. 23, The forecaſtle guns.

C, In the forecaſtle. 24, The door of the bulk head, forward. 25, The officers cabins. 26, The ſtair-caſe. 27, The fore top-ſail ſheet bits. 28, The beams. 29, The car lines.

D, The middle gun-deck, forward. 30, The fore-jeer bits. 31, The oven and furnace of copper. 32, The captain's cook-room. 33, The ladder, or way up into the forecaſtle.

E, The lower gun-deck, forward. 34, The knees fore and aft. 35, The ſpirketings, or the firſt ſtreak next to each deck; the next under the beams being called *clamps*. 36, The beams of the middle gun-deck fore and aft. 37, The car-lines of the middle gun-deck, fore and aft. 38, The fore bits. 39, The after, or main bits. 40, The hatchway to the gunner's and boatſwain's ſtore-rooms. 41, The jeer capſton.

F, The orlap. 42, 43, 44, The gunner's, boatſwain's, and carpenter's ſtore-rooms. 45, The beams of the lower gun-deck. 46, 47, The pillars and the riders, fore and aft. 48, The bulk-head of the ſtore-rooms.

G, The hold. 49, 50, 51, The foot-hook rider, the floor-rider, and the ſtandard, fore and aft. 52, The pillars. 53, The ſtep of the fore maſt. 54, The kelſon, or falſe keel, and dead riſing. 55, The dead wood.

H, A-midſhips in the hold. 56, The floor timbers. 57, The keel. 58, The well. 59, The chain pump. 60, The ſtep of the main maſt. 61, 62, Beams and car-lines of the orlop, fore and aft.

I, The orlop a-midſhips. 63, The cable tire. 64, The main hatchway.

K, The lower gun-deck a-midſhips. 65, The ladder leading up to the middle gun-deck. 66, The lower tire or ports.

L, The middle gun-deck a-midſhips. 67, The middle tire ports. 68, The entering port. 69. The main jeer bits. 70, Twiſted pillars or ſtantions. 71, The capſtan. 72, The gratings. 73, The ladder leading to the upper deck.

M, The upper gun-deck a-midſhips. 74, The main top-ſail ſheet bits. 75, The upper partners of the main maſt. 76, The gallows on which ſpare top-maſts, &c. are laid. 77, The fore ſheet blocks. 78, The rennets. 79, The gun wale. 80, The upper gratings. 81, The drift brackets. 82, The piſs dale. 83, The capſton pall.

N, Abaft the main maſt. 84, The gang-way off the quarter-deck. 85. The bulkhead of the coach. 86, The ſtair-caſe down to the middle gun-deck. 87, The beams of the upper deck. 88, The gratings about the main-maſt. 89, The coach, or council-chamber. 90, The ſtair-caſe up to the quarter-deck.

O, The quarter-deck. 91, The beams. 92, The car-lines. 93, The partners of the mizen maſt. 94, The gangway up to the poop. 95, The bulk-head of the cuddy.

P, The poop. 96, The trumpeter's cabin. 97, The tafferel.

Q, The captain-lieutenant's cabin.

R, The cuddy, uſually divided for the maſter and ſecretary's officers.

S, The ſtate-room, out of which is made the bed-chamber, and other conveniences for the commander in chief. 98, The entrance into the gallery. 99, The bulk-head of the great cabin. 100, The ſtern-lights and after galleries.

T, The ward-room, allotted for the lieutenants and land-officers. 101, The lower gallery. 102, The ſteerage and bulk-head of the ward-room. 103, The whip-ſtaff, commanding the tiller. 104, The after ſtair-caſe down to the lower gun-deck.

V, Several officers cabins abaft the main maſt, where the ſoldiers generally keep guard.

W, The gun-room. 105, The tiller commanding the rudder. 106, The rudder. 107, The ſtern-poſt. 108, The tiller-tranſom. 109, The ſeveral tranſoms, *viz.* 1, 2, 3, 4, 5. 110, The gun-room ports, or ſtern-chaſe. 111, The bread-room ſcuttle, out of the gun-room. 112, The main capſtan. 113, The pall of the capſtan, 114, The partner. 115, The bulk-head of the bread-room.

X, The bread-room. Y, The ſteward's room, where all proviſions are weighed and ſerved out. Z, The cock-pit, where are ſubdiviſions for the purſer, the ſurgeon, and his mates.

AA, The platform, or orlop, where proviſion is made for the wounded in time of ſervice. 116, The hold abaft the main-maſt. 117, The ſtep of the mizen maſt. 115, The kelſon, or falſe keel. 119, The dead-wood, or riſing.

Different Kinds of SHIPS. All ſhips at firſt were of the ſame form, whatever uſes they were deſigned for; but the various ends of navigation, ſome of which were better anſwered by one form, ſome by another, ſoon gave occaſion to build and fit out ſhips, not only different in bigneſs, but alſo in their conſtruction and rigging: and as trade gave occaſion to the fitting out large fleets of different kinds of merchant-ſhips; ſo ſhips of war became neceſſary to preſerve them to their juſt proprietors.

SHIPS *of War*, are veſſels properly equipped with artillery, ammunition, and all the neceſſary martial weapons and inſtruments for attack or defence. They are diſtinguiſhed from each other by their ſeveral ranks or claſſes. See RATE.

SHIP *of the Line*, is uſually applied to all men of war mounting 60 guns and upwards. Of late, however, our fifty-gun ſhips have been formed ſufficiently ſtrong to carry the ſame metal as thoſe of 60; and accordingly may fall into the line in caſes of neceſſity. See NAVAL *Tactics*, Sect. II.

Armed SHIP. See ARMED *Ship*.

Hoſpital SHIP, a veſſel fitted up to attend on a fleet of men of war, and receive their ſick or wounded; for which purpoſe her decks ſhould be high, and her ports ſufficiently large. Her cables ought alſo to run upon the upper deck, to the end that the beds or cradles may be more commodiouſly placed between decks, and admit a free paſſage of the air, to diſperſe that which is offenſive or corrupted.

Merchant SHIP, a veſſel employed in commerce, to carry commodities of various ſorts from one port to another.

Merchant ſhips are eſtimated by their burden; that is, by the number of tons they bear, each ton reckoned at 2000 lb. weight; this eſtimate being made by gauging the hold, which is the proper place of loading.—The largeſt merchant-ſhips are thoſe employed by the different European companies of merchants who trade to the Eaſt Indies. They are in general ſomewhat larger than our forty-gun ſhips: they are mounted with twenty cannon on their upper-deck, which are nine-pounders, and ſix on their quarter-deck, which are ſix-pounders.

Private SHIP *of War*. See PRIVATEER.

Store-SHIP, a veſſel employed to carry artillery or naval ſtores for the uſe of a fleet, fortreſs, or garriſon.

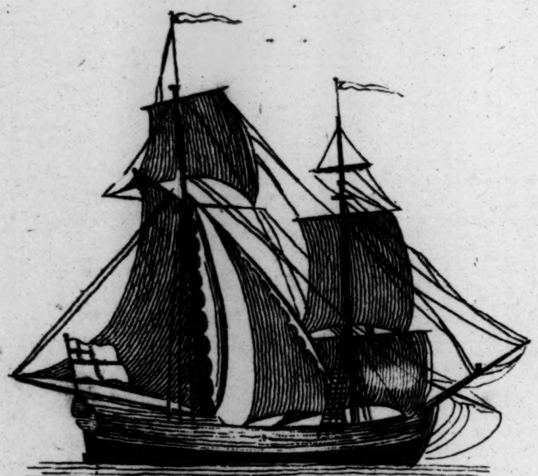
Tranſport SHIP, is generally uſed to conduct troops from one place to another.

Beſides thoſe mentioned above, there are other forms; the principal of which we have collected into one point of view in Plate CCLXV. ſo that the reader who is unacquainted with marine affairs may the more eaſily perceive their diſtinguiſhing characters, which are alſo more particularly deſcribed under their reſpective articles.

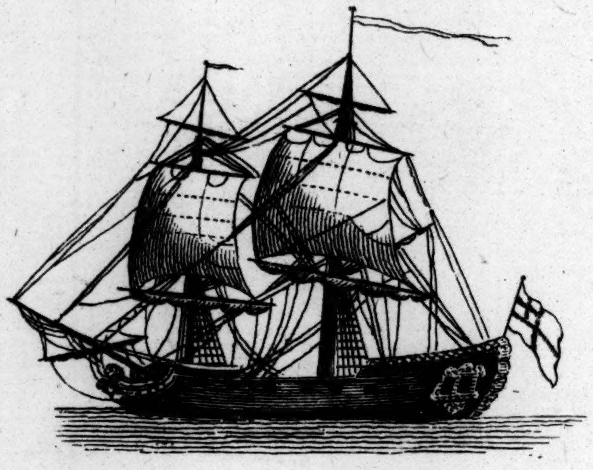
In the different kinds of ſhips referred to above, and diſtinguiſhed from each other by their ſize or figure, we have only conſidered thoſe which are moſt common in European nations, where the marine art has received the greateſt improvements. So far is apparently conſiſtent with the views of utility. To give a circumſtantial account of the various ſpecies of ſhips employed in different nations, beſides being an almoſt endleſs taſk, would be of little ſervice except to gratify an uſeleſs curioſity.

Plate CCLXIV.

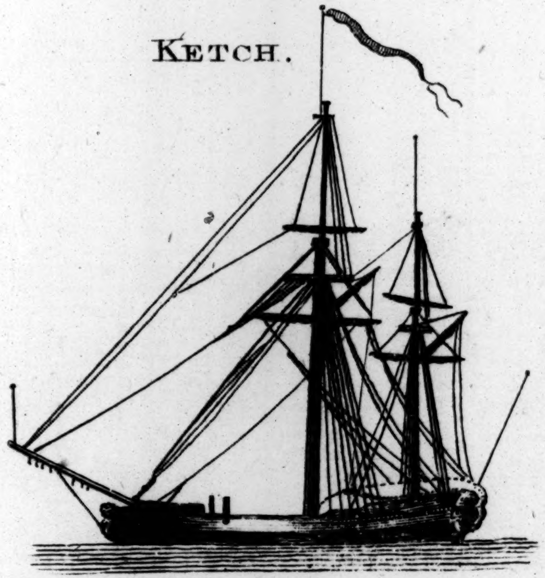
BRIG or BRIGANTINE.



SNOW.



KETCH.



SLOOP.

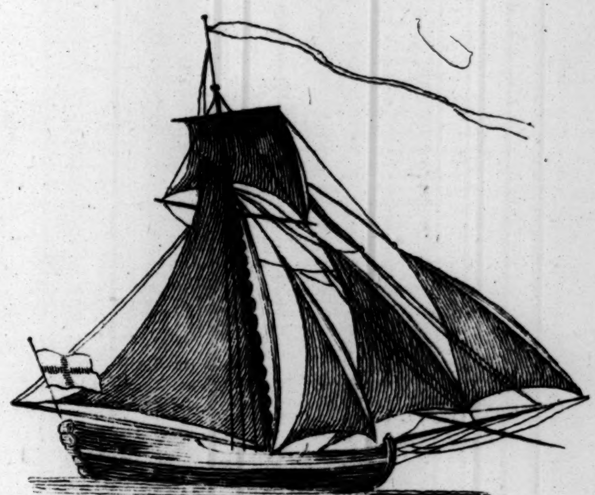
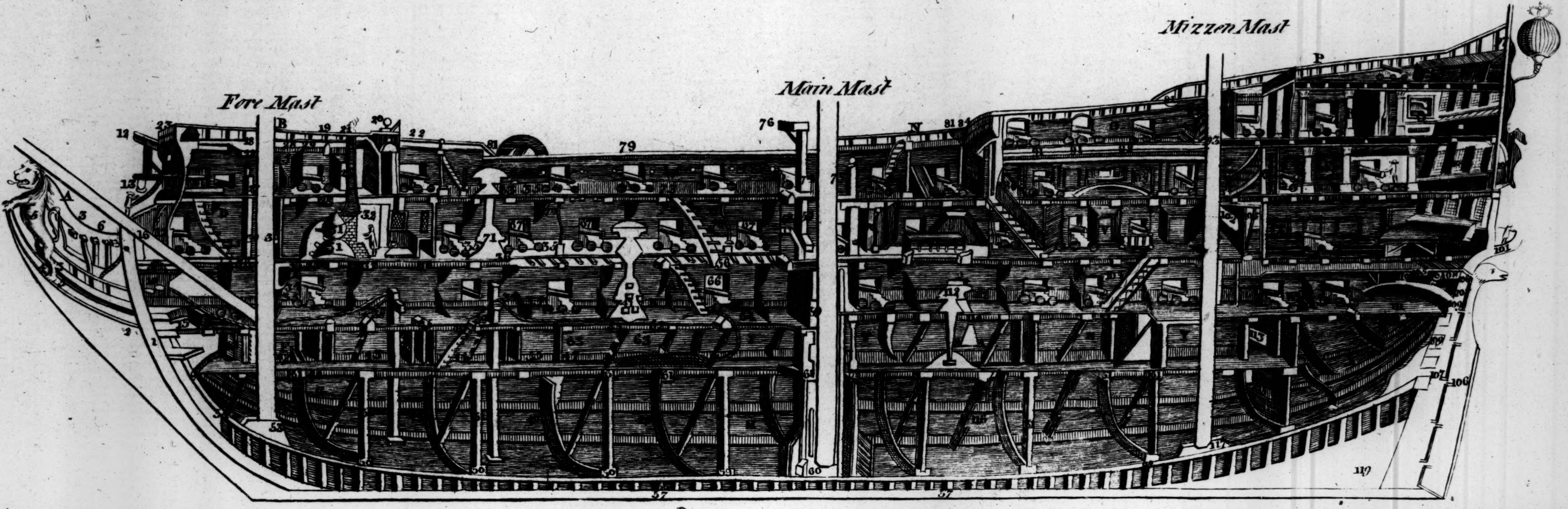


Fig. 1. The Section of a First Rate SHIP of War, Shewing its various Timbers and Apartments


Fore Mast
Main Mast
Mizzen Mast
B
N
P
A
79
76
57
119

A Bell Sculp.

8

3. MA 55

Ship.

To Ship, is either uſed actively; as, to embark any perſon, or put any thing aboard-ſhip: Or paſſively, to receive any thing into a ſhip; as, We ſhipped a heavy ſea at three o'clock in the morning.

To Ship, alſo implies to fix any thing in its place; as, to ſhip the oars, i. e. to fix them in their row-locks. To ſhip the ſwivel-guns, is to fix them in their ſockets, &c.

SHIP-BUILDING.

Ship-building may be defined, The manner of conſtructing ſhips, or the work itſelf; as diſtinguiſhed from Naval Architecture, which may be conſidered as the theory or art of delineating ſhips on a plane. The latter was referred to this place, that we might avoid the impropriety of giving the theory and practice under different articles.

Part I. ART of DELINEATING SHIPS on a PLANE.

All edifices, whether civil or military, are known to be erected in conſequence of certain eſtabliſhed plans, which have been previouſly altered or improved till they have arrived at the deſired point of perfection. The conſtruction of ſhips appears alſo to require at leaſt as much correctneſs and preciſion as the buildings which are founded upon *terra firma*: it is therefore abſolutely neceſſary that the mechanical ſkill of the ſhipwright ſhould be aſſiſted by plans and ſections, which have been drawn with all poſſible exactneſs, examined by proper calculations, and ſubmitted to the moſt accurate ſcrutiny.

Naval architecture may be diſtinguiſhed into three principal parts.

Firſt, To give the ſhip ſuch an exterior form as may be moſt ſuitable to the ſervice for which ſhe is deſigned.

Secondly, To give the various pieces of a ſhip their proper figures; to aſſemble and unite them into a firm compact frame, ſo that by their combination and diſpoſition they may form a ſolid fabric, ſufficient to anſwer all the purpoſes for which it is intended. And,

Thirdly, To provide convenient accommodations for the officers and crew, as well as ſuitable apartments for the cargo, furniture, proviſions, artillery, and ammunition.

The exterior figure of a ſhip may be divided into the bottom and upper works.

The bottom, or quick-work, contains what is termed the *hold*, and which is under water when the ſhip is laden. The upper works, called alſo the *dead-work*, comprehend all that part which is uſually above the water when the ſhip is laden.

The figure of the bottom is therefore determined by the qualities which are neceſſary for the veſſel, and conformable to the ſervice for which ſhe is propoſed.

The limits of our deſign will not admit of a minute deſcription and enumeration of all the pieces of timber which enter into the conſtruction of a ſhip, nor of a particular deſcription of their aſſemblage and union, or the manner in which they reciprocally contribute to the ſolidity of thoſe floating citadels. It nevertheleſs appears neceſſary to give a general idea of the uſe, figure, and ſtation of the principal pieces, to thoſe who are entirely unacquainted with the ſubject. As our definitions will be greatly illuſtrated by the proper figures, we have annexed to this article a plate, which comprehends ſome of the moſt material draughts, as well as a repreſentation of the principal pieces employed in naval architecture.

It is uſual among ſhipwrights to delineate three ſeveral draughts.

Firſt, The whole length of the ſhip is repreſented according to a ſide-view, perpendicular to the keel, and is termed the *plane if elevation*, or *ſheer-draught*. Plate CCXLVI. fig. 1.

Second, The ſhip is exhibited according to an end-view, and ſtripped of her planks, ſo as to preſent the outlines of the principal timbers; and this is properly termed the *plane of projection*, or the *vertical plane of the timbers*, (fig. 4.) becauſe it ſhows the projection of their frames relatively to each other.

Third, It is not ſufficient to have the vertical curves of the bottom in different places, for a diſtinct idea of the horizontal curves is alſo equally neceſſary and uſeful: this is obtained by means of water-lines, traced upon what is called the *horizontal plane*, (fig. 2.) In this draught the curves of the tranſoms called the *round-aft* is alſo marked, and ſometimes the breadth and thickneſs of the timbers.

The plane of elevation (fig. 1.) determines the length and depth of the keel; the difference of the draughts of water; the length and projection, or rake, of the ſtem and ſtern-poſt; the poſition of the midſhip-frame upon the keel, together with that of the principal frames afore and abaft; the load-water line; the wales; the dimenſions and ſituations of the gun-ports; the projection of the rails of the head and ſtern-gallery; with the ſtations of the maſts and channels.

This draught, however, conveys no idea of the vertical curve of the ribs or timbers; for as their projection will be only repreſented in a plane elevated upon the length of the keel, they will appear in this direction no otherwiſe than as ſtraight lines. To perceive theſe curves accurately, they muſt be regarded in another point of view; which will repreſent their projection upon a vertical plane, ſuppoſed to cut the keel at right angles in the place where the ſhip is broadeſt. For as all ſhips are broader near the middle of their length than towards the extremities, it is evident that the timbers are more extended in proportion. The moſt capacious of theſe repreſents what is called the *midſhip-frame*; and upon the area of this frame is delineated the projection of all the others.

Thus the plane of projection limits the different breadths of a ſhip in various points of her length, and exhibits the outline of the timbers reſpectively to each other as they are erected upon the keel. Accordingly, this draught ought to preſent a variety of ſections of the ſhip in different places of her length, and always perpendicular to the ſurface of the water; ſo that the eye of the obſerver, when placed in what may be properly termed the *axis* of the ſhip, may perceive the ſeveral ſections at one glance; that is to ſay, when looking full on the ſtem from before the ſhip †, he ſhall diſcover the fore-timbers; and when looking from behind, directly on the ſtern, he ſhall perceive the form of the after-timbers. See Plate of Stern, fig. 2. 3. at the article Stern; in both of which figures the ſections of the inferior timbers are expreſſed by curved black lines drawn upon the area of the midſhip-frame, which is already deſcribed to be a plane elevated perpendicularly upon the keel at the extreme breadth of the veſſel. See Midship-*Frame*.

To form a juſt idea of this plane, therefore, we ought to ſuppoſe a ſhip reſting upon the ſtocks, in the ſame poſition as when afloat upon the water. Thus a variety of black vertical lines may be drawn at equal diſtances upon the bottom, which is white, to form different outlines of the ſhip correſponding to the timbers within. It is to be obſerved, that the faſhion of the inferior timbers muſt conform to the figure of the midſhip-frame, which is placed in the fulleſt part of the ſhip; and as the planes of all the other timbers diminiſh in a certain progreſſion as they approach the ſtem and ſtern, they are properly delineated on the plane of the midſhip-frame, which alſo repreſents the depth of the keel and length of the midſhip-beam.

As the two ſides of a ſhip ought to be exactly alike, it is judged ſufficient to repreſent the ſections of the fore-part of the ſhip on the left ſide, and thoſe in the after-part on the right ſide, ſo as to perceive all the ſections, as well afore as abaft, upon one plane. See Plate CCLXVI. fig. 4.

However neceſſary it may be to underſtand preciſely the vertical curves of the bottom, it is no leſs requiſite to have a juſt idea of thoſe which are horizontal.

The horizontal, or floor-plane, is that upon which the whole frame is erected, and will be more clearly underſtood by previouſly deſcribing the water-lines and ribbands of which it is compoſed.

When a ſhip floats upon the ſtream, it is evident that her upper works will be ſeparated from the bottom by the ſurface of the water, which will accordingly deſcribe an imaginary horizontal line upon the bottom from the ſtem to the ſtern-poſt.

The moſt elevated of thoſe lines is termed the *load water-line*, which is ſuppoſed to be drawn by the ſurface of the water on the upper part of the bottom, when ſhe is ſufficiently laden for a ſea-voyage. For if we ſuppoſe this ſurface a rule, and thereby deſcribe a correſponding black line along the veſſel's bottom, that line will be diſtinguiſhed upon the bottom, which is white, and repreſent what is called the *load water-line*.

If the ſhip is lightened of any part of her lading, and preſerves the ſame difference in her draught of water at the two ends; or, what is the ſame thing, if ſhe is lightened ſo as to preſerve the ſame equilibrium of the keel with regard to the ſurface of the water, it is evident that ſhe will riſe higher out of the water, ſo that the black line already deſcribed will be elevated above it; and another black line may be delineated upon the bottom, cloſe to the ſurface of the water, which will exhibit a ſecond water-line parallel to the firſt, but nearer the keel in proportion to the number of feet which the ſhip has riſen.

Thus by lightening a ſhip gradually, and at the ſame time preſerving the direction of her keel, or the angle which the keel makes with the ſurface of the water, a variety of water-lines may be drawn parallel to each other and to the load water-line. See a farther illuſtration of theſe lines in the article Water-line.

The ribands are likewiſe of great utility in ſhip-building; they are narrow and flexible planks placed on the bottom at different heights, ſo as to form a ſort of mould for ſtationing the inferior timbers between the principal ones. They differ from the water-lines, inaſmuch as the latter have only one curve, which is horizontal; whereas the ribbands, beſides their horizontal one, have a vertical curve. To convey a juſt idea of theſe curves, which cannot be repreſented on one draught at their full length, without an oblique ſection of the ſhip's length, it will be neceſſary to have recourſe to two planes; that of the elevation, which exhibits their vertical curve; and to the floor-plane, upon which the horizontal curve is expreſſed. See Riband, and Timber.

Theſe different lines are extremely uſeful in exhibiting the various curves of a ſhip's bottom, that as they are gradually diminiſhed, their uniformity or irregularity may be diſcovered by the ſkilful artiſt.

The qualities required in a ſhip ought to determine the figure of the bottom. A ſhip of war, therefore, ſhould be able to ſail ſwiftly, and carry her lower tier of guns ſufficiently out of the water; otherwiſe a ſmall ſhip will have the advantage of a large one, inaſmuch as the latter cannot open her lower battery in a freſh ſide-wind without being expoſed to extreme danger by receiving a great quantity of water in at her ports between decks. A merchant-ſhip ought to contain a large cargo of merchant-goods, and be navigated with few hands: And both ſhould be able to carry ſail firmly; ſteer well; drive little to leeward; and ſuſtain the ſhocks of the ſea without being violently ſtrained.

The firſt thing to be eſtabliſhed in the draught of a ſhip is her length; and as a ſhip of war, according to her rate, is furniſhed with a certain number of cannon, which are placed in battery on her decks, it is neceſſary that a ſufficient diſtance ſhould be left between their ports to work the guns with facility; and particularly to leave ſpace enough between the foremoſt gun and the ſtem, and between the aftmoſt gun and the ſtern-poſt on each ſide, on account of the arching or inward curve of the ſhip toward her extremities.

When the length of a ſhip is determined, it is uſual to fix her breadth by the dimenſions of the midſhip-beam. On this occaſion the ſhipwrights, for the moſt part, are conducted by rules founded on their own obſervation; for having remarked, that ſome veſſels, which by repeated experience have been found to anſwer all the purpoſes of navigation, have a certain breadth in proportion to their length, they have inferred that it would be improper to depart from this proportion: but as other ſhips have been conſtructed

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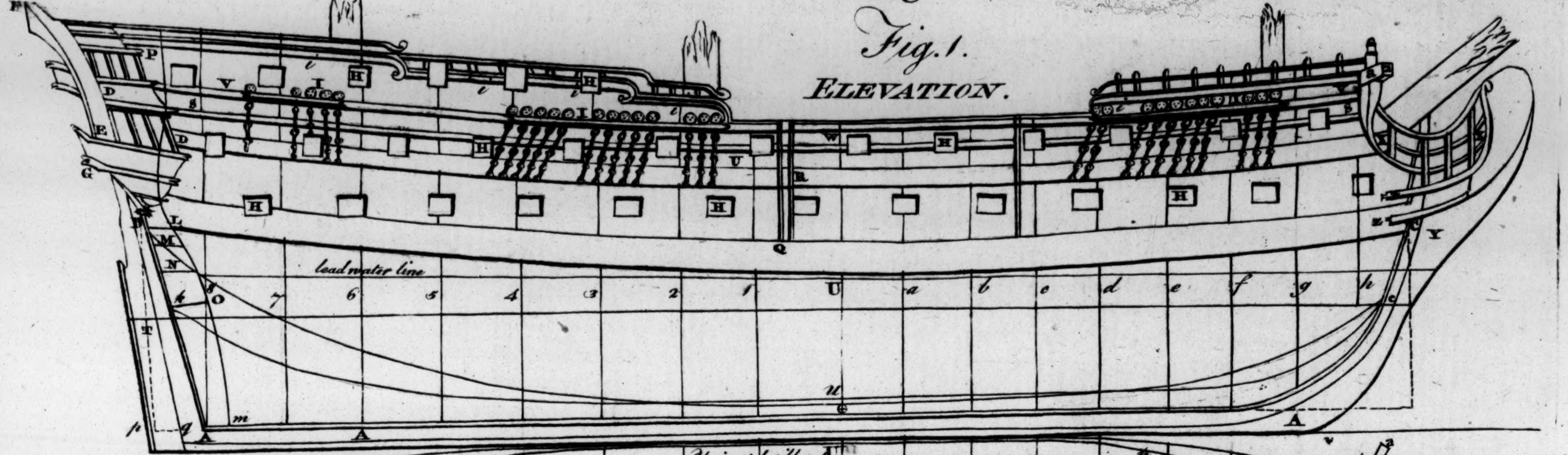
† See Pl. CLIX. fig. 2.

3 MA 53

Fig. 1.

ELEVATION.


lead water line
7
6
5
4
3
2
1
U
a
b
c
d
e
f
g
h
A
Q
Y

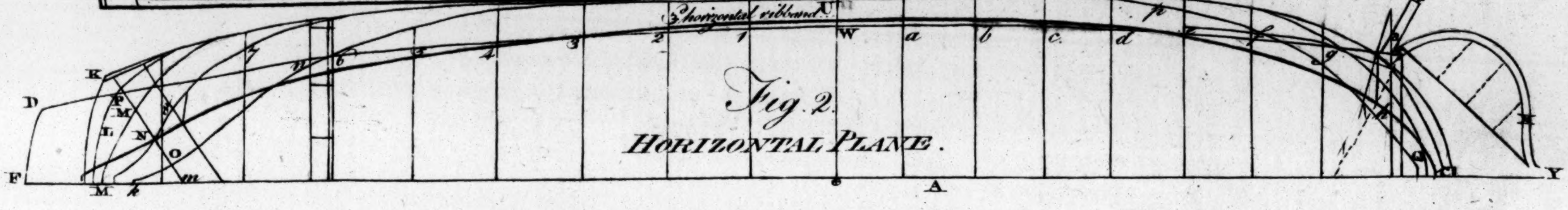

3 horizontal ribband
W
A

Fig. 2.

HORIZONTAL PLANE.

Fig. 3.

PIECES of the HULL.

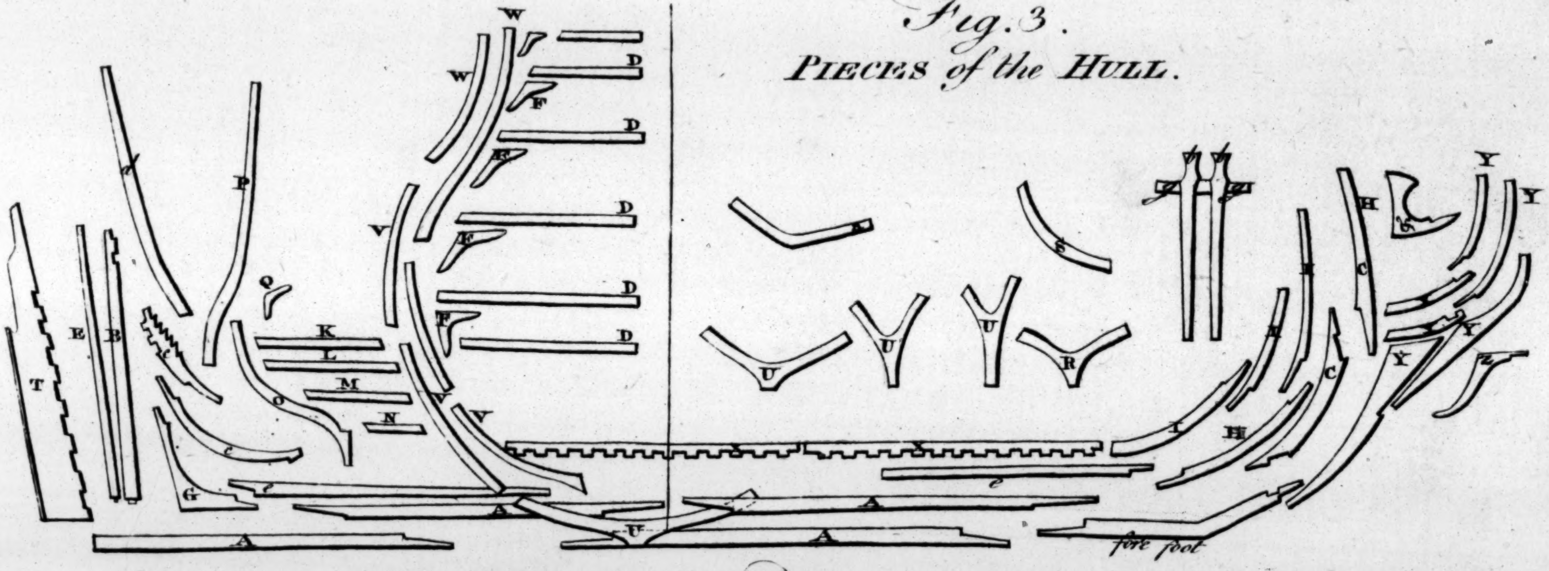
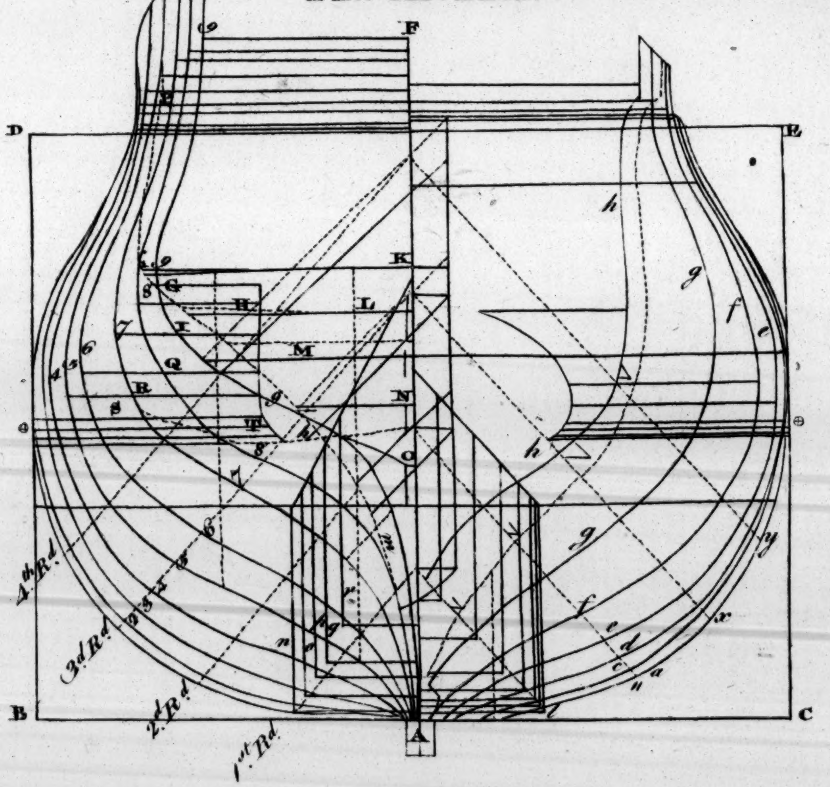


Fig. 4.

PROJECTION.


1st Rd
2d Rd
3d Rd
4th Rd

A. Bell Sculpt.

with different breadths, which were equally perfect, a variety of different general rules have been adopted by theſe artiſts; who are accordingly divided in their opinions about the breadth which ought to be aſſigned to a ſhip relatively with her length, whilſt each one produces reaſons and experience in ſupport of his own ſtandard. Thoſe who would diminiſh the breadth, allege, 1. That a narrow veſſel meets with leſs reſiſtance in paſſing through the water: 2dly, That by increaſing the length ſhe will drive leſs to leeward: 3dly, That, according to this principle, the water-lines will be more conveniently formed to divide the fluid: 4thly, That a long and narrow ſhip will require leſs ſail to advance ſwiftly; that her maſts will be lower, and her rigging lighter; and, by conſequence, the ſeamen leſs fatigued with managing the ſails, &c. Thoſe, on the contrary, who would enlarge the breadth, pretend, 1ſt, That this form is better fitted to preſerve a good battery of guns: 2dly, That there will be more room to work the guns conveniently: 3dly, That, by carrying more ſail, the ſhip will be enabled to run faſter; or, that this quality will at leaſt overbalance the advantage which the others have of more eaſily dividing the fluid: 4thly, That being broader at the load-water line, or place where the ſurface of the water deſcribes a line round the bottom, they will admit of being very narrow on the floor, particularly towards the extremities: And, 5thly, That a broad veſſel will more readily riſe upon the waves than a narrow one. From ſuch oppoſite principles has reſulted that variety of ſtandards adopted by different ſhipwrights.

It has been remarked above, that a ſhip of war muſt carry her lower tier of cannon high enough above the water, otherwiſe a great ſhip which cannot open her lower battery, when ſailing with a freſh ſide-wind, may be taken by a ſmall one that can make uſe of her cannon.

A ſhip ſhould be duly poiſed, ſo as not to dive or pitch heavily, but go ſmooth and eaſy through the water, riſing to the waves when they run high and the ſhip has reduced her ſail to the ſtorm; otherwiſe they will break aboard, and ſtrain the decks or carry away the boats; the maſts are likewiſe in great danger from the ſame cauſe.

A ſhip ſhould ſail well when large and before the wind, but chiefly cloſe-hauled, or with a ſide-wind, and her ſails ſharp-trimmed, and then not fall off to the leeward.

Now, the great difficulty lies in uniting ſo many different qualities in one ſhip; which ſeems to be nearly impoſſible: the whole art, therefore, conſiſts in forming the body in ſuch a manner that none of theſe qualities ſhould be entirely deſtroyed, and in giving a preference to that which is chiefly required in the particular ſervice for which the veſſel is deſigned. We ſhall briefly ſhow the poſſibility of uniting them all in one ſhip, that each of them may be eaſily diſcerned: when it happens otherwiſe, the fault muſt lie in the builder, who has not applied himſelf to ſtudy the fundamental rules and principles of his art.

To make a ſhip carry a good ſail. A flat floor-timber, and ſomewhat long, or the lower futtock pretty round, a ſtraight upper futtock, the top-timber to throw the breadth out aloft; at any rate, to carry her main breadth as high as the lower deck. Now, if the rigging be well adapted to ſuch a body, and the upper works lightened as much as poſſible, ſo that they all concur to lower the centre of gravity, there will be no room to doubt of her carrying a good ſail.

To make a ſhip ſteer well, and anſwer the helm quickly. If the faſhion-pieces be well formed, the tuck, or ſpreading parts under the ſtern, carried pretty high, the midſhip-frame well forward, a conſiderable difference in the draught of water abaft more than before, a great rake forward and none abaft, a ſnug quarter-deck and fore-caſtle; all theſe will make a ſhip ſteer well. A ſhip which ſails well will certainly ſteer well.

To make a ſhip carry her guns well out of the water. A long floor-timber, and not of great riſing; a very full midſhip-frame, and low tuck, with light upper works.

To make a ſhip go ſmoothly through the water without pitching hard. A long keel, a long floor, not to riſe too high afore and abaft; but the area or ſpace continued in the fore-body, according to the reſpective weights they are to carry; all theſe are neceſſary to make a ſhip go ſmoothly through the water.

To make a ſhip keep a good wind, and drive little to the leeward. A good length by the keel; not too broad, but pretty deep in the hold, which will occaſion her to have a ſhort floor-timber and a great riſing. As ſuch a ſhip will meet with great reſiſtance in the water going over the broadſide, and little when going ahead, ſhe will not fall much to the leeward.

Now, ſome builders imagine it is impoſſible to make a ſhip carry her guns well, bear a good ſail, and be a prime ſailer; becauſe it would require a very full bottom to gain the firſt two qualities, whereas a ſharp ſhip will anſwer better for the latter: but when it is conſidered that a full ſhip will carry a great deal more ſail than a ſharp one, a good artiſt may ſo form the body, as to have all theſe three good qualities, and alſo ſteer well.

We ſhall now proceed to deſcribe the principal pieces of which a ſhip is compoſed, and to explain the principal draughts uſed in the conſtruction thereof.

As the ſeveral lines exhibited in the planes of elevation, projection, &c. will be rendered more intelligible by a previous account of thoſe pieces, it may not be improper to begin with reciting their names, and giving a ſummary deſcription of their uſes and ſtations. They are for the moſt part repreſented according to the order of their diſpoſition in that part of Plate CCLXVI. which is termed *pieces of the hull*.

A. The pieces which compoſe the keel, to be ſecurely bolted together, and clinched.

B. The ſtern-poſt, which is tenanted into the keel, and connected to it by a knee, G. It ſupports the rudder, and unites the ſides of the ſhip abaft.

C. The ſtem, which is compoſed of two pieces ſcarfed together: it is an arching piece of timber, into which the ſhip's ſides are united forwards.

D. The beams, which are uſed to ſupport the decks, and confine the ſides to their proper diſtance.

E. The falſe poſt, which ſerves to augment the breadth of the ſtern-poſt, being alſo tenanted into the keel.

F. The knees which connect the beams to the ſides.

Plate CCLXVI. fig. 3.

G. The knee of the ſtern-poſt, which unites it to the keel.

H. The apron, in two pieces: it is fayed on the inſide of the ſtem, to ſupport the ſcarf thereof; for which reaſon the ſcarf of the former muſt be at ſome diſtance from that of the latter.

I. The ſtemſon, in two pieces, to reinforce the ſcarf of the apron.

K. The wing-tranſom: it is fayed acroſs the ſtem-poſt, and bolted ſo the head of it, having its two ends let into the faſhion-pieces.

L. The deck-tranſom, parallel to the wing-tranſom, and ſecured in the ſame manner.

M N. The lower tranſoms.

O. The faſhion-piece on one ſide; the heel of it is connected with the dead-wood, and the head is ſecured to the wing-tranſom.

P. The top-timbers, or upper parts of the faſhion-pieces.

Q. The knees, which faſhion the tranſoms to the ſhip's ſide.

R. The breaſt-hooks, in the hold; they are fayed acroſs the ſtem, to ſtrengthen the fore-part of the ſhip.

S. The breaſt-hooks of the deck: they are placed immediately above the former, and uſed for the ſame purpoſes.

T. The rudder, which is joined to the ſtern-poſt by hinges, and ſerves to direct the ſhip's courſe.

U. The floor-timbers; they are laid acroſs the keel, to which they are firmly bolted.

V. The lower futtocks, and,

W. The top-timbers, which are all united to the floor-timbers, forming a frame that reaches from the keel to the top of the ſide.

X. The pieces which compoſe the kelſon: they are ſcarfed together like the keel-pieces, and placed over the middle of the floor-timbers, upon each of which they are ſcored about an inch and a half, as exhibited by the notches.

Y. The ſeveral pieces of the knee of the head; the lower part of which is fayed to the ſtem; the heel being ſcarfed to the fore-foot.

Z. The cheeks of the head or knees, which connect the head to the bows on each ſide.

&. The ſtandard of the head, which faſtens it to the ſtem.

a. The cat-heads, one of which lies on each bow, projecting outwards like the arm of a crane. They are uſed to draw the anchors up to the top of the ſide without injuring the bow.

b. The bits, to which the cable is faſtened when the ſhip rides at anchor.

c. The falſe poſt, in two pieces, fayed to the fore-part of the ſtern-poſt.

d. The ſide-counter-timbers, which terminate the ſhip abaft within the quarter-gallery.

e e. Two pieces of dead-wood, one afore and another abaft, fayed on the keel.

In veſſels of war, the general dimenſions are eſtabliſhed by authority of officers appointed by the government to ſuperintend the building of ſhips. In the merchant-ſervice, the extreme breadth, length of the keel, depth in the hold, height between decks and in the waſte, are agreed on by contract; and from theſe dimenſions the ſhipwright is to form a draught ſuitable to the trade for which the ſhip is deſigned.

Plate CCLXVI. fig. 3.

In projecting the draught of a veſſel of war, the firſt article to be conſidered is her length. As all ſhips are much longer above then below, it is alſo neceſſary to diſtinguiſh the preciſe part of her height from which her length is taken: this is uſually the lower gun-deck, or the load water-line. It has been already obſerved, that water-lines are deſcribed longitudinally on a ſhip's bottom by the ſurface of the water in which ſhe floats, and that the line which determines her depth under the water is uſually termed the load water-line. In this draught it will be particularly neceſſary to leave ſufficient diſtance between the ports.

The next object is to eſtabliſh the breadth by the midſhip-beam. Although there is great difference of opinion about proportioning the breadth to the length, yet it is moſt uſual to conform to the dimenſions of ſhips of the ſame rate. After the dimenſions of the breadth and length are determined, the depth of the hold muſt be fixed, which is generally half the breadth: but the form of the body ſhould be conſidered on this occaſion; for a flat floor will require leſs depth in the hold than a ſharp one. The diſtance between the decks muſt alſo be ſettled.

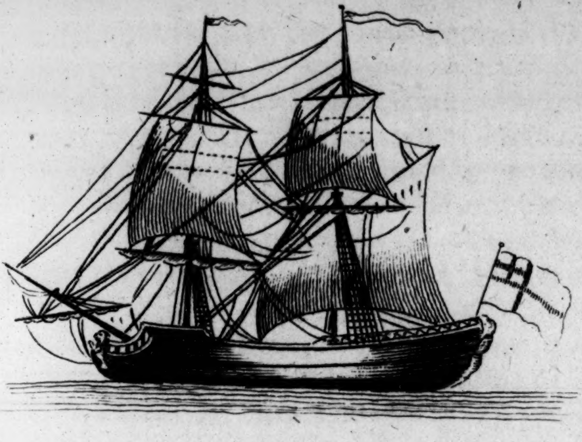
We may then proceed to fix the length of the keel, by which we ſhall be enabled to judge of the rake of the ſtem and ſtern-poſt. The rake is known to be the projection of the ſhip at the height of the ſtem and ſtern-poſt beyond the ends of the keel afore and abaft, or the angle by which the length is increaſed as the fabric riſes. To theſe we may alſo add the height of the ſtem and wing-tranſom.

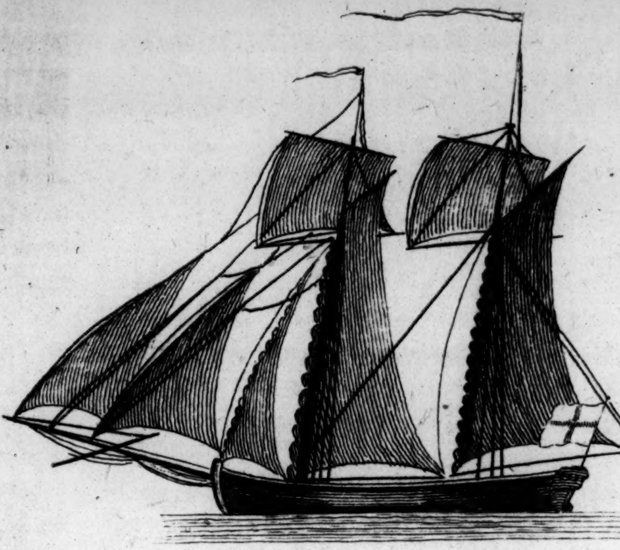
After theſe dimenſions are ſettled, the timbers may be conſidered which form the ſides of the ſhip. A frame of timbers, which appears to be one continued piece, is compoſed of one floor-timber, U, whoſe arms branch outward to both ſides of the ſhip; two or three futtocks, V V; and a top-timber, W. The futtocks are connected to the upper arms of the floor-timbers on each ſide of the ſhip, and ſerve to prolong the timber in a vertical direction: and the top-timbers are placed at the upper part of the futtocks for the ſame purpoſe. All theſe being united, and ſecured by croſs-bars, form a circular incloſure, which is called a frame of timbers. And as a ſhip is much broader at the middle than at the extremities, the arms of the floor-timber will form a very obtuſe angle at the extreme breadth: but this angle decreaſes in proportion to the diſtance of the timbers from the midſhip-frame, ſo that the foremoſt and aftmoſt ones will form a very acute angle. Floor-timbers of the latter ſort are uſually called *crutches*.

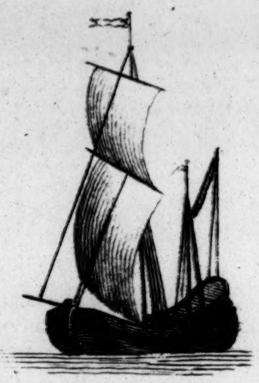
Shipwrights differ extremely in determining the ſtation of the midſhip-frame; ſome placing it at the middle of the ſhip's length, and others further forward. They who place it before the middle allege, that if a ſhip is full forwards, ſhe will meet with no reſiſtance after ſhe has opened a column of water; and that the water ſo diſplaced will eaſily unite abaft, and by that means force the ſhip forward; beſides having more power on the rudder, in proportion to its diſtance from the centre of gravity: this alſo comes nearer the

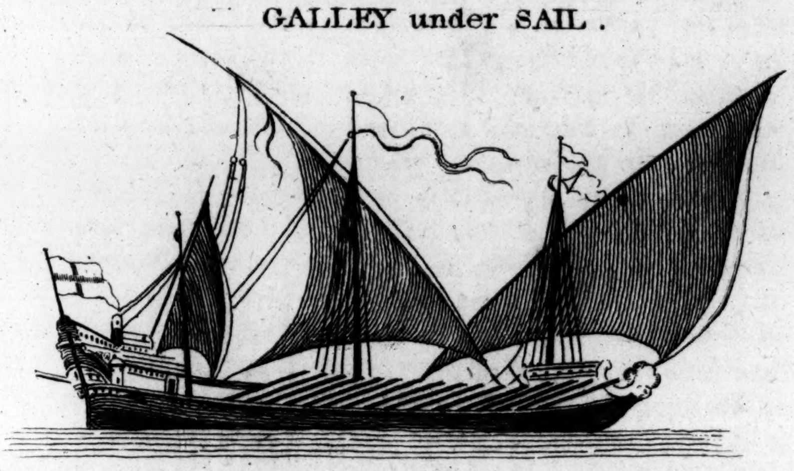
form

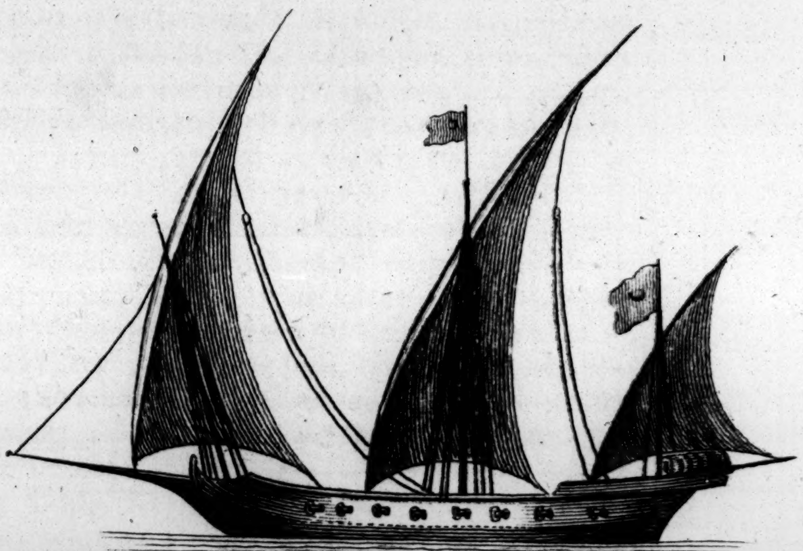
Plate CCLXV.

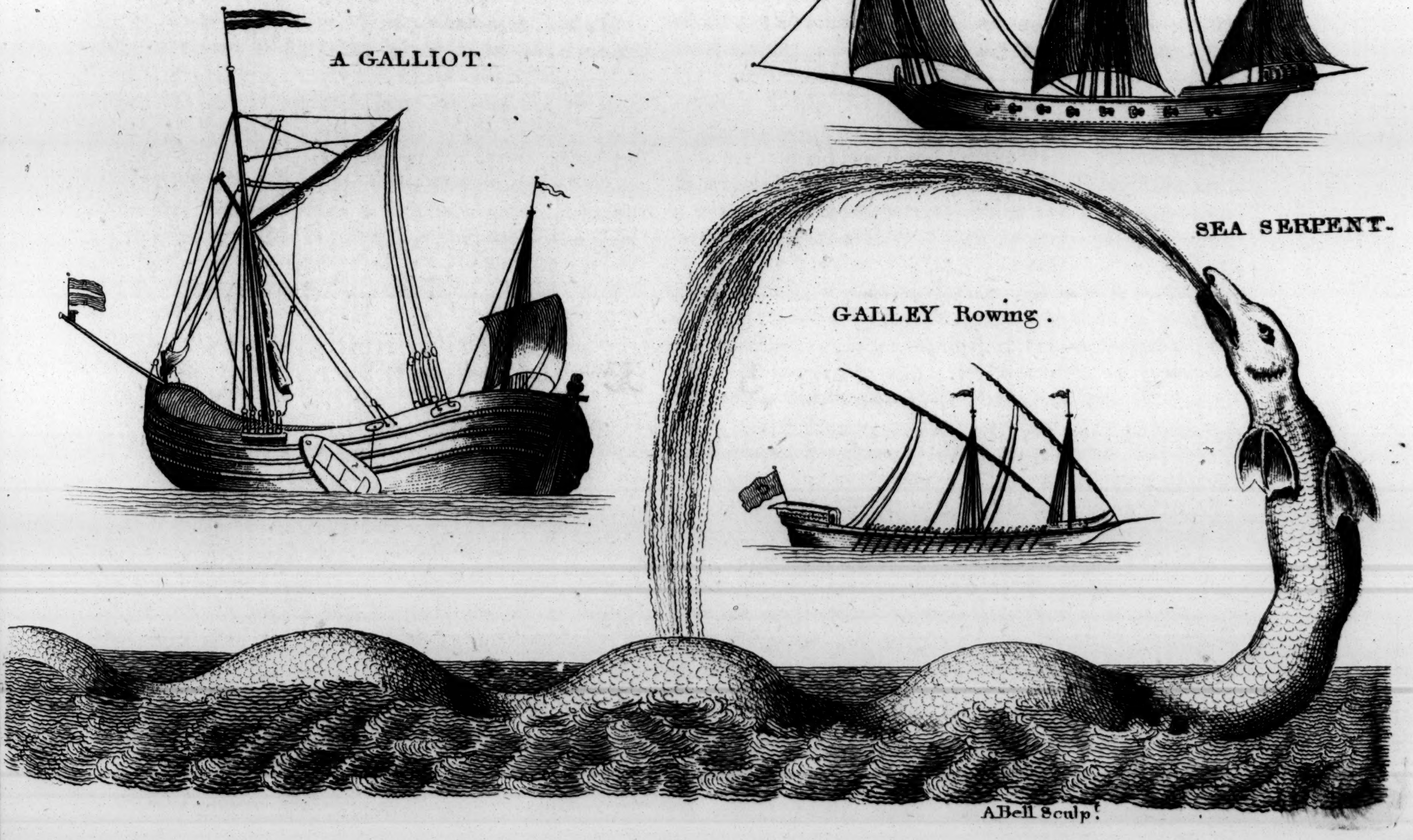

A BILANDER.


A SCHOONER.


A DOGGER.


GALLEY under SAIL.


A ZEBEC.


A GALLIOT.

SEA SERPENT.

GALLEY Rowing.

A Bell Sculpt.

3 MA 53

Plate CCLXVI.

form of fiſhes, which ſhould ſeem the moſt advantageous for dividing the fluid.

When the riſing of the midſhip-floor-timber is decided, we may then proceed to deſcribe the riſing-line of the floor, on the ſtern-poſt abaft, and on the ſtem afore.

The height of the lower-deck is the next thing to be conſidered: it is determined in the middle by the depth of the hold; and ſome builders make it no higher than the ſtem; but they raiſe it abaft as much above its height in the middle as the load water-mark, or draught of water abaft, exceeds that afore. With regard to the height between decks, it is altogether arbitrary, and muſt be determined by the rate of the ſhip and the ſervice ſhe is deſigned for.

It is alſo neceſſary to remember the ſheer of the wales, and to give them a proper hanging; becauſe the beauty and ſtatelineſs of a ſhip greatly depend upon their figure and curve, which, if properly drawn, will make her appear airy and graceful on the water.

We come now to conſider the upper works, and all that is above water, called the *dead-work:* and here the ſhip muſt be narrower, ſo that all the weight lying above the load water-line will thereby be brought nearer the middle of the breadth, and of courſe the ſhip will be leſs ſtrained by the working of her guns, &c. But although ſome advantages are acquired by diminiſhing the breadth, above water, we muſt be careful not to narrow her too much; as there muſt be ſufficient room left on the upper deck for the guns to recoil. The ſecurity of the maſts ſhould likewiſe be remembered, which requires ſufficient breadth to ſpread the ſhrouds. A deficiency of this ſort may indeed be in ſome meaſure ſupplied by enlarging the breadth of the channels.

We come to explain the ſheer-draught, or plane of Elevation of a ſixty-gun ſhip; wherein we have been attentive to make the ſame letters refer to the ſame objects, as in the explanation of the Pieces, as above; at leaſt when the ſame objects are in both figures.

Fig. 1. A A. Is the keel, whoſe upper edge is prolonged by the dotted line *pq*, upon the extremities of which are erected perpendiculars which determine the height of the wing-tranſom K, and the length of the gun-deck K C.

A B. The ſtern-poſt.

A C. The ſtem.

D D. The quarter-gallery, with its windows.

E F. The quarter-pieces, which limit the ſtern on each ſide.

F. The taffarel, or upper piece of the ſtern.

F G. Profile of the ſtern, with its galleries.

H. The gun-ports.

I. The channels, with their dead-eyes and chain-plates.

K. The wing-tranſom.

K G. The counter.

L B. The deck-tranſom.

M N O. The firſt, ſecond, and third tranſoms, of which O *k* is the third or loweſt.

m O L P. The direction of the faſhion-piece, having its breadth canted aft towards the ſtern.

Q R. The main ſkeeds, for hoiſting in the boats clear of the ſhip's ſide.

L Q Z. The main-wale, with its ſheer afore and abaft. Plate CCLXVI.

D R X. The channel-wales, parallel to the main-wale.

S U S. The ſheer-rail, parallel to the wales.

T *t*. The rudder.

A t F. The rake of the ſtern.

V W V. The waiſt-rail.

P *i i*. The drift-rails abaft; and *i a*, the drift-rails forward.

T U C. The water-line.

X X. The rails of the head.

Y. The knee of the head, or cutwater.

Z Z. The cheeks of the head.

a a. The cat-head.

M ⊕ C. The riſing line of the floor.

k u C. The cutting-down line, which limits the thickneſs of all the floor-timbers, and likewiſe the height of the dead-wood afore and abaft.

⊕ *u* U W. The midſhip-frame.

a, b, c, d, e, f, g, h. The frames or timbers in the fore-body of the ſhip, *i. e.* before the midſhip frame.

1, 2, 3, 4, 5, 6, 7, 8, 9. The timbers in the after-body, or which are erected abaft the midſhip-frame.

As the eye of a ſpectator is ſuppoſed in this projection to view the ſhip's ſide in a line perpendicular to the plane of elevation, it is evident that the convexity will vaniſh, like that of a cylinder or globe, when viewed at a conſiderable diſtance; and that the frames will conſequently be repreſented by ſtraight lines, except the faſhion-piece abaft and the knuckle-timber forward.

It has been already obſerved, that the plane of projection may be defined a vertical delineation of the curves of the timbers upon the plane of the midſhip-frame, which is perpendicular to that of the elevation. It is neceſſary to obſerve here, that the various methods by which theſe curves are deſcribed, are equally mechanical and arbitrary. In the latter ſenſe, they are calculated to make a ſhip fuller or narrower, according to the ſervice for which ſhe is deſigned; and in the former they are drawn according to thoſe rules which the artiſt has been implicitly taught to follow, or which his fancy or judgment has eſteemed the moſt accurate and convenient. They are generally compoſed of ſeveral arches of a circle, reconciled together by moulds framed for that purpoſe. The radii of thoſe arches, therefore, are of different lengths, according to the breadth of the ſhip in the place where ſuch arches are ſwept; and they are expreſſed on the plane of projection either by horizontal or perpendicular lines: the radii of the breadth-ſweeps being always in the former, and the radii of the floor-ſweeps in the latter direction. Theſe two arches are joined by a third, which coincides with both, without interſecting either. The curve of the top-timber is either formed by a mould which correſponds to the arch of the breadth-ſweep, or by another ſweep whoſe centre and radius are without the plane of projection. The breadth of the ſhip, at every top-timber, is limited by an horizontal line drawn on the floor-plane, called the *half-breadth of the top-timbers.* The extreme breadth is alſo determined by another horizontal line on the floor-plane; and the lines of half-breadth are thus mutually tranſferable, from the projection and floor-planes, to each other.

Plate CCLXVI. The neceſſary data by which the curves of the timbers are delineated, then, are the perpendicular height from the keel; the main, or principal breadth; and the top-timber breadth: for as a ſhip is much broader near the middle of her length than towards the end, ſo ſhe is broader in the middle of her height than above and below; and this latter difference of breadth is continued throughout every point of her length. The main breadth of each frame of timbers is therefore the ſhip's breadth nearly in the middle of her height in that part: and the top-timber breadth is the line of her breadth near the upper ends of each timber. It has been already obſerved, that as both ſides of a ſhip are alike, the artificers only draw one ſide, from which both ſides of the ſhip are built: therefore the timbers abaft the midſhip-frame are exhibited on one ſide of the plane of projection, and the timbers before it on the other.

Plane of PROJECTION.

Fig. 4. A, The keel.

BC, The line which expreſſes the upper edge of the keel, from which the height of each timber and height of its different breadths are meaſured.

B D, and C E, Perpendiculars raiſed on the line BC, to limit the ſhip's extreme breadth and height amid-ſhips; or, in other words, to limit the breadth and height of the midſhip-frame.

A F, A perpendicular erected from the middle of the keel to biſect the line of the ſhip's breadth in two equal parts.

F ✶ 9, The half-breadth line of the aftmoſt top-timber; being the uppermoſt horizontal line in this figure.

Note, The ſeven lines parallel to and immediately under this, on the right-ſide of the line A F, are all top-timber half-breadths, abaft the midſhip-frame; the loweſt of which coincides with the horizontal line D E.

The parallel horizontal lines nearly oppoſite to theſe, on the left ſide of the line A F, repreſent the top-timber half-breadths in the fore-body, or the half-breadths of the top-timbers before the midſhip-frame.

G, H, I, Q, R, S, T, The radii of the breadth-ſweeps abaft the midſhip-frame; thoſe of the breadth-ſweeps in the fore-body, or before the midſhip-frame are directly oppoſite on the right ſide.

⊕ A , The midſhip-frame, from the extreme breadth downwards.

1, 2, 3, 4, 5, 6, 7, 8, 9, The outlines of the timbers abaft the midſhip-frame, in different parts of their height.

a, b, c, d, e, f, g, h, The outlines of the timbers before the midſhip-frame, in different parts of their height, *h* being the foremoſt or knuckle timber.

K *i*, the wing-tranſom, whoſe ends reſt upon the faſhion-piece.

L, The deck-tranſom, parallel to and under the wing-tranſom.

M N O, The lower-tranſoms, of which O *k* is the third and loweſt.

m k P, The dotted line, which expreſſes the figure of the faſhion-piece, without being canted aft.

P, The upper-part, or top-timber of the faſhion-piece.

n, o, p, q, r, ſ, The radii of the floor-ſweeps, abaft the midſhip-frame: thoſe before the midſhip-frame are on the oppoſite ſide of the line AF, to which they are all parallel. Plate CCLXVI.

1ſt R^d, 2d R^d, 3d R^d, 4th R^d, The diagonal ribands abaft the midſhips *t, u, x, y.* The ſame ribands expreſſed in the fore-body.

It has been remarked above, that the horizontal plane is compoſed of water-lines and ribands; it alſo contains the main and top-timber-breadth lines, or the longitudinal lines by which the main-breadth and top-timber-breadth are limited in every point of the ſhip's length. The horizontal curve of the tranſoms and harpins are alſo repreſented therein; together with the planes of the principal timbers, the cant of the faſhion-piece, the length of the rake afore and abaft, the projection of the cat-heads, and the curve of the upper rail of the head, to which the curves of the lower ones are uſually parallel.

HORIZONTAL PLANE.

B A C, The line of the ſhip's length, paſſing thro' the middle of the ſtem and ſtern-poſt. Fig. 2.

B, The upper-end of the ſtern-poſt.

C, The upper-end of the ſtem.

B F, The length of the rake abaſt.

D W X, The top-timber-breadth line, or the line which limits the breadth of each top-timber.

D F, The breadth of the aftmoſt timber at the taffarel.

B K, The wing-tranſom.

B L P, The horizontal curve of the deck-tranſom.

M M, The horizontal curve, or round aft, of the firſt tranſom.

M N, The horizontal curve of the ſecond tranſom: it is prolonged into a water-line, N 8 7.

k O, The horizontal curve of the third tranſom, which is alſo prolonged into another water-line, O, *n*, U, *p*, Q.

m O P, The plane of the faſhion-piece, as canted aft.

⊕ W U, The plane of the midſhip-frame.

a, b, c, d, e, f, h, The planes of the timbers before the midſhip-frame.

1, 2, 3, 4, 5, 6, 7, 8, 9, The planes of the timbers abaft the midſhip-frame.

X X, The figure of the upper-rail of the head.

C Y, The projection of the knee of the head.

The third horizontal riband is marked on the plate.

a a, The projection of the cat-head.

Thus we have endeavoured briefly to explain the nature and uſes of the principal draughts uſed in the conſtruction of a ſhip, which reciprocally correſpond with each other in the dimenſions of length, breadth, and depth. Thus the plane of elevation is exactly of the ſame length with the horizontal or floor-plane. The ſeveral breadths of the timbers in the floor-plane, and that of the projection, are mutually transferable; and the real height of the timbers in the projection exactly conforms to their height in the elevation. Thus let it be required to transfer the height of the wing-tranſom from the elevation to the projection:

Extend the compaſſes from the point K, in the elevation, down to the dotted line prolonged from the upper-edge of the keel, and ſetting the other foot in the point *p*, then ſhall the line K *p* be the perpendicular

Plate CCLXVI.

cular height in the wing-tranſom: tranſfer this from the middle of the line B A C, in the projection, to the point K in the perpendicular A F, then will A K be the height of the wing-tranſom in the plane of projection: and thus the height of all the tranſoms may be laid from the former upon the latter.

Again: Let it be required to tranſfer the main-breadth of the midſhip-frame from the projection to the horizontal plane: Set one foot of the compaſſes in the point ⊕ on the perpendicular C E, and extend the other along the main-breadth-ſweep ⊕ G, till it touches the perpendicular A F parallel to C E: lay this diſtance upon the horizontal plane from the point *u* in the line of the ſhip's length, B A C, along the plane of the midſhip-frame to the point ⊕; ſo ſhall the line W U be the breadth of the midſhip-frame on the horizontal plane.

Thus alſo the top-timber-breadth, or the diſtance of each top-timber from the middle of the ſhip's breadth, may be in the ſame manner tranſferred, by extending the compaſſes from the line B A C, in the horizontal plane, to the top-timber-breadth line, upon any particular timber, as 1, 2, 3, &c. which will give its proper dimenſions thereon.

Plate CCLXVI.

In the ſame manner the breadths of all the timbers may be laid from the projection to the horizontal plane, and, *vice verſa*, from that to the projection. Thus the height of each timber may alſo be tranſferred from the elevation to the projection, &c.

The principal utility of theſe draughts, therefore, is to exhibit the various curves of the ſhip's body, and of the pieces of which it is framed, in different points of view, which are either tranſverſe or longitudinal, and will accordingly preſent them in very different directions. Thus the horizontal curves of the tranſoms and water-lines are repreſented on the floor-plane, all of which are nearly ſtraight lines in the elevation and projection; and thus the vertical curves of the timbers are all exhibited on the projection, although they appear as ſtraight lines in the elevation and floor-plane.

PART II. OF CONSTRUCTING SHIPS.

THE pieces by which this complicated machine, a ſhip, is framed, are joined together in various places, by *ſcarfing*, *rabitting*, *tenanting*, and *ſcoring*. See thoſe articles.

During the conſtruction of a ſhip, ſhe is ſupported in the dock, or upon a wharf, by a number of ſolid blocks of timber placed at equal diſtances from and parallel to each other, as may be ſeen in the article LANCHING; ſhe is then ſaid to be on the ſtocks.

The firſt piece of timber laid upon the blocks is generally the keel: we ſay *generally*, becauſe, of late, a different method has been adopted in ſome of the royal dock-yards, by beginning with the floor-timbers; the artiſts having found that the keel is often apt to rot during the long period of building a large ſhip of war. The pieces of the keel are ſcarfed together, and bolted, forming one entire piece, A A, which conſtitutes the length of the veſſel below. At one extremity of the keel is erected the ſtem. It is a ſtrong piece of timber incurvated nearly into a circular arch, or, according to the technical term, *compaſſing*, ſo as to project outwards at the upper-end, forming what is called the *rake forward*. In ſmall veſſels this is framed of one piece; but in large ſhips it is compoſed of ſeveral pieces ſcarfed and bolted together, as expreſſed in the explanation of fig. 3. and in thoſe terms ſeparately. At the other extremity of the keel is elevated the ſtern-poſt, which is always of one entire ſtraight piece. The heel of it is let into a mortiſe in the keel, and having its upper end to hang outwards, making an obtuſe angle with the keel, like that of the ſtem: this projection is called the *rake abaſt*. The ſtern-poſt, which ought to ſupport the ſtern, contains the iron-work, or hinges of the rudder, which are called *googings*, and unites the lower-part of the ſhip's ſides abaft. See the connection of thoſe pieces in the *Elevation*, fig. 1.

Towards the upper-end of the ſtern-poſt, and at right angles with its length, is fixed the middle of the wing-tranſom, where it is firmly bolted. Under this is placed another piece parallel thereto, and called the *deck-tranſom*, upon which the after-end of the lower-deck is ſupported. Parallel to the deck-tranſom, and at a proper diſtance under it, another piece is fixed to the ſtern poſt, called the *firſt tranſom*; all of which ſerve to connect the ſtern-poſt to the faſhion-pieces. Two more tranſoms, called the *ſecond* and *third*, are alſo placed under theſe, being likewiſe attached to the faſhion-pieces, into which the extremities of all the tranſoms are let. The faſhion-pieces are formed like the other timbers of the ſhip, and have their heels reſting on the upper-part of the kelſon, at the after-extremity of the floor-ribands.

All theſe pieces, viz. the tranſoms, the faſhion-pieces, and their top-timbers, being ſtrongly united into one frame, are elevated upon the ſtern-poſt; and the whole forms the ſtructure of the ſtern, upon which the galleries and windows, with their ornaments, are afterwards built.

The ſtem and ſtern-poſt being thus elevated upon the keel, to which they are ſecurely connected by knees and arched pieces of timber bolted to both; and the keel being raiſed at its two extremities by pieces of dead-wood, the midſhip floor-timber is placed acroſs the keel, whereto it is bolted through the middle. The floor-timbers before and abaft the midſhip-frame are then ſtationed in their proper places upon the keel; after which the kelſon, which, like the keel, is compoſed of ſeveral pieces ſcarfed together, is fixed acroſs the middle of the floor-timbers, to which it is attached by bolts driven through the keel, and clinched on the upper-part of the kelſon. The futtocks are then raiſed upon the floor-timbers, and the hawſe-pieces erected upon the cant-timbers in the fore-part of the ſhip. The top-timbers on each ſide are next attached to the head of the futtocks, as already explained in Part I. The frames of the principal timbers being thus completed, are ſupported by ribands. See RIBANDS.

The ribs of the ſhip being now ſtationed, they proceed to fix on the planks, of which the wales are the principal, being much thicker and ſtronger than the reſt; as is repreſented in the Midship-*Frame*. The harpins, which may be conſidered as a continuation of the wales at their fore-ends, are fixed acroſs the hawſe-pieces, and ſurround the fore-part of the ſhip. The planks that incloſe the ſhip's ſides are then brought about the timbers; and the clamps, which are of equal thickneſs with the wales, fixed oppoſite to the wales within the ſhip: theſe are uſed to ſupport the ends of the beams, and accordingly ſtretch from one end of the ſhip to the other. The thick-ſtuff, or ſtrong planks of the bottom within-board, are then placed oppoſite to the ſeveral ſcarfs of the timbers, to reinforce them throughout the ſhip's length. The planks employed to line the ſhip, called the *ceiling*, or *foot-waling*, is next fixed in the intervals between the thick-ſtuff of the hold. The beams are afterwards laid acroſs the ſhip to ſupport the decks, and are connected to the ſide by lodging and hanging knees; the former of which are exhibited in their proper ſtations in Plate LXXXVIII. F. and the hanging ones, together with the breadth, thickneſs, and poſition of the keel, floor-timbers, futtocks, top-timbers, wales, clamps, thick-ſtuff, planks within and without, beams, decks, &c. are ſeen in the Midship-*Frame*.

The cable-bits being next erected, the *carlings* (a), and *ledges* (b), which are repreſented in Pl. LXXXVIII. are diſpoſed between the beams to ſtrengthen the deck. The water-ways are then laid on the ends of the beams throughout the ſhip's length, and the ſpirketting fixed cloſe above them. The upper-deck is then planked, and the ſtring placed under the gunnel or planſheer in the waiſt. The diſpoſition of thoſe latter pieces on the timbers, viz. the water-ways, ſpirketting, upper-deck, ſtring, and gunnel, are alſo repreſented in the Midship-*Frame*.

They proceed next to plank the quarter-deck and forecaſtle, and to fix the partners of the maſts and capſterns with the coamings of the hatches. The breaſt-hooks are then bolted acroſs the ſtem and bow within-board; the ſtep of the fore-maſt placed on the kelſon; and the riders, exhibited in the Midship-*Frame*, fayed on the inſide of the timbers to reinforce the ſides in different places of the ſhip's length. The pointers, if any, are afterwards fixed acroſs the hold diagonally to ſupport the beams; and the crotches ſtationed in the after-hold to unite the half-timbers. The ſteps of the main-maſt and capſterns are next placed; the planks of the lower-decks and orlop laid; the navel-hoods fayed on the hawſe-holes; and the knee of the head, or cutwater, connected to the ſtem. The figure of the head is then erected, and the trail-board and cheeks are fixed on the ſides of the knee.

The taffarel and quarter-pieces, which terminate the ſhip abaft, the former above and the latter on each ſide, are then diſpoſed; and the ſtern and quarter galleries framed and ſupported by their brackets. The pumps, with their well, are next fixed in the hold; the limber-boards laid on each ſide of the kelſon; and the garboard ſtrake fixed on the ſhip's bottom next to the keel without.

The hull being thus fabricated, they proceed to ſeparate the apartments by bulk-heads, or partitions; to frame the port-lids; to fix the cat-heads and cheſs-trees; to form the hatchways and ſcuttles, and fit them with proper covers or gratings. They next fix the ladders whereby to mount or deſcend the different hatchways; and build the manger on the lower-deck, to carry off the water that runs in at the hawſe-holes when the ſhip rides at anchor in a ſea. The bread-room and magazines are then lined; and the gunnel, rails, and gangways, fixed on the upper part of the ſhip. The cleats, kevels, and ranges, by which the ropes are faſtened, are afterwards bolted or nailed to the ſides in different places.

The rudder, being fitted with its irons, is next hung to the ſtern-poſt; and the tiller, or bar, by which it is managed, let into a mortiſe at its upper-end. The ſcuppers, or leaden tubes, that carry the water off from the decks, are then placed in holes cut through the ſhip's ſides; and the ſtandards, repreſented in the Midship-*Frame*, bolted to the beams and ſides above the decks to which they belong. The poop-lanthorns are laſt fixed upon their cranes over the ſtern; and the bilge-ways, or cradles, placed under the bottom, to conduct the ſhip ſteadily into the water whilſt lanching.

As the various pieces which have been mentioned above, are explained at large in their proper places, it would have been ſuperfluous to have entered into a more particular deſcription of them here.

Ship-money.

Ship-*Money*, was an impoſition charged upon the ports, towns, cities, boroughs, and counties of this realm, in the reign of king Charles I. by writs, commonly called *ſhip-writs*, under the great ſeal of England, in the years 1635 and 1636, for the providing and furniſhing certain ſhips for the king's ſervice, &c. which was declared to be contrary to the laws and ſtatutes of this realm, the *petition of right* and liberty of the ſubject, by ſtat. 17 Car. I. c. 14. See *Blackſt. Comment.* Vol. IV. p. 30.

Ship-*Shape*, according to the faſhion of a ſhip, or in the manner of an expert ſailor; as, The maſt is not rigged ſhip-ſhape; Trim your ſails ſhip-ſhape.

Shipping.

SHIPPING, a multitude of veſſels. Thus we ſay, The harbour is crowded with ſhipping.

Defending Ships *from Lightning*. This is effected either by a continued conductor or chain, fixed to the top of the higheſt maſt, and brought from thence into the ſea. For the greater ſecurity, a chain or conductor may be affixed to each maſt. See the articles Electricity and Lightning.

Of late it has been obſerved, that a coating of lamp-black and tar is an effectual ſecurity againſt any ſtroke of lightning. But this acts not in the way of a conductor,

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(a) Theſe are ſhort pieces of timber ranging fore and aft, from one of the deck-beams to another, into which their ends are ſcored: they are uſed to ſuſtain and fortify the ſmaller beams of the ſhip.

(b) Theſe are certain ſmall pieces of timber placed athwart-ſhips, under the decks of a ſhip, in the interval between the beams; as exhibited in the repreſentation of the deck, Plate LXXXVIII.

ductor, but as a repellent; being ſuch a ſtrong negative electric, that lightning itſelf ſeems unable to pierce it. However, though this would effectually protect the maſts, it might otherwiſe be very dangerous, as the electric matter repelled from the maſt might dart down upon the deck, and be productive of incredible miſchief. The conductors or chains are therefore preferable, and ſhould always be conveyed into the ſea by the ſhorteſt way poſſible.

SHIRE, a Saxon word ſignifying a diviſion: but a county, *comitatus*, is plainly derived from *comes*, the "count of the Franks;" that is, the earl, or alderman (as the Saxons called him) of the ſhire, to whom the government of it was intruſted. This he uſually exerciſed by his deputy, ſtill called in Latin *vice-comes*, and in Engliſh the *ſheriff*, *ſhrieve*, or *ſhire-reeve*, ſignifying the "officer of the ſhire;" upon whom, by proceſs of time, the civil adminiſtration of it is now totally devolved. In ſome counties there is an intermediate diviſion between the ſhire and the hundred; as lathes in Kent, and rapes in Suſſex, each of them containing about three or four hundreds a-piece. Theſe had formerly their lathe-reeves and rape-reeves, acting in ſubordination to the ſhire-reeve. Where a county is divided into three of theſe intermediate juriſdictions, they are called *trithings*, which were anciently governed by a trithing-reeve. Theſe trithings ſtill ſubſiſt in the large county of York, where, by an eaſy corruption, they are denominated *ridings;* the north, the eaſt; and the weſt riding.

SHIRLEY (James), an eminent Engliſh poet in the 17th century, was born at London about the year 1594. He was educated at Merchant-taylor's ſchool, and thence removed to Oxford. Some time after he went to Cambridge, where, entering into holy orders, he took cure at or near St Albans. In the mean time, growing unſettled in his principles, he changed his religion for that of Rome, left his living, and taught a grammar-ſchool in St Albans. But this employment becoming uneaſy to him, he retired to London, lived in Gray's Inn, and became a writer of plays. By this he gained not only a livelihood, but alſo great reſpect and encouragement from perſons of quality; eſpecially from the queen, wife to king Charles I. who made him her ſervant. When the rebellion broke out, he was obliged to leave London with his family, (for he had a wife and children); and being invited by his patron, William, earl, afterwards duke, of Newcaſtle, to follow his fortune in the civil wars, he attended his lordſhip. On the decline of the king's cauſe he retired to London; where, among others of his friends, he found Mr Stanley, author of the Lives of the Philoſophers, who ſupported him for the preſent. The acting of plays being prohibited, he returned to his old occupation of teaching ſchool; which he did at White-Friars. At the Reſtoration, ſeveral of his plays were acted with applauſe. In 1666 he was forced, by the great fire, from his houſe near Fleet-ſtreet, into St Giles's in the Fields; where both he and his wife, being exceedingly afflicted by the loſs and terror which the fire had occaſioned, died within the ſpace of 24 hours. He was by many conſidered as one of the moſt noted dramatic poets of his time; and ſome thought him even equal to Fletcher. Beſides his plays, which are 38 in number, he wrote a volume of poems, and ſome tracts on grammar.

SHIRT, a looſe garment, commonly of linen, worn next the body.—Some diſpute about changing the linen when a perſon is ſick. Clean linen promotes perſpiration, and it may be renewed as often as the patient pleaſes, whether the diſorder be of the acute or the chronical kind. Except during a criſis in fevers, whilſt the patient is in a ſweat, a change of linen, if well dried and warmed, may be daily uſed.

SHIVERS, in the ſea-language, names given to the little rollers, or round wheels of pulleys.

SHOAD, among miners, denotes a train of metalline ſtones, ſerving to direct them in the diſcovery of mines.

SHOAL, in the ſea-language, denotes a place where the water is ſhallow.

SHOCK, in electricity. The effect of the exploſion of a charged body, that is, the diſcharge of its electricity on any other body, is called the *electric ſhock*.

SHOE, a covering for the foot, uſually of leather.

Its ſtructure, though the object of a particular art, is too popular to need explaining. See CORDWAINER.

Its hiſtory is more obſcure. Bened. Baudoin, a ſhoemaker by profeſſion, has a learned treatiſe of the ancient ſhoe, *De ſolea veterum;* where the origin, matter, form, &c. thereof, are particularly inquired into.—Baudoin maintains, that God, in giving Adam ſkins of beaſts to clothe him, did not leave him to go barefooted, but gave him ſhoes of the ſame matter. That after raw ſkins, men came to make their ſhoes of ruſhes, broom, paper, flax, ſilk, wood, iron, ſilver, and gold: ſo different has their matter been.—Nor was their form more ſtable, with regard either to the ſhape, colour, or ornaments: they have been ſquare, high, low, long, and quite even, cut, carved, &c.

Pliny, *lib.* vii. *c.* 56. tells us, that one Tychius of Bœotia was the firſt who uſed ſhoes.—M. Nilant, in his remarks upon Baudoin, obſerves, that he quotes Xenophon in vain, to ſhow that even in his time they ſtill wore ſhoes of raw ſkins. Xenophon relates, that the 10,000 Greeks who had followed the young Cyrus, wanting ſhoes in their retreat, were forced to cover their feet with raw ſkins, which occaſioned them great inconveniences. Nilant will not even allow that the ſhoes of the country-people, called *carbatinæ* and *peroneæ*, were of crude ſkin, without any preparation.

The patricians among the Romans wore an ivory creſcent on their ſhoes. Heliogabalus had his ſhoes covered over with a very white linen; in conformity to the prieſts of the ſun, for whom he profeſſed a very high veneration: this kind of ſhoe was called ȣδος, *udo*, or *odo*. Caligula wore ſhoes enriched with precious ſtones. The Indians, like the Egyptians, wore ſhoes made of the bark of the papyrus. The Turks put off their ſhoes, and leave them at the doors of their moſques.

SHOE *of an Anchor*, a ſmall block of wood, convex on the back, and having a ſmall hole, ſufficient to contain the point of the anchor-fluke, on the fore-ſide. It is uſed to prevent the anchor from tearing or wounding the planks on the ſhip's bow, when aſcending or deſcending; for which purpoſe the ſhoe ſlides up and down along the bow, between the fluke of the anchor and the planks, as being preſſed cloſe to the latter by the weight of the former.

To SHOE *an Anchor*, is to cover the flukes with a broad triangular piece of plank, whoſe area or ſuperficies is much larger than that of the flukes. It is intended to give the anchor a ſtronger and ſurer hold of the bottom in very ſoft and oozy ground.

Horſe-SHOE, a plate of iron, of a certain form, nailed to the feet of horſes, to defend and preſerve the hoof.

As feet differ, ſo ſhould ſhoes accordingly. "The only ſyſtem of farriers, (Lord Pembroke obſerves), is to ſhoe in general with exceſſive heavy and clumſy ill-ſhaped ſhoes, and very many nails, to the total deſtruction of the foot. The cramps they annex, tend to deſtroy the bullet; and the ſhoes made in the ſhape of a walnut-ſhell prevent the horſe's walking upon the firm baſis which God has given him for that end, and thereby oblige him to ſtumble and fall. They totally pare away alſo and lay bare the inſide of the animal's foot with their deteſtable butteris, and afterwards put on very long ſhoes, whereby the foot is hindered from having any preſſure at all upon the heels, which preſſure otherwiſe might ſtill perchance, notwithſtanding their dreadful cutting, keep the heels properly open, and the foot in good order. The frog ſhould never be cut out; but as it will ſometimes become ragged, it muſt be cleaned every now and then, and the ragged pieces pared off with a knife. In one kind of foot indeed a conſiderable cutting away muſt be allowed of, but not of the frog: we mean, that very high feet muſt be cut down to a proper height; becauſe, if they were not, the frog, though not cut, would ſtill be ſo far above the ground, as not to have any bearing on it, whereby the great tendon muſt inevitably be damaged, and conſequently the horſe would go lame.

"The weight of ſhoes muſt greatly depend on the quality and hardneſs of the iron. If the iron be very good, it will not bend; and in this caſe the ſhoes cannot poſſibly be made too light: care, however, muſt be taken, that they be of a thickneſs ſo as not to bend; for bending would force out the nails, and ruin the hoof. That part of the ſhoe which is next the horſe's heel, muſt be narrower than any other, (as is ſeen in the draught, Plate CCLXVII. fig. 1.) that ſtones may be thereby prevented from getting under it, and ſticking there: which otherwiſe would be the caſe; becauſe the iron, when it advances inwardly beyond the bearing of the foot, forms a cavity, wherein ſtones being lodged would remain, and, by preſſing againſt the foot, lame the horſe. The part of the ſhoe which the horſe walks upon ſhould be quite flat, and the inſide of it likewiſe; only juſt ſpace enough being left next the foot, to put in a picker, (which ought to be uſed every time the horſe comes into the ſtable), and alſo to prevent the ſhoe's preſſing upon the ſole. Four nails on each ſide hold better than a greater number, and keep the hoof in a far better ſtate. The toe of the horſe muſt be cut ſhort, and nearly ſquare, (the angles only juſt rounded off), nor muſt any nails be driven there; this method prevents much ſtumbling, eſpecially in deſcents, and ſerves, by throwing nouriſhment to the heels, to ſtrengthen them; on them the horſe ſhould in ſome meaſure walk, and the ſhoe be made of a proper length accordingly; by this means, narrow heels are prevented, and many other good effects produced. Many people drive a nail at the toe, but it is an abſurd practice. Leaving room to drive one there cauſes the foot to be of an improper length; and moreover, that part of the hoof is naturally ſo brittle, that even when it is kept well greaſed, the nail there ſeldom ſtays in, but tears out and damages the hoof. That the directions for ſhoeing a proper length may be the more clear and intelligible, we have annexed (Plate CCLXVII.) a draught of a foot ſhoed a proper length ſtanding on a plain ſurface, and with it a draught of the right kind of ſhoe.

"In wet, ſpungy, and ſoft ground, where the foot ſinks in, the preſſure upon the heels is of courſe greater than on hard ground; and ſo indeed it ſhould be upon all accounts. The hinder-feet muſt be treated in the ſame manner as the fore-ones; and the ſhoes the ſame: except in hilly and ſlippery countries, they may not improperly be turned up a little behind: but turning up the fore-ſhoes is of no ſervice, and is certain ruin to the fore-legs, eſpecially to the bullets. In deſcending hills, cramps are apt to throw horſes down, by ſtopping the fore-legs, out of their proper baſis and natural bearing, when the hinder ones are rapidly preſſed; which unavoidably muſt be the caſe, and conſequently cannot but puſh the horſe upon his noſe. With them on a plain ſurface, a horſe's foot is always thrown forwards on the toe, out of its proper bearing, which is very liable to make the horſe ſtumble. The notion of their utility in going up hills is a falſe one. In aſcending, the toe is the firſt part of the foot which bears on, takes hold of the ground, and whether the horſe draws or carries, conſequently the buſineſs is done before the part where the cramps are comes to the ground. Ice-nails are preferable to any thing to prevent ſlipping, as alſo to help horſes up hill, the moſt forward ones taking hold of the ground early, conſiderably before the heels touch the ground: they muſt be ſo made, as to be, when driven in, ſcarce half an inch above the ſhoe, and alſo have four ſides ending at the top in a point. They are of great ſervice to prevent ſlipping on all kinds of places; and by means of them a horſe is not thrown out of his proper baſis. They muſt be made of very good iron; if they are not, the heads of them will be perpetually breaking off. From the race-horſe to the cart-horſe, the ſame ſyſtem of ſhoeing ſhould be obſerved. The ſize, thickneſs, and weight of them only ſhould differ. The ſhoe of a race-horſe muſt of courſe be lighter than that of a ſaddle-horſe; that of a ſaddle-horſe lighter than that of a coach or bat horſe; and theſe laſt more ſo than a cart, waggon, or artillery horſe. At preſent all ſhoes in general are too heavy; if the iron is good, ſhoes need not be ſo thick as they are now generally made.—The utmoſt ſeverity ought to be inflicted upon all thoſe who clap ſhoes on hot: this unpardonable lazineſs of farriers in making feet thus fit ſhoes, inſtead of ſhoes fitting feet, dries up the hoof, and utterly deſtroys them. Frequent removals of ſhoes are detrimental, and tear the foot; but ſometimes they are very neceſſary: this is an inconvenience which half-ſhoes are liable to; for the end of the ſhoe, being very ſhort, is apt to work ſoon into the foot, and conſequently muſt then be moved."

In a late treatiſe on this ſubject by Mr Clark of Edinburgh, the common form of ſhoes, and method of ſhoeing, are, with great appearance of reaſon, totally condemned, and a new form and method recommended, which ſeem founded on rational principles, and to have been confirmed by experience.

Common method. "In preparing the foot for the ſhoe,

3 MA 53

Plate CCLXVII.

Horſe SHOE.

Fig. 1.

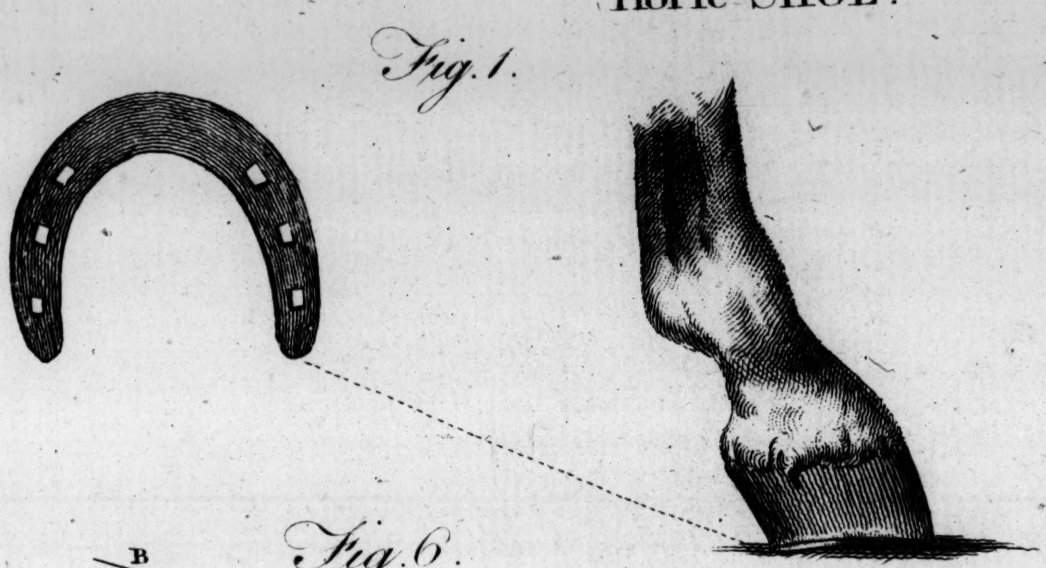


Fig. 2.

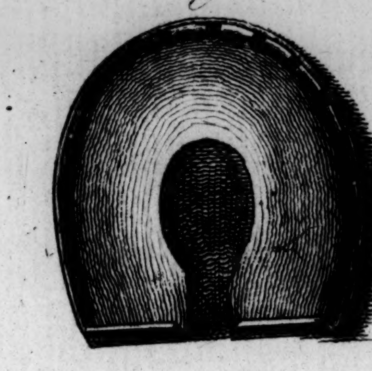


Fig. 6.

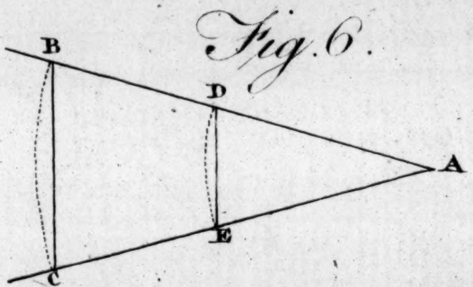
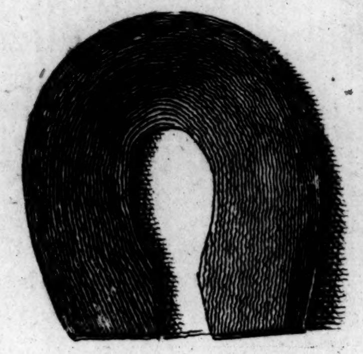


Fig. 3.



The SECTOR.

Fig. 7.

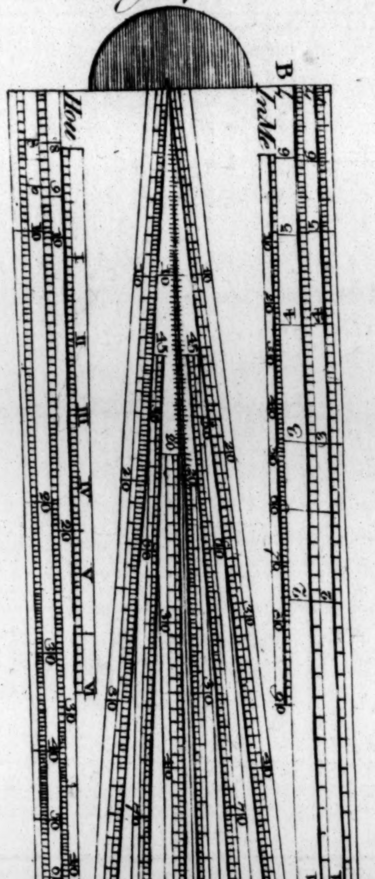


Fig. 8.

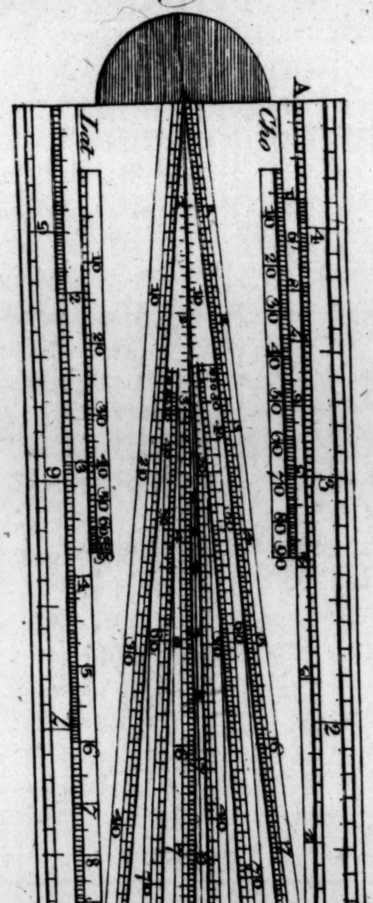

A
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Fig. 4.

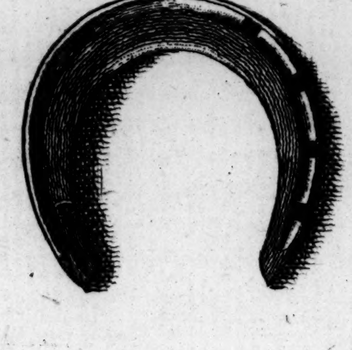
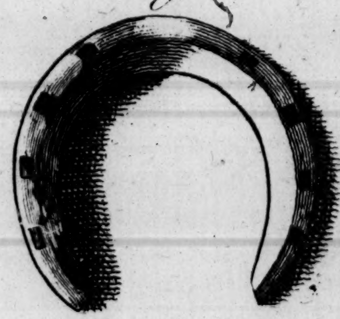


Fig. 5.



A. Bell Sculpt.

ſhoe, our author obſerves, the frog, the ſole, and the bars or binders, are pared ſo much that the blood frequently appears. The ſhoe by its form (being thick on the inſide of the rim, and thin upon the outſide †), muſt of conſequence be made concave or hollow on that ſide which is placed immediately next the foot, in order to prevent its reſting upon the ſole. The ſhoes are generally of an immoderate weight and length, and every means is uſed to prevent the frog from reſting upon the ground, by making the ſhoe-heels thick, broad, and ſtrong, or raiſing cramps or caukers on them.

† See fig. 2. nd 3. Plate CCLXVII.

“ From this form of the ſhoe, and from this method of treating the hoof, the frog is raiſed to a conſiderable height above the ground, the heels are deprived of that ſubſtance which was provided by nature to keep the cruſt extended at a proper wideneſs, and the foot is fixed as it were in a mould.

“ By the preſſure from the weight of the body, and reſiſtance from the outer edges of the ſhoe, the heels are forced together, and retain that ſhape impreſſed upon them, which it is impoſſible ever afterwards to remove; hence a contraction of the heels, and of courſe lameneſs. But farther,

“ The heels, as has been obſerved, being forced together, the cruſt preſſes upon the proceſſes of the coffin and extremities of the nut-bone: The frog is confined, and raiſed ſo far from the ground, that it cannot have that ſupport upon it which it ought to have: the circulation of the blood is impeded, and a waſting of the frog, and frequently of the whole foot, enſues. Hence proceed all thoſe diſeaſes of the feet, known by the names of *foundered, hoof-bound, narrow-heels, running thruſhes, corns, high ſoles, &c.*

“ I have likewiſe frequently obſerved, from this compreſſion of the internal parts of the foot, a ſwelling of the legs immediately above the hoof, attended with great pain and inflammation, with a diſcharge of thin, ichorous, fetid matter: from which ſymptoms, it is often concluded, that the horſe is in a bad habit of body, (or what is termed a *greaſe falling down*), and muſt therefore undergo a courſe of medicine, &c.

“ The bad effects of this practice are ſtill more obvious upon the external parts of the hoof. The cruſt toward the toe, being the only part of the hoof free from compreſſion, enjoys a free circulation of that fluid neceſſary for its nouriſhment, and grows broader and longer; from which extraordinary length of toe, the horſe ſtumbles in his going, and cuts his legs. The ſmaller particles of ſand inſinuate themſelves between the ſhoe and the heels, which grind them away, and thereby produce lameneſs. All this is entirely owing to the great ſpring the heels of the horſe muſt unavoidably have upon the heels of a ſhoe made in this form.

“ This concave ſhoe in time wears thin at the toe, and, yielding to the preſſnre made upon it, is forced wider, and of conſequence breaks off all that part of the cruſt on the outſide of the nails. Inſtances of this kind daily occur, inſomuch that there hardly remains cruſt ſufficient to fix a ſhoe upon.

“ It is generally thought, that the broader a ſhoe is, and the more it covers the ſole and frog, a horſe will travel the better. But, as has been formerly remarked, the broader a ſhoe is of this form, it muſt be made the more concave; and, of conſequence, the contracting power upon the heels muſt be the greater. It is likewiſe to be obſerved, that, by uſing ſtrong broad-rimmed concave ſhoes in the ſummer-ſeaſon, when the weather is hot and the roads very dry and hard, if a horſe is obliged to ride faſt, the ſhoes, by repeated ſtrokes (or friction) againſt the ground, acquire a great degree of heat, which is communicated to the internal parts of the foot; and, together with the contraction upon the heels occaſioned by the form of the ſhoe, muſt certainly cauſe exquiſite pain. This is frequently ſucceeded by a violent inflammation in the internal parts of the hoof, and is the cauſe of that diſeaſe in the feet ſo fatal to the very beſt of our horſes, commonly termed a *founder*. This is alſo the reaſon why horſes, after a journey or a hard ride, are obſerved to ſhift their feet ſo frequently, and to lie down much.

“ If we attend further to the convex ſurface of this ſhoe, and the convexity of the pavement upon which horſes walk, it will then be evident, that it is impoſſible for them to keep their feet from ſlipping in this form of ſhoe, eſpecially upon declivities of ſtreets.

“ It is alſo a common practice, eſpecially in this place, to turn up the heels of the ſhoes into what is called *cramps* or *caukers*, by which means the weight of the horſe is confined to a very narrow ſurface, viz. the inner round edge of the ſhoe-rim and the points or caukers of each heel, which ſoon wear round and blunt; beſides, they for the moſt part are made by far too thick and long. The conſequence is, that it throws the horſe forward upon the toes, and is apt to make him ſlip and ſtumble. To this cauſe we muſt likewiſe aſcribe the frequent and ſudden lameneſs horſes are ſubject to in the legs, by twiſting the ligaments of the joints, tendons, &c.

“ I do not affirm, that caukers are always hurtful, and ought to be laid aſide: On the contrary, I grant, that they, or ſome ſuch like contrivance, are extremely neceſſary, and may be uſed with advantage upon flat ſhoes where the ground is ſlippery; but they ſhould be made thinner and ſharper than thoſe commonly uſed, ſo as to ſink into the ground, otherwiſe they will rather be hurtful than of any advantage.

“ The Chineſe are ſaid to account a ſmall foot an ornament in their women, and for that purpoſe, when young, their feet are confined in ſmall ſhoes. This no doubt produces the deſired effect; but muſt neceſſarily be very prejudicial to them in walking, and apt to render them entirely lame.

“ This practice, however, very much reſembles our manner of ſhoeing horſes: for, if we looked upon it as an advantage to them to have long feet, with narrow low heels, and ſuppoſing we obſerved no inconvenience to attend it, or bad conſequence to follow it, we could not poſſibly uſe a more effectual means to bring it about, than by following the method already deſcribed.

“ In ſhoeing a horſe, therefore, we ſhould in this, as in every other caſe, ſtudy to follow nature: and certainly that ſhoe which is made of ſuch a form as to reſemble as near as poſſible the natural tread and ſhape of the foot, muſt be preferable to any other.

“ But it is extremely difficult to lay down fixed rules with reſpect to the proper method to be obſerved in treating the hoofs of different horſes: it is equally difficult to lay down any certain rule for determining the preciſe form to be given their ſhoes. This will be obvious to every judicious practitioner, from the various conſtructions of their feet, from diſeaſe, and from other cauſes that may occur; ſo that a great deal muſt depend upon the diſcretion and judgment of the operator, in proportioning the ſhoe to the foot, by imitating the natural tread, to prevent the hoof from contracting a bad ſhape.

“ In order, therefore, to give ſome general idea of what may be thought moſt neceſſary in this matter, I ſhall endeavour to deſcribe that form of ſhoe and method of treating the hoofs of horſes, which from experience I have found moſt beneficial.

“ *Proper Method.* It is to be remembered, that a horſe's ſhoe ought by no means to reſt upon the ſole, otherwiſe it will occaſion lameneſs; therefore it muſt reſt entirely on the cruſt: and, in order that we may imitate the natural tread of the foot, the ſhoe muſt be made flat, (if the height of the ſole does not forbid it); it muſt be of an equal thickneſs all around the outſide of the rim (A); and on that part of it which is to be placed immediately next the foot, a narrow rim or margin is to be formed, not exceeding the breadth of the cruſt upon which it is to reſt, with the nail-holes placed exactly in the middle; and from this narrow rim the ſhoe is to be made gradually thinner towards its inner edge. See fig. 5.

“ The breadth of the ſhoe is to be regulated by the ſize of the foot, and the work to which the horſe is accuſtomed: but, in general, it ſhould be made rather broad at the toe, and narrow towards the extremity of each heel, in order to let the frog reſt with freedom upon the ground. The neceſſity of this has been already ſhown.

“ The ſhoe being thus formed and ſhaped like the foot, the ſurface of the cruſt is to be made ſmooth, and the ſhoe fixed on with eight or at moſt ten nails, the heads of which ſhould be ſunk into the holes, ſo as to be equal with the ſurface of the ſhoe. The ſole, frog, and bars, as I have already obſerved, ſhould never be pared, farther than taking off what is ragged from the frog, and any excreſcences or inequalities from the ſole. And it is very properly remarked by Mr Oſmer, “ That the ſhoe ſhould be made ſo as to ſtand a little wider at the extremity of each heel, than the foot itſelf: otherwiſe, as the foot grows in length, the heel of the ſhoe in a ſhort time gets within the heel of the horſe; which preſſure often breaks the cruſt, and produces a temporary lameneſs, perhaps a corn.”

“ This method of ſhoeing horſes I have followed long before Mr Oſmer's treatiſe on that ſubject was publiſhed; and for theſe ſeveral years paſt I have endeavoured to introduce it into practice.

“ But ſo much are farriers, grooms, &c. prejudiced in favour of the common method of ſhoeing and paring out the feet, that it is with difficulty they can even be prevailed upon to make a proper trial of it.

“ They cannot be ſatisfied unleſs the frog be finely ſhaped, the ſole pared, and the bars cut out, in order to make the heels appear wide (B). This practice gives them a ſhow of wideneſs for the time; yet that, together with the concave form of the ſhoe, forwards the contraction of the heels, which, when confirmed, renders the animal lame for life.

“ In this flat form of ſhoe, its thickeſt part is upon the outſide of the rim, where it is moſt expoſed to be worn; and being made gradually thinner towards its inner edge, it is therefore much lighter than the common concave ſhoe: yet it will laſt equally as long, and with more advantage to the hoof; and as the frog or heel is allowed to reſt upon the ground, the foot enjoys the ſame points of ſupport as in its natural ſtate. It muſt therefore be much eaſier for the horſe in his way of going, and be a means of making him ſurer-footed. It is likewiſe evident, that, from this ſhoe, the hoof cannot acquire any bad form; when, at the ſame time, it receives every advantage that poſſibly could be expected from ſhoeing. In this reſpect it may very properly be ſaid, that we make the ſhoe to the foot, and not the foot to the ſhoe, as is but too much the caſe in the concave ſhoes, where the foot very much reſembles that of a cat's fixed into a walnut-ſhell.

“ It is to be obſerved, that the hoofs of young horſes, before they are ſhoed, for the moſt part are wide and open at the heels, and that the cruſt is ſufficiently thick and ſtrong to admit of the nails being fixed very near the extremities of each. But, as I have formerly remarked, from the conſtant uſe of concave ſhoes, the cruſt of this part of the foot grows thinner and weaker; and when the nails are fixed too far back, eſpecially upon the inſide, the horſe becomes lame: to avoid this, they are placed more towards the fore-part of the hoof. This cauſes the heels of the horſe to have the greater ſpring upon the heels of the ſhoe, which is ſo very detrimental as to occaſion lameneſs; whereas, by uſing this flat form of ſhoe, all theſe inconveniences are avoided; and if the hoofs of young horſes, from the firſt time that they were ſhoed, were continued to be conſtantly treated according to the method here recommended, the heels would always retain their natural ſtrength and ſhape.

“ By following this flat method of ſhoeing, and manner of treating the hoofs, ſeveral horſes now under my care, that were formerly tender-footed, and frequently lame, while ſhoed with broad concave ſhoes, are now quite ſound, and their hoofs in as good condition as when the firſt ſhoes were put upon them: In particular, the horſe that wore the broad concave ſhoes, from which the drawings of fig. 2. and 3. were taken, now goes perfectly ſound in the open narrow kind of ſhoes, as repreſented fig. 4. 5.

“ If farriers conſidered attentively the deſign of ſhoeing horſes, and would take pains to make themſelves acquainted with the anatomical ſtructure of the foot, they would then be convinced, that this method of treating the hoofs, and that this form of ſhoe, is preferable to that which is ſo generally practiſed.

“ It has been alleged, that in this form of ſhoe horſes do not go ſo well as in that commonly uſed. This objection will eaſily be laid aſide, by attending to the following particulars. There are but few practitioners that can or will endeavour to make this ſort of ſhoe as it ought to be. The iron, in forming it,

does

(A) For a draught-horſe about half an inch thick, and larger in proportion for a ſaddle-horſe.

(B) Wide open heels are looked upon as a mark of a ſound good hoof.

Shoeing of Horſes.

does not ſo eaſily turn into the circular ſhape neceſſary as in the common ſhoe; and perhaps this is the principal reaſon why farriers object to it, eſpecially where they work much by the piece. And as many horſes that are commonly ſhoed with concave ſhoes have their ſoles conſiderably higher than the cruſt, if the ſhoe is not properly formed, or if it is made too flat, it muſt unavoidably reſt upon the ſole, and occaſion lameneſs.

“ The practice of paring the ſole and frog is alſo ſo prevalent, and thought ſo abſolutely neceſſary, that it is indiſcriminately practiſed, even to exceſs, on all kinds of feet: And while this method continues to be followed, it cannot be expected that horſes can go upon hard ground (on this open ſhoe) with that freedom they would do if their ſoles and frogs were allowed to remain in their full natural ſtrength.

“ Experience teaches us, that, in very thin-ſoled ſhoes, we feel an acute pain from every ſharp-pointed ſtone we happen to tread upon. Horſes are ſenſible of the ſame thing in their feet, when their ſoles, &c. are pared too thin. Hence they who are prejudiced againſt this method, without ever reflecting upon the thin ſtate of the ſole, &c. are apt to condemn it, and draw their concluſions more from outward appearances than from any reaſoning or knowledge of the ſtructure of the parts. From a due attention likewiſe to the ſtructure of a horſe's foot in a natural ſtate, it will be obvious, that paring away the ſole, frog, &c. muſt be hurtful, and in reality is deſtroying that ſubſtance provided by nature for the defence of the internal parts of the foot: From ſuch practice it muſt be more liable to accidents from hard bodies, ſuch as ſharp ſtones, nails, glaſs, &c. From this conſideration, we will likewiſe find, that a narrow piece of iron, adapted to the ſhape and ſize of the foot, is the only thing neceſſary to protect the cruſt from breaking or wearing away; the ſole, &c. requiring no defence if never pared.

“ There is one obſervation I would farther make, which is, that the ſhoe ſhould be made of good iron, well worked, or what ſmiths call hammer-hardened, that is, beat all over lightly with a hammer when almoſt cold. The Spaniards and Portugueſe farriers uſe this practice greatly, inſomuch that many people, who have ſeen them at work, have reported, that they form their horſes ſhoes without heating them in the fire as we do. It is well known, that heating of iron till it is red ſoftens it greatly; and when ſhoes thus ſoftened are put upon horſes feet, they wear away like lead. But when the ſhoes are well hammered, the iron becomes more compact, firm, and hard; ſo that a well-hammered ſhoe, though made conſiderably lighter, yet will laſt as long as one that is made heavier; the advantage of which is obvious, as the horſe will move his feet with more activity, and be in leſs danger of cutting his legs.

“ The common concave ſhoes are very faulty in this reſpect; for, in fitting or ſhaping them to the foot, they require to be frequently heated, in order to make them bend to the unequal ſurface which the hoof acquires from the conſtant uſe of theſe ſhoes: they thereby become ſoft; and to attempt to harden them by beating or hammering when they are ſhaped to the foot, would undo the whole. But flat ſhoes, by making them, when heated, a little narrower than the foot, will, by means of hammering, become wider, and acquire a degree of elaſticity and firmneſs which it is neceſſary they ſhould have, but impoſſible to be given them by any other means whatever; ſo that any farrier, from practice, will ſoon be able to judge, from the quality of the iron, how much a ſhoe, in fitting it to the circumference of the hoof, will ſtretch by hammering when it is almoſt cold: this operation, in fitting flat ſhoes, will be the leſs difficult, eſpecially when it is conſidered, that as there are no inequalities on the ſurface of the hoof (or at leaſt ought not to be) which require to be bended thereto, ſhoes of this kind only require to be made ſmooth and flat; hence they will preſs equally upon the circumference or cruſt of the hoof, which is the natural tread of a horſe.”

Shooting.

SHOOTING, in the military art. See ARTILLERY, GUNNERY, and PROJECTILES.

SHOOTING, in ſportmanſhip, the killing of game by the gun, with or without the help of dogs.

Whether the game be flying, or on a hedge or tree, always endeavour to ſhoot as near as you poſſibly can with the wind, and rather ſidewiſe or behind the fowl than in their face; nor ſhoot at a ſingle bird, if you can compaſs more within your level. If they be on a tree, hedge, or the ground, ſeek out for the moſt convenient ſhelter you can, of a hedge, bank, tree, &c. that you may be concealed from the ſight of the fowl; and being within ſhot, and having a fair mark, loſe no time, but let fly.

If dogs are uſed, we put them on the hunt by whiſtling or hying-on (as the term is): it is neceſſary to obſerve the motions of ſpaniels, for there are but few that will not give ſome intimation when they come on ſcent; uſe them to come in at a ſharp call, and never ſuffer them to run after a bird, except it is wounded: obſerve to let the dogs, whether ſpaniels or pointers, have the wind as much as poſſible, (that is, let them hunt againſt the wind).

In uſing pointers, when they are obſerved drawing on a point, and are known to be not quite ſtaunch, call to them to take heed; and if they ſpring without ſtanding, correct them ſlightly with a ſwitch, ſpeaking angrily to them, and keep them at a diſtance the remaining part of the day; unleſs their after-behaviour deſerve encouragement, when it may not be improper to take them into favour.

Shooting flying, is by experience found to be the beſt and moſt diverting way of ſhooting. It is neceſſary for any gentleman who ſports much to have two guns; the barrel of one about two feet nine inches, which will ſerve very well for the beginning of the ſeaſon, and for wood-ſhooting; the other about three feet three inches, for open-ſhooting after Michaelmas: the birds by that time are grown ſo ſhy, that your ſhots muſt be at longer diſtances. But if you intend one gun to ſerve for all purpoſes, then a three-feet barrel, or thereabouts, is moſt proper. You ſhould always have it cocked in readineſs; holding your thumb over the cock, leſt it ſhould go off when you would not have it.

It is generally accounted the beſt way to aim at the head, if the game flies over your head; but to aim as it were under the belly, if it flies from you; and it will be beſt to let the game fly a little paſt you before you let fly, for by ſo doing the ſhot will the better enter the body. Shot delivered from a gun in general loſe or decreaſe half the quantity every ten yards or thereabouts; ſo that at forty yards there will not be thrown in above a fourth of what would be into the ſame ſpace at twenty yards. From which it appears, that if you take aim a foot before a croſs-ſhot at forty yards, you will be the moſt likely to meet the bird with the centre-ſhot; and which is looked upon to fly the ſtrongeſt, and to be more efficacious at long diſtances, than the diverging ſhot: for whether it be the ſhot ſtriking againſt each other, or againſt the air, at firſt coming out of the muzzle, or whatever be the cauſe of their diverging, it muſt in ſome degree retard their motion. But if there be a briſk wind, it will certainly bend the courſe of the ſhot; you muſt therefore conſider whether the wind blows with the bird or againſt it: if it blow with it, you need little more than to obſerve the general rule, becauſe the wind helps the bird forward nearly as much as it diverts the ſhot; but if it fly againſt the wind, the ſhot will decline more than the bird is retarded, and therefore you ought to take aim at a greater diſtance before the bird.

One good pointer in the field at a time, if you have patience to attend him, will be ſufficient for two men to ſhoot with; but if you have an old ſpringing ſpaniel, that is ſo well under command that you can always keep him near you, ſuch a dog may be uſed with your pointer with great advantage; as he will better find birds that are wounded, and alſo ſpring ſuch as are near you, which you otherwiſe might paſs. But if you ſhould be fond of hunting many pointers together in a field, as is frequently done, you ſhould not have more than one amongſt them, who has been taught to fetch his game, leſt, by endeavouring to get it from each other, they ſhould tear it.

Partridge-Shooting. The ſeaſon for this ſport begins, by act of parliament, on the 1ſt of September, and ends the 12th of February; and which, on account of the cleanneſs, little fatigue, and more certain diverſion than any other, by their being found in coveys, and taking ſhort flights, is generally eſteemed the genteeleſt and beſt ſport we have.—In the beginning of the ſeaſon, they haunt the wheat, barley, oat, peaſe and bean-ſtubbles; but the wheat-vetch is their favourite: they alſo lie in turnips, clover-ſeed, and on fallow-land; and indeed, at times, they are found any where.

The moſt proper dog for partridge-ſhooting, is the pointer, a dog extremely well calculated for the ſport; as partridges can ſeldom or ever be ſeen on the ground, if the ſtubble, &c. be but three or four inches high: if the pointer be ſtaunch, and have a good noſe, he will ſeldom paſs, in common fields, within 40 yards of a covey, without intimating by a point pretty near the exact line they lie in.

Two perſons in the field with guns are better than more at partridge-ſhooting, who ſhould with patience pay a due attention to each other.

Obſerve, after a fire, never to blow through the barrel, but charge again immediately, while the inſide of the barrel is hot and dry; by this method of immediate charging, a gun ſeldom hangs fire, and carries much ſmarter and better: there is no occaſion to wipe either pan or flint while out, (if the flint is good, which, by the bye, it always ſhould be); but on returning home, wipe clean with tow, or linen-rags, both out and inſide of the barrel, and alſo the lock, from the ſoil of the powder; when it is thus cleaned, hang it up, and, if it can be ſo ordered, where a conſtant winter fire is kept, hanging it at a moderate diſtance from the fire: the powder-flaſk ſhould alſo be kept in the ſame degree of warmth in winter-time; if the gun has received any rain or wet, let it be wiped thoroughly dry, and ſtand ſome time near a fire, to dry any remaining damp, and have a little oil rubbed over it before hanging up.

When your dog points, walk up without any hurry, ſeparating a few yards, one to the right and the other to the left of your dog: if a covey ſprings, never ſhoot into the midſt of them, but let him on the left ſingle out a bird which flieth to the left, and him on the right a bird to the right, that you may not interrupt each other nor both ſhoot at the ſame bird, and readily let fly at the firſt aim. Let each of you mark the fall of his bird, and immediately run to the place; and if the dog does not ſecure it, or the bird ſhould be only wounded and have run, put him upon the ſcent; but if your dog underſtands his buſineſs, and will fetch his game, it is better to truſt to him, and load again as quick as you can. It will always be of great uſe, and ſave much time and trouble, to have a perſon without a gun to mark the flight of the birds. If a ſingle bird be ſprung, let him take the ſhoot to whoſe ſide it flies: the bird being killed, cauſe your dog to lie by it whilſt you load, leſt he ſpring other birds that are near you.

If you trace the birds to a hedge, double the row by walking one on each ſide, taking your dog on the ditch ſide: here if you have a ſpaniel, he will be of great uſe; as you may make him go along in the ditch, and your pointer on the other ſide; by which means you will not paſs a bird, and one of you will moſt likely get a good ſhoot at it. Your own judgment, with very little experience, will beſt direct where the birds are moſt likely to be found at different times of the day, according to the grounds you have to hunt in.

Pheaſant and Woodcock Shooting. Pheaſants and woodcocks generally lie in carrs or woods where there is much cover. Spaniels are therefore the dogs moſt proper for this kind of ſhooting. Some pointers indeed, that are bold-ſpirited and have been a great deal uſed to this work, will follow a pheaſant very well; but from the generality of ſlow ſtaunch pointers a pheaſant will get off ſo faſt, as, when ſprung, to be out of the reach of gun-ſhot; beſides, they are not hardy enough to go into thick cover.

The ſpaniels proper for this work are of a middling ſize, their legs rather ſhort and very ſtrong: they muſt be hardy, able to bear great fatigue, diſpoſed to go into cover freely and undaunted, to hunt very briſkly, and yet go very ſlow when upon ſcent of game. You cannot begin too early with theſe dogs to teach them to fetch a bird and bring it after you: which will prevent their getting a habit of tearing or breaking the game. One of this kind muſt be always obliged to lie down whilſt you load: and as his buſineſs is to ſpring game, you ſhould never ſuffer him to go above ten or fifteen yards from you; and therefore take him out with others that are brought under command as ſoon as he is able to hunt. For to have good ſpaniels, they muſt be uſed a great deal. If you find any difficulty in keeping him to hunt near you, put one of his feet into his collar, and hunt him ſo for an hour or two. Frequent repetitions of this puniſhment will bring him to a ſenſe of his duty. One, two, or three brace of ſpaniels well broken, may be uſed together; and they will find work enough in a large wood or thick cover. If two perſons intend hunting in a wood, it is beſt for one to go round it on the outſide firſt, whilſt the other goes oppoſite to him a little way into the wood, and afterwards to ſink in deeper as you ſhall find occaſion, unleſs you know the moſt likely part to find game in; in which caſe you may hunt the interior part firſt. Some perſons, when they want to hunt a very large wood, approve of taking a brace of high-mettled ſpaniels that have not been broken, to hunt cloſe, and turn them into the middle of the wood; whilſt they with their well-broken ſpaniels hunt outwards. But unleſs you have any extenſive woods to hunt, ſuch dogs are more likely to hinder than add to your ſport; and it will be better to hunt with patience with only ſuch dogs as are under good command, let the woods or cover be ever ſo large.

1. Pheaſant-Shooting begins, by act of parliament, on the 1ſt of October, and laſts till the 1ſt of February.

Theſe birds afford very pretty ſport, though far more fatiguing and tireſome than partridge-ſhooting; owing to the buſhes, briars, and other diſagreable circumſtances of the woods.—In hunting them, keep as near the dogs as poſſible; and when they ſpring, one or more, let ſuch only fire at the bird as to whom, in point of riſing, it belongs; which rule ſhould be always obſerved in all ſorts of ſhooting in company. In pheaſant-ſhooting, the trees frequently interfere, therefore forbear firing till you have a clear aim at the bird; which, if it cannot be had, it is better to let him eſcape for another chance.

2. Woodcock Shooting generally begins towards the latter end of November; they are birds of paſſage, and come over to us in flights in the night-time, about the full of the moon: the firſt flight, which is ſometimes in October, is commonly very ſcanty; but they continue coming over, more or leſs, every moon, till February; conſequently it will generally be found they are in greater plenty towards the latter end of the winter; though this is no abſolute rule, as they are very irregular with regard to number in their coming over; ſometimes the firſt or ſecond flight being the largeſt we have through the winter, and the others very trifling; they remain with us generally till the middle or latter end of March.

Their haunts are chiefly in the ſprings and bogs, in woods and coppices; and in the beginning of the winter, before the leaves are well off, they prefer the outparts of the woods. For ſpringing them, therefore, ſpaniels are uſed, as already mentioned.

A woodcock is a very tender bird; and being a large mark, affords eaſy, pretty ſhooting, where a perſon has got the art of ſhooting flying tolerably well; but it frequently occurs that the bird riſes in a perpendicular line, which is the moſt difficult ſhot that is. In this caſe, an experienced ſportſman will find it more adviſeable to forbear firing (if opportunity will allow) till the bird has arrived at the height of the perpendicular, and flies offward; but as a ſhot will be often loſt by this delay, the good markſman ſhould never wait it, except he judges the ſhot will be better.

Snipe-Shooting. The ſnipe, like the woodcock, is a bird of paſſage; they begin coming over to us about the middle or latter end of October, and remain with us pretty forward in the ſpring. They frequent, like the woodcock, the ſprings, bogs, and marſhy places; but with this difference, that the cock ſeeks theſe in cover, and the ſnipe in the open clear parts, as fields and common.

Snipes afford as pretty ſport, to a good markſman, as any bird whatſoever; though they are very quick fliers, yet are very tender, and will fall almoſt at the bare report of the gun.

We ſpring ſnipes either with ſpaniels, or by making a ſlight ſharp kind of noiſe about the places where we know they haunt: they moſtly fly directly againſt the wind, (if there is any material air ſtirring), and a ſhot after them is the beſt and moſt ſure: the ſlant and croſs ſhots are rather difficult, as they are a ſmall mark, and fly exceeding quick.—For practice in this, which is very nice, ſwallow-ſhooting may be uſed in ſummer to advantage.

Of Water-fowl Shooting. In ſhooting water-fowl, as geeſe, ducks, widgeons, &c. we uſe the longeſt killing gun, and as large ſhot as the n° 1 or 2.

The proper dog is the rough, curled, water ſpaniel, of which the white ſort are commonly the beſt. They ſhould be under the ſtricteſt command; be ready at fetching any thing out of the water, without biting it; and catching what is only wounded; ſhould be uſed, on occaſion, to creep quiet and cloſe behind the maſter's heel.

The fowl may either be ſhot ſwimming, or, which is better, taken on the wing; as in the water they are ſtrongly guarded by the cloſe lying of their wings and feathers; therefore, if a perſon is a good markſman, it will be always beſt to ſpring them firſt.

The beſt place to throw the ſhot, if opportunity will allow, is under the wing, as that is by much the tendereſt place; and the worſe of all is the breaſt, as the feathers here lie extremely thick and cloſe.

Fen Shooting. In this ſport we uſe in general the n° 3 ſhot, which will ſerve as well for the bittern and curlew, as the plover. One or two ſteady water or land ſpaniels may be uſed; and it will be always beſt to ſpring the birds before firing.

Upland Winter Shooting. Our common field-ſhooting is generally beſt in froſty weather, and when the ground has a tolerable cover of ſnow. The moſt common birds in this ſport are, different ſorts of wild pigeons, fieldfares, ſtarlings, redwings, &c. In this diverſion we uſe no dog; and the fewer ſhooters together the better.

The ſeveral kinds of *pigeons* require the n° 3 ſhot, as being ſtrong birds; and may be either taken on the wing, or as they perch on a tree; but the rock-pigeons are beſt, in general, taken on the wing; however, it ſometimes happens that a ſhot at them ſitting is more proper; in this diſcretion muſt direct.

The *fieldfare* is a very common bird: it ſeems to delight moſt in large cloſe orchards; but in hard weather, in the fields; they frequent the haw buſhes, and afford very pretty diverſion. Though they are naturally very wild, yet, when a hard froſt is ſet in, there is no difficulty in getting within 40 yards of them, at the time they are keenly engaged on their feeding buſh: here they will ſit 40 or 50 ſometimes together. The proper way of managing this kind of ſhooting is, if poſſible, to ſecrete behind a buſh, or in a hedge, within ſhot of one of the buſhes they frequent: when a ſufficient number (as the perſon may judge) are together, to fire at them as they ſit; what are killed ſhould be taken up, and the ſhooter replace himſelf as before: in a quarter of an hour, or leſs, more will probably be on the buſh; and he may often go on ſhooting in the ſame place all the while they are on their feed, which is from a little after ſun-riſe till 11 or 12 o'clock; and in the afternoon they go on again, about an hour before ſun-ſet; but ſuch ſport as this muſt be expected only where fieldfares are in great plenty.

Starlings afford tolerable diverſion in ſhooting. In winter they, for the moſt part, go in flocks from 20 to 50; they delight chiefly to be in moiſt paſtures among cattle, and ſometimes ſit ſo cloſe together on the ground, that a perſon may kill 25 or 30 at a ſhot. Taking theſe on the ground, or wing, may be left at the diſcretion of the ſhooter; but the wing will be beſt preferred: what are ſhot, ſhould have their heads immediately pulled off, which, by their bleeding, prevents a bitterneſs of taſte they would otherwiſe have. Uſe for theſe and fieldfares the n° 4 ſhot.—In ſhooting *larks* in flocks, uſe the n° 5 ſhot; and make it a rule always to take them on the wing. Here it will be adviſeable to have the gun ſcatter more than common: And in order to do this, put in an equal quantity of ſhot, ſuppoſing the uſual charge to be three parts ſhot to two of powder; but if the gun, in common, carries an equal quantity of each, then it will be neceſſary to put in only about three parts of ſhot to four of powder: and in ſhooting any of the ſmaller birds in flocks, this rule of charging ſhould be obſerved.

SHOP-LIFTERS, are thoſe that ſteal goods privately out of ſhops; which being to the value of 5 s. though no perſon be in the ſhop, is felony excluded clergy, by the 10 and 11 W. III. c. 23.

SHORE, a place waſhed by the ſea, or by ſome large river.

Count Marſigli divides the ſea-ſhore into three portions: the firſt of which is that track of land which the ſea juſt reaches in ſtorms and high tides, but which it never covers; the ſecond part of the ſhore, is that which is covered in high tides and ſtorms, but is dry at other times; and the third is the deſcent from this, which is always covered with water. See SEA.

The firſt part is only a continuation of the continent, and ſuffers no alteration from the neighbourhood of the ſea, except that it is rendered fit for the growth of ſome plants, and wholly unfit for that of others, by the ſaline ſteams and impregnations: and it is ſcarce to be conceived by any, but thoſe who have obſerved it, how far on land the effects of the ſea reach, ſo as to make the earth proper for plants which will not grow without this influence; there being ſeveral plants frequently found on high hills and dry places, at three, four, and more miles from the ſea, which yet would not grow unleſs in the neighbourhood of it, nor will ever be found elſewhere.

The ſecond part or portion of the ſhore is much more affected by the ſea than the former, being frequently waſhed and beaten by it. Its productions are rendered ſalt by the water, and is covered with ſand, or with the fragments of ſhells in form of ſand, and in ſome places with a tartarous matter depoſited from the water; the colour of this whole extent of ground is uſually duſky and dull, eſpecially where there are rocks and ſtones, and theſe covered with a ſlimy matter.

The third part of the ſhore is more affected by the ſea than either of the others; and is covered with an uniform cruſt of the true nature of the bottom of the ſea, except that plants and animals have their reſidence in it, and the decayed parts of theſe alter it a little.

SHORE (Jane), the celebrated concubine of the licentious king Edward IV. was the wife of Mr Mathew Shore, a goldſmith in Lombard-ſtreet, London. Kings are ſeldom unſucceſsful in their amorous purſuits; therefore there was nothing wonderful in Mrs Shore's removing from Lombard-ſtreet to ſhine at court as the royal favourite. Hiſtorians repreſent her as extremely beautiful, remarkably cheerful, and of moſt uncommon generoſity. The king, it is ſaid, was no leſs captivated with her temper than with her perſon: ſhe never made uſe of her influence over him to the prejudice of any perſon; and if ever ſhe importuned him, it was in favour of the unfortunate. After the death of Edward, ſhe attached herſelf to the lord Haſtings; and when Richard III. cut off that nobleman as an obſtacle to his ambitious ſchemes, Jane Shore was arreſted as an accomplice, on the ridiculous accuſation of witchcraft. This, however, terminated only in a public penance; excepting that Richard rifled her of all her little property: but whatever ſeverity might have been exerciſed towards her, it appears that ſhe was alive, though ſufficiently wretched, under the reign of Henry VIII. when Sir Thomas More ſaw her poor, old, and ſhrivelled, without the leaſt trace of her former beauty. Mr Rowe, in his tragedy of Jane Shore, has adopted the popular ſtory related in the old hiſtorical ballad, of her periſhing by hunger in a ditch where Shoreditch now ſtands. But Stow aſſures us that ſtreet was ſo named before her time.

SHORLING *and* MORLING, are words to diſtinguiſh fells of ſheep; *ſhorling* being the fells after the fleeces are ſhorn off the ſheep's back; and *morling*, the fells flead off after they die or are killed. In ſome parts of England they underſtand by a *ſhorling*, a ſheep whoſe face is ſhorn off; and by a *morling*, a ſheep that dies.

SHORT-HAND *Writing*. See STENOGRAPHY.

SHORT-*Sightedneſs*, a certain defect in viſion, by which objects cannot be diſtinctly ſeen unleſs they are very near the eye. See MEDICINE, n° 179. and OPTICS, n° 123.

SHOT, a denominatton given to all ſorts of balls for fire-arms; thoſe for cannon being of iron, and thoſe for guns, piſtols, &c. of lead.

***Small* SHOT**, or that uſed for fowling, ſhould be well ſized, and of a moderate bigneſs: for ſhould it be too great, then it flies thin, and ſcatters too much; or if too ſmall, then it hath not weight and ſtrength to penetrate far, and the bird is apt to fly away with it. In order, therefore, to have it ſuitable to the occaſion, it not being always to be had every place fit for the purpoſe, we ſhall ſet down the true method of making all ſorts and ſizes under the name of mould-ſhot. Its principal good properties are to be round and ſolid.

Take any quantity of lead you think fit, and melt it down in an iron veſſel; and as it melts keep it ſtirring with an iron ladle, ſkimming off all impurities whatſoever that may ariſe at the top: when it begins to look of a greeniſh colour, ſtrew on it as much auripigmentum, or yellow orpiment finely powdered, as will lie on a ſhilling, to every 12 or 14 pound of lead; then ſtirring them together, the orpiment will flame.

The ladle ſhould have a notch on one ſide of the brim, for the eaſier pouring out the lead; the ladle muſt remain in the melted lead, that its heat may be agreeable to that of the lead, to prevent inconveniences which otherwiſe may happen by its being either too hot or too cold: then, to try your lead, drop a little of it into the water, which if the drops prove round, then the temper of heat is right; if otherwiſe, and the ſhot have tails, then add more orpiment to increaſe the heat, till it be found right.

Then take a plate of copper, about the bigneſs of a trencher, which muſt be made with a hollowneſs in the middle, about three inches compaſs, within which muſt be bored about 40 holes according to the ſize of the ſhot which you intend to caſt: the hollow bottom ſhould be thin; but the thicker the brim, the better it will retain the heat. Place this plate on a frame of iron, over a tub or veſſel of water, about four inches from the water, and ſpread burning coals on the plate, to keep the lead melted upon it: then take ſome lead and pour it gently on the coals on the plate, and it will make its way through the holes into the water, and form itſelf into ſhot; do thus till all your lead be run through the holes of the plate, taking care, by keeping your coals alive, that the lead do not cool, and ſo ſtop up the holes.

While you are caſting in this manner, another perſon with another ladle may catch ſome of the ſhot, placing the ladle four or five inches underneath the plate in the water, by which means you will ſee if they are defective, and rectify them.

Your chief care is to keep the lead in a juſt degree of heat, that it be not ſo cold as to ſtop up the holes in your plate, nor ſo hot as to cauſe the ſhot to crack: to remedy the heat, you muſt refrain working till it is of a proper coolneſs; and to remedy the coolneſs of your lead and plate, you muſt blow your fire; obſerving, that the cooler your lead is, the larger will be your ſhot; as the hotter it is, the ſmaller they will be.

After you have done caſting, take them out of the water, and dry them over the fire with a gentle heat, ſtirring them continually that they do not melt; when dry, you are to ſeparate the great ſhot from the ſmall, by the help of a ſieve made for that purpoſe, according to their ſeveral ſizes. But thoſe who would have very large ſhot, make the lead trickle with a ſtick out of the ladle into the water, without the plate.

If it ſtop on the plate, and yet the plate be not too cool, give but the plate a little knock, and it will run again; care muſt be had that none of your implements be greaſy, oily, or the like; and when the ſhot, being ſeparated, are found too large or too ſmall for your purpoſe, or otherwiſe imperfect, they will ſerve again at the next operation.

The ſizes of ſhot for fowling are from N° 1 to 6, and ſmaller, which is called *muſtard-ſeed*, or *duſt-ſhot*; but N° 5 is ſmall enough for any ſhooting whatſoever. The N° 1 may be uſed for wild-geeſe; the N° 2 for ducks, widgeons, and other water-fowl; the N° 3 for pheaſants, partridges after the firſt month, and all the fen-fowl; the N° 4 for partridges, woodcocks, &c.; and the N° 5 for ſnipes and all the ſmaller birds.

Grape-SHOT. See GRAPE-*Shot*.

Tin-caſe SHOT, in artillery, is formed by putting a great quantity of ſmall iron ſhot into a cylindrical tin-box called a *canniſter*, that juſt fits the bore of the gun. Leaden bullets are ſometimes uſed in the ſame manner; and it muſt be obſerved, that whatever number or ſizes of the ſhots are uſed, they muſt weigh with their caſes nearly as much as the ſhot of the piece.

Caſe-SHOT, formerly conſiſted of all kinds of old iron, nails, muſket-balls, ſtones, &c. uſed as above.

SHOVEL (Sir Cloudeſley), a brave Engliſh admiral, meanly born in 1650. He went to ſea a cabin-boy under Sir Chriſtopher Mynus; and ſoon becoming an able ſeaman, diſtinguiſhed himſelf by his courage and conduct at Tripoli under Sir John Narborough, whoſe widow he afterward married. King William knighted, and made him an admiral. He had a great ſhare of the glory in the battles of Bantry bay, La Hogue, Malaga, and at the ſiege of Barcelona. After the unſucceſsful attempt upon Toulon, he was caſt away on his return home, upon the rocks of Scilly; being then rear-admiral of England, admiral of the white, commander in chief of the queen's fleet, and one of the council to prince George of Denmark as lord high-admiral of England.

SHOVELER, in ornithology, a ſpecies of ANAS.

SHOWER, in meteorology, a cloud condenſed into RAIN.

SHREWMOUSE. See SOREX.

SHREWSBURY, the capital of Shropſhire in England. This town, the metropolis of the county, grew up out of the ruins of Uriconium, anciently a city, now a village called *Wroxeter* about four miles from it. The Saxons called it *Scrobbes Berig*, from the ſhrubs that grew about it; and from thence the preſent name of *Shrewſbury* is ſuppoſed to have been formed. It is pleaſantly ſituated upon a hill near the Severn, over which there are two handſome bridges. It was a place of good note in the Saxon times; after which it was granted by William the Conqueror, together with the title of *earl* and moſt of the county, to Roger de Montgomery, who built a caſtle upon the north ſide of it, where the Severn, that encompaſſes it on all ſides, leaves an opening. His ſon Robert built alſo a wall acroſs this neck of land, when he revolted from Henry I. We learn from doomſday book, that at that time, when a widow of this town married, ſhe paid 20 ſhillings to the king, and a virgin 10. The abovementioned Roger founded alſo, and endowed here, a Benedictine monaſtery, and a collegiate church. When old age came upon him, he quitted the world, and ſpent the reſt of his days as a monk in the abbey, and, when he died, was interred in its church. From the hiſtory of this church and monaſtery, it appears, that eccleſiaſtical benefices about that time were hereditary. The abbey became ſo rich afterwards, that the abbot was mitred, and ſat in parliament. Beſides this abbey, in after-times there were three others, viz.

a Franciſcan, Dominican, and Auguſtin, and likewiſe two collegiate churches; one dedicated to St Chad, and the other to St Mary. In the conteſt between the empreſs Maud and Stephen, this town, and its governor William Fitz-Allan, ſided with the the empreſs. In Henry III.'s time, a part of it was burnt down by the Welch; and in Richard II.'s reign a parliament was held in it. At a place called *Battlefield*, near this town, Henry Percy the younger, ſurnamed *Hotſpur*, was killed in an engagement with Henry IV. againſt whom he had rebelled. The king afterwards built a chapel upon the ſpot, and ſettled two maſs-prieſts to pray for the ſouls of the ſlain. Two of Edward IV.'s ſons were born here; namely, Richard, ſtyled *duke of York*, whom Perkin Warbeck afterwards perſonated, and who was murdered in the Tower; and George Plantagenet, who died before his brothers. Here firſt broke out the ſweating-ſickneſs, which carried off great numbers ſo ſuddenly, that thoſe who were ſeized with it either died or recovered in the ſpace of 24 hours. In the beginning of the civil wars king Chaales I. came hither, and formed an army, with which he marched towards London; but was met by the parliament's forces at Edgehill. He continued here from the 20th of September to the 12th of October; during which time he was joined by prince Rupert, and many of the gentry and nobility of theſe parts. This town anciently gave title of *earl* to the Montgomeries, and afterwards to the Talbots, by whom it is ſtill retained. Here is a free grammar-ſchool, with three maſters, and ſeveral uſhers, well endowed by Edward VI. and queen Elizabeth, and not inferior to many colleges in the univerſities. It has a good library and chapel, and there are ſeveral ſcholarſhips appropriated to it in the univerſity of Cambridge. Here are alſo ſeveral hoſpitals, almshouſes, and charity-ſchools. This town is one of the moſt flouriſhing in England, having two great weekly markets, for corn, cattle, and proviſions; and another for Welch cottons and flannels, of which great quantities are ſold. A great trade is carried on with the Welch, who bring their commodities hither, as to the common mart of both nations. The town is large and well built, and the ſituation extremely pleaſant. There is a very beautiful walk called the *quarry*, between the town-walls and the Severn, delightfully ſhaded with rows of lime-trees, ſo that it is not inferior to the Mall in St James's Park. The town is alſo noted for its gallantry and politeneſs, being full of gentry, and for whom there are always balls and aſſemblies once a-week all the year round. Here is a fine houſe and gardens which belonged to the earl of Bradford; and in the neighbourhood, at Wroxeter, the Roman highway, called *Watling-ſtreet*, may be ſeen for ſeveral miles, where Roman coins are frequently found. In Shrewſbury are 12 incorporated trading-companies; and the corporation has a power to try even capital cauſes of itſelf, except high-treaſon. Thigh-bones of dead men have been found here a yard long, and teeth three inches round and three long.

SHREWSBURY (earl of). See TALBOT.

SHRIKE, a ſpecies of LANIUS.

SHRIMP, in ichthyology. See SQUILLA.

SHRINE, in eccleſiaſtical hiſtory, a caſe or box to hold the relics of ſome ſaint.

SHROPSHIRE, a county of England, bounded on the ſouth by Worceſterſhire, Herefordſhire, and Radnorſhire; on the north, by Cheſhire; on the eaſt, by Staffordſhire; on the weſt, by Montgomeryſhire and Denbighſhire, in Wales. Its length is between 30 and 40 miles, its breadth about 30, and its circumference about 134. It is an inland county, of an almoſt circular form; and contains 890,000 acres, 139,000 inhabitants, and 15 hundreds, in which are 170 pariſhes and 15 market-towns. It makes a part of three biſhoprics, viz. Herefordſhire, Coventry and Litchfield, and St Aſaph. Some part of it lies on the north, and ſome on the ſouth ſide of the Severn. Beſides the Severn, it is alſo watered by the Tiſidiane, or Faſidiane, as it is called in Welch, which flows from the mountains of Radnorſhire; and by the Tern, which has its riſe and name from one of thoſe pools called *tearnes* in Staffordſhire. All theſe abound with fiſh, eſpecially trouts, pikes, lampreys, graylings, carp, and eels. The air, eſpecially upon the hills, with which the county abounds, is very wholeſome. There is as great a diverſity of ſoil, as in moſt other counties. On the hills, where it is poor, is very good paſture for ſheep; and in the low grounds, where it is very rich, along the Severn in particular, there is plenty of graſs for hay and black cattle, with all ſorts of corn. No county is better provided with fuel than this, having in it many inexhauſtible pits of coal; and alſo mines of lead and iron. Over moſt of the coal-pits in this county lies a ſtratum or layer of blackiſh porous rock, of which, by grinding and boiling, they make pitch and tar, which are rather better than the common ſort for caulking ſhips, as they do not crack, but always continue cloſe and ſmooth. Quarries of lime-ſtone and iron-ſtone are common enough in the county; and the ſoil in many places is a reddiſh clay. As it lies upon the borders of Wales, it was anciently full of caſtles and walled towns. On the ſide next that country there was an almoſt continued line of caſtles, to guard the county againſt the inroads and depredations of the Welch. The borders here, as thoſe between England and Scotland, were called *marches*, and there were certain noblemen intitled *barones marchiæ, marchiones de marchia Walliæ*, "lords marchers, or marquiſſes of the marches of Wales," who were veſted with a ſort of palatine juriſdiction, held courts of juſtice to determine controverſies, and enjoyed many privileges and immunities, the better to enable and encourage them to protect the county againſt the incurſions of the Welch, and to maintain order amongſt the borderers; but they often abuſed their power, and were the greateſt of tyrants.

As to the eccleſiaſtical government of the county, the far greater part, namely, all that belongs to the biſhoprics of Hereford, and of Litchfield and Coventry, is under the juriſdiction and viſitation of the archdeacon of Shrewſbury or Salop, and is divided into ſeveral deaneries.

The Oxford circuit includes in it this county, which ſends 12 members to parliament, viz. two for the ſhire, and two for each of the following towns, Shrewſbury, Ludlow, Wenlock, and Biſhop's Caſtle.

SHROVE-TUESDAY, is the Tueſday after Quinquageſima ſunday, or the day immediately preceding the firſt Lent; being ſo called from the Saxon word *ſhrive*,

ſhrive, which ſignifies *to confeſs*, as having been employed by the people in the time of Popery in confeſſing their ſins in order to receive the ſacrament, and thereby qualify themſelves for a more religious obſervation of Lent.

SHROUDS, (*ſcrud* Sax.) a range of large ropes extending from the maſt-heads to the right and left ſide of the ſhip, to ſupport the maſts and enable them to carry ſail, &c.

The ſhrouds as well as the ſails are detetmined from the maſts to which they belong. Thus they are the main, fore, and mizen ſhrouds; the main-top-maſt, fore-top-maſt, or mizen top-maſt-ſhrouds; and the main-top-gallant, fore-top-gallant, or mizen-top-gallant ſhrouds.—The number of ſhrouds by which a maſt is ſuſtained, as well as the ſize of rope of which they are formed, is always in proportion to the ſize of the maſt and the weight of the ſail it is intended to carry. See MAST and SAIL.

SHRUB, in botany, a plant which riſes with a woody durable ſtem, to a height ſuperior to that of under-ſhrubs, inferior to that of trees.

SHUTTLE, in the manufactures, an inſtrument much uſed by weavers, in the middle of which is an eye or cavity, wherein is incloſed the ſpoul with the woof.

SIALOGOGUES, medicines which promote the ſalivary diſcharge.

SIAM, a kingdom of Aſia in the Eaſt Indies, bounded on the north by Laos; on the eaſt, by Cambays and Keo; on the ſouth, by a gulph of the ſame name; and on the weſt, by the peninſula of Malacca. It is about 550 miles in length from north to ſouth, and 250 in breadth where it is broadeſt. In the rainy ſeaſon the rice-fields and meadows are overflowed in ſuch a manner as to render them very fruitful. The city of Siam ſtands on an iſland made by the river, in a low country, and is as fruitful as any ſpot of ground in the world; for it produces rice, ſeveral kinds of pulſe, many fruits and roots, with wild and tame cattle, and the river abounds in many ſorts of excellent fiſh. The city is about ten miles in circumference; and there are many canals from the river, which croſs the town ſeveral ways. The walls are high and thick, and are conſtructed of brick and ſtone; but the houſes, though large, are low, and built on ſtakes driven into the ground, about ten or twelve feet high. The king has three palaces; and there are many large temples, well adorned and decorated with gilded images. The women in Siam are the only merchants in buying goods, and generally maintain their huſbands with their traffic. The Europeans while at Siam accommodate themſelves with temporary wives; for the women are very fond of foreigners, and they agree with each other in the preſence of their neareſt friends and relations, and then it is a lawful marriage for the time agreed upon. Theſe wives are very obliging, and take the whole management of the houſehold-affairs into their own hands. They buy proviſions, dreſs the victuals, and take care of the cloaths, waſhing and mending them. If their huſbands have any goods to ſell, they ſet up a ſhop, and diſpoſe of them by retail, which is of more advantage than ſelling them by wholeſale. If the huſband leaves the kingdom, and is willing to continue the marriage, he leaves her about 6 s. 8 d. a month to live upon in his abſence, otherwiſe ſhe may take another huſband at the year's end. And here it muſt be noted, that women are never the worſe eſteemed for having been married to foreigners.

The natives of both ſexes go bare-headed, and cut their hair ſo as to leave it two inches long, and then they gum it, and comb it upwards; ſo that it looks rather like briſtles than hair, and makes their heads ſeem very large. They are well ſhaped, and have a large forehead, with a little noſe, and a handſome mouth, with plump lips, and black ſparkling eyes. The lappits of their ears are thick, and the men have but little hair on their chins. The men are of an olive complexion; but the women are of a ſtraw-colour, and very prolific. Even the courtiers have nothing but a cloth which reaches from the waiſt to the middle of the thigh, and a ſort of a waiſtcoat made of muſlin, with a cap upon their head covered with muſlin, and terminating in a point. The cloth that the men wrap about their middles is brought round between their legs, and turned into their girdles behind: but that of the women hangs down a little below their knees; and they cover their breaſts with another cloth, throwing the ends over their ſhoulder; the reſt of their bodies is quite naked, nor have they any covering on their heads: this muſt be underſtood of the better ſort; for the common people of both ſexes go quite naked, except a covering for thoſe parts which decency requires them to hide. They however adorn themſelves with rings, bracelets, and pendants. The general doctrine of this country is the tranſmigration of the ſoul.

SIBERIA, a very large country of Aſia, extending along all the northern part of the continent from the northern confines of Tartary quite to the Frozen Sea.

At what time this country was firſt inhabited, or by whom it was peopled, we are entirely ignorant. The Ruſſians, from whom we have received our knowledge, knew nothing of it before the middle of the 16th century. In the reign of John Baſilowitz I. indeed, an incurſion had been made into Siberia, and ſome Tartar tribes ſubdued: but theſe conqueſts were not permanent; and we hear of no further communication between Ruſſia and Siberia till the time of John Baſilowitz II. It was opened again at that time by means of one Anika Strogonoff, a Ruſſian merchant who had eſtabliſhed ſome ſalt-works at a town in the government of Archangel. This man carried on a trade with the inhabitants of the north-weſt parts of Siberia, who brought every year to the town abovementioned, large quantities of the fineſt furs. Thus he acquired a very conſiderable fortune in a ſhort time; when at laſt the czar, perceiving the advantages which would accrue to his ſubjects from having a regular intercourſe with Siberia, determined to enlarge the communication which was already opened. With this view he ſent into Siberia a body of troops, who croſſed the Yugorian mountains which form part of the north-eaſtern boundary of Europe. They ſeem, however, not to have paſſed the Irtiſh, or to have penetrated further than the weſtern branch of the river Oby. Some Tartar tribes were laid under contribution, and a chief named *Yediger* conſented to pay an annual tribute of a thouſand ſables. But this produced no laſting advantage to Ruſſia; for, ſoon after, Yediger

Siberia, Sibyls

was defeated and taken priſoner by Kutchum Khan, a deſcendant of the Great Jenghiz Khan: and thus the allegiance of this country to Ruſſia was diſſolved.

For ſome time we hear of no further attempts made by the Ruſſians on Siberia; but in 1577 the foundation of a permanent conqueſt was laid by one Yermac Temofeeff, a Coſſac of the Don. This man was at firſt the head of a party of banditti who infeſted the Ruſſians in the province of Caſan; but being defeated by the troops of the czar, he retired with 6000 of his followers into the interior parts of that province. Continuing his courſe ſtill eaſtward, he came to Orel, the moſt eaſterly of all the Ruſſian ſettlements. Here he took up his winter-quarters: but his reſtleſs genius did not ſuffer him to continue for any length of time in a ſtate of inactivity; and from the intelligence he procured concerning the ſituation of the neighbouring Tartars of Siberia, he turned his arms toward that quarter.

Siberia was at that time partly divided among a number of ſeparate princes, and partly inhabited by the various tribes of independent Tartars. Of the former Kutchum Khan was the moſt powerful ſovereign. His dominions conſiſted of that tract of country which now forms the ſouth-weſtern part of the province of Tobolſk; and ſtretched from the banks of the Irtiſh and Oby to thoſe of the Tobol and Tura. His principal reſidence was at Sibir, a ſmall fortreſs upon the river Irtiſh, not far from the preſent town of Tobolſk, and of which ſome ruins are ſtill to be ſeen. After a courſe of unremitted fatigue, and a ſeries of victories which almoſt exceed belief, but of which we have not room to give the detail, our intrepid adventurer diſpoſſeſſed this prince of his dominions, and ſeated himſelf on the throne of Sibir. The number of his followers, however, being greatly reduced, and perceiving he could not depend on the affection of his new ſubjects, he had recourſe to the czar of Muſcovy, and made a tender of his new acquiſitions to that monarch, upon condition of receiving immediate and effectual ſupport. This propoſal was received with the greateſt ſatisfaction by the czar; who granted him a pardon for all former offences, and ſent him the required ſuccours. Yermac, however, being ſoon after drowned in an unſucceſsful excurſion, the Ruſſians began to loſe their footing in the country. But freſh reinforcements being ſeaſonably ſent, they not only recovered their ground, but puſhed their conqueſts far and wide; wherever they appeared, the Tartars were either reduced or exterminated. New towns were built, and colonies were planted on all ſides. Before a century had well elapſed, all that vaſt tract of country now called *Siberia*, which ſtretches from the confines of Europe to the Eaſtern Ocean, and from the Frozen Sea to the preſent frontiers of China, was annexed to the Ruſſian dominions.

For an account of the climate, ſoil, and produce, &c. of this vaſt region, ſee the articles KAMTCHATKA and TARTARY.

SIBYLS, in pagan antiquity, certain women ſaid to have been endowed with a prophetic ſpirit, and to have delivered oracles for ſhowing the fates and revolutions of kingdoms, &c. The moſt eminent of the ten Sibyls mentioned by the ancient writers was ſhe whom the Romans called the *Cumæan* or *Erythræan Sibyl*, from her being born at Erythræ in Ionia, and removed from thence to Cumæ in Italy, where ſhe delivered all her oracles from a cave dug out of the main rock, according to Virgil, Æneid III. 441, &c.

Sicily.

There is ſtill preſerved, in eight books of Greek verſes, a collection of verſes pretended to have been delivered by the Sibyls: but the generality of critics look upon them as ſpurious; and it is the opinion of Prideaux that the ſtory of the books of the Sibyls ſold to Tarquin was a ſtate-trick or fetch of politics.

SICILY, a large iſland of the Mediterranean ſea, lying near the coaſt of Italy, between 12° and 16° E. Long. and between 37° and 39° N. Lat. being about 170 miles long and 100 broad. It is divided from Italy by the ſtraits of Meſſina, reaching from the Tower of Faro, which is the moſt northerly part of the iſland, to the *Capo dell' armi*, or the Cape of Arms, the moſt ſouthern part of Calabria. Theſe ſtraits, by the Latins called *Fretum Siculum*, by the Italians *Il Fare di Meſſina*, and by us the *Fare of Meſſina*, are between 12 and 15 miles over in the broadeſt places, and in the narroweſt about a mile and an half; inſomuch that when Meſſina was taken by the Carthaginians, many of the inhabitants are ſaid to have ſaved themſelves by ſwimming to the oppoſite coaſts of Italy. Hence has ariſen an opinion that the iſland of Sicily was originally joined to the continent, but afterwards ſeparated by an earthquake or ſome other natural cauſe. This ſeparation, however, is reckoned by the moſt judicious among the ancients to be fabulous; and they content themſelves with ſpeaking of it as a thing ſaid to have happened.

Anciently this iſland was called *Sicania*, *Sicilia*, and *Trinacria* or *Triquetra*; the two former it had from the Sicani and Siculi, who peopled a conſiderable part of the country; the two latter from its triangular figure. Its firſt inhabitants, according to the moſt reſpectable ancient authors, were the Cyclopes and Læſtrigones, who are ſaid to have ſettled in the countries adjoining to Mount Ætna; but of their origin we know nothing, except what is related by the poets. After them came the Sicani, who called themſelves the original inhabitants of the country; but ſeveral ancient hiſtorians inform us that they came from a country in Spain watered by the river Siconus. Diodorus, however, is of opinion, that the Sicani were the moſt ancient inhabitants of this iſland. He tells us that they were in poſſeſſion of the whole, and applied themſelves to cultivate and improve the ground in the neighbourhood of Ætna, which was the moſt fruitful part of the iſland: they built ſeveral ſmall towns and villages on the hills to ſecure themſelves againſt thieves and robbers; and were governed, not by one prince, but each city and diſtrict by its own king. Thus they lived till Ætna began to throw out flames, and forced them to retire to the weſtern parts of the iſland, which they continued to inhabit in the time of Thucydides. Some Trojans, after the deſtruction of their city, landed in the iſland, ſettled among the Sicani, and built the cities of Eryx and Egeſta, uniting themſelves with them, and taking the general name of Elymi or Elymæi. They were afterwards joined by ſome Phocenſes, who ſettled here on their return from the ſiege of Troy.

After the Sicani had for many ages enjoyed an undiſturbed

diſturbed poſſeſſion of the whole of Sicily, or ſuch parts of it as they choſe to inhabit, they were viſited by the Siculi, who were the ancient inhabitants of Auſonia properly ſo called; but being driven out from thence by the Opici, they took refuge in the iſland of Sicily. Not being contented with the narrow bounds allowed them by the Sicani, they began to encroach upon their neighbours; upon which a war enſuing, the Sicani were utterly defeated, and confined to a corner of the iſland, the name of which was now changed from *Sicania* into that of *Sicilia*.

About 300 years after the arrival of the Siculi, the iſland firſt began to be known to the Greeks, who eſtabliſhed various colonies, and built many cities in different parts of the iſland; and it is only from the time of their arrival that we have any hiſtory of the iſland. The firſt of the Greeks that came into Sicily were the Chalcidians of Eubœa, under the conduct of Thucles, who built Naxus, and a famous altar of Apollo, which, as Thucydides tells us, was ſtill ſtanding in his time without the city. The year after, which was, according to Dionyſius Halicarnaſſenſis, the third of the 17th Olympiad, Archias the Corinthian, one of the Heraclidæ, laid the foundations of Syracuſe. Seven years after, a new colony of Chalcidians founded Leontini and Catana, after having driven out the Siculi, who inhabited that tract. About the ſame time Lamis, with a colony from Megara, a city of Achaia, ſettled on the river Pantacius, at a place called *Trotilum*, where his adventurers lived ſome time in common with the Chalcidians of Leontini; but, being driven from thence by the Leontines, he built the city of Thapſus, where he died. Upon his death, the colony left Thapſus; and, under the conduct of Hyblon king of the Siculi, founded Megara Hyblæa, where they reſided 245 years, till they were driven out by Gelon tyrant of Syracuſe. During their abode at Megara, they ſent one Pamilus, who was come from Megara in Achaia, their original city, to build Selinus. This city was founded about 100 years after the foundation of Megara. Antiphemus and Entimus, the former a Rhodian, the other a Cretan, led each a colony of their countrymen, and jointly built the city of Gela on a river of the ſame name, eſtabliſhing in their new ſettlement the Doric cuſtoms, about 45 years after the founding of Syracuſe. The inhabitants of Gela founded Agrigentum 108 years after their arrival in Sicily, and introduced the ſame cuſtoms there. A few years after, Zancle was built by the pirates of Cumæ in Italy; but chiefly peopled by the Chalcidians, Samians, and Ionians, who choſe rather to ſeek new ſettlements than live under the Perſian yoke. Some time after, Anaxales, tyrant of Rhegium, drove out the ancient proprietors; and, dividing his lands amongſt his followers, called the city *Meſſana* or *Meſſene*, which was the name of his native city in Peloponneſus. The city of Himera was founded by the Zancleans under the direction of Eucleides, Simus, and Sacon; but peopled by the Chalcidians and ſome Syracuſan exiles, who had been driven out by the contrary faction.

The Syracuſians built Acræ, Chaſmenæ, and Camarina; the firſt 70 years, the ſecond 90, and the third 135, after the foundation of their own city. This is the account which Thucydides, a moſt judicious and exact writer, gives us of the various nations, whether Greeks or Barbarians, who ſettled in Sicily. Strabo counts among the ancient inhabitants of Sicily the Morgetes, who being driven out of Italy by the Oenotrians, ſettled in that part of the iſland where the ancient city of Morgantium ſtood. The Campani, who aſſumed the name of *Mamertini*, that is, *invincible warriors*, and the Carthaginians, who ſettled very early in Sicily, ought likewiſe to be counted among the ancient inhabitants of the iſland.

The iſland of Sicily continued to be divided between the Greeks and Carthaginians till the wars of the latter with the Romans, when the whole iſland was reduced to a province of that republic about the year 198 B. C. The free cities in the iſland before this time, beſides Syracuſe, were Leontini, Agrigentum, Gela, Meſſana, Himera, Catana, Ætna, Apollonia, Selinus, Taurominium, Agyris, and Centuripe. Theſe underwent the ſame viciſſitudes as SYRACUSE; being ſometimes governed by their own laws, and at other times enſlaved by domeſtic tyrants, till finally ſubdued by the Romans.

During the time of its ſubjection to the Romans, Sicily was not treated as the other conquered countries, but ſuffered to enjoy its ancient rights and privileges. This diſtinction it well deſerved, ſince the Sicilians were the firſt of foreign nations that had entered into an alliance with Rome, and the firſt conqueſt that the republic made out of Italy. This iſland was afterwards a kind of paſs for their troops into Africa; and Rome would not ſo eaſily have reduced the formidable power of Carthage, had not Sicily ſerved as a magazine for ſupplying her armies with proviſions, and been a ſecure retreat for her fleets. Hence Scipio Africanus, after having taken and deſtroyed Carthage, thought himſelf obliged to adorn the cities of Sicily with ſome of the richeſt ſpoils he had brought from Africa, that the Sicilians might have among them ſome monuments of thoſe victories to which they had greatly contributed.

About the time of the ſedition of the Gracchi, a moſt dangerous inſurrection of the Sicilian ſlaves took place on the following occaſion. The beſt eſtates in that country were in the hands of ſome rich men of the natives, and of the Roman knights (thoſe opulent publicans), who, finding their account more in employing ſlaves than huſbandmen of free condition to cultivate the farms, had tranſported ſuch multitudes of ſlaves thither, that the iſland ſwarmed with them. The ill treatment theſe wretches ſuffered from their maſters, who ſcarce allowed them neceſſary food or raiment, put them upon ſeeking by rapine what was needful for the ſupport of life. They frequently went out in gangs, plundered villages, and exerciſed all kinds of violence. The ſeveral prætors, ſucceſſively ſent from Rome into the iſland, had, out of fear of the maſters to whom the ſlaves belonged, neglected doing any thing effectual to remedy theſe diſorders: for the Roman knights were a powerful body, whom it was dangerous to diſoblige. Impunity naturally increaſed the miſchief; the ſlaves grew daily more licentious; and their going out in bands to rob, gave them an opportunity of forming plots to deliver themſelves from the yoke of ſervitude.

It happened that one Antigenes, a Cicilian, had a Syrian ſlave named *Eunus*, a man of ſpirit, and who had a particular talent for impoſing on the multitude. He pretended to have, by dreams and ſenſible apparitions, intercourſe with the gods. By breathing flames out of his mouth, and by a variety of other juggling tricks, he got at length into ſuch vogue as to paſs for an oracle. Whole crowds came to him to be told their fortunes. As to himſelf, he conſtantly publiſhed that his deſtiny was to be a king. His maſter, diverted with this whim, uſed frequently, when at table, to queſtion him concerning his future royalty, and the manner in which he would treat each of the gueſts then preſent. According to his different anſwers, ſome inſulted him, others ſent him meat from the table, craving his future protection when he ſhould be upon his throne. The jeſt proved ſerious in the event, as we ſhall preſently ſee, and Eunus did not forget the different treatment he had met with from his maſter's gueſts.

Among thoſe who repaired to this prophet for advice, there came at length the ſlaves of one Damophilus of Enna, a man of brutal character, and who had a wife no leſs inhuman. Cruelly treated by both, the ſlaves had formed a plot to murder both. However, before they proceeded to action, they thought it adviſable to aſk the oracle of the country, Whether the gods would proſper them in an enterpriſe they were meditating? Eunus anſwered, That whatever was their project, it was agreeable to the gods, and would infallibly ſucceed, provided they did not defer the execution. The ſlaves, thereupon, to the number of 400, armed with forks and ſcythes and other ruſtic weapons, aſſembled themſelves in all haſte, put Eunus at their head, and ſtraight marched to Enna; where, being joined by the ſlaves of the town, they maſſacred the inhabitants, without regard to age or ſex, and plundered the houſes. As for Damophilus, Eunus, to try him in form, erected, in the public theatre, a court of judicature, where he himſelf preſided. Some of thoſe ſlaves, whom the priſoner had treated barbarouſly, made themſelves the accuſers; and the multitude was judge. Damophilus pleaded earneſtly for himſelf, and moved many to compaſſion; but Hermias and Zeuxis, two ſlaves, more ſpirited with revenge, and more audacious than the reſt, approaching the accuſed, one of them, without farther ceremony, ran him thro' with a ſword, and the other cut off his head with an ax. And now Eunus was elected king, not for his valour or ſkill in martial affairs, but on account of his pretended inſpirations. He began his reign by putting to death all the priſoners, except ſuch as could make arms, and thoſe of his maſter's acquaintance who had uſed him civilly. He alſo gave up Damophilus's wife, Megallis, into the hands of her women-ſlaves, who, when they had whipped and otherwiſe tormented her as much as they pleaſed, threw her headlong down a precipice: but as for her daughter, who had always diſapproved the barbarity of her parents, and ſhowed great compaſſion to the ſlaves, they treated her with all imaginable reſpect and tenderneſs, and conveyed her ſafely to Catana, where they delivered her into the care of ſome of her relations. Eunus with his own hands ſlew Pytho and Antigenes, the two maſters he had ſucceſſively ſerved. After which, putting the regal circle on his head, and aſſuming the other ornaments of ſovereignty, he took the name of *Antiochus*, and called his followers *Syrians*. His next affair was to eſtabliſh a form of government among his ſubjects. He choſe out ſome of the ableſt men to be his council; and gave the command of his troops to an Achæan, an old ſoldier, who by his bravery and experience was qualified to command a better army. In three days, his followers increaſing to more than 6000 men, he commenced his military expeditions. It was in the year of Rome 615 that this tumult began, Didius being then prætor of Sicily. In 616, Manlius, who ſucceeded him, was defeated by the rebels, and his camp plundered. The like miſfortune happened to P. Cornelius Lentulus in 617; and in 618, when Calpurnius Piſo was prætor, Eunus had ſtill the advantage over the Romans. Three prætors thus vanquiſhed ſucceſſively by the ſlaves, ſtruck a terror throughout the whole iſland. Eunus's army grew daily more numerous. Cleon, a Sicilian ſlave, had taken it into his head to imitate him; and, having got together 5000 ſlaves, had pillaged Agrigentum and the territory about it. It was hoped at firſt, that theſe two leaders would be competitors for dominion, and deſtroy one another; but, contrary to all mens expectations, they joined forces, and Cleon ſerved as general under Eunus.

The Roman affairs were in this bad ſituation, when the prætor Plautius Hypſæus, in the year 619, came into Sicily, to reſtore them. Far from ſucceeding, he ſuffered a total defeat by the rebels; whoſe army, after this victory, augmented to near 200,000 men; they ravaged the whole country, and took many cities.

The example of the ſlaves in Sicily infected thoſe in Italy and Greece, and occaſioned inſurrections there. Theſe, however, were eaſily quelled. Calpurnius Piſo, one of the conſuls for the year 620, having firſt reſtored diſcipline, that was much relaxed among the troops, overthrew the ſlaves before Meſſana, to which they had laid ſiege: 8000 of them periſhed in the action, and the priſoners were all crucified. Notwithſtanding this victory, the war continued, till Rupilius, one of the conſuls of the year 621, had the command of the Roman forces. After his arrival in the iſland, he ſucceſſively laid ſiege to Tauromenium and Enna, the ſtrongeſt places in the poſſeſſion of the ſlaves. Both were betrayed into his hands. Twenty thouſand of the rebels are ſaid to have been cut off. Eunus, with 600 of his guards, eſcaped from Enna, and took refuge in a ſteep rocky place. Being there inveſted by the Romans, and having no hope to eſcape, they ſlew one another, to avoid a more painful death. King Eunus hid himſelf in a cave, whence he was quickly dragged out, together with his cook, his baker, the man that uſed to rub him when he bathed, and a buffoon whoſe buſineſs had been to divert him at his meals. Rupilius ſent him in chains to Morgantia, where, conſumed with vermin, he miſerably ended his days in priſon.

The tranquillity eſtabliſhed on this occaſion, laſted not long. The Romans, finding themſelves in great danger from the Cimbri and Teutones, applied for ſuccours to the eaſtern nations; and among the reſt to Nicomedes king of Bithynia. That monarch, however, excuſed himſelf; alleging, that a great number of his ſubjects had been forcibly carried away into ſlavery, by thoſe who farmed the revenues of the republic in the eaſt. The complaint appearing to the ſenate to be well-grounded, they paſſed a decree, that no freemen of the Roman allies ſhould in any province be treated as ſlaves; and that the proconſuls and prætors ſhould take care that all ſuch as had been injuriouſly forced into ſlavery ſhould be ſet free. In obedience to this decree, Licinius Nerva, prætor in Sicily, gave liberty in a few days to above 800 ſlaves. The chief men of the iſland, foreſeeing how much they ſhould be loſers by the execution of this decree, addreſſed themſelves to the prætor, and begged of him to manumiſe no more of the ſlaves. Licinius, either prevailed upon by bribes, or deſiring to ingratiate himſelf with the rich, would no longer liſten to the complaints of ſuch of the ſlaves as, having been forced into ſlavery, had recourſe to him for redreſs. On the contrary, he gave them rough language, and ſent them home to their maſters. The ſlaves hereupon had recourſe to arms. About 200 of them having poſted themſelves upon a rock, fortified it, and defended themſelves for ſome time againſt all the efforts of Licinius. At length he ſent for one C. Titinius, who had been ſome years before condemned to death; but having eſcaped from puniſhment, now practiſed robbery. To this man Licinius promiſed pardon and protection, if by his means the ſlaves ſhould be reduced. Titinius, with a body of his aſſociates, went over to the rebels, as if to ſpirit them againſt their enemies. Being well received by them, and for his bravery declared their general, he ſoon after betrayed them into the hands of the Romans. This inſurrection thus ſuppreſſed, was immediately followed by another. In a few days the rebels amounted to 2000 men; and, after a victory which they obtained over a Roman detachment, their number increaſed to above 6000. They then choſe themſelves a king, one Salvius, a pretender to the art of divination by inſpecting the entrails of animals. After ſome time ſpent in plundering the country, Salvius laid ſiege to Morgantia; and Licinius advanced with a view to relieve the place. But the rebels turned upon him, and, having the advantage of the ground, defeated him. Only 600 men of the Roman army fell in this action, but 4000 were taken priſoners; for Salvius had prudently proclaimed quarter to all who ſhould throw down their arms.

On the report of this victory, ſuch multitudes flocked in to the rebels from all parts, that their army was doubled, and they renewed their attacks upon Morgantia; at the ſame time promiſing liberty to the ſlaves within the town. But their maſters making them the ſame promiſe in caſe of victory, the ſlaves fought ſo bravely that they forced the rebels to raiſe the ſiege. Nevertheleſs Licinius annulled the promiſe made to thoſe ſlaves, who thereupon went over to the enemy.

The contagion of rebellion ſpread itſelf to the territories of Ægeſta and Lilybæum. Athenio, a Cilician, a pretender to divination by the ſtars, got together about 1000 of his fellow-ſlaves; and he too aſſumed the title of *king*. His army increaſing to 10,000 able-bodied men, (for he would not, like king Salvius, receive promiſcuouſly all that came to him), he laid ſiege to Lilybæum, a place that was deemed impregnable. Athenio, after ſome time, became ſenſible of his error; and then, that he might quit his enterpriſe without diſhonour, pretended, that the gods had foretold him by the ſtars, that if the army continued the ſiege, ſome ſudden misfortune would certainly befall it. A fleet from Mauritania, with ſuccours ſent by king Bocchus to the Romans, happened to arrive at Lilybæum juſt at the time when Athenio began to decamp; and thoſe Africans landed ſoon enough to fall upon the rear of the rebel army, which ſuffered a conſiderable loſs: but this loſs was more than compenſated to Athenio by the increaſe of credit which his aſtrological prediction gained him.

In the mean time Salvius, who had aſſumed the name of *Tryphon*, a name formerly borne by one of the kings of Syria, choſe Triocala for his place of reſidence. There he built a palace; fortified the caſtle, which was before very ſtrong; and enlarged the town. From hence he ſent as king, a command to Athenio to come and join him with the forces he had collected. Contrary to all mens expectations, Athenio obeyed, and marched to Triocala with 3000 men; the remainder of his army he had diſperſed over the country to pillage it, and to engage as many of the ſlaves as they could to take part with him. The two generals for ſome time lived amicably together; but at length Tryphon, ſuſpecting Athenio of a deſign to ſupplant him, cauſed him to be ſeized and put under confinement.

The next year, 650, Licinius Lucullus, who ſucceeded Licinius Nerva in the prætorſhip of Sicily, landed in the iſland with 17,000 men. On the news of their arrival, Tryphon releaſed Athenio, and marched with him at the head of 40,000 men to meet Lucullus. The battle was long doubtful. Athenio fought with great bravery; but having received three wounds, by two of which his legs were lamed, he at length fell among the dead. Hereupon the ſlaves loſt courage, and took to their heels. Twenty thouſand of them were ſlain; the reſt, by favour of the night, eſcaped with their king to Triocala. Athenio, tho' grievouſly wounded, was not killed; in the dark, he made a ſhift to creep away and join his companions. The rebels, much diſheartened by their loſs, held a council to deliberate upon the ſtate of their affairs. Some propoſed ſubmiſſion to their maſters at diſcretion; but the prevailing opinion was to fight it out to the laſt. Lucullus gave them time to recover themſelves; for it was nine days after the battle before he inveſted Triocala; and then the rebels made ſo reſolute a defence, that they obliged him to quit the enterpriſe. Nor did the Roman general take any further meaſures to cruſh the rebellion: his only care was to enrich himſelf at the expence of his province. Of this, at his return to Rome, he was accuſed before the people, and found guilty.

The prætor Servilius, who, in 651, ſucceeded Lucullus, had no ſucceſs againſt the rebels. Tryphon was now dead: His ſucceſſor Athenio, always brave and enterpriſing, forced the Roman camp, took towns, and ravaged the country at pleaſure.

In 652, the fifth conſulſhip of Marius, the ſenate thought proper to commiſſion his coleague Aquilius to conduct that war, in which three prætors had been foiled. This new general applied himſelf chiefly to cut off the enemies proviſions; nor does he ſeem to have offered them battle till the next year, when their number was conſiderably diminiſhed.

He then entirely defeated them in a general engagement, wherein, it is ſaid, he fought hand to hand with Athenio, and killed him, after being wounded by him in the head. About 10,000 of the rebels eſcaped to their ſtrong holds, where Aquilius afterwards deſtroyed them chiefly by famine. A thouſand ſtill remained under a leader named *Satyrus*, and theſe ſurrendered themſelves. The proconſul promiſed them pardon; but when he had tranſported them to Rome, he condemned them to fight with wild beaſts. This they refuſed to do; and choſe rather to fall by the hands of one another: Satyrus alone remaining, he ran upon his own ſword, and was the laſt that periſhed on account of this rebellion, which had laſted four years. We are told, that in this and the former ſervile war in Sicily a million of ſlaves were deſtroyed.

In A. D. 439, when the weſtern empire began to fail, Sicily ſhared the ſame fate with the reſt of the provinces, whoſe ſufferings indeed had begun long before. At this time the Vandals, under their king Genſeric, made a deſcent on the iſland, and ravanged all the open country, but were unable to take the city of Palermo, to which they laid ſiege; however, they returned to Africa with a very conſiderable booty.—In 475 Genſeric was attended with better ſucceſs; reducing not only the iſland of Sicily, but all thoſe between Italy and Africa. The next year Sicily was ceded by him to Odoacer, (who at this time totally ſubverted the Roman empire in the weſt), on condition that he ſhould hold the iſland of him, and pay him a yearly tribute; for ſecuring which he kept the ſtrong caſtle of Lilybæum. In the year 550 the whole iſland was reduced by Totila the Goth: however, it was next year given up to the emperor of Conſtantinople, who kept poſſeſſion of it till 857, when the Arabs made a deſcent upon it; and five years after, according to ſome hiſtorians, made themſelves maſters of the whole. They appear to have kept poſſeſſion of the iſland till the year 1040, when the Greeks, aſſiſted by the Normans, took it from them. The hiſtory of Sicily from that time is related under the article NAPLES, n° 20—28.

The iſland has ſince continued in the hands of the royal family of Spain; and having been reunited to the kingdom of Naples, the king of Spain's eldeſt ſon is now king of Sicily as well as of Naples. See SPAIN.

Sicily is ſeparated, as we have already obſerved, from Italy, by a narrow ſtrait called the *Fare of Meſſina*. This ſtrait is ſtill remarkable for the rapidity of its currents, and the irregular ebbing and flowing of the ſea, which ſometimes ruſhes in with ſuch violence as to endanger ſhips riding at anchor. Anciently it was much more remarkable for the Scylla and Charybdis, one a rock, and the other a whirlpool, between which it was very dangerous to ſteer, and concerning which ſo many fables have been related by the ancients. Scylla is a rock on the Italian ſide, oppoſite to Cap Pylores, which runs out into the ſea on the Sicilian ſide. Mr Brydone informs us, that the navigation of the ſtraits is not even yet performed without danger. He informs us, that the noiſe of the current which ſets through the ſtraits may be heard for ſeveral miles, like the roaring of ſome large impetuous river confined between narrow banks. In many places the water roſe into whirlpools and eddies, which are dangerous to ſhipping. The current ſet exactly for the rock of Scylla, and would certainly have carried any thing thrown into it againſt that point. Our author, however, is by no means of opinion that the ſtrait is ſo dangerous as the ancients have repreſented it; though he thinks that the ſtrait is now probably much wider than formerly, which may have diminiſhed the danger. There are many ſmall rocks, which ſhow their heads near the baſe of the large ones. Theſe are probably the dogs, deſcribed by the ancient poets as howling round Scylla*. The rock is near 200 feet high, and has a kind of caſtle or fort built on its ſummit with a town called *Scylla* or *Sciglio*, containing 300 or 400 inhabitants on its ſouth ſide, which gives the title of prince to a Calabreſe family.

Charybdis is now ſo much diminiſhed, that it ſeems almoſt reduced to nothing in compariſon of what it was; though even yet it is not to be paſſed without danger. See CHARYBDIS.

In the ſtraits, Mr Brydone informs us, a moſt ſurpriſing phenomenon is to be obſerved. In the heat of ſummer, after the ſea and air have been much agitated, there appear in the heavens over the ſtraits a great variety of ſingular forms, ſome at reſt, and others moving with great velocity. Theſe forms, in proportion as the light increaſes, ſeem to become more aerial, till at laſt, ſome time before ſun-riſe, they totally diſappear. The Sicilians repreſent this as the moſt beautiful ſight in nature. Leonti, one of their beſt and lateſt writers, ſays, that the heavens appear crowded with a variety of objects, ſuch as palaces, woods, gardens, &c. beſides the figures of men and other animals that appear in motion among them. Some treatiſes have been written concerning this phenomenon; but nothing ſatisfactory has been delivered concerning its cauſe.

Though Sicily lies in a warm climate, the air is healthful, being refreſhed with ſea-breezes on every ſide. Anciently its fertility was ſuch, that it was ſtyled the granary or ſtore-houſe of Italy; nor has it yet loſt its glory in this reſpect, producing, in great abundance, corn, wine, oil, fruits, ſugar, honey, wax, ſaffron, and ſilk. Here are alſo ſome mines of gold, ſilver, iron, and other metals; with ſeveral kinds of minerals, as alum, vitriol, ſaltpetre, and mineral ſalt. The mountains yield alſo emeralds, jaſper, agate, porphyry, and lapis lazuli. A good deal of coral is found upon the coaſt, and plenty of excellent fiſh; among which are the peſce ſpada, or ſword-fiſh, and tunnies.

Of theſe commodities, particularly ſilk, raw or manufactured, great quantities uſed to be exported from Meſſina, the great ſea-port and emporium of the kingdom; where a conſul from almoſt every nation in Europe reſided, to manage and protect the trade of his nation. But that city is now no more; having been totally deſtroyed by the late earthquake and eruption of Ætna, (Feb. 5. 7. 8. 1783), when a vaſt number of inferior towns and villages, together with the Lipari iſlands adjacent, are ſaid to have ſhared the ſame fate, and moſt of their inhabitants, including many of the firſt eminence, to have periſhed.

Here are ſeveral rivers and good ſprings; but few of the rivers are navigable, having but a ſhort courſe, and deſcending precipitately from the mountains. The chief are the Cantera, the Jarretta, and the Salſo; of which, the two former run from weſt to eaſt, and the third from north to ſouth.

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* See *Scylla*.

Of the mountains in this iſland the moſt noted is Mount Ætna, now called *Monte Gibello*, or *Mongibello*, a volcano whoſe eruptions have often proved fatal to the neighbouring country. See ÆTNA.

While Sicily was immediately ſubject to Spain, it was governed by a viceroy ſent thither, who received from thence a revenue of above 4,000,000 crowns; but ſince it hath, jointly with Naples, been erected into a kingdom, under the name of the Two Sicilies, the face of affairs, as well as form of government, is ſaid to be much altered, though, it is to be feared, not much in favour of the inhabitants. The nobility are ſo numerous in this iſland, that Labit ſays it is paved with noblemen; there being no leſs than 60 dukedoms, 56 marquiſates, and upwards of 100 earldoms, beſides a great number of baronies. This people, with reſpect to their character, are far from appearing in a favourable light; being repreſented as a perverſe race, who muſt be kept under with a high hand, according to an old proverb, *Inſulani plerumq. mali, Siculi autem omnium peſſimi.* They are a mixture of Italians and Spaniards; but ſpeak chiefly Spaniſh, and follow the Spaniſh faſhions, particularly in wearing black. The eſtabliſhed religion of the iſland is the Roman-Catholic. The Jews are now allowed to ſettle here, and make open profeſſion of their religion; which was not the caſe while the iſland was immediately ſubject to Spain. The number of churches, convents, and religious foundations here, is very great, and they are well endowed. There is a ſovereign tribunal, which judges in all eccleſiaſtical affairs, and admits of no appeal to the pope. The iſland is commonly divided into three parts or provinces, viz. Val di Demoni, Val di Noto, and Val Mazara.

SICINNIUS (Dentatus), a tribune of the people, lived a little after the expulſion of the kings from Rome. He was in 120 battles and ſkirmiſhes, beſides ſingle combats, in all of which he came off conqueror. He ſerved under nine generals, all of whom triumphed by his means. In theſe battles he received 45 wounds in the fore-part of his body, and not one in his back. The ſenate made him great preſents, and he was honoured with the name of the Roman Achilles.

SIDEREAL YEAR. See ASTRONOMY, n° 290.

SIDERIA, in natural hiſtory, the name of a genus of cryſtals, uſed to expreſs thoſe altered in their figure by particles of iron. Theſe are of a rhomboidal figure, and compoſed only of ſix planes. Of this genus there are four known ſpecies. 1. A colourleſs, pellucid, and thin one; found in conſiderable quantities among the iron ores of the foreſt of Dean in Glouceſterſhire, and in other the like places. 2. A dull, thick, and brown one; not uncommon in the ſame places with the former. And, 3. A black and very gloſſy kind, a foſſil of great beauty; found in the ſame place with the others, as alſo in Leiceſterſhire and Suſſex.

SIDEROXYLUM, IRON-WOOD; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are four ſpecies; the inerme, the oppoſitifolium, the lycioides, and the tenax.

The wood of theſe trees being very cloſe and ſolid, has given occaſion for this name being applied to them, it being ſo heavy as to ſink in water; and the title of iron-wood having been applied to the wood by the inhabitants of the countries where it grows, has occaſioned the botaniſts to conſtitute a genus by this name. But as the characters of the plants have not been ſo well examined as could be wiſhed, occaſioned by their ſeldom flowering in Europe, it is very probable, that the plants which have been ranged under this genus do not properly belong to it; for Dr Plukenet has figured a plant under the title of *ebenus Jamaicenſis*, whoſe characters are very different from thoſe aſſigned to this genus: and the Jamaica iron-wood is totally different from both in its characters, for this has male and female flowers on different trees; the male flowers have no petals.

Theſe plants are natives of warm countries; ſo cannot be preſerved in this country unleſs they are placed, the two former in a warm ſtove, the others in a green-houſe. They are propagated by ſeeds, when theſe can be procured from abroad.

SIDNEY (Sir Philip), the eldeſt ſon of Sir Henry Sidney, and Mary the daughter of John Dudley duke of Northumberland, was born in the year 1554 at Penſhurſt in Kent. From a grammar-ſchool at Shrewſbury he was ſent to Chriſt-church, Cambridge, where he continued till the age of 18, and then ſet out upon his travels. Immediately on his arrival in France, Charles IX. made him one of his gentlemen of the bed-chamber; but he had hardly entered upon his office, before the horrid maſſacre of the Proteſtants began. He ſaved his life by taking refuge in the houſe of Sir Francis Walſingham the Engliſh ambaſſador. Not chooſing to continue longer at the court of an infernal aſſaſſin, he travelled to Francfort, where he became acquainted with the learned Hubert Languet, whoſe future epiſtles to Sir Philip Sidney have been ſo much admired. In 1573, he ſet out for Vienna, whence he proceeded to Hungary, and thence to Italy, where he continued till the latter end of ſummer 1574. Returning thro' Germany and Flanders, he arrived in England in May 1575.

Our young traveller was at this time only in the 21ſt year of his age; nevertheleſs, the queen was ſo charmed with his abilities and addreſs, that in 1576 ſhe ſent him ambaſſador to congratulate the emperor Rodolph II. on his acceſſion, charging him at the ſame time with ſeveral important negotiations with other German princes.

In 1579, he wrote a private letter to the queen, diſſuading her from the marriage then in agitation with the duke of Anjou; which letter ſeems to have been taken by her majeſty in good part. In the following year Mr Sidney had a quarrel with the earl of Oxford in a tennis-court; which probably would have ended in a duel, had not the queen interfered. However, Sidney was diſguſted, retired from court, and amuſed himſelf with writing his *Arcadia*. Whilſt he was thus employed, the Spaniards having taken poſſeſſion of the kingdom of Portugal on the death of the late king Don Antonio, the competitor for that crown earneſtly ſolicited Mr Sidney's aid.

In 1581, we find our young hero again at court, principally engaged in juſts and tournaments, which were celebrated for the entertainment of the duke of Anjou, then in England; whom he accompanied, with ſeveral of the firſt nobility, to Antwerp. In 1583, the prince Palatine being inſtalled knight of the garter, Mr Sidney was appointed to poſſeſs the ſtall in his name, and received the honour of knighthood on that occaſion. In 1585, he projected an expedition to America, in conjunction with Sir Francis Drake; but when he was at Plymouth ready to ſail, he received an expreſs from the queen, brought by a peer of the realm, commanding him to return to court.

Soon after this diſappointment, he was made governor of Fluſhing; and general of horſe under his uncle the earl of Leiceſter, who at that time commanded the queen's troops in the Low Countries. In this ſervice, his courage, prudence, and ſagacity, were ſo eminently conſpicuous, that his fame became univerſal; ſo univerſal, that the republic of Poland would probably have elected him their king, had not queen Elizabeth refuſed her aſſiſtance. On the 22d of September 1586, in a luckleſs hour, the gallant Sidney was ſent out with a party to intercept a convoy marching towards Zutphen. The morning being hazy, they fell into an ambuſcade of the enemy, and Sir Philip having juſt mounted his ſecond horſe, received a ſhot in the thigh, which broke the bone to pieces. He was carried to Arnheim, and on the 17th of October expired. Thus fell the amiable, the virtuous, the accompliſhed, the brave, Sir Philip Sidney, in the 32d year of his age; a polite ſcholar, the patron of learning and genius, and the object of univerſal panegyric. His body was brought to England, and buried with great pomp, at the queen's expence, in St Paul's cathedral. The funeral proceſſion was ſo uncommonly magnificent, as to be deemed a ſubject worthy the pencil of Lant, an eminent deſigner. It was afterwards engraved on 34 plates by Theodore de Brie, a native of Liege.

SIDNEY (Algernon), was ſecond ſon of Robert earl of Leiceſter. During the civil wars, he adhered to the intereſt of parliament, in whoſe army he was a colonel; and was nominated one of the king's judges, though he did not ſit among them. He was a zealous republican; and conſequently a violent enemy to Cromwel, after he had made himſelf protector. In 1659 he was appointed by the council of ſtate to go with Sir Robert Honeywood, and Bulſtrode Whitelocke, Eſq; commiſſioners to the Sound, to mediate a peace between the kings of Sweden and Denmark. At the reſtoration, colonel Sidney would not perſonally accept of the oblivion and indemnity then generally granted to the whole nation, but continued abroad till 1677, when he obtained from the king a particular pardon, upon repeated promiſes of conſtant quiet and obedience for the future. In 1683, however, he was accuſed of being concerned in the Rye-houſe plot; and after the lord Ruſſel had been examined, he was next brought before the king and council. He ſaid that he would make the beſt defence he could, if they had any proof againſt him; but he would not fortify their evidence by any thing he ſhould ſay; ſo that the examination was very ſhort. He was arraigned for high-treaſon before the lord chief juſtice Jeffreys at the king's bench, tried, found guilty, and beheaded in 1683. He wrote *Diſcourſes on Government*, which have been often printed, and are eſteemed deciſive authorities in politics; inſomuch, that ſome have declared them an ample recompence for the loſs of Cicero's ſix books *De Republica*. Is is certain they abound with ſtrong ſenſe and good learning; and ſhow their author to have been very conſummate in the knowledge of human nature and civil polity.

SIDON, (anc. geog.), a city of Phœnicia in Aſia, famous in Scripture for its riches, ariſing from the extenſive commerce carried on by its inhabitants. Heavy judgments were denounced againſt the Sidonians on account of their wickedneſs, which were accompliſhed in the time of Ochus king of Perſia: for that monarch having come againſt them with an army on account of their rebellion, the city was betrayed by its king; upon which the wretched inhabitants were ſeized with ſuch deſpair, that they ſet fire to their houſes, and 40,000, with their wives and children, periſhed in the flames.

SIEGE, in the art of war, is to ſurround a fortified place with an army, and approach it by paſſages made in the ground, ſo as to be covered againſt the fire of the place.

SIEGEN, a town of Germany in Wetteravia, with a caſtle and the title of a principality, which it givss to a branch of the houſe of Naſſau. It is ſeated on a river of the ſame name, in E. Long. 8. 5. N. Lat. 50. 43.

SIENNA, a large, ancient, and celebrated city of Tuſcany in Italy; capital of the Sienneſe, with an archbiſhop's ſee, a famous univerſity, and a citadel. It is about four miles in circumference, and ſurrounded with an old wall. The metropolitan church is much eſteemed by travellers; and though it is a Gothic ſtructure, the architecture is admirable. It is built with black and white marble, and the pavement is of Moſaic work. The town is adorned with a great number of palaces, fountains, and ſuperb churches, as alſo a magnificent hoſpital. The great area is round, and the houſes about it are of the ſame height, ſupported by piazzas, under which people may walk in all weathers; in the middle is a baſon, which they can fill with water at any time, and repreſent a ſea-fight with ſmall veſſels. The Italian language is taught here with ſuch purity, that a great many foreigners frequent it on that account. It is ſeated on three eminences, in a fertile ſoil; in E. Long. 11. 26. N. Lat. 43. 20.

SIENNESE, a duchy in Italy; bounded on the north by the Florentino, on the ſouth by the Mediterranean ſea and the duchy of Caſtro, on the eaſt by the Perugino and Orvietano, and on the weſt by the Florentino and the Tuſcan ſea; being about 55 miles in length, and as much in breadth. The ſoil is pretty fertile, eſpecially in mulberry-trees, which feed a great number of ſilk-worms; and there are ſeveral mineral ſprings. Sienna is the capital town.

SIERRA MORENA, mountains of Andaluſia in Spain.

SIFANTO, or SIPHANTO, an iſland of the Archipelago, to the weſt of Paros, to the north-eaſt of Milo, and to the ſouth-weſt of Serphanto. The air is ſo good here, that many of the inhabitants live to the age of 120; and their water, fruits, wild fowl, and poultry, are excellent, but more eſpecially the grapes. It abounds with marble and granite, and is one of the moſt fertile and beſt cultivated of theſe iſlands. The inhabitants employ themſelves in cultivating olive-trees and capers; and they have very good ſilk. They trade in figs, onions, wax, honey, and ſtraw-hats; and may be about 8000 in all. E. Long. 25. 15. N. Lat. 38. 0.

SIEUR, a title of reſpect among the French, like that of *maſter* among us. It is much uſed by lawyers, as alſo by ſuperiors in their letters to inferiors.

SIGETH, a town of Lower Hungary, and capital of a county of the ſame name. It is ſeated in a moraſs, and has a triple wall, with ditches full of water; and is defended by a citadel, being one of the ſtrongeſt places in Hungary. It now belongs to the houſe of Auſtria, and was retaken from the Turks in 1669, after it had been blocked up two years. In ſome maps it is called *Zigat*. E. Long. 18. 30. N. Lat. 46. 35.

SIGHT, or VISION. See ANATOMY, n° 406. and *Index* ſubjoined to OPTICS.

Imperfection of SIGHT *with regard to Colours.*—Under the article COLOURS, is given an inſtance of a ſtrange deficiency of ſight in ſome people who could not diſtinguiſh between the different colours. In the Phil. Tranſ. Vol. LXVIII. p. 611. we have an account of a gentleman who could not diſtinguiſh a claret colour from black. Theſe imperfections are totally unaccountable from any thing we yet know concerning the nature of this ſenſe.

SIGN, in general, the mark or character of ſomething abſent or inviſible. See CHARACTER.

Among phyſicians, the term *ſign* denotes ſome appearance in the human body which ſerves to indicate or point out the condition of the patient with regard to health or diſeaſe.

SIGN, in algebra. See ALGEBRA, ſect. i.

SIGN, in aſtronomy, a conſtellation containing a 12th part of the zodiac. See ASTRONOMY, n° 110. 135.

SIGNALS, certain alarms or notices uſed to communicate intelligence to a diſtant object at ſea.

Signals are made by firing artillery, and diſplaying colours, lanthorns, or fire-works; and theſe are combined by multiplication and repetition. Thus, like the words of a language, they become arbitrary expreſſions, to which we have previouſly annexed particular ideas: and hence they are the general ſources of intelligence throughout a naval armament, &c.

Signals ought to be diſtinct, with ſimplicity. They are ſimple when every inſtruction is expreſſed by a particular token, in order to avoid any miſtakes ariſing from the double purport of one ſignal. They are diſtinct when iſſued without precipitation, when ſufficient time is allowed to obſerve and obey them, and when they are expoſed in a conſpicuous place, ſo as to be readily perceived at a diſtance.

All ſignals may be reduced into three different kinds, viz. thoſe which are made by the ſound of particular inſtruments, as the trumpet, horn, or fife; to which may be added, ſtriking the bell or beating the drum. Thoſe which are made by diſplaying pendents, enſigns, and flags of different colours; or by lowering or altering the poſition of the ſails; and, finally, thoſe which are executed by rockets of different kinds; by firing cannon or ſmall arms; by artificial fire-works; and by lanthorns.

Firing of great guns will ſerve equally in the day or night, or in a fog, to make or confirm ſignals, or to raiſe the attention of the hearers to a future order. This method, however, is attended with ſome inconveniences, and ſhould not be uſed indiſcriminately. Too great a repetition of the cannon is apt to introduce miſtakes and confuſion, as well as to diſcover the track of the ſquadron. The report and flight of the rockets is liable to the ſame objection, when at a ſhort diſtance from the enemy.

It is then, by the combination of ſignals, previouſly known, that the admiral conveys orders to his fleet; every ſquadron, every diviſion, and every ſhip of which has its particular ſignal. The inſtruction may therefore occaſionally be given to the whole fleet, or to any of its ſquadrons; to any diviſion of thoſe ſquadrons, or to any ſhip of thoſe diviſions.

Hence the ſignal of command may at the ſame time be diſplayed for three diviſions, and for three ſhips of each diviſion; or for three ſhips in each ſquadron, and for only nine ſhips in the whole fleet. For, the general ſignal of the fleet being ſhown, if a particular pendant be alſo thrown out from ſome particular place on the ſame maſt with the general ſignal, it will communicate intelligence to nine ſhips that wear the ſame pendant.

The preparatory ſignal given by the admiral to the whole or any part of his fleet, is immediately anſwered by thoſe to whom it is directed; by ſhowing the ſame ſignal, to teſtify that they are ready to put his orders in execution. Having obſerved their anſwer, he will ſhow the ſignal which is to direct their operations: as, To chace, to form the line, to begin the engagement, to board, to double upon the enemy, to rally or return to action, to diſcontinue the fight, to retreat and ſave themſelves. The dexterity of working the ſhips in a fleet depends on the preciſe moment of executing theſe orders, and on the general harmony of their movements; a circumſtance which evinces the utility of a ſignal of preparation.

As the extent of the line of battle, and the fire and ſmoke of the action, or other circumſtances in navigation, will frequently prevent the admiral's ſignals from being ſeen throughout the fleet, they are always repeated by the officers next in command; by ſhips appointed to repeat ſignals; and, finally, by the ſhip or ſhips for which they are intended.

The ſhips that repeat the ſignals, beſides the chiefs of ſquadrons or diviſions, are uſually frigates lying to windward or to leeward of the line. They ſhould be extremely vigilant to obſerve and repeat the ſignals, whether they are to tranſmit the orders of the commander in chief, or his ſeconds, to any part of the fleet; or to report the fortunate or diſtreſsful ſituation of any part thereof. By this means all the ſhips from the van to the rear will, unleſs diſabled, be ready at a moment's warning to put the admiral's deſigns in execution.

To preſerve order in the repetition of ſignals, and to favour their communication, without embarraſſment, from the commander in chief to the ſhip for which they are calculated, the commanders of the ſquadrons repeat after the admiral; the chiefs of the diviſions, according

cording to their order of the line, after the commanders of the ſquadrons; and the particular ſhips after the chiefs of the diviſions; and thoſe in return, after the particular ſhips, *vice verſa*, when the object is to convey any intelligence from the latter to the admiral.

Beſides the ſignals above-mentioned, there are others for different ranks of officers; as for captains, lieutenants, maſters, &c. or for any of thoſe officers of a peculiar ſhip.

SIGNALS *by the Drum*, made uſe of, in the exerciſe of the army, inſtead of the word of command, viz.

SIGNALS.	*Operations.*
A ſhort roll, -	To caution.
A flam,	To perform any diſtinct thing.
To arms, -	To form the line or battalion.
The march, -	To advance, except when intended for a ſalute.
The quick march,	To advance quick.
The point of war,	To march and charge.
The retreat, -	To retreat.
Drum ceaſing, -	To halt.
Two ſhort rolls, -	To perform the flank-firing.
The dragoon march,	To open the battalion.
The grenadier march,	To form the column.
The troop, -	To double diviſions.
The long roll, -	To form the ſquare.
The grenadier march,	To reduce the ſquare to the column.
The preparative, -	To make ready and fire.
The general, -	To ceaſe firing.
Two long rolls, -	To bring or lodge the colours.

SIGNATURE, a ſigning of a perſon's name at the bottom of an act or deed wrote by his own hand.

SIGNATURE, in printing, is a letter put at the bottom of the firſt page at leaſt, in each ſheet, as a direction to the binder in folding, gathering, and collating them. The ſignatures conſiſt of the capital letters of the alphabet, which change in every ſheet: if there be more ſheets than letters in the alphabet, to the capital letter is added a ſmall one of the ſame ſort, as A a, B b; which are repeated as often as neceſſary. In large volumes it is eaſy to diſtinguiſh the number of alphabets, after the firſt three or four, by placing a figure before the ſignature, as 5 B, 6 B, &c.

SIGNET, one of the king's ſeals, made uſe of in ſealing his private letters, and all grants that paſs by bill ſigned under his majeſty's hand: it is always in the cuſtody of the ſecretaries of ſtate.

SIGNET, in Scots law. See LAW, N° clvii. 16.

SILENE, VISCOUS CAMPION; a genus of the trigynia order, belonging to the decandria claſs of plants. The principal ſpecies are, Lobel's catch-fly, dwarf lychnis, Spaniſh campion, Portugal campion, nodding or mountain campion, Perſian campion, ſhrubby Sicilian campion, &c. The two firſt are annuals, the two next biennials, and the laſt three perennial in root. They all flower here in ſummer from May till Auguſt, in the different ſorts, each flower having five petals; and ſeveral of the ſorts produce ripe ſeeds, particularly the annuals and biennials, by which all the ſorts may be raiſed, and the perennials alſo by parting the roots, &c. They are all hardy herbaceous plants, and in general have very viſcous or clammy ſtalks, particularly juſt below the joints, to which flies often ſtick faſt; hence the name *catch-fly*, *viſcous campion*, &c. They will all proſper in any of the garden-compartments.

SILESIA, a duchy of Germany, bounded on the eaſt by Poland; on the weſt, by Moravia, Bohemia, Luſatia, and the county of Glatz; on the ſouth, by a chain of mountains, and a thicket of conſiderable extent, which ſeparates it from Hungary; and to the north, by the mark of Brandenburg. From north-weſt to ſouth-eaſt it is about 225 miles, and about 100 where broadeſt: but it is much contracted at both ends. Upon the frontiers of this country, to the weſt and ſouth, are very high mountains, and ſome likewiſe in other parts of it. One of the ridges upon the frontiers is ſtyled the *Riphæan Mountains*, another the *Moravian*, another the *Bohemian*, and another the *Hungarian*, *Crapack*, or *Carpathian*. A branch of the Bohemian is called the *Giant Mountains*. The winter on theſe hilly tracks is more ſevere, ſets in ſooner, and laſts longer, than in the low lands. The inhabitants uſe a kind of ſkaits when the ſnow is deep, as they do in Carniola. Little or no grain is raiſed in the mountains and ſome ſandy tracks; but the reſt of the country is abundantly fruitful, not only in grain, but fruits, roots, paſture, flax, hops, madder, tobacco, and hemp, yielding alſo ſome wine, with conſiderable quantities of ſilk and honey. In many places are great woods of pines, fir, beech, larch, and other trees, affording tar, pitch, roſin, turpentine, lamp-black, and timber for all uſes. In this country alſo is found marble of ſeveral ſorts, ſome precious ſtones, limeſtone, millſtone, pit-coal, turf, vitriol, ſome ſilver ore, copper, lead, iron, and mineral ſprings. Great numbers of black cattle and horſes are brought hither from Poland and Hungary for ſale, thoſe bred in the country not being ſufficient; but of ſheep, goats, game, and veniſon, they have great plenty. As for wild-beaſts, here are lynxes, foxes, weaſels, otters, and beavers. The rivers, lakes, and ponds, yield fiſh of ſeveral ſorts, particularly ſturgeons ſeveral ells in length, and ſalmon. Beſides a number of ſmaller ſtreams to water this country, there is the Oder, which traverſes it almoſt from one end to the other; and the Viſtula, which, after a pretty long courſe through it, enters Poland. The number of the cities and market-towns is ſaid to be about 200, the county of Glatz included, and that of the villages 5000. The inhabitants, who are computed to be about a million and an half, are a mixture of Germans, Poles, and Moravians. The language generally ſpoken is German; but in ſome places the vulgar tongue is a dialect of the Sclavonic. The ſtates conſiſt of the princes and dukes, and thoſe called *ſtate-lords*, with the nobility, who are immediately ſubject to the ſovereign, and the repreſentatives of the chief cities; but ſince the country fell under the dominion of the king of Pruſſia, no furſtentage or diets have been held. The king, however, when he took poſſeſſion of the country, confirmed all the other privileges of the inhabitants. With reſpect to religion, not only Proteſtants, but Papiſts, Jews, and Greeks, enjoy full liberty of conſcience. The greateſt part of Sileſia lies in the dioceſe of Breſlau, but ſome part of it in the Poliſh dioceſes of Poſen and Cracow. The biſhop of Breſlau ſtands immediately under the pope with regard to ſpirituals; but all eccleſiaſtical benefices, not excepting the ſee of Breſlau, is in the king's gift. Beſides Latin ſchools, col-

Sileſia. colleges, and ſeminaries, at Breſlau is an univerſity, and at Lignitz an academy for martial exerciſes. The principal manufactures here are woollens, linens, and cottons of ſeveral ſorts, with hats, glaſs-ware, gunpowder, and iron manufactures. Of theſe there is a conſiderable exportation. Accounts are generally kept in rix-dollars, ſilver groſchens, and deuaren. With reſpect to its revolutions and preſent government, it was long a part of the kingdom of Poland; afterwards it had ſeveral dukes and petty princes for its ſovereigns, who by degrees became ſubject to the kings of Bohemia, until at laſt king Charles IV. incorporated the whole duchy with Bohemia; and thus it continued in the poſſeſſion of the houſe of Auſtria, until the preſent king of Pruſſia, taking advantage of the troubles that enſued upon the death of the emperor Charles VI. and pretending a kind of claim, wreſted a great part of it, together with the county of Glatz, from his daughter and heireſs Maria Thereſa, the late empreſs-dowager; ſo that now only a ſmall part of it is poſſeſſed by the houſe of Auſtria, and connected with the empire, the reſt being governed by the king of Pruſſia, without acknowledging any ſort of dependence on the crown of Bohemia or the empire. For the adminiſtration of juſtice in all civil, criminal, and feudal caſes, and ſuch as relate to the revenue, the king of Pruſſia has eſtabliſhed three ſupreme judicatories, to which an appeal lies from all the inferior ones, and from which, when the ſum exceeds 500 rix-dollars, cauſes may be moved to Berlin. The Lutheran churches and ſchools are under the inſpection of the upper-conſiſtories, and thoſe of the Papiſts under that of the biſhop's court at Breſlau; but from both an appeal lies to the tribunal at Berlin. As to the revenue, the exciſe here is levied only in the walled towns, being on the ſame footing as in the mark of Brandenburg; but in the reſt of the country the contributions are fixed, and the ſame both in peace and war. The ſeveral branches of the revenue are under the management of the war and domain offices of Breſlau and Glogau. The whole revenue ariſing to the king of Pruſſia from Sileſia and the county of Glatz amounts to about four millions of rix-dollars *per annum*.

Sileſia is divided into Upper and Lower, and each of theſe again into principalities and lordſhips; of ſome of which both the property and juriſdiction belong immediately to the ſovereign, but of others to his ſubjects and vaſſals. In regard to the character of the people, the boors are accounted very dull and ſilly; but of thoſe of a higher rank, many have diſtinguiſhed themſelves by their wit and learning, as well as by their military and political talents. However, in general, like their neighbours the Germans and Bohemians, they have more of Mars than Mercury in their compoſition; and their parts are more ſolid than ſhining.

SILESIAN EARTH, in the materia medica, a fine aſtringent bole. It is very heavy, of a firm compact texture, and in colour of a browniſh yellow. It breaks eaſily between the fingers, and does not ſtain the hands; is naturally of a ſmooth ſurface, is readily diffuſible in water, and melts freely into a butter-like ſubſtance in the mouth. It leaves no grittineſs between the teeth, and does not ferment with acid menſtrua. It is found in the perpendicular fiſſures of rocks near the gold-mines at Strigonium in Hungary, and is ſuppoſed to be impregnated with the ſulphur of that metal. It is a good aſtringent, and better than moſt of the boles in uſe.

Silius. SILIUS (Italicus Caius), an ancient Roman poet, and author of an epic poem in 17 books, which contains an hiſtory of the ſecond Punic war, ſo famous in hiſtory for having decided the empire of the world in favour of the Romans. He was born in the reign of Tiberius, and is ſuppoſed to have derived the name of *Italicus* from the place of his birth; but whether he was born at Italica in Spain, or at Corfinium in Italy, which, according to Strabo, had the name of *Italica* given it during the Social war, is a point which cannot be known: though, if his birth had happened at either of theſe places, the grammarians will tell us, that he ſhould have been called *Italicenſis*, and not *Italicus*. When he came to Rome, he applied himſelf to the bar; and, by a cloſe imitation of Cicero, ſucceeded ſo well, that he became a celebrated advocate and moſt accompliſhed orator. His merit and character recommended him to the higheſt offices in the republic, even to the conſulſhip, of which he was poſſeſſed when Nero died. He is ſaid to have been aiding and aſſiſting in accuſing perſons of high rank and fortune, whom that wicked emperor had devoted to deſtruction: but he retrieved his character afterwards by a long and uniform courſe of virtuous behaviour. Veſpaſian ſent him as proconſul into Aſia, where he behaved with clean hands and unblemiſhed reputation. After having thus ſpent the beſt part of his life in the ſervice of his country, he bid adieu to public affairs, reſolving to conſecrate the remainder to a polite retirement and the muſes. He had ſeveral fine villas in the country: one at Tuſculum, celebrated for having been Cicero's; and a farm near Naples ſaid to have been Virgil's, and at which was his tomb, which Silvius often viſited. Thus Martial compliments him on both theſe accounts:

> *Silius hæc magni celebrat monumenta Maronis,*
> *Jugera facundi qui Ciceronis habet.*
> *Hæredem Dominumque ſui tumulique lariſque*
> *Non alium mallet nec Maro nec Cicero.*
>
> Epigr. 49. Lib. xi.

> Of Tully's ſeat my Silius is poſſeſs'd,
> And his the tomb where Virgil's aſhes reſt.
> Could thoſe great ſhades return to chooſe their heir,
> The preſent owner they would both prefer.

In theſe retirements he applied himſelf to poetry: led not ſo much by any great force of genius, which would certainly not have ſuffered him to ſtay till life was in the wane and his imagination growing cold, as by his exceeding great love of Virgil, to whoſe memory he paid the higheſt veneration. He has imitated him in his poem; and though he falls infinitely ſhort of him, yet he has diſcovered a great and univerſal genius, which would enable him to ſucceed in ſome degree in whatever he undertook.

Since we know little of Silius Italicus but what we learn from an epiſtle of the younger Pliny, we cannot do better than ſubjoin part of that epiſtle, as we find it tranſlated by Mr Melmoth; ſince it will not only confirm all that has been ſaid, but let the reader into ſome farther particulars concerning him.

"I am juſt now informed, that Silius Italicus has ſtarved himſelf to death, at his villa near Naples. Having been afflicted with an impoſthume, which was deemed incurable, he grew weary of life under ſuch un-

Silius, Silk.

eaſy circumſtances, and therefore put an end to it with the moſt determined courage. He had been extremely fortunate through the whole courſe of his days, excepting only the loſs of his younger ſon; however, that was made up to him in the ſatisfaction of ſeeing his eldeſt, who is of a more amiable character, attain the conſular dignity, and of leaving him in a very flouriſhing ſituation. He ſuffered a little in his reputation in the time of Nero, having been ſuſpected of forwardly joining in ſome of the informations which were carried on in the reign of that prince; but he made uſe of his intereſt in Vitellius with great diſcretion and humanity. He acquired much honour by his adminiſtration of the government of Aſia; and by his approved behaviour after his retirement from buſineſs, cleared his character from that ſtain which his former intrigues had thrown upon it. He lived among the nobility of Rome without power, and conſequently without envy. Though he frequently was confined to his bed, and always to his chamber, yet he was highly reſpected and much viſited; not with a view to his wealth, but merely on account of his merit. He employed his time between converſing with men of letters and compoſing of verſes; which he ſometimes recited, in order to try the ſentiments of the public; but he diſcovered in them more induſtry than genius. In the decline of his years he entirely quitted Rome, and lived altogether in Campania, from whence even the acceſſion of the new emperor (Trajan) could not draw him. A circumſtance which I mention, as well to the honour of the prince, who was not diſpleaſed with that liberty, as of Italicus, who was not afraid to make uſe of it. He was reproached with being fond of all the elegancies of the fine arts to a degree of exceſs. He had ſeveral villas in the ſame province; and the laſt purchaſe was always the chief favourite, to the neglect of the reſt. They were all furniſhed with large collections of books, ſtatues, and pictures, which he more than enjoyed, he even adored; particularly that of Virgil, of whom he was ſo paſſionate an admirer, that he celebrated the anniverſary of that poet's birth-day with more ſolemnity than his own; eſpecially at Naples, where he uſed to approach his tomb with as much reverence as if it had been a temple. In this tranquillity he lived to the 75th year of his age, with a delicate rather than a ſickly conſtitution. It is remarkable, that as he was the laſt perſon upon whom Nero conferred the conſular office (that prince being killed during his conſulſhip), ſo he was the laſt alſo that ſurvived of all thoſe who had been raiſed by him to that dignity. When I conſider this, I cannot forbear lamenting the tranſitory condition of mankind. Is there any thing in nature ſo ſhort and limited as human life even in its moſt extended period? Does it not ſeem to you, my friend, but yeſterday that Nero was upon the throne? and yet none of all thoſe who were conſuls in his reign now remain!"——

There have been many editions of Silius Italicus. A neat and correct one was publiſhed at Leipſic, 1696, in 8vo, with ſhort and uſeful notes by Cellarius: but the beſt is that *cum notis integris variorum & Arnoldi Drakenborch*. Traject. ad Rhen. 1717, in 4to.

SILK, is properly an animal fluid, hardened by the air; being an extremely ſoft and gloſſy thread, ſpun by the ſilk-worm. See SILK-*worm*.

Silk.

As ſoon as the animal is arrived at the ſize and ſtrength neceſſary for beginning his cod, he makes his web; for it is thus they call that ſlight tiſſue which is the beginning and ground of this admirable work. This is his firſt day's employment. On the ſecond he forms his folliculus or ball, and covers himſelf almoſt over with ſilk. The third day he is quite hid; and the following days employs himſelf in thickening and ſtrengthening his ball: always working from one ſingle end, which he never breaks by his own fault; and which is ſo fine, and ſo long, that thoſe who have examined it attentively think they ſpeak within compaſs, when they affirm, that each ball contains ſilk enough to reach the length of ſix Engliſh miles.

In ten days time the ball is in its perfection, and is now to be taken down from the branches of the mulberry-tree, where the worms have hung it. But this point requires a deal of attention: for there are ſome worms more lazy than others; and it is very dangerous waiting till they make themſelves a paſſage, which uſually happens about the fifteenth day of the month.

The firſt, fineſt, and ſtrongeſt balls are kept for the grain, the reſt are carefully wound; or if it is deſired to keep them all, or if there be more than can be well wound at once, they lay them for ſome time in an oven moderately hot, or elſe expoſe them for ſeveral days ſucceſſively to the greateſt heats of the ſun, in order to kill the inſect, which, without this precaution, would not fail to open itſelf a way to go and uſe thoſe new wings abroad it has acquired within.

Ordinarily, they only wind the more perfect balls; thoſe that are double, or too weak, or too coarſe, are laid aſide, not as altogether uſeleſs, but that, being improper for winding, they are reſerved to be drawn out into ſkains. The balls are of different colours; the moſt common are yellow, orange-colour, iſabella, and fleſh-colour; there are ſome alſo of a ſea-green, others of a ſulphur colour, and others white; but there is no neceſſity for ſeparating the colours and ſhades to wind them apart, as all the colours are to be loſt in the future ſcouring and preparing of the ſilk.

To wind ſilks from off the balls, two machines are neceſſary, the one a furnace, with its copper; the other a reel, or frame, to draw the ſilk. The winder, then, ſeated near the furnace, throws into the copper of water over the furnace (firſt heated and boiled to a certain degree, which cuſtom alone can teach) a handful or two of balls, which have been firſt well purged of all their looſe furry ſubſtance. She than ſtirs the whole very briſkly about with birchen rods, bound and cut like bruſhes; and when the heat and agitation have detached the ends of the ſilks of the pods, which are apt to catch on the rods, ſhe draws them forth; and joining ten or twelve, or even fourteen of them together, ſhe forms them into threads, according to the bigneſs required to the works they are deſtined for: eight ends ſufficing for ribbands; and velvets, &c. requiring no leſs than fourteen. The ends, thus joined into two or three threads, are firſt paſſed into the holes of three iron rods in the fore-part of the reel, then upon the bobbins or pullies, and at laſt are drawn out to the reel itſelf, and there faſtened each to an end of an arm or branch of the reel. Thus diſpoſed, the winder, giving motion to the reel, by turning the handle, guides the threads; ſubſtitutes new ones, when any of them break, or any of the balls are wound out; ſtrengthens them, where neceſſary, by adding others; and takes away the balls wound out, or that, having been pierced, are full of water.

In this manner, two perſons will ſpin and reel three pounds of ſilk in a day; which is done with greater diſpatch than is made by the ſpinning-wheel or diſtaff. Indeed, all ſilks cannot be ſpun and reeled after this manner; either by reaſon the balls have been perforated by the ſilk-worms themſelves; or becauſe they are double, or too weak to bear the water; or becauſe they are coarſe, &c. Of all theſe together, they make a particular kind of ſilk, called *floretta;* which being carded, or even ſpun on the diſtaff or the wheel, in the condition it comes from the ball, makes a tolerable ſilk.

As to the balls, after opening them with ſciſſars, and taking out the inſects, (which are of ſome uſe for the feeding of poultry), they are ſteeped three or four days in troughs, the water whereof is changed every day to prevent their ſtinking. When they are well ſoftened by this ſcouring, and cleared of that gummy matter the worm had lined the inſide withal, and which renders it impenetrable to the water, and even to air itſelf, they boil them half an hour in a lye of aſhes, very clear and well ſtrained; and after waſhing them out in the river, and drying them in the ſun, they card and ſpin them on the wheel, &c. and thus make another kind of floretta, ſomewhat inferior to the former.

As to the ſpinning and reeling of raw ſilks off the balls, ſuch as they are brought from Italy and the Levant, the firſt is chiefly performed on the ſpinning-wheel; and the latter, either on hand-reels, or on reels mounted on machines, which ſerve to reel ſeveral ſkains at the ſame time.

Dyeing of Silk *Black.* To the general directions given under the article Dyeing, n° 17. we ſhall here add a particular receipt from Dr Lewis's Commerce of Arts. "The ſilk," ſays he, "waſhed as above directed *, is ſteeped in a decoction of one-third its weight of Aleppo or blue galls, or half its weight of the weaker white galls of Sicily and Romania, and afterwards waſhed with water; every 12 ounces are reduced by the cleanſing to 9, which ought to be increaſed by the galling to 11, and no more. The dyeing liquor for 100 lb. of ſilk is prepared by boiling 20 pounds of galls in a ſufficient quantity of water, (about 126 gallons), and adding to this decoction, after being ſettled and drawn off from the ſediment, two pounds and an half of Engliſh vitriol, 12 pounds of iron-filings, and 20 pounds of the gum of the cherry or plum tree: that the gum may diſſolve the more readily, it is put into a large copper cullender, immerſed in the hot liquor, and ſtirred and worked from time to time with a wooden rod till it is all paſſed through. This mixture is kept for ſix or ſeven days or more, a circumſtance ſuppoſed to be neceſſary for its perfection; and being then made as hot as the hand can bear, freſh parcels of the galled ſilks are dipped in it ſucceſſively, and kept in about 10 minutes each. All of them, after being aired, are dipped again ſeveral times, with the addition of more vitriol and iron-filings, till they have acquired the requiſite blackneſs, after which they are well waſhed in water."

This is the proceſs which Mr Macquer tells us is followed in the manufactories at Tours and Genes; on which Dr Lewis makes the following remarks. Having repeated the proceſs in ſmall, with each of the articles exactly in the proportions above-mentioned, he found that it required 30 dippings, or more, to produce a good colour. With leſs than half this number the ſilk appears of a beautiful black when taken out of the liquor; but by waſhing, it becomes pale, and ſtill more ſo by drying. The quantity of vitriol uſed, in all, was about eight times that recommended above to be added at one time, or one-fifth part of the weight of the ſilk; but the iron-filings put in at firſt remaining undiſſolved, it was not thought needful to add any more of this ingredient. The operation being repeated without iron-filings at all, no difference could be perceived between the two colours. Without the gum there was a very conſiderable difference in the ſilk as taken out of the dye; that which had been dyed with gum having a fine gloſſineſs which the other wanted: the ſubſequent waſhing, however, deſtroyed that gloſſineſs, ſo that the gum ſeemed to be of no ſervice, but rather detriment, by thickening the liquor, and making it penetrate with more difficulty into the ſilk, in the ſame manner as it prevents ink from ſinking into paper. Some ſilk dyed in the ſame manner as woollen cloth *, turned out a ruſty black when the ſilk was put in white, but very good when the ſilk had been previouſly dyed blue.

Silk-*Worm.* This inſect conſiſts of 11 rings, and each of theſe of a great number of other ſmaller ones, joined to each other; and the head, which terminates theſe rings, is furniſhed with two jaws, which work and cut the food, not by a perpendicular but a lateral action. The humours found in the body of this creature, all ſeem approaching to the nature of the ſilk which it ſpins, for on being rubbed in the hands they leave a hard or ſolid cruſt behind them. Under the ſkin there is always found a mucous roſy-coloured membrane, enveloping the animal, and ſuppoſed to be the new ſkin in which it is to appear on throwing off the old one. The heart of this creature reaches from the head to the tail, running the whole length of the body: it is indeed rather a ſeries of many hearts connected together, than one. The motion of ſyſtole and diaſtole is very evident in this whole chain of hearts; and it is an elegant ſight to obſerve the manner of the vital fluids paſſing from one of them to the other. The ſtomach of this animal is as long as the heart, reaching, like it, from one end of the body to the other. This large receptacle for food, and the ſudden paſſage of it through the animal, are very good reaſons for its great voracity.—In the ſides of the belly, all about the ventricle, there are depoſited a vaſt number of veſſels which contain the ſilky juice; theſe run with various windings and meanders to the mouth, and are ſo diſpoſed that the creatures can diſcharge their contents at pleaſure at the mouth; and, according to the nature of the juices that they are ſupplied with, furniſh different ſorts of ſilk from them, all the fluid contents of theſe veſſels hardening in the air into that ſort of thread that we find the web or balls of this creature conſiſt of. Theſe creatures never are offended at any ſtench, of whatever kind; but they always feel a ſouthern wind, and an extremely hot air always make them ſick.

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* See the laſt article.

* See Wool.

SILPHIUM, BASTARD CHRYSANTHEMUM; a genus of the polygamia neceſſaria order, belonging to the ſyngeneſia claſs of plants. There are ſix ſpecies; all of them herbaceous perennials, riſing from three to nine feet high, with compound radiated flowers of a yellow colour. They are all very hardy, and eaſily propagated by parting their roots in autumn.

SILVER, called *luna* by the chemiſts, a perfect metal of a ſhining white colour. See CHEMISTRY, n° 140, 195, 238, 363. See alſo METALLURGY, p. 4924, *et ſeq.*

Shell SILVER, is prepared of the ſhreds of ſilver-leaf or of the leaves themſelves, for the uſe of painters, after the ſame manner as ſhell-gold. See *Shell*-GOLD.

SILVERING, the covering of any thing with ſilver. It is uſual to ſilver metals, wood, paper, &c. which is performed either with fire, oil, or ſize. Metal-gilders ſilver by the fire; painter-gilders all the other ways. See GILDING.

To ſilver copper or braſs. 1. Cleanſe the metal with aquafortis, by waſhing it lightly, and immediately throwing it into fair water; or by heating it red-hot, and ſcouring it with ſalt and tartar and fair water, with a ſmall wire-bruſh. 2. Diſſolve ſome ſilver in aquafortis, in a broad-bottomed glaſs veſſel, or of glazed earth; then evaporate away the aquafortis over a chaffing-diſh of coals. 3. Put five or ſix times its quantity of water, or as much as will be neceſſary to diſſolve it perfectly, on the remaining dry calx; evaporate this water with the like heat; then put more freſh water, and evaporate again; and, if need be, the third time, making the fire towards the latter end ſo ſtrong, as to leave the calx perfectly dry, which, if your ſilver is good, will be of a pure white. 4. Take of this calx, common ſalt, cryſtal of tartar, of each a like quantity or bulk, and mixing well the whole compoſition, put the metal into fair water, and take of the ſaid powder with your wet fingers, and rub it well on, till you find every little cavity of the metal ſufficiently ſilvered over. 5. If you would have it richly done, you muſt rub on more of the powder, and in the laſt place waſh the ſilvered metal in fair water, and rub it hard with a dry cloth.

SILVERING *of Glaſſes*. See FOLIATING *of Looking-glaſſes*.

SILURUS, in ichthyology, a genus belonging to the order of piſces abdominales. The head is naked; the mouth ſet round with hairy filaments; the branchiæ have from 4 to 14 rays; the ray of the pectoral fins, or the firſt dorſal one, is prickly, and dentated backwards. There are 21 ſpecies, moſt of them natives of the Indian and American ſeas. Mr Haſſelquiſt mentions one called the *clarias* by Linnæus, and *ſcheilan* by the Arabians. If it pricks one with the bone of the breaſt-fin, it is dangerous; and our author ſaw the cook of a Swediſh merchant-ſhip die of the poiſon communicated by the prick of one of theſe fiſh.

SIMEON *of* DURHAM, the cotemporary of William of Malmſbury, took great pains in collecting the monuments of our hiſtory, eſpecially in the north of England, after they had been ſcattered by the Danes. From theſe he compoſed a hiſtory of the kings of England, from A. D. 616 to 1130; with ſome ſmaller hiſtorical pieces. Simeon both ſtudied and taught the ſciences, and particularly the mathematics at Oxford; and became precentor of the church at Durham, where he died, probably ſoon after the concluſion of his hiſtory, which was continued by John, prior of Hexham, to A. D. 1156.

SIMIA, the MONKEY; a genus of quadrupeds, belonging to the order of primates. They have four fore-teeth in each jaw, placed near each other: the dog-teeth are ſolitary and more remote; and the grinders are obtuſe. They are a numerous race; but almoſt all confined to the torrid zone. They fill the woods of Africa, from Senegal to the Cape, and from thence to Æthiopia: they are found in all parts of India, and its iſlands; in Cochin-China, in the ſouth of China, and in Japan; (and one is met with in Arabia): and they ſwarm in the foreſts of South America, from the iſthmus of Darien, as far as Paraguay. They are lively, agile, full of frolic, chatter, and grimace. From the ſtructure of their members, they have many actions in common with the human kind. Moſt of them are fierce and untameable: ſome are of a milder nature, and will ſhow a degree of attachment: but in general, they are endowed with miſchievous intellects; and are filthy, obſcene, laſcivious, thieving. They inhabit the woods, and live in trees; feeding on fruits, leaves, and inſects. In general, they are gregarious, going in vaſt companies: but the different ſpecies never mix with each other, always keeping apart and in different quarters. They leap with vaſt activity from tree to tree, even when loaded with their young, which cling to them. They are the prey of leopards and others of the feline race; and of ſerpents, which purſue them to the ſummit of the trees, and ſwallow them entire. They are not carnivorous, but for miſchief's ſake will rob the neſts of birds of the eggs and young: in the countries where they moſt abound, the ſagacity of the feathered tribe is more marvellouſly ſhown in their contrivances to fix the neſt beyond the reach of theſe invaders. See MOTACILLA.

The ſimiæ being more numerous in their ſpecies than any other animals, and differing greatly in their appearances, it ſeemed neceſſary to methodize and ſubdivide the genus. Accordingly Mr Ray firſt diſtributed them into three claſſes:

Simiæ, Apes, ſuch as wanted tails.

Cercopithici, Monkeys, ſuch as had tails.

Papiones, Baboons, thoſe with ſhort tails: to diſtinguiſh them from the common monkeys, which have very long ones.

From Ray's method, Linnæus formed his. M. de Buffon followed the ſame; but with a ſubdiviſion of the long-tailed apes, or the true monkeys, into ſuch which had prehenſile tails, and ſuch which had not. Mr Pennant has adopted the ſame method; but is more definite as to the claſs of baboons, in which he comprehends all whoſe tails do not exceed half the length of their bodies, and are carried in an arched direction. According to thoſe diviſions, the following are the principal ſpecies:

I. Without tails; the true APES.

1. The ſatyrus, orang outang, or great ape, has a flat face, and a deformed reſemblance of the human;

ears exactly like thoſe of a man; the hair on the head longer than on the body. The body and limbs are covered with reddiſh and ſhaggy hair; longeſt on the back, thinneſt on the fore-parts. The face and paws are ſwarthy; the buttocks covered with hair. They inhabit the interior parts of Africa, the iſles of Sumatra, Borneo, and Java. Are ſolitary, and live in the moſt deſart places. They grow to the height of ſix feet: have prodigious ſtrength, and will overpower the ſtrongeſt man. The old ones are ſhot with arrows, the young alone can be taken alive. They live entirely on fruits and nuts. They will attack and kill the negroes who wander in the woods; will drive away the elephants, and beat them with their fiſts or pieces of wood; and will throw ſtones at people that offend them. They ſleep in trees; and make a ſort of ſhelter from the inclemency of the weather. They are of a grave appearance and melancholy diſpoſition, and even when young not inclined to frolic. They go erect, and are vaſtly ſwift and agile. Theſe accounts are chiefly taken from Andrew Battel, an Engliſh ſailor, who was taken priſoner 1589, and lived many years in the inner parts of Congo; his narrative is plain, and ſeems very authentic: it is preſerved in Purchas's collection. Froger * informs us, "that thoſe along the banks of the river Ganges are larger and more miſchievous than in any part of Africa: the negroes dread them, and cannot travel alone in the country, without running the hazard of being attacked by theſe animals, who often preſent them with a ſtick, and force them to fight. I have heard the Portugueſe ſay, that they have often ſeen them hoiſt up young girls, about ſeven or eight years old, into trees, and that they could not be wreſted from them without a great deal of difficulty. The moſt part of the negroes imagine them to be a foreign nation come to inhabit their country, and that they do not ſpeak for fear of being compelled to work." When taken young, they are capable of being tamed, and taught to perform many menial offices. Francis Pyrard † relates, "that in the province of Sierra Leona, there is a ſpecies ſo ſtrong-limbed, and ſo induſtrious, that, when properly trained and fed, they work like ſervants; that they generally walk on the two hind-feet; that they pound any ſubſtances in a mortar; that they go to bring water from the river in ſmall pitchers, which they carry full on their heads. But when they arrive at the door, if the pitchers are not ſoon taken off, they allow them to fall; and when they perceive the pitchers overturned and broken, they weep and lament." Father Jarric ‡, quoted by Nieremberg, ſays the ſame thing, nearly in the ſame terms. With regard to the education of theſe animals, the teſtimony of Schoutten || accords with that of Pyrard. "They are taken (he remarks) with ſnares, taught to walk on their hind-feet, and to uſe their fore-feet as hands in performing different operations, as rinſing glaſſes, carrying drink round the company, turning a ſpit, &c." "I ſaw at Java, (ſays Guat) §, a very extraordinary ape. It was a female. She was very tall, and often walked erect on her hind-feet. On theſe occaſions, ſhe concealed with her hands the parts which diſtinguiſh the ſex. Except the eye-brows, there was no hair on her face, which pretty much reſembled the groteſque female faces I ſaw among the Hottentots at the Cape. She made her bed very neatly every day, lay upon her ſide, and covered herſelf with the bedcloaths. When her head ached, ſhe bound it up with a handkerchief; and it was amuſing to ſee her thus hooded in bed. I could relate many other little articles which appeared to me extremely ſingular. But I admired them not ſo much as the multitude; becauſe as I knew the deſign of bringing her to Europe to be exhibited as a ſhow, I was inclined to think that ſhe had been taught many of theſe monkey-tricks, which the people conſidered as being natural to the animal. She died in our ſhip, about the latitude of the Cape of Good Hope. The figure of this ape had a very great reſemblance to that of man, &c." Gemelli Carreri tells us, that he ſaw one of theſe apes, which cried like an infant, walked upon its hind-feet, and carried a matt under its arm to lie down and ſleep upon.

* *Deſcript. hiſtorique du royaume de Macacar,* p. 51.

† *Voyages e François Pyrard,* om. ii. p. 331.

‡ *Euſ. Nie-emberg. Hiſt. Nat. eregrin.* b. ix. p. 45.

Voyages e Guat.

houtten x Indes ientales.

Vòyage de . le Guat. m. ii. 96.

An orang-outang which Buffon ſaw, is deſcribed by him as mild, affectionate, and good-natured. His air was melancholy, his gait grave, his movements meaſured, his diſpoſitions gentle, and very different from thoſe of other apes. He had neither the impatience of the Barbary ape, the maliciouſneſs of the baboon, nor the extravagance of the monkeys. "It may be alleged, (ſays our author), that he had the benefit of inſtruction; but the other apes which I ſhall compare with him, were educated in the ſame manner. Signs and words were alone ſufficient to make our orang-outang act: but the baboon required a cudgel, and the other apes a whip; for none of them would obey without blows. I have ſeen this animal preſent his hand to conduct the people who came to viſit him, and walk as gravely along with them as if he had formed a part of the company. I have ſeen him ſit down at table, unfold his towel, wipe his lips, uſe a ſpoon or a fork to carry the victuals to his mouth, pour his liquor into a glaſs, and make it touch that of the perſon who drank along with him. When invited to take tea, he brought a cup and ſaucer, placed them on the table, put in ſugar, poured out the tea, and allowed it to cool before he drank it. All theſe actions he performed without any other inſtigation than the ſigns or verbal orders of his maſter, and often of his own accord. He did no injury to any perſon: he even approached company with circumſpection, and preſented himſelf as if he wanted to be careſſed. He was very fond of dainties, which every body gave him: And as his breaſt was diſeaſed, and he was afflicted with a teazing cough, this quantity of ſweetmeats undoubtedly contributed to ſhorten his life. He lived one ſummer in Paris, and died in London the following winter. He eat almoſt every thing; but preferred ripe and dried fruits to all other kinds of food. He drank a litle wine; but ſpontaneouſly left it for milk, tea, or other mild liquors." This was only two feet four inches high, and was a young one. There is great poſſibility that theſe animals may vary in ſize and in colour, ſome being covered with black, others with reddiſh hairs.—They are not the ſatyrs of the ancients; which had tails (A), and were a ſpecies of monkey. Linnæus's *Homo*

(A) Ælian gives them tails, *lib.* Pliny ſays they have teeth like dogs, *lib.* vii. *c.* 2. circumſtances common to many monkeys. *Ptolemy*, *lib.* vii. *c.* 2. ſpeaks of certain iſlands in the Indian ocean, inhabited by people with *homo nocturnus*, an animal of this kind, is unneceſſarily ſeparated from his *ſimia ſatyrus*.

See plate CCLXVIII &c. fig. 1. To enable the reader to form a judgment of this animal which has ſo great a reſemblance to man, it may not be unacceptable to quote from Buffon the differences and conformities which make him approach or recede from the human ſpecies. "He differs from man externally by the flatneſs of his noſe, by the ſhortneſs of his front, and by his chin, which is not elevated at the baſe. His ears are proportionally too large, his eyes too near each other, and the diſtance between his noſe and mouth is too great. Theſe are the only differences between the face of an orang-outang and that of a man. With regard to the body and members, the thighs are proportionally too ſhort, the arms too long, the fingers too ſmall, the palm of the hands too long and narrow, and the feet rather reſemble hands than the human foot. The male organs of generation differ not from thoſe of man, except that the prepuce has no frænum. The female organs are extremely ſimilar to thoſe of a woman.

"The orang-outang differs internally from the human ſpecies in the number of ribs: man has only 12; but the orang-outang has 13. The vertebræ of the neck are alſo ſhorter, the bones of the pelvis narrow, the buttocks flatter, and the orbits of the eyes ſunk deeper. He has no ſpinal proceſs on the firſt vertebra of the neck. The kidneys are rounder that thoſe of man, and the ureters have a different figure, as well as the bladder and gall-bladder, which are narrower and longer than in the human ſpecies. All the other parts of the body, head, and members, both external and internal, ſo perfectly reſemble thoſe of man, that we cannot make the compariſon without being aſtoniſhed that ſuch a ſimilarity in ſtructure and organization ſhould not produce the ſame effects. The tongue, and all the organs of ſpeech, for example, are the ſame as in man; and yet the orang-outang enjoys not the faculty of ſpeaking; the brain has the ſame figure and proportions; and yet he poſſeſſes not the power of thinking. Can there be a more evident proof than is exhibited in the orang-outang, that matter alone, though perfectly organized, can produce neither language nor thought, unleſs it be animated by a ſuperior principle? Man and the orang-outang are the only animals who have buttocks and the calfs of the legs, and who, of courſe, are formed for walking erect; the only animals who have a broad cheſt, flat ſhoulders, and vertebræ of the ſame ſtructure; and the only animals whoſe brain, heart, lungs, liver, ſpleen, ſtomach, and inteſtines, are perfectly ſimilar, and who have an appendix vermiformis, or blind-gut. In fine, the orang-outang has a greater reſemblance to man than even to the baboons or monkeys, not only in all the parts we have mentioned, but in the largeneſs of the face, the figure of the cranium, of the jaws, of the teeth, and of the other bones of the head and face; in the thickneſs of the fingers and thumb, the figure of the nails, and the number of vertebræ; and, laſtly, in the conformity of the articulations, the magnitude and figure of the rotula, ſternum, &c. Hence, as there is a greater ſimilarity between this animal and man, than between thoſe creatures which reſemble him moſt, as the Barbary ape, the baboon, and monkey, who have all been deſigned by the general name of *apes*, the Indians are to be excuſed for aſſociating him with the human ſpecies, under the denomination of *orang-outang*, or *wild man*. In fine, if there were a ſcale by which we could deſcend from human nature to that of the brutes, and if the eſſence of this nature conſiſted entirely in the form of the body, and depended on its organization, the orang-outang would approach nearer to man than any other animal. Placed in the ſecond rank of beings, he would make the other animals feel his ſuperiority, and oblige them to obey him. If the principle of imitation, by which he ſeems to mimic human actions, were a reſult of thought, this ape would be ſtill farther removed from the brutes, and have a greater affinity to man. But the interval which ſeparates them is immenſe. Mind, reflection, and language, depend not on figure or the organization of the body. Theſe are endowments peculiar to man. The orang-outang, though, as we have ſeen, he has a body, members, ſenſes, a brain, and a tongue, perfectly ſimilar to thoſe of man, neither ſpeaks nor thinks. Though he counterfeits every human movement, he performs no action that is characteriſtic of man, no action that has the ſame principle or the ſame deſign. With regard to imitation, which appears to be the moſt ſtriking character of the ape-kind, and which the vulgar have attributed to him as a peculiar talent, before we decide, it is neceſſary to inquire whether this imitation be ſpontaneous or forced. Does the ape imitate us from inclination, or becauſe, without any exertion of the will, he feels the capacity of doing it? I appeal to all thoſe who have examined this animal without prejudice; and I am convinced that they will agree with me, that there is nothing voluntary in this imitation. The ape, having arms and hands, uſes them as we do, but without thinking of us. The ſimilarity of his members and organs neceſſarily produces movements, and ſometimes ſucceſſions of movements, which reſemble ours. Being endowed with the human ſtructure, the ape muſt move like man; but the ſame motions imply not that he acts from imitation. Two bodies which receive the ſame impulſe, two ſimilar pendulums or machines, will move in the ſame manner; but theſe bodies or machines can never be ſaid to imitate each other in their motions. The ape and the human body are two machines ſimilarly conſtructed, and neceſſarily move nearly in the ſame manner; but parity is not imitation. The one depends on matter and the other on mind. Imitation preſuppoſes the deſign of imitating. The ape is incapable of forming this deſign, which requires a train of thinking: conſequently, man, if he inclines, can imitate the ape; but the ape cannot even incline to imitate man."

2. The ſylvanus, or pigmy, has a flattiſh face; ears like thoſe of a man; body, of the ſize of a cat; colour above, of an olive brown; beneath, yellowiſh: nails flat: buttocks naked. Sits upright. Inhabits Africa. This ſpecies is not uncommon in our exhibitions of animals; and is very tractable and good-natured. Moſt probably the Pigmy of the ancients. They abound in Ethiopia, Fig. 2.

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with tails like thoſe with which ſatyrs are painted, whence called the *iſles of ſatyrs*. Kœping, a Swede, pretended to have diſcovered theſe *homines caudati*; that they would have trafficked with him, offering him live parrots; that afterwards they killed ſome of the crew that went on ſhore, and eat them, &c. &c. *Amœn. Acad.* vi. 71.

Ethiopia, one ſeat of that imaginary nation. They were believed to dwell near the fountains of the Nile: they deſcended annually to make war on the cranes, *i. e.* to ſteal their eggs, which the birds may be ſuppoſed naturally to defend; whence the fiction of their combats. Strabo judiciouſly obſerves, that no perſon worthy of credit ever ventured to aſſert that he had ever ſeen this nation. Ariſtotle ſpeaks of them only by hearſay: they were ſaid to be mounted on little horſes, on goats, on rams, and even on partridges. The Indians, taking advantage of the credulity of people, embalmed this ſpecies of ape with ſpices, and ſold them to merchants as true pigmies *: ſuch, doubtleſs, were the diminutive inhabitants mentioned by Mr Groſe † to be found in the foreſts of the Carnatic. They feed on fruits: are very fond of inſects, particularly of ants; aſſembling in troops, and turning over every ſtone in ſearch of them. If attacked by wild beaſts, they take to flight; but if overtaken, will face their purſuers, and, by flinging the ſubtle ſand of the deſart in their eyes, often eſcape.

Fig. 3. 3. The gibbon, or long-armed ape, with a flat ſwarthy face ſurrounded with grey hairs: hair on the body black and rough: buttocks bare: nails on the hands flat; on the feet, long: arms of a moſt diſproportioned length, reaching quite to the ground when the animal is erect, its natural poſture: of a hideous deformity.—Inhabits India, Malacca, and the Mollucca iſles: a mild and gentle animal: grows to the height of four feet. The great black ape of Mangſi, a province in China, ſeems to be of this kind.

Fig. 4. 4. The innuus, magot, or Barbary ape, has a long face, not unlike that of a dog: canine teeth, long and ſtrong: ears like the human: nails flat: buttocks bare: colour of the upper part of the body, a dirty greeniſh brown; belly, of a dull pale yellow: grows to above the length of four feet.—They inhabit many parts of India, Arabia, and all parts of Africa except Egypt, where none of this genus are found. A few are found on the hill of Gibraltar, which breed there: probably from a pair that had eſcaped from the town; as they are not found in any other part of Spain.—They are very ill-natured, miſchievous, and fierce; agreeing with the character of the ancient Cynocephali. They are a very common kind in exhibitions. By force of diſcipline, are made to play ſome tricks; otherwiſe, they are more dull and ſullen than the reſt of this genus. They aſſemble in great troops in the open fields in India; and will attack women going to market, and take their proviſions from them. The females carry the young in their arms, and will leap from tree to tree with them. Apes were worſhipped in India, and had magnificent temples erected to them. When the Portugueſe plundered one in Ceylon, they found in a little golden caſket (B) the tooth of an ape; a relic held by the natives in ſuch veneration, that they offered 700,000 ducats to redeem it, but in vain; for it was burnt by the viceroy, to ſtop the progreſs of idolatry. Fig. 2.

Fig. 5. 5. The tufted ape, a ſpecies of moſt diſguſting deformity, deſcribed in the Philoſophical Tranſactions, abridged, N° 290. It had a noſe and head 14 inches in length: the noſe of a deep red, face blue, both naked; black eye-brows; ears like the human: on the top of the head a long upright tuft of hair; on the chin another; two long tuſks in the upper jaw: fore-feet exactly reſembling hands, and the nails on the fingers flat: the fore-part of the body, and the inſide of the legs and arms, naked: the outſide covered with mottled brown and olive hair. Length, from the noſe to the rump, three feet two inches. It was very fierce and ſalacious: went on all-fours; but would ſit up on its rump, and ſupport itſelf with a ſtick: in this attitude, it would hold a cup in its hand, and drink out of it. Its food was fruits.

II. Baboons. A. With ſhort tails.

6. The ſphynx, or great baboon, with hazel irides; ears ſmall and naked; face canine, and very thick; middle of the face and fore-head naked, and of a bright vermilion colour; tip of the noſe of the ſame, and ending trincated like that of a hog; ſides of the noſe broadly ribbed, and of a fine violet hue; the opening of the mouth very ſmall; cheeks, throat, and goat-like beard yellow; hair on the fore-head very long, turns back, is black, and forms a kind of pointed creſt. Head, arms, and legs, covered with ſhort hair, yellow and black intermixed; the breaſt with long whitiſh yellow hairs, the ſhoulders with long brown hair. Nails flat; feet and hands black; tail four inches long, and very hairy: buttocks bare, red, and filthy; but the ſpace about them is of a moſt elegant purple colour, which reaches to the inſide of the upper part of the thighs. Fig. 6.

This was deſcribed by Mr Pennant from a ſtuffed ſpecimen in Sir Aſhton Lever's muſæum. In Auguſt 1779, a live animal of this ſpecies was ſhown at Edinburgh, and in October following at Cheſter, where being ſeen by Mr Pennant, that inquiſitive naturaliſt has deſcribed it in his Hiſtory of Quadrupeds. "It differed little (he obſerves) in colour from the above, being in general much darker. Eyes much ſunk in the head, and ſmall. On the internal ſide of each ear was a white line, pointing upwards. The hair on the fore-head turned up like a toupee. Feet black; in other reſpects reſembled the former. In this I had an opportunity of examining the teeth. The cutting teeth were like thoſe of the reſt of the genus; but, in the upper and lower jaw, were two canine, or rather tuſks, near three inches long, and exceedingly ſharp and pointed. This animal was five feet high, of a moſt tremendous ſtrength in all its parts; was exceſſively fierce, libidinous, and ſtrong.

Mr Schreber ſays, that this ſpecies lives on ſucculent fruits, and on nuts; is very fond of eggs, and will put eight at once into its pouches, and, taking them out one by one, break them at the end, and ſwallow the yolk and white: rejects all fleſh-meat, unleſs it be dreſſed: would drink quantities of wine or brandy: was leſs agile than other baboons: very cleanly; for it would immediately fling its excrements out of its hut. That which was ſhown at Cheſter was particularly fond of cheeſe. Its voice was a kind of roar, not unlike that of a lion, but low and ſomewhat inward. It went upon all-fours, and never ſtood on its hind-legs, unleſs forced by the keeper; but would frequently ſit on its rump in a crouching manner,

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* *Ariſt. lib.* xvi.

† *Eaſt Indies*, 365.

(B) *Linſchotten's Voy.* 53. In Amadabat are hoſpitals for apes and other maimed animals; *Tavernier's Voy. part* II. 48. The ſame writer ſays, that they breed in great numbers in India, in the copſes of bamboos, which grow on each ſide the road, *p.* 94.

Simia. BABOONS. der, and drop its arms before the belly. Inhabits the hotter parts of Africa."

Fig. 7. 7. The wood-baboon, with a long dog-like face, covered with a ſmall gloſſy black ſkin; hands and feet naked, and black like the face; hair on all parts long, elegantly mottled with black and tawny; nails white. About three feet high when erect; tail not three inches, and very hairy on the upper part.—Inhabits Guiney, where it is called the *man of the wood.*

8. The nemeſtrina, or pig-tail baboon, with a pointed face, which is naked, of a ſwarthy redneſs: two ſharp canine teeth: ears like the human: hair on the limbs and body brown inclining to aſh-colour, paleſt on the belly: fingers black: nails long and flat: thumbs on the hind-feet very long, connected to the neareſt toe by a broad membrane: tail four inches long, ſlender, exactly like a pig's, and almoſt naked; the bare ſpaces on the rump red, and but ſmall: length, from head to tail, 22 inches. Inhabits the iſles of Sumatra and Japan: is very docile. In Japan it is taught ſeveral tricks, and carried about the country by mountebanks. Kempfer was informed by one of theſe people, that the baboon he had was 102 years old.

B. Baboons with *longer* tails.

Fig. 8. 9. The hamadryas, or dog-faced baboon, with a long, thick, and ſtrong noſe, covered with a ſmooth red ſkin: ears pointed, and hid in the hair: head great, and flat: hair on the head, and fore-part of the body as far as the waiſt, very long and ſhaggy; grey and olive-brinded; the ſides of the head very full, the hair on the limbs and hind-part of the body very ſhort: limbs ſtrong and thick: hands and feet duſky: the nails on the fore-feet flat; thoſe on the hind like a dog's: buttocks very bare, and covered with a ſkin of a bloody colour: tail ſcarce the length of the body, and carried generally erect. They inhabit the hotteſt parts of Africa and Aſia; where they keep in vaſt troops, and are very fierce and dangerous. They rob gardens. They will run up trees when paſſengers go by, ſhake the boughs at them with great fury, and chatter very loud. They are exceſſively impudent, indecent, laſcivious: moſt deteſtable animals in their manners as well as appearance. They range the woods in hundreds; which obliges the owners of the coffee-plantations to be continually on their guard againſt their depredations. One of them was ſhown in London ſome years ago: it came from Mokha, in the province of Yeman, in Arabia Felix in the Perſian gulph; and was above five feet high. It was very fierce, and untameable; ſo ſtrong, as eaſily to maſter its keeper, a ſtout young man. Its inclinations to women appeared in the moſt violent manner. A footman, who brought a girl to ſee it, in order to teaze the animal, kiſſed and hugged her: The beaſt, enraged at being ſo tantalized, caught hold of a quart pewter-pot, which he threw with ſuch force and ſo ſure an aim, that, had not the man's hat and wig ſoftened the blow, his ſkull muſt have been fractured; but he fortunately eſcaped with a common broken head.

Fig. 9. 10. The faunus, ſilenus, or lion-tailed baboon, with a dog-like face, naked, and of a duſky colour: a very large and full white or hoary beard: large canine teeth: body covered with black hair; belly of a light-colour: tail terminated with a tuft of hair like that of a lion. Its bulk that of a middling ſized dog. It inhabits the Eaſt-Indies and the hotter parts of Africa.

Simia. MONKEYS. III. With tails longer than their bodies, or MONKEYS.

A. Thoſe of the old world, or the continent of Aſia and Africa, having within each lower jaw pouches for the reception of their food: buttocks generally naked.

A, Tails ſtraight, not prehenſile.

Fig. 11. 11. The purple-faced monkey, with a great triangular white beard, ſhort, and pointed at the bottom, and on each ſide of the ears, extending in a winged faſhion far beyond them; face and hands purple, body black. Inhabit Ceylon. They are very harmleſs; live in the woods, and feed on leaves and buds of trees; and when taken ſoon become tame.

12. The ſabæa, or green monkey, has a black and flattiſh face: the ſide of it bounded by long white hairs, falling backwards, and almoſt covering the ears, which are black, and like the human: head, limbs, and whole upper part of the body and tail, covered with ſoft hair, of a yellowiſh green colour at their ends, cinereous at their roots: under-ſide of the body and tail, and inner ſide of the limbs, of a ſilvery colour: tail very long and ſlender. Size of a ſmall cat.—Inhabit different parts of Africa: keep in great flocks, and live in the woods: are ſcarce diſcernible when among the leaves, except by their breaking the boughs with their gambols: in which they are very agile and ſilent: even when ſhot at, do not make the leaſt noiſe; but will unite in company, knit their brows, and gnaſh their teeth, as if they meant to attack the enemy: are very common in the Cape Verd iſlands.

Fig. 10. 13. The æthiops, mangaby, or white-eyelid monkey, has a long, black, naked, and dog-like face: the upper eye-lids of a pure white: ears black, and like the human: no canine teeth: hairs on the ſides of the face beneath the cheeks, longer than the reſt: tail long: colour of the whole body tawny and black: flat nails on the thumbs and fore-fingers; blunt claws on the others: hands and feet black.—Shown in London ſome years ago: place uncertain: that deſcribed by M. de Buffon came from Madagaſcar; was very good-natured; went on all-fours.

Fig. 12. 14. The aygula, or egret monkey, has a long face, and an upright ſharp-pointed tuft of hair on the top of the head. The hair on the fore-head is black; the tuft, and the upper part of the body, light grey; the belly, white: the eye-brows are large; the beard very ſmall. Size of a ſmall cat. They inhabit Java. They fawn on men, on their own ſpecies, and embrace each other. They play with dogs, if they have none of their own ſpecies with them. If they ſee a monkey of another kind, they greet him with a thouſand grimaces. When a number of them ſleep, they put their heads together. They make a continual noiſe during night.

15. The Chineſe monkey, (*le bonnet Chinois* of Buffon), has a long ſmooth noſe, of a whitiſh colour: hair on the crown of the head long, lying flat, and parted like that of a man; colour, a pale cinereous brown. Inhabit Ceylon. They keep in great troops; and rob the gardens of fruit, and fields of the corn; to prevent which, the natives are obliged to watch the whole day: yet theſe animals are ſo bold, that, when driven from one end of the field, they will immediately enter at the

other, and carry off with them as much as their mouth and arms can hold. Boſman, ſpeaking of the thefts of the monkeys of Guiney, ſays, that they will take in each paw one or two ſtalks of millet, as many under their arms, and two or three in their mouth; and thus laden, hop away on their hind-legs: but, if purſued, they fling away all, except what is in their mouths, that it may not impede their flight. They are very nice in the choice of the millet; examine every ſtalk; and if they do not like it, fling it away: ſo that this delicacy does more harm to the fields than their thievery.

Fig. 13. 16. Full-bottom monkey, with a ſhort, black, and naked face; that and the ſhoulders covered with long, coarſe, flowing hairs like a full-bottomed perriwig; of a dirty-yellowiſh colour, mixed with black: body, arms, and legs, of a fine gloſſy blackneſs, covered with ſhort hairs: hands naked, furniſhed with only four fingers; on each foot four very long ſlender toes: tail very long, of a ſnowy whiteneſs, with a tuft at the end: body and limbs ſlender; length above three feet. Inhabits the foreſts of Sierra Leone in Guiney; where it is called the *bey* or *king monkey*. The negroes hold the ſkin in high eſtimation; and uſe it for pouches, and for coverings to their guns.

B. Monkeys of the new world, or the continent of America, having neither pouches in their jaws, nor naked buttocks. Tails of many prehenſile, and naked on the under ſide for a certain ſpace next their end.

A, With prehenſile tails.

17. Beelzebub, or the preacher, has black ſhining eyes; ſhort round ears; and a round beard under the chin and throat. The hairs on the body are of a ſhining black, long, yet lie ſo cloſe on each other that the animal appears quite ſmooth: the feet and end of the tail are brown; the tail very long, and always twiſted at the end. Size of a fox. Inhabit the woods of Braſil and Guiana in vaſt numbers, and make a moſt dreadful howling. Sometimes one mounts on a higher branch, the reſt ſeat themſelves beneath: the firſt begins as if it was to harangue, and ſets up ſo loud and ſharp a howl as may be heard a vaſt way, and a perſon at a diſtance would think that a hundred joined in the cry: after a certain ſpace, he gives a ſignal with his hand, when the whole aſſembly joins in chorus; but on another ſignal, is ſilent, and the orator finiſhes his addreſs (c). Their clamour is the moſt diſageeeable and tremendous that can be conceived; owing to a hollow and hard bone placed in the throat, which the Engliſh call the *throttle-bone*. Theſe monkeys are very fierce, untameable, and bite dreadfully. There is a variety of a ferruginous or reddiſh bay colour, which the Indians call the *king of the monkeys*: it is large, and as noiſy as the former. The natives eat this ſpecies, as well as ſeveral other ſorts of monkeys, but are particularly fond of this. Europeans will alſo eat it, eſpecially in thoſe parts of America where food is ſcarce: when it is ſcalded in order to get off the hair, it looks very white; and has a reſemblance ſhocking to humanity, that of a child of two or three years old, when crying (d).

Fig. 14. 18. The paniſcus, four-fingered, or ſpider-monkey, has a long flat face, of a ſwarthy fleſh-colour: the eyes are ſunk in the head; ears like the human; limbs of a great length, and uncommonly ſlender: the hair is black, long, and rough. There are only four fingers on the hands, being quite deſtitute of a thumb; five toes on the feet. The tail is long; and naked below, near the end. The body is ſlender; about a foot and a half long: the tail near two feet, and ſo prehenſile as to ſerve every purpoſe of a hand.—They inhabit the neighbourhood of Carthagena, Guiana, Braſil, and Peru; aſſociate in vaſt herds; and are ſcarce ever ſeen on the ground. Dampier deſcribes their gambols in a lively manner: "There was (ſays he) a great company dancing from tree to tree over my head, chattering, and making a terrible noiſe and a great many grim faces and antic geſtures; ſome broke down dry ſticks and flung them at me, others ſcattered their urine and dung about my ears: at laſt one bigger than the reſt came to a ſmall limb juſt over my head, and leaping directly at me, made me leap back; but the monkey caught hold of the bough with the tip of its tail, and there continued ſwinging to and fro, making mouths at me. The females with their young ones are much troubled to leap after the males; for they have commonly two, one ſhe carries under her arm, the other ſits on her back, and claps its two fore-paws about her neck: are very ſullen when taken; and very hard to be got when ſhot, for they will cling with their tail or feet to a bough, as long as any life remains; when I have ſhot at one, and broke a leg or arm, I have pitied the poor creature to ſee it look and handle the broken limb, and turn it from ſide to ſide."—They are the moſt active of monkeys, and quite enliven the foreſts of America. In order to paſs from top to top of lofty trees, whoſe branches are too diſtant for a leap, they will form a chain, by hanging down, linked to each other by their tails, and ſwinging in that manner till the loweſt catches hold of a bough of the next tree, and draws up the reſt; and ſometimes they paſs rivers by the ſame expedient. They are ſometimes brought to Europe; but are very tender, and ſeldom live long in our climate.

Fig. 15. 19. The ſai, or weeper, with a round and flat face, of a reddiſh brown colour, very deformed: the hair on the head, and upper part of the body, black, tinged with brown; beneath and on the limbs, tinged with red: tail black, and much longer than the head and body: the young exceſſively deformed; their hair very long, and thinly diſperſed: in the Britiſh Muſæum are ſpecimens of old and young. M. de Buffon has a variety with a white throat. Inhabits Surinam and Braſil: appear as if they were always weeping: of a melancholy diſpoſition; but very full of imitating what they ſee done. Theſe probably are the monkeys Dampier ſaw in the Bay of All Saints, which he ſays are very ugly, and ſmell ſtrongly of muſk. They keep in large com-

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(c) A ſingular account, yet related by Marcgrave and ſeveral other writers. Marcgrave is a writer of the firſt authority, and a moſt able naturaliſt, long reſident in the Braſils, and ſpeaks from his own knowledge.

(d) *Ulloa's Voy.* I. 113. *Des Marchais*, III. 311. ſays, they are excellent eating, and that a *ſoupe aux ſinges* will be found as good as any other, as ſoon as you have conquered the averſion to the *bouilli* of their heads, which look very like thoſe of little children.

companies; and make a great chattering, eſpecially in ſtormy weather; reſide much on a ſpecies of tree which bears a podded fruit, which they feed on.

B. With ſtraight tails, not prehenſile.

Fig. 16. 20. The pithecia, or fox-tailed monkey, with a ſwarthy face, covered with ſhort white down: forehead and ſides of the face with whitiſh, and pretty long hair: body with long duſky brown hairs; white or yellowiſh at their tips: hair on the tail very long and buſhy; ſometimes black, ſometimes reddiſh: belly and lower part of the limbs a reddiſh white: length from noſe to tail, near a foot and a half: tail longer, and like that of a fox: hands and feet black, with claws inſtead of nails. Inhabits Guiana.

Fig. 17. 21. The iacchus, or ſtriated monkey, with a very round head: about the ears two very long full tufts of white hairs ſtanding out on each ſide: irides reddiſh: face a ſwarthy fleſh colour: ears like the human: head black: body aſh-coloured, reddiſh, and duſky; the laſt forms ſtriated bars croſs the body: tail full of hair, annulated with aſh-colour and black: body ſeven inches long; tail, near eleven: hands and feet covered with ſhort hairs: fingers like thoſe of a ſquirrel: nails, or rather claws, ſharp. Inhabits Braſil: feeds on vegetables; will alſo eat fiſh: makes a weak noiſe: very reſtleſs: often brought over to Europe.

Fig. 18. 22. The mico, or fair monkey, with a ſmall round head: face and ears of the moſt lively vermilion colour: body covered with moſt beautiful long hairs of a bright and ſilvery whiteneſs, of matchleſs elegance: tail of a ſhining dark cheſnut: head and body eight inches long; tail twelve. Inhabits the banks of the Amazons; diſcovered by M. de Condamine.

SIMILE, or Similitude, in rhetoric, a compariſon of two things, which though different in other reſpects, yet agree in ſome one. The difference between a ſimile and compariſon is ſaid to conſiſt in this, that the ſimile properly belongs to whatever we call the quality of a thing, and the compariſon to the quantity. See Comparison; and Oratory, n° 84. 118.

SIMILOR, a name given to an alloy of red copper and zinc, made in the beſt proportions, to imitate ſilver and gold.

SIMON (Richard), a French critic and divine, of great ſenſe and learning, born at Dieppe in 1638. He made a vaſt proficiency in the Oriental tongues, for which he had always a particular turn. He was the author and editor of ſeveral works; but the moſt important of his publications was his *Hiſtoire Critique du Vieux Teſtament*; which appeared in 1678. He died in 1612.

SIMONICAL, is applied to any perſon guilty of ſimony. See Simony.

SIMONIANS, in church-hiſtory, a ſect of ancient heretics, ſo called from their founder Simon Magus or the Magician. The hereſies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Ghoſt were venal, and to be purchaſed with money. He is ſaid to have invented the Æons, which were ſo many perſons of whom the Godhead was ſuppoſed to be compounded. His concubine Helen he called the firſt intelligence, and mother of all things. Sometimes he called her *Minerva*, and himſelf *Jupiter*. Simon Magus gained a great many proſelytes, who paid himſelf and his concubine divine worſhip. Theſe were the earlieſt heretics, and whom St John, St Peter, and St Paul, in their epiſtles, ſo often warn Chriſtians againſt.

SIMONIDES, the name of ſeveral poets celebrated in antiquity; but by the Marbles it appears, that the eldeſt and moſt illuſtrious of them was born in the 55th Olympiad, 538 years B. C. and that he died in his 90th year; which nearly agrees with the chronology of Euſebius. He was a native of Ceos, one of the Cyclades, in the neighbourhood of Attica, and the preceptor of Pindar. Both Plato and Cicero give him the character not only of a good poet and muſician, but ſpeak of him as a perſon of great virtue and wiſdom. Such longevity gave him an opportunity of knowing a great number of the firſt characters in antiquity, with whom he was in ſome meaſure connected. It appears in Fabricius, from ancient authority, that Simonides was cotemporary and in friendſhip with Pittacus of Mitylene, Hipparchus tyrant of Athens, Pauſanias king of Sparta, Hiero tyrant of Syracuſe, with Themiſtocles, and with Alevades king of Theſſaly. He is mentioned by Herodotus; and Xenophon, in his Dialogue upon Tyranny, makes him one of the interlocutors with Hiero king of Syracuſe. Cicero alleges, what has often been quoted in proof of the modeſty and wiſdom of Simonides, that when Hiero aſked him for a definition of God, the poet required a whole day to meditate on ſo important a queſtion; at the end of which, upon the prince putting the ſame queſtion to him a ſecond time, he aſked two days reſpite; and in this manner always doubled the delay each time he was required to anſwer it; till at length, to avoid offending his patron by more diſappointments, he frankly confeſſed that he found the queſtion ſo difficult, that the more he meditated upon it, the leſs was his hope of being able to ſolve it.

In his old age, perhaps from ſeeing the reſpect which money procured to ſuch as had loſt the charms of youth and the power of attaching mankind by other means, he became ſomewhat mercenary and avaricious. He was frequently employed by the victors at the games to write panegyrics and odes in their praiſe, before his pupil Pindar had exerciſed his talents in their behalf: but Simonides would never gratify their vanity in this particular till he had firſt tied them down to a ſtipulated ſum for his trouble; and upon being upbraided for his meanneſs, he ſaid, that he had two coffers, in one of which he had for many years put his pecuniary rewards; the other was for honours, verbal thanks, and promiſes; that the firſt was pretty well filled, but the laſt remained always empty. And he made no ſcruple to confeſs, in his old age, that of all the enjoyments of life, the love of money was the only one of which time had not deprived him.

He was frequently reproached for this vice; however, he always defended himſelf with good-humour. Upon being aſked by Hiero's queen, Whether it was moſt deſirable to be learned or rich? he anſwered, that it was far better to be rich; for the learned were always dependent on the rich, and waiting at their doors; whereas he never ſaw rich men at the doors of the learned. When he was accuſed of being ſo ſordid as to ſell part of the proviſions with which his table was furniſhed by Hiero, he ſaid he had done it in order "to diſplay to the world the magnificence of that

SIMIA

Plate CCLXVIII.

I. Apes.

Fig. 1. Orang Outang

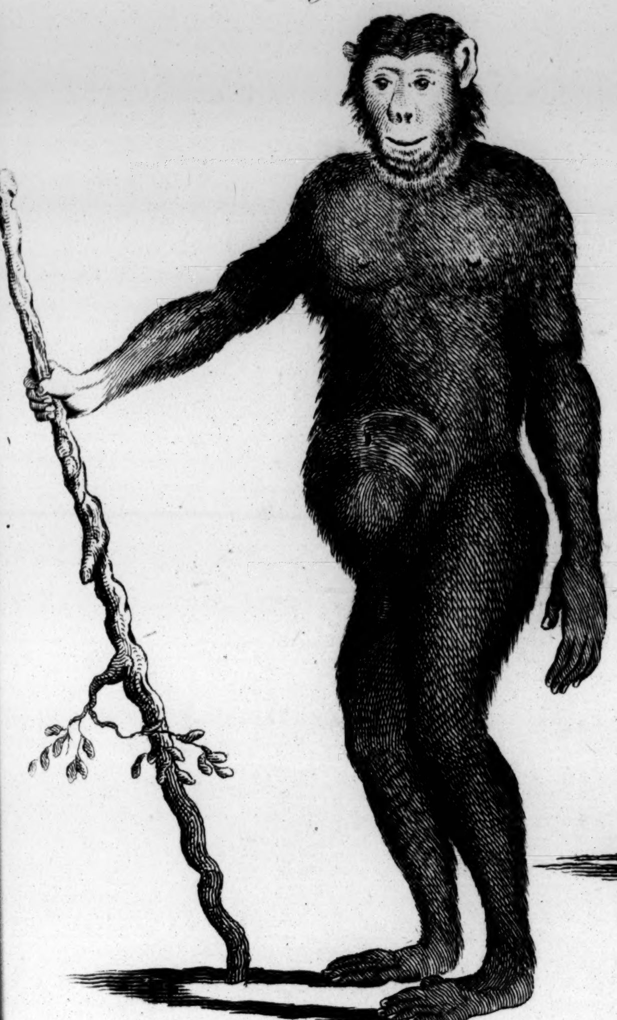


Fig. 3. Long-armed Ape.

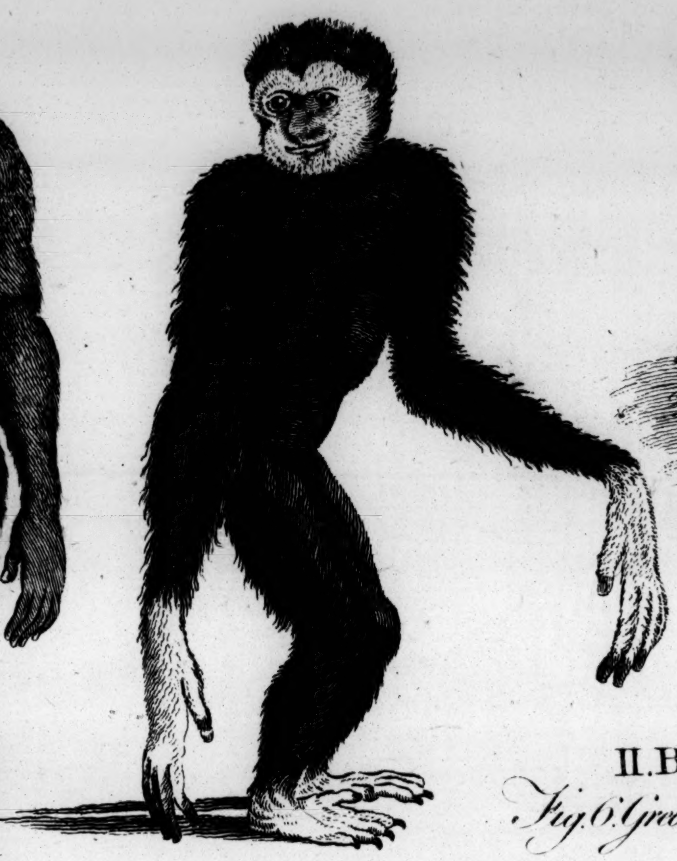
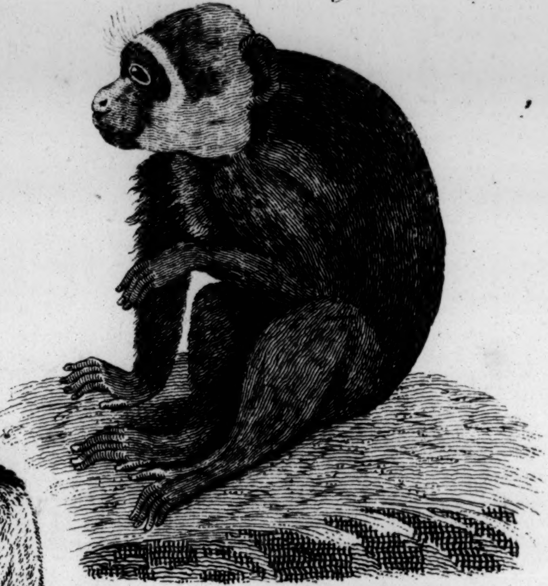


Fig. 2. Pigmy.



II. Baboons.

Fig. 6. Great Baboon.

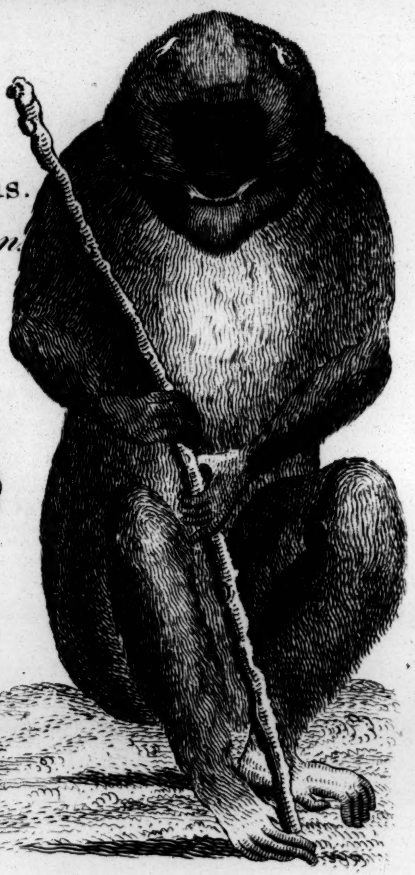


Fig. 5. Tufted Ape.

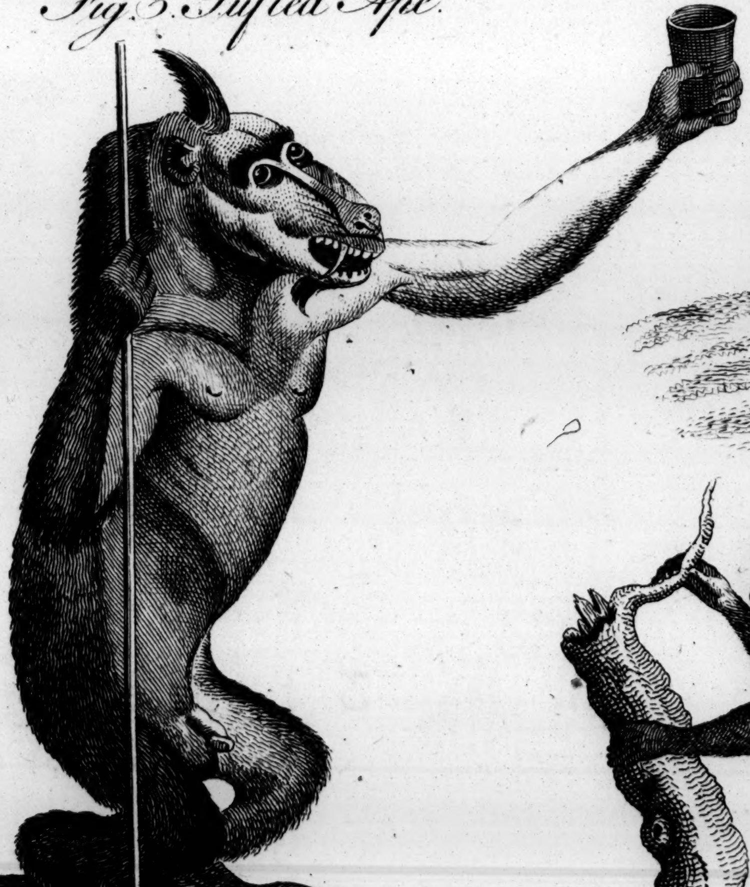


Fig. 4. Barbary Ape.

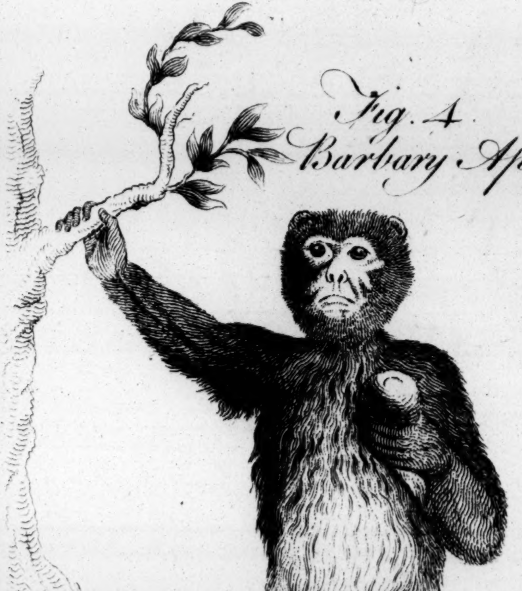
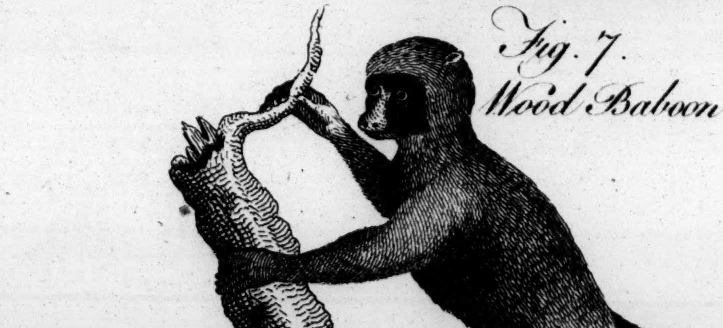


Fig. 7. Wood Baboon.



A. Bell sculp!

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SIMIA. Plate CCLXIX.

Fig. 8. Dog-faced Baboon.

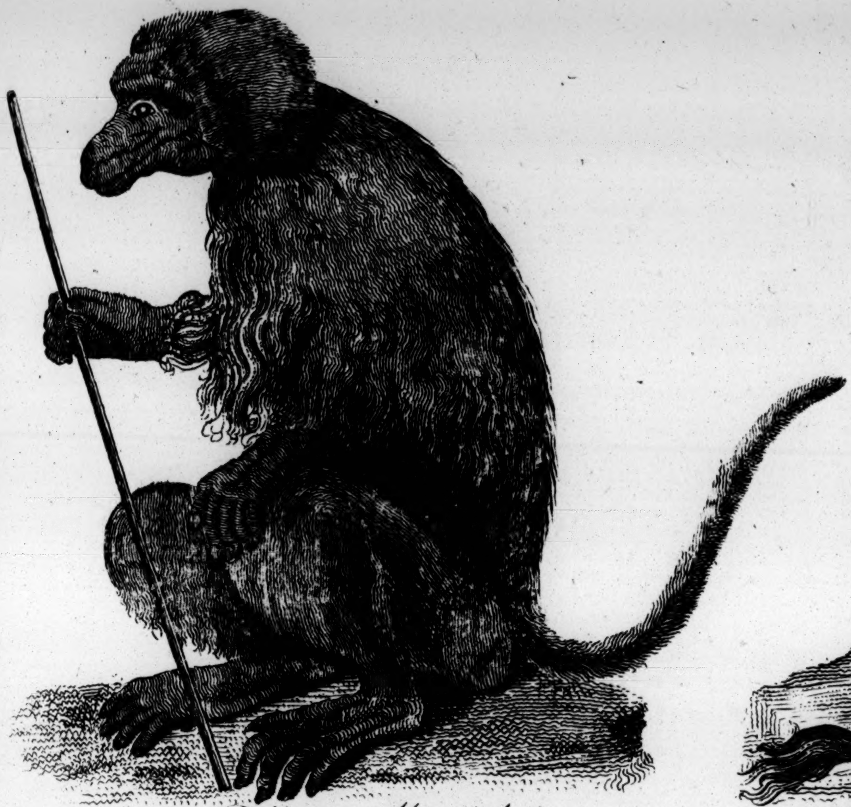
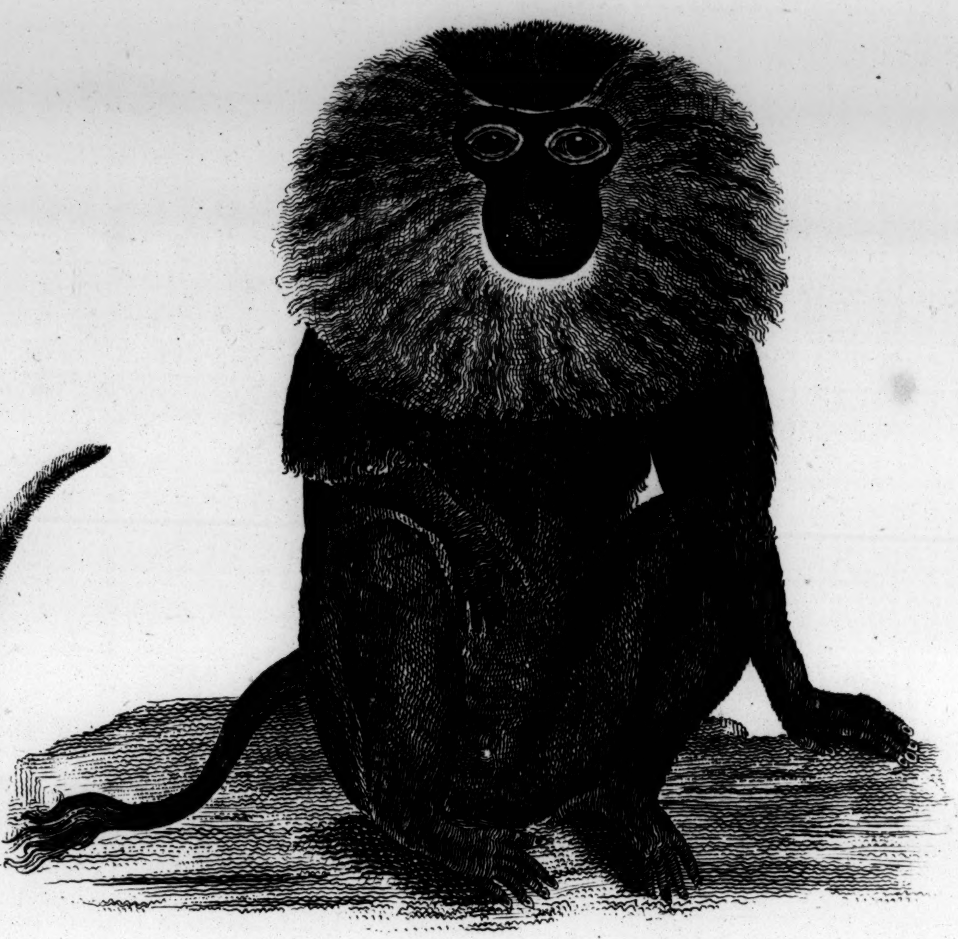


Fig. 9. Lion-tailed Baboon.



III. Monkeys. Fig. 10. Mangabey.

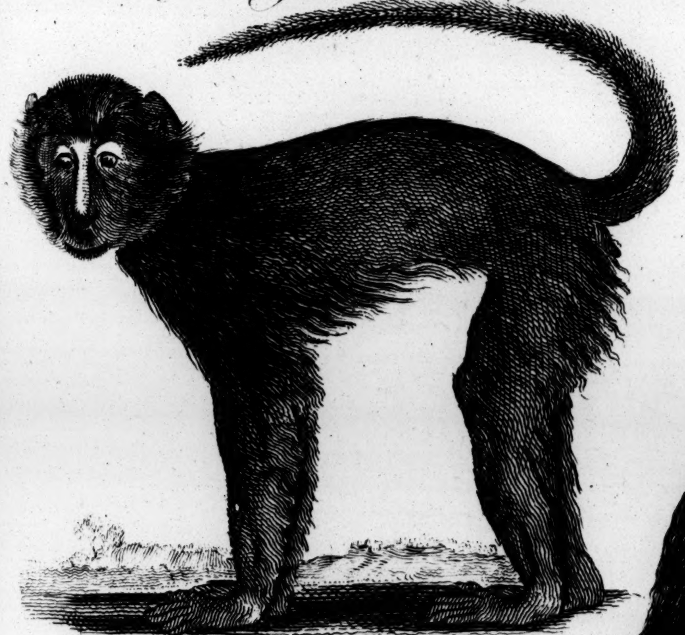


Fig. 12. Egret Monkey.

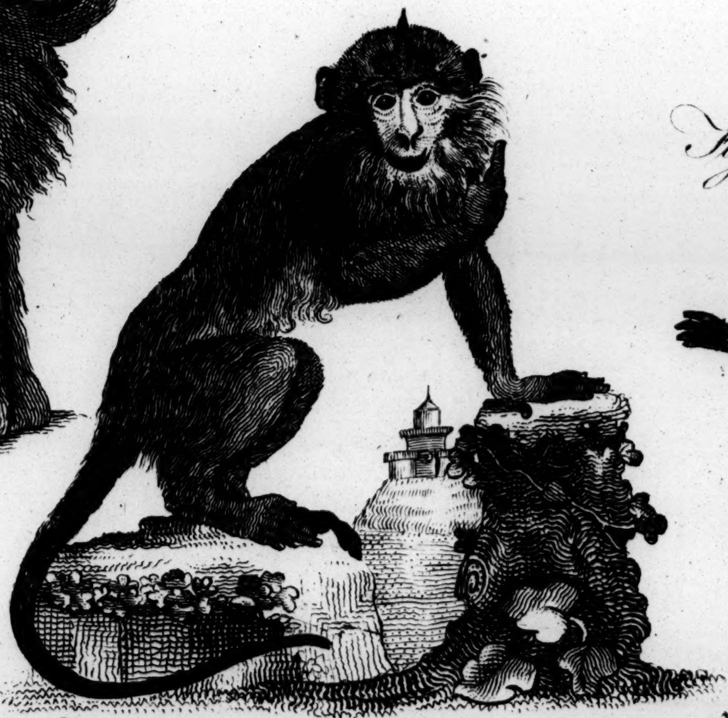


Fig. 13. Full-bottom Monkey.

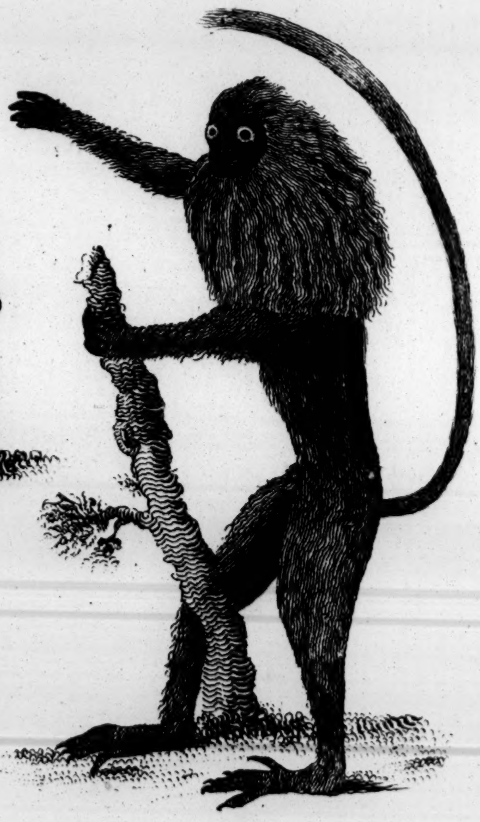
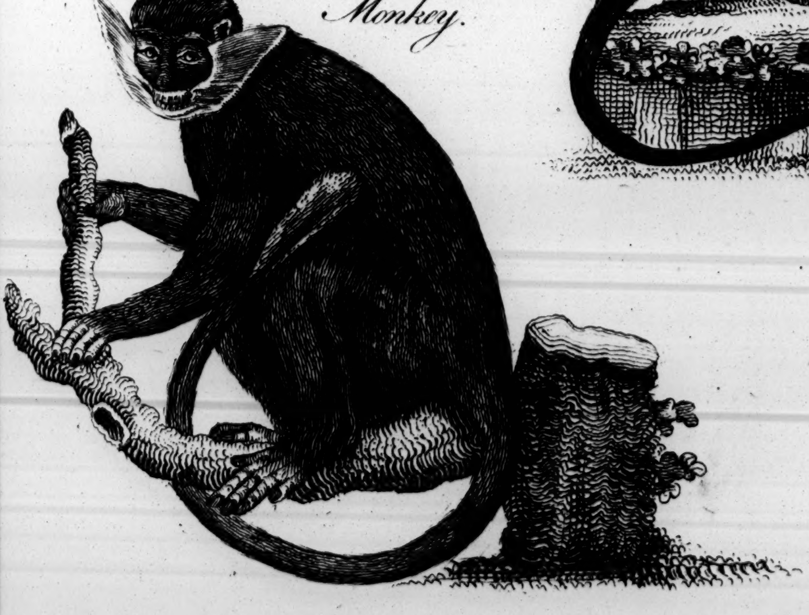


Fig. 11. Purple-faced Monkey.



A. Bell Sculp.

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prince and his own frugality." To others he ſaid, that his reaſon for accumulating wealth was, that "he would rather leave money to his enemies after death, than be troubleſome to his friends while living."

He obtained the prize in poetry at the public games when he was fourſcore years of age. According to Suidas, he added four letters to the Greek alphabet; and Pliny aſſigns to him the eighth ſtring of the lyre; but theſe claims are diſputed by the learned.

Among the numerous poetical productions of which, according to Fabricius, antiquity has made him the author, are many ſongs of victory and triumph for athletic conquerors at the public games. He is likewiſe ſaid to have gained there himſelf the prize in elegiac poetry when Æſchylus was his competitor.

His poetry was ſo tender and plaintive, that he acquired the cognomen of *Melicertes*, "ſweet as honey;" and the *tearful* eye of his muſe was proverbial.

"Simonides (ſays an elegant modern writer *, and excellent judge of every ſpecies of literary merit), was celebrated by the ancients for the ſweetneſs, correctneſs, and purity of his ſtyle, and his irreſiſtible ſkill in moving the paſſions. Dionyſius places him among thoſe poliſhed writers who excel in a ſmooth volubility, and flow on, like plenteous and perennial rivers, in a courſe of even and uninterrupted harmony."

It is to Dionyſius that we are indebted for the preſervation of the following fragment of this poet. Danaë being by her mercileſs father incloſed in a cheſt, and thrown into the ſea with her child, when night comes on, and a ſtorm ariſes which threatens to overſet the cheſt, ſhe, weeping and embracing the young Perſeus, cries out:

Sweet child! what anguiſh does thy mother know,
Ere cruel grief has taught thy tears to flow!
Amidſt the roaring wind's tremendous ſound,
Which threats deſtruction as it howls around;
In balmy ſleep thou lieſt, as at the breaſt,
Without one bitter thought to break thy reſt.——
The glimm'ring moon in pity hides her light,
And ſhrinks with horror at the ghaſtly ſight.
Didſt thou but know, ſweet innocent! our woes,
Not opiate's pow'r thy eye-lids now could cloſe.
Sleep on, ſweet babe! ye waves in ſilence roar;
And lull, O lull to reſt my tortur'd ſoul!

There is a ſecond great poet of the name of Simonides recorded on the Marbles, ſuppoſed to have been his grandſon, and who gained, in 478 B. C. the prize in the games at Athens.

SIMONY, is the corrupt preſentation of any one to an eccleſiaſtical benefice for money, gift, or reward. It is ſo called from the reſemblance it is ſaid to bear to the ſin of Simon Magus, though the purchaſing of holy orders ſeems to approach nearer to his offence. It was by the canon law a very grievous crime: and is ſo much the more odious, becauſe, as Sir Edward Coke obſerves, it is ever accompanied with perjury; for the preſentee is ſworn to have committed no ſimony. However, it was not an offence puniſhable in a criminal way at the common law; it being thought ſufficient to leave the clerk to eccleſiaſtical cenſures. But as theſe did not affect the ſimoniacal patron, nor were efficacious enough to repel the notorious practice of the thing, divers acts of parliament have been made to reſtrain it by means of civil forfeitures; which the modern prevailing uſage, with regard to ſpiritual preferments, calls aloud to be put in execution. The ſtatute 31 Eliz. c. 6. enacts, that if any patron, for money or any other corrupt conſideration or promiſe, directly or indirectly given, ſhall preſent, admit, inſtitute, induct, inſtall, or collate any perſon to an eccleſiaſtical benefice or dignity, both the giver and taker ſhall forfeit two years value of the benefice or dignity; one moiety to the king, and the other to any one who will ſue for the ſame. If perſons alſo corruptly reſign or exchange their benefices, both the giver and taker ſhall in like manner forfeit double the value of the money or other corrupt conſideration. And perſons who ſhall corruptly ordain or licenſe any miniſter, or procure him to be ordained or licenſed, (which is the true idea of ſimony), ſhall incur a like forfeiture of forty pounds; and the miniſter himſelf of ten pounds, beſides an incapacity to hold any eccleſiaſtical preferment for ſeven years afterwards. Corrupt elections and reſignations in colleges, hoſpitals, and other eleemoſynary corporations, are alſo puniſhed, by the ſame ſtatute, with forfeiture of the double value, vacating the place or office, and a devolution of the right of election, for that turn, to the crown.

SIMPLE, ſomething not mixed or compounded; in which ſenſe it ſtands oppoſed to *compound*.

Simple, in the materia medica, a general name for all herbs or plants, as having each its particular virtue, whereby it becomes a ſimple remedy.

SIMPLICITY in writing. If we examine the writers whoſe compoſitions have ſtood the teſt of ages, and obtained that higheſt honour, "the concurrent approbation of diſtant times and nations," we ſhall find that the character of ſimplicity is the unvarying circumſtance which alone hath been able to gain this univerſal homage from mankind. Among the Greeks, whoſe writers in general are of the ſimple kind, the divineſt poet, the moſt commanding orator, the fineſt hiſtorian, and deepeſt philoſopher, are, above the reſt, conſpicuouſly eminent in this great quality. The Roman writers riſe towards perfection according to that meaſure of ſimplicity which they mingle in their works: indeed, they are all inferior to the Greek models. But who will deny that Lucretius, Horace, Virgil, Livy, Terence, Tully, are at once the ſimpleſt and beſt of Roman writers? unleſs we add the noble annaliſt who appeared in after-times; who, notwithſtanding the political turn of his genius, which ſometimes interferes, is admirable in this great quality, and by it far ſuperior to his contemporaries. It is this one circumſtance that hath raiſed the venerable Dante, the father of modern poetry, above the ſucceeding poets of his country, who could never long maintain the local and temporary honours beſtowed upon them; but have fallen under that juſt neglect which time will ever decree to thoſe who deſert a juſt ſimplicity for the florid colourings of ſtyle, contraſted phraſes, affected conceits, the mere trappings of compoſition and Gothic minutiæ. It is this hath given to Boileau the moſt laſting wreath in France, and to Shakeſpeare and Milton in England; eſpecially to the laſt, whoſe writings are more unmixed in this reſpect, and who had formed himſelf entirely on the ſimple model of the beſt Greek writers and of the ſacred Scriptures. As it appears from theſe inſtances, that ſimplicity is the only univerſal characteriſtic of juſt writing, ſo the ſuperior eminence of the ſacred Scriptures in this prime quality hath been generally acknowledged. One of the greateſt critics in antiquity, himſelf conſpicuous in the ſublime and ſimple manner, hath borne this teſtimony to the writings of Moſes and St Paul; and by parity of reaſon we muſt conclude, that had he been converſant with the other ſacred writers, his taſte and candour would have allowed them the ſame encomium.

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* Adventurer, nº 89.

It hath been often obſerved, even by writers of no mean rank, that the “Scriptures ſuffer in their credit by the diſadvantage of a literal verſion, while other ancient writings enjoy the advantage of a free and embelliſhed tranſlation.” But in reality thoſe gentlemens concern is ill-placed and groundleſs: for the truth is, “that moſt other writings are impaired by a literal tranſlation; whereas giving only a due regard to the idiom of different languages, the ſacred writings, when literally tranſlated, are then in their full perfection.”

Now this is an internal proof, that in all other writings there is a mixture of local, relative, exterior ornament, which is often loſt in the transfuſion from one language to another. But the internal beauties, which depend not on the particular conſtruction of tongues, no change of tongue can deſtroy. Hence the Bible-compoſition preſerves its native beauty and ſtrength alike in every language, by the ſole energy of unadorned phraſe, natural images, weight of ſentiment, and great ſimplicity.

It is in this reſpect like a rich vein of gold, which, under the ſevereſt trials of heat, cold, and moiſture, retains its original weight and ſplendour, without either loſs or alloy; while baſer metals are corrupted by earth, air, water, fire, and aſſimilated to the various elements through which they paſs.

This circumſtance, then, may be juſtly regarded as ſufficient to vindicate the compoſition of the ſacred Scriptures, as it is at once their chief excellence and greateſt ſecurity. It is their excellence, as it renders them intelligible and uſeful to all; it is their ſecurity, as it prevents their being diſguiſed by the falſe and capricious ornaments of vain or weak tranſlators. We may ſafely appeal to experience and fact for the confirmation of theſe remarks on the ſuperior ſimplicity, utility, and excellence of the ſtyle of the holy Scripture. Is there any book in the world ſo perfectly adapted to all capacities? that contains ſuch ſublime and exalted precepts, conveyed in ſuch an artleſs and intelligible ſtrain, that can be read with ſuch pleaſure and advantage by the lettered ſage and the unlettered peaſant?

SIMPLOCE. See ORATORY, n° 72.

SIMPSON (Thomas), profeſſor of mathematics at the royal academy at Woolwich, fellow of the Royal Society, and member of the Royal Academy at Stockholm, was born at Market Boſworth in Leiceſterſhire in 1710. His father, a ſtuff-weaver, taught him only to read Engliſh, and brought him up to his own buſineſs; but meeting with a ſcientifical pedlar, who likewiſe practiſed fortune-telling, young Simpſon by his aſſiſtance and advice, left off weaving, and profeſſed aſtrology. As he improved in knowledge, however, he grew diſguſted with his pretended art; and renouncing it, was driven to ſuch difficulties for the ſubſiſtence of his family, that he came up to London, where he worked as a weaver, and taught mathematics at his ſpare hours. As his ſcholars increaſed, his abilities became better known, and he publiſhed his Treatiſe on Fluxions by ſubſcription in 1737: in 1740, he publiſhed his Treatiſe on the Nature and Laws of Chance; and Eſſays in ſpeculative and mixed Mathematics. After theſe appeared his Doctrine of Annuities and Reverſions; Mathematical Diſſertations; Treatiſe on Algebra; Elements of Geometry; Trigonometry, plane and ſpherical; Select Exerciſes; and his Doctrine and Application of Fluxions; which he profeſſes to be rather a new work, than a ſecond edition of his former publication on fluxions. In 1743, he obtained the mathematical profeſſorſhip at Woolwich academy; and ſoon after was choſen a member of the Royal Society, when the preſident and council, in conſideration of his moderate circumſtances, were pleaſed to excuſe his admiſſion-fees, and his giving bonds for the ſettled future payments. At the academy, he exerted all his abilities in inſtructing the pupils who were the immediate objects of his duty, as well as others whom the ſuperior officers of the ordnance permitted to be boarded and lodged in his houſe. In his manner of teaching, he had a peculiar and happy addreſs, a certain dignity and perſpicuity, tempered with ſuch a degree of mildneſs, as engaged the attention, eſteem, and friendſhip, of his ſcholars. He therefore acquired great applauſe from his ſuperiors in the diſcharge of his duty. His application and cloſe confinement, however, injured his health. Exerciſe and a proper regimen were preſcribed to him, but to little purpoſe; for his ſpirits ſunk gradually, till he became incapable of performing his duty, or even of reading the letters of his friends. At length his phyſicians adviſed his native air for his recovery, and he ſet out in February 1761; but was ſo fatigued by his journey, that, upon his arrival at Boſworth, he betook himſelf to his chamber, and grew continually worſe till the day of his death, which happened on the 14th of May, in the 51ſt year of his age.

SIN, a breach or tranſgreſſion of ſome divine law or command.

SINAPI, MUSTARD; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants. The principal ſpecies are, 1. The alba, or white muſtard, which is generally cultivated as a ſalad-herb for winter and ſpring uſe. This riſes with a branched hairy ſtalk two feet high; the leaves are deeply jagged on their edges and rough. The flowers are diſpoſed in looſe ſpikes at the end of the branches, ſtanding upon horizontal footſtalks; they have four yellow petals in form of a croſs, which are ſucceeded by hairy pods that end with long, compreſſed oblique beaks; the pods generally contain four white ſeeds.

2. The nigra, or common muſtard, which is frequently found growing naturally in many parts of Britain, but is alſo cultivated in fields for the ſeed, of which the ſauce called *muſtard* is made. This riſes with a branching ſtalk four or five feet high; the lower leaves are large, rough, and very like thoſe of turnep; the upper leaves are ſmaller and leſs jagged. The flowers are ſmall, yellow, and grow in ſpiked cluſters at the end of the branches; they have four petals placed in form of a croſs, and are ſucceeded by ſmooth four-cornered pods.

3. The arvenſis, grows naturally on arable land in

many parts of England. The ſeed of this is commonly ſold under the title of *Durham muſtard-ſeed;* of this there are two varieties, if not diſtinct ſpecies; one with cut, the other has entire leaves. The ſtalks riſe two feet high; the leaves are rough, and in one they are jagged like turnep-leaves; the other are long and entire. The flowers are yellow; the pods are turgid, angular, and have long beaks.

Muſtard, by its acrimony and pungency, ſtimulates the ſolids, and attenuates viſcid juices; and hence ſtands deſervedly recommended for exciting appetite, aſſiſting digeſtion, promoting the fluid ſecretions, and for the other purpoſes of the acrid plants called *antiſcorbutic*. It imparts its taſte and ſmell in perfection to aqueous liquors, whilſt ſpirit of wine extracts very little of either: the whole of the pungency ariſes with water in diſtillation. By expreſſion it yields a conſiderable quantity of a ſoft inſipid oil, perfectly void of acrimony: the cake left after the expreſſion is more pungent than the muſtard was at firſt.—By diſtillation with a violent fire, muſtard yields a volatile alkali, empyreumatic oil, and a ſmall quantity of phoſphorus.

SINAPISM, in pharmacy, an external medicine, in form of a cataplaſm, compoſed chiefly of muſtard-ſeed pulverized and mixed with the pulp of figs, or with briony, garlic, onion, or the like.

SINCERITY, honeſty of intention, freedom from hypocriſy. See MORAL *Philoſophy*, n° 157.

SINCIPUT, in anatomy, the fore-part of the head, reaching from the forehead to the coronal ſuture.

SINE, or *right* SINE *of an Arch*, in trigonometry, is a right line drawn from one end of that arch, perpendicular to the radius drawn to the other end of the arch; being always equal to half the chord of twice the earch. See TRIGONOMETRY, and GEOMETRY.

SINECURES, eccleſiaſtical benefices without cure of ſouls.

SINEW, denotes properly what we call a *nerve*, tho' in common ſpeech it is rather uſed for a *tendon*.

SINGING, the action of making divers inflexions of the voice, agreeable to the ear, and correſpondent to the notes of a ſong, or piece of melody. See MELODY.

The firſt thing to be done in learning to ſing, is to raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend by the ſame notes; and then to riſe and fall by greater intervals, as a third, fourth, fifth, &c. and to do all this by notes of different pitch. Then theſe notes are repreſented by lines and ſpaces, to which the ſyllables *fa, ſol, la, mi,* are applied, and the pupil taught to name each line and ſpace thereby; whence this practice is called *ſol-faing*, the nature, reaſon, effects, &c. whereof, ſee under the article SOL-FAING.

SINGING *of Birds.* It is worthy of obſervation, that the female of no ſpecies of birds ever ſings: with birds, it is the reverſe of what occurs in human kind. Among the feathered tribe, all the cares of life fall to the lot of the tender ſex; theirs is the fatigue of incubation; and the principal ſhare in nurſing the helpleſs brood: to alleviate theſe fatigues, and to ſupport her under them, nature hath given to the male the ſong, with all the little blandiſhments and ſoothing arts; theſe he fondly exerts (even after courtſhip) on ſome ſpray contiguous to the neſt, during the time his mate is performing her parental duties. But that ſhe ſhould be ſilent is alſo another wiſe proviſion of nature, for her ſong would diſcover her neſt; as would a gaudineſs of plumage, which, for the ſame reaſon, ſeems to have been denied her.

On the ſong of birds ſeveral curious experiments and obſervations have been made by the Hon. Daines Barrington. See Philoſophical Tranſactions, vol. lxiii.

SINGULAR NUMBER, in grammar, that number of nouns and verbs which ſtands oppoſed to plural; and is uſed when we only ſpeak of a ſingle, or one perſon or thing. See GRAMMAR.

The Latins, French, Engliſh, &c. have no numbers but the ſingular and plural; but the Greeks and Hebrews have likewiſe a dual number, peculiar to two perſons.

SINISTER, ſomething on or towards the left hand. Hence ſome derive the word *ſiniſter*, *à ſinendo*; becauſe the gods, by ſuch auguries, permit us to proceed in our deſigns.

SINISTER, is ordinarily uſed among us for unlucky; though, in the ſacred rites of divination, the Romans uſed it in an oppoſite ſenſe. Thus *avis ſiniſtra*, or a bird on the left hand, was eſteemed a happy omen: whence, in the law of the 12 tables, *Ave ſiniſtra populi magiſter eſto.*

SINISTER, in heraldry. The ſiniſter ſide of an eſcutcheon is the left-hand ſide; the ſiniſter chief, the left angle of the chief; the ſiniſter baſe, the left-hand part of the baſe.

SINISTER *Aſpect*, among aſtrologers, is an appearance of two planets happening according to the ſucceſſion of the ſigns; as Saturn in Aries, and Mars in the ſame degree of gemini.

SINISTRI, a ſect of ancient heretics, thus called becauſe they held the left hand in abhorrence, and made it a point of religion not to receive any thing therewith.

SINKING FUND, a proviſion made by parliament, conſiſting of the ſurpluſage of other funds, intended to be appropriated to the payment of the national debt; on the credit of which very large ſums have been borrowed for public uſes. See NATIONAL *Debt*, and REVENUE.

SINOPICA TERRA, in natural hiſtory, the name of a red earth of the ochre kind, called alſo *rubrica ſinopica*, and by ſome authors *ſinopis*. It is a very cloſe, compact, and weighty earth, of a fine glowing purple colour. It is of a pure texture, but not very hard, and of an even but duſty ſurface. It adheres firmly to the tongue, is perfectly fine and ſmooth to the touch, does not crumble eaſily between the fingers, and ſtains the hands. It melts very ſlowly in the mouth, is perfectly pure and fine, of an auſtere aſtringent taſte, and ferments violently with aqua-fortis. It was dug in Cappadocia, and carried for ſale to a city in the neighbourhood called *Sinope*, whence it had its name. It is now found in plenty in the New Jerſeys in America, and is called by the people there *blood-ſtone*. Its fine texture and body, with its high florid colour, muſt make it very valuable to painters; and its aſtringency promiſes it to be a powerful medicine.

SINOPLE, in heraldry, denotes vert, or green colourlour in armories.—Sinople is uſed to ſignify love, youth, beauty, rejoicing, and liberty; whence it is that letters of grace, ambition, legitimation, &c. are always uſed to be ſealed with green wax.

SINUOSITY, a ſeries of bends and turns in arches, or other irregular figures, ſometimes jetting out, and ſometimes falling in.

SINUS, in anatomy, denotes a cavity in certain bones and other parts, the entrance whereof is very narrow, and the bottom wider and more ſpacious.

Sinus, in ſurgery, a little cavity or ſacculus, frequently formed by a wound or ulcer, wherein pus is collected.

SIPHON, in hydroſtatics. See Hydrostatics, n° 20.

SIR, the title of a knight or baronet, which, for diſtinction's ſake, as it is now given indiſcriminately to all men, is always prefixed to the knight's Chriſtian name, either in ſpeaking or writing to them.

SIRE, a title of honour in France, now given to the king only as a mark of ſovereignty.

SIRENS, in fabulous hiſtory, certain celebrated ſongſtreſſes who were ranked among the demi-gods of antiquity.

Hyginus places their birth among the conſequences of the rape of Proſerpine. Others make them daughters of the river Acheloüs and one of the muſes. *Ovid Met.* lib. v.

The number of the Sirens was three; and their names were *Parthenope*, *Lygea*, and *Leucoſia*. Some make them half women and half fiſh; others, half women and half birds. There are antique repreſentations of them ſtill ſubſiſting under both theſe forms.

Pauſanias tells us, that the Sirens, by the perſuaſion of Juno, challenged the Muſes to a trial of ſkill in ſinging; and theſe having vanquiſhed them, plucked the golden feathers from the wings of the Sirens, and formed them into crowns, with which they adorned their own heads.

The Argonauts are ſaid to have been diverted from the enchantment of their ſongs by the ſuperior ſtrains of Orpheus: Ulyſſes, however, had great difficulty in ſecuring himſelf from ſeduction. (See *Odyſ.* lib. xii.)

Pope, in his notes to the twelfth book of the Odyſſey, obſerves, the critics have greatly laboured to explain what was the foundation of this fiction of Sirens. We are told by ſome, that the Sirens were queens of certain ſmall iſlands named *Sirenuſæ*, that lie near Capræa in Italy, and chiefly inhabited the promontory of Minerva, upon the top of which that goddeſs had a temple, as ſome affirm, built by Ulyſſes. Here there was a renowned academy, in the reign of the Sirens, famous for eloquence and the liberal ſciences, which gave occaſion to the invention of this fable of the ſweetneſs of the voice, and attracting ſongs of the Sirens. But why then are they fabled to be deſtroyers, and painted in ſuch dreadful colours? We are told, that at laſt the ſtudents abuſed their knowledge, to the colouring of wrong, the corruption of manners, and the ſubverſion of government: that is, in the language of poetry, they were feigned to be transformed into monſters, and with their muſic to have enticed paſſengers to their ruin, who there conſumed their patrimonies, and poiſoned their virtues with riot and effeminacy. The place is now called *Maſſa*. Some writers tell us of a certain bay, contracted within winding ſtreights and broken cliffs, which, by the ſinging of the winds and beating of the waters, returns a delightful harmony, that allures the paſſenger to approach, who is immediately thrown againſt the rocks, and ſwallowed up by the violent eddies. Thus Horace, moraliſing, calls *idleneſs* a Siren,

> ——*Vitanda eſt improba Siren*
> *Deſidia*——

But the fable may be applied to all pleaſures in general, which, if too eagerly purſued, betray the incautious into ruin; while wiſe men, like Ulyſſes, making uſe of their reaſon, ſtop their ears againſt their inſinuations.

All ancient authors agree in telling us, that Sirens inhabited the coaſt of Sicily. The name, according to Bochart, who derives it from the Phœnician language, implies a ſongſtreſs. Hence it is probable, ſays Mr Burney, that in ancient times there may have been excellent ſingers, but of corrupt morals, on the coaſt of Sicily, who, by ſeducing voyagers, gave riſe to this fable. And if this conjecture be well founded, he obſerves, the Muſes are not the only pagan divinities who preſerved their influence over mankind in modern times; for every age has its Sirens, and every Siren her votaries; when beauty and talents, both powerful in themſelves, are united, they become ſtill more attractive.

Siren in zoology, a genus belonging to the order of amphibia nantes. The body is naked, and furniſhed with two unguiculated feet and a tail. It has a great reſemblance to a lizard, only it is larger. It is found in marſhy grounds in Carolina.

SIRIUS, in aſtronomy, a bright ſtar in the conſtellation Canis. See Astronomy, n° 206.

SIRLET (Flavius), an eminent Roman engraver on precious ſtones: his Lacoon, and repreſentations in miniature of antique ſtatues at Rome, are almoſt invaluable, and very ſcarce. He died in 1737.

SIRMOND (James), a famous Jeſuit, and one of the moſt learned men France has produced, was born at Riom in 1559. He became well ſkilled in eccleſiaſtical antiquities; and acquired great reputation throughout all Europe by his profound erudition and his works. He was invited to Rome in 1590 by father Aquaviva, to whom he was ſecretary for above 16 years. The cardinals Baronius, d'Oſſat, and Barberino, had a particular eſteem for him; and he was of ſome ſervice to the former in aſſiſting him in compoſing his Annals. In 1608 he returned to Paris; and from that time ſcarcely ever let a year paſs without publiſhing ſome of his works. He at length became confeſſor to Lewis XIII. and for a long time enjoyed that place. He died at Paris in 1651. He publiſhed a great number of books; the principal of which are, Excellent Notes on the Councils of France, the Capitularies of Charles the Bald, and the Theodoſian Code; good editions of the Works of Theodoret and Hincmar of Rheims; and many Opuſcula on different Subjects, printed at Paris in 1696, in five vols folio.

SISON, bastard parsley, a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſix ſpecies, the moſt remarkable of which is the amomum, or common baſtard-parſley. This is a biennial plant about three feet high, growing wild in many places of Britain. Its ſeeds are ſmall, ſtriated, of an oval figure and brown colour. Their taſte is warm and aromatic. Their whole flavour is extracted by ſpirit of wine, which elevates very little of it in diſtillation; and hence the ſpirituous extract has the flavour in great perfection, while the watery extract has very little. A tincture drawn with pure ſpirit is of a green colour. The ſeeds have been eſteemed aperient, diuretic, and carminative; but are little regardad in the preſent practice.

SISTRUM, or CISTRUM, a kind of ancient muſical inſtrument, uſed by the prieſts of Iſis and Oſiris. It is deſcribed by Spon as of an oval form, in manner of a racket, with three ſticks traverſing it breadthwiſe; which playing freely by the agitation of the whole inſtrument, yielded a kind of ſound which to them ſeemed melodious. Mr Malcolm takes the ſiſtrum to be no better than a kind of rattle. Oiſelius obſerves, that the ſiſtrum is found repreſented on ſeveral medals and on taliſmans.

SISYMBRIUM, WATER-CRESS; a genus of the ſiliquoſa order, belonging to the tetradynamia claſs of plants. There are 25 ſpecies; the moſt remarkable is the naſturtium, or common water-creſs. This grows naturally in rivulets and clear ſtanding waters in this country. The leaves are a ſtrong antiſcorbutic, and the expreſſed juice contains all their virtues. It is an ingredient in the ſucciſcorbutici of the ſhops, and may be taken in the doſe of one or two ounces.

SISYPHUS, in fabulous hiſtory, one of the deſcendents of Eolus, married Merope, one of the Pleiades, who bore him Glaucus. He reſided at Epyra in Peloponneſus, and was a very crafty man. Others ſay, that he was a Trojan ſecretary, who was puniſhed for diſcovering ſecrets of ſtate; and others again, that he was a notorious robber, killed by Theſeus. However, all the poets agree that he was puniſhed in Tartarus for his crimes, by rolling a great ſtone to the top of an hill, which conſtantly recoiled, and, rolling down inceſſantly, renewed his labour.

SITE, denotes the ſituation of an houſe, &c. and ſometimes the ground-plot or ſpot of earth it ſtands on.

SITTA, in ornithology, a genus belonging to the order of picæ. The bill is ſubulated, clyindrical, ſtraight, and entire; the ſuperior mandible being longer than the inferior, and compreſſed at the point. The tongue is lacerated, and the noſtrils covered with hairs. There are three ſpecies, diſtinguiſhed by their colour. The Europæa, or nut-hatch, is in length near five inches three-quarters, breadth nine inches; the bill is ſtrong and ſtraight, about three quarters of an inch long; the upper mandible black, the lower white: the irides are hazel; the crown of the head, back, and coverts of the wings, of a fine bluiſh grey: a black ſtreak paſſes over the eye from the mouth: the cheeks and chin are white; the breaſt and belly of a dull orange-colour; the quill-feathers duſky; the wings underneath are marked with two ſpots, one white at the root of the exterior quills, the other black at the joint of the baſtard-wing: the tail conſiſts of twelve feathers; the two middle are grey, the two exterior feathers tipt with grey; then ſucceeds a tranſverſe white ſpot; beneath that the reſt is black: the legs are of a pale yellow; the back-toe very ſtrong, and the claws large.

The bird runs up and down the bodies of trees, like the woodpecker tribe; and feeds not only on inſects, but nuts, of which it lays up a conſiderable proviſion in the hollows of trees: it is a pretty ſight, ſays Mr Willoughby, to ſee her fetch a nut out of her hoard, place it faſt in a chink, and then, ſtanding above it with its head downwards, ſtriking it with all its force, break the ſhell, and catch up the kernel. It breeds in the hollows of trees; if the entrance to its neſt be too large, it ſtops up part of it with clay, leaving only room enough for admiſſion: in autumn it begins to make a chattering noiſe, being ſilent for the greateſt part of the year. Dr Plott tells us, that this bird, by putting its bill into a crack in the bough of a tree, can make ſuch a violent ſound as if it was rending aſunder, ſo that the noiſe may be heard at leſt twelve ſcore yards.

SIUM, KEX; a genus of the digynia order, belonging to the pentandria claſs of plants. There are eight ſpecies; the moſt remarkable is the latifolium, or great water-parſnep, which grows ſpontaneouſly in many places both of England and Scotland on the ſides of lakes, ponds, and rivulets. The ſtalk is erect and furrowed, a yard high or more. The leaves are pinnated with three or four pair of large elliptic pinnæ, with an odd one at the end, all ſerrated on the edges. The ſtalk and branches are terminated with erect umbels, which is the chief characteriſtic of the ſpecies. Cattle are ſaid to have run mad by feeding upon this plant.

SIXTH, in muſic, one of the ſimple original concords or harmonical intervals. See INTERVAL.

SIXTUS V. (pope), the moſt extraordinary man of his time. His father, a poor vine-dreſſer, unable to maintain him, put him out to a farmer, who made him keep his ſheep, and afterwards his hogs. His real name is not known, but in this ſtation he called himſelf *Felix*; and, from his earlieſt youth, he ſeems to have had an unaccountable prepoſſeſſion or impulſe of his future greatneſs. By degrees he roſe to be inquiſitor at Venice; but quarrelling with the ſenate, he was obliged to quit the territories of the republic. Being rallied upon his precipitate retreat, he replied, that having made a vow to be pope at Rome, he did not think it right to ſtay to be hanged at Venice. By his intrigues and addreſs he obtained a cardinal's hat from pope Pius V. By an affectation of great humility, and the appearance of being loaded with bodily infirmities, he ſo far deceived the conclave, after the death of pope Gregory XIII. that, being divided into factions, in order to put an end to the hopes and cabals of each, they elected him pope, imagining that he would not live long, and in the mean time that the factions would be weakened, and render the choice of a ſucceſſor leſs difficult. Sixtus was no ſooner elected, than he threw away his crutch, and with it all his aſſumed debility, to the great aſtoniſhment of the whole conclave. Nor was the change in his manners remarkable than in his perſon Inſtead of his former humility and complaiſance, he treated every one with reſerve and haughtneſs; thoſe particularly who had been moſt inſtrumental in his exaltation.

tation. The lenity of his predeceſſor Gregory's government had introduced a licentiouſneſs among all ranks of people: but the reformation of abuſes both in church and ſtate was the firſt and principal care of Sixtus; and this he ſignified very early. It had been cuſtomary with many preceding popes to order the priſon-doors to be ſet open on the day of their coronation; and in expectation of this act of grace, many of the banditti and other delinquents were wont to ſurrender themſelves on the election of a new pope. Sixtus, on the contrary, ordered that four of the moſt notorious offenders ſhould be publicly executed at the very time of his coronation; two by the axe, and two by the halter: and, in conformity to the reſolution he had taken he put an early ſtop to the profligacy of the people, he conducted himſelf with an unexampled ſeverity in the puniſhment of offenders, without the leaſt reſpect to perſons; of which many inſtances are recorded. He particularly directed the legates and governors of the eccleſiaſtical ſtate to be expeditious in their criminal proceſſes; declaring, he had rather have the gibbets and galleys full than the priſons; and had in view the ſhortening law-proceedings in general. At his acceſſion to the papacy, he found the apoſtolic chamber not only exhauſted, but in debt; he left it clear, and enriched with five millions of gold. To him the city of Rome was obliged for ſeveral of its greateſt embelliſhments, particularly the Vatican library; and to him its citizens were indebted for the introduction of trade into the eccleſiaſtical ſtate. This great man, who was alſo a patron of learning and of men of genius, died, not without the ſuſpicion of having been poiſoned by the Spaniards, in 1590; having enjoyed the papacy little more than five years. A Latin verſion of the Bible, compiled by his order, appeared in the ſame year, in three vols folio; but ſo many faults were diſcovered in it, that it was ſuppreſſed by his ſucceſſor Gregory XIV. Clement VIII. who ſucceeded Gregory cauſed a new edition to be printed, in which the errors of the firſt are corrected; and this is very ſcarce.

SIYA-GHUSH, the caracal of Buffon, an animal of the cat kind. It has a lengthened face, and ſmall head; very long ſlender black ears, terminated with a long tuft of black hairs; inſide and bottom of the ears white; noſe white; eyes ſmall: the upper part of the body is of a very pale reddiſh brown, the tail rather darker; belly and breaſt whitiſh: limbs ſtrong, and pretty long: tail about half the length of the body. They inhabit Perſia, India, and Barbary; where they are often brought up tame, and uſed in the chace of leſſer quadrupeds, and of the larger ſort of birds, ſuch as cranes, pelecans, peacocks, &c. which they ſurpriſe with great addreſs: when they ſeize their prey, they hold it faſt with their mouth, and lie for a time motionleſs on it. They are ſaid to attend the lion, and to feed on the remains of the prey that animal leaves. They are very fierce when provoked: Dr Charleton ſays, he ſaw one fall on a hound, which it killed and tore to pieces in a moment, notwithſtanding the dog defended itſelf to the utmoſt. The Arabian writers call it *Anak el Ard*: they ſay that it hunts like the panther; jumps up at cranes as they fly; and covers its ſteps when hunting.

SIZE, the name of an inſtrument uſed for finding the bigneſs of fine round pearls. It conſiſts of thin pieces or leaves, about two inches long, and half an inch broad, faſtened together at one end by a rivet. In each of theſe are round holes drilled of different diameters. Thoſe in the firſt leaf ſerve for meaſuring pearls from half a grain to ſeven grains; thoſe of the ſecond, for pearls from eight grains or two carats to five carats, &c.; and thoſe of the third, for pearls from ſix carats and a half to eight carats and a half.

Size, is alſo a ſort of paint, varniſh, or glue uſed by painters, &c.

The ſhreds and parings of leather, parchment, or vellum, being boiled in water and ſtrained, make ſize. This ſubſtance is much uſed in many trades.—The manner of uſing ſize is to melt ſome of it over a gentle fire; and ſcraping as much whiting into it as may only colour it, let them be well incorporated together; after which you may whiten frames, &c. with it. After it dries, melt the ſize again, and put more whiting, and whiten the frames, &c. ſeven or eight times, letting it dry between each time: but before it is quite dry, between each waſhing with ſize, you muſt ſmoothe and wet it over with a clean bruſh-pencil in fair water.

To make gold-ſize. Take gum animi and aſphaltum, of each one ounce; minium, litharge of gold, and amber, of each half an ounce: reduce all into a very fine powder, and add to them four ounces of linſeed-oil, and eight ounces of drying oil: digeſt them over a gentle fire that does not flame, ſo that the mixture may only ſimmer, but not boil; for fear it ſhould run over and ſet the houſe on fire, keep it conſtantly ſtirring with a ſtick till all the ingredients are diſſolved and incorporated, and do not leave off ſtirring till it becomes thick and ropy; and being boiled long enough, let it ſtand till it is almoſt cold, and then ſtrain it through a coarſe linen cloth, and keep it for uſe.—To prepare it for working, put what quantity you pleaſe in a horſe-muſcle ſhell, adding as much oil of turpentine as will diſſolve it; and making it as thin as the bottom of your ſeed-lac varniſh, hold it over a candle, and then ſtrain it through a linen-rag into another ſhell; add to theſe as much vermilion as will make it of a darkiſh red: if it is too thick for drawing, you may thin it with ſome oil of turpentine. The chief uſe of this ſize is for laying on of metals.

The beſt gold-ſize for burniſhing is made as follows. Take fine bole, what quantity you pleaſe; grind it finely on a marble, then ſcrape into it a little beef-ſuet; grind all well together; after which mix in a ſmall proportion of parchment-ſize with a double proportion of water, and it is done.

To make ſilver-ſize. Take tobacco-pipe clay in fine powder, into which ſcrape ſome black-lead, and a little Genoa ſoap, and grind them all together with parchment ſize as already directed.

SKELETON, in anatomy, the dried bones of any animal joined together by wires, or by the natural ligaments dried, in ſuch a manner as to ſhow their poſition when the creature was alive.

SKIE, one of the greateſt of the Weſtern Iſlands of Scotland, ſo called from *Skianach*, which in the Erſe dialect ſignifies *winged*, becauſe the two promontories of Valerneſs and Trotterneſs, by which it is bounded on the north-weſt and north-eaſt, are ſuppoſed to reſemble wings. The iſland lies between the ſhire of Roſs and the

SIMIA.

Fig. 14. Four Fingered Monkey.

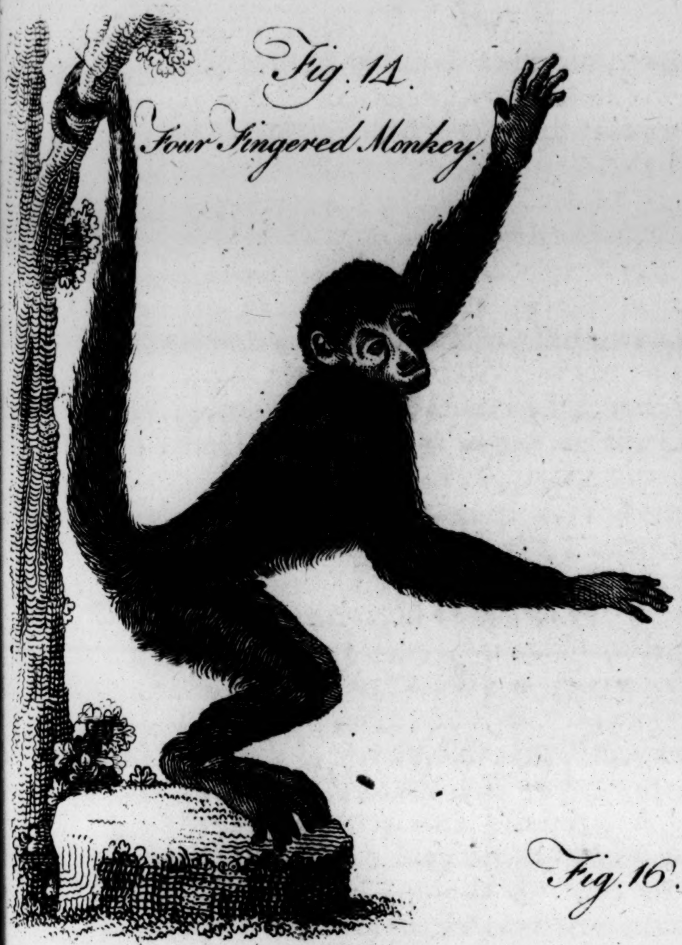


Fig. 18. Fair Monkey.

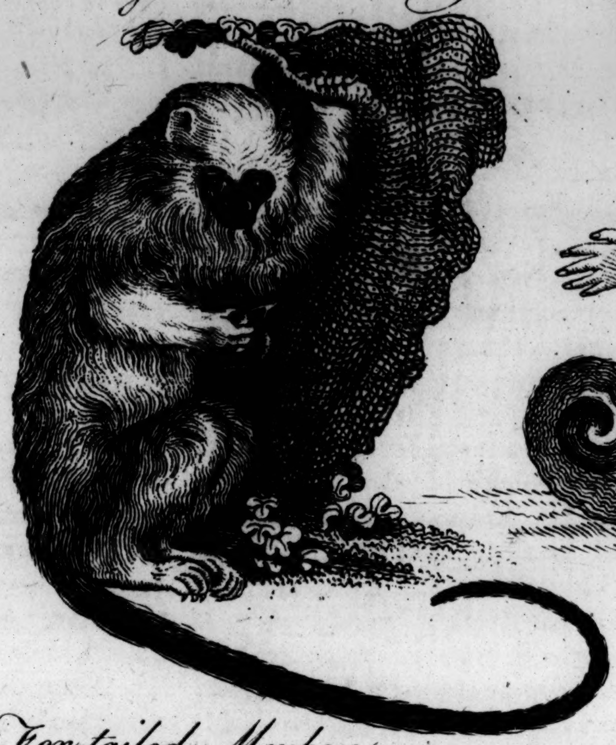


Fig. 15. Weeper.

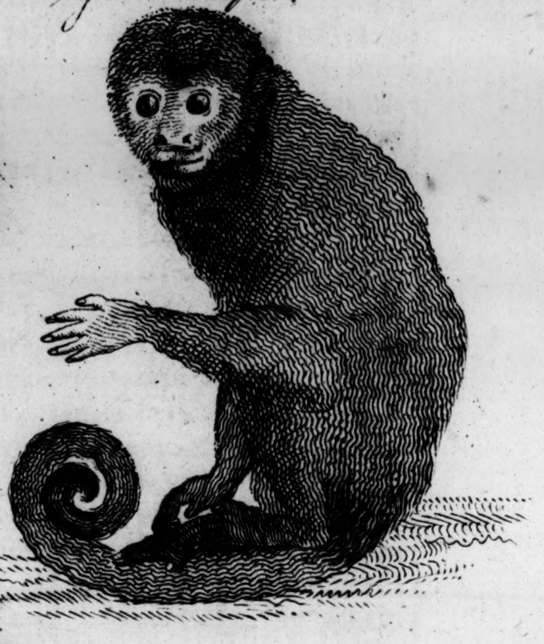


Fig. 16. Fox-tailed Monkey.

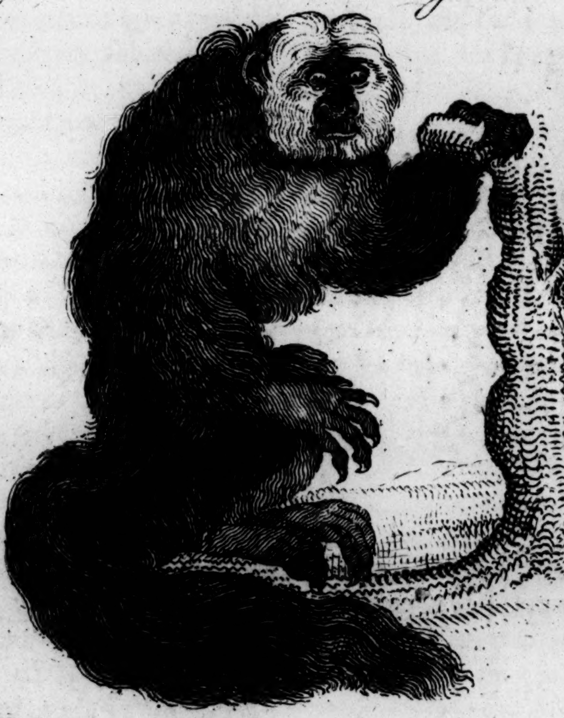


Fig. 19.

SIYA-GHUSH or, Caracol.

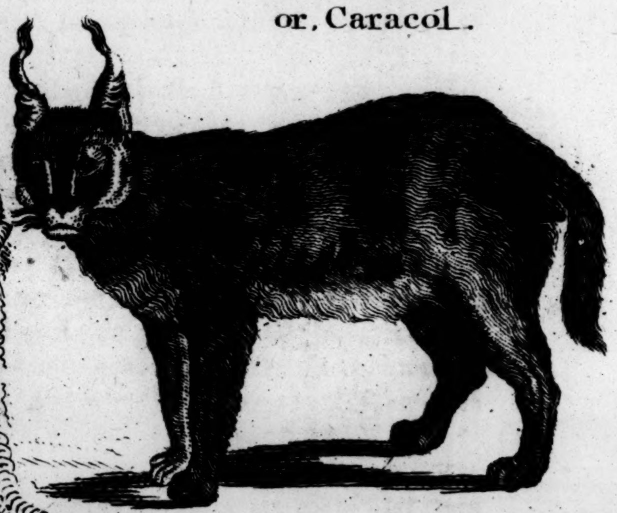


Fig. 17. Striated Monkey.

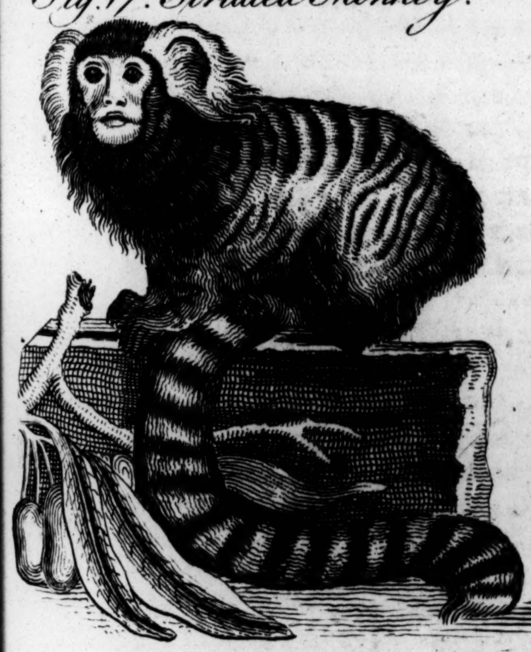


Fig. 20.

Chinese SWAN-PAN.

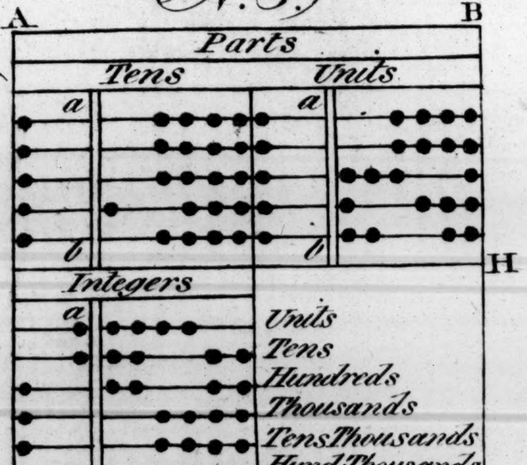
No. 1.

1	1	2	3	4	5	6	7	8	9	0
2	/2	/4	/6	/8	1/0	1/2	1/4	1/6	1/8	/0
3	/3	/6	/9	1/2	1/5	1/8	2/1	2/4	2/7	/0
4	/4	/8	1/2	1/6	2/0	2/4	2/8	3/2	3/6	/0
5	/5	1/0	1/5	2/0	2/5	3/0	3/5	4/0	4/5	/0
6	/6	1/2	1/8	2/4	3/0	3/6	4/2	4/8	5/4	/0
7	/7	1/4	2/1	2/8	3/5	4/2	4/9	5/6	6/3	/0
8	/8	1/6	2/4	3/2	4/0	4/8	5/6	6/4	7/2	/0
9	/9	1/8	2/7	3/6	4/5	5/4	6/3	7/2	8/1	/0

No. 2.

1	5	4	8	6
2	1/0	/8	1/6	1/2
3	1/5	1/2	2/4	1/8
4	2/0	1/6	3/2	2/4
5	2/5	2/0	4/0	3/0
6	3/0	2/4	4/8	3/6
7	3/5	2/8	5/6	4/2
8	4/0	3/2	6/4	4/8
9	4/5	3/6	7/2	5/4

No. 3.


A
B
Parts
Tens
Units
a
a
b
b
H
Integers
a
Units
Tens
Hundreds
Thousands
Tens Thousands
Hund. Thousands
Millions
b
C
T.
D

A. Bell Sculp.t

3 MA 53

Skie.

the weſtern part of Lewis, extending 40 miles in length from north to ſouth; in ſome places 20, and in others 30, in breadth; the circumference of the whole amounting to about 100. The iſland of Skie is divided between two proprietors: the ſouthern part belongs to the laird of Macleod, ſaid to be lineally deſcended from Leod ſon to the black prince of Man: the northern diſtrict, or barony of Troterneſs, is the property of Sir James Macdonald, whoſe anceſtor was Donald, king or lord of the iſles, and chief of the numerous clan of Macdonalds, who are counted the moſt warlike of all the Highlanders. Skie is part of the ſhire of Inverneſs, and formerly belonged to the dioceſe of the iſles: on the ſouth, it is parted from the main land by a channel three leagues in breadth; though, at the ferry of Glenelly, it is ſo narrow that a man may be heard calling for the boat, from one ſide to the other. Skie is well provided with a variety of excellent bays and harbours.

The face of the country is roughened with mountains, ſome of which are ſo high as to be covered with ſnow on the top at Midſummer; in general, their ſides are clothed with heath and graſs, which afford good paſturage for ſheep and black cattle. Between the mountains there are ſome fertile valleys, and the greater part of the land towards the ſea-coaſt is plain and arable. The iſland is well watered with a great number of rivers, above 30 of which afford ſalmon; and ſome of them produce black muſcles in which pearls are bred, particularly the rivers Kilmartin and Ord: Martin was aſſured by the proprietor of the former, that a pearl hath been found in it valued at 20l. Sterling. Here is alſo a conſiderable number of freſh-water lakes well ſtored with trout and eels. The largeſt of theſe lakes takes its denomination from St Columba, to whom is dedicated a chapel that ſtands upon a ſmall iſle in the middle of the lake. Skie likewiſe affords ſeveral cataracts, that roar down the rocks with great impetuoſity. That the iſland has been formerly covered with woods, appears from the large trunks of fir and other trees daily dug out of the bogs and peat-marſhes in every part of this country.

The air is cold and moiſt; the climate rainy, but not unwholeſome The ſoil is generally black, though it likewiſe affords clay of different colours; ſuch as white, red, and blue, and in ſome places fuller's earth. The iſland produces barley, oats, rye, peaſe, and plenty of graſs for paſture, together with pot-herbs and roots for the kitchen: in the article of fruit it is very defective; tho' there are ſome in the orchards belonging to the proprietors.

The minerals found here are lead and iron ore, which, however, have never been wrought to any advantage. Near the village Sartle, the natives find black and white marcaſites, and variegated pebbles. The appleſglen, in the neighbourhood of Loch-fallart, produces beautiful agates of different ſizes and colours: ſtones of a purple hue are, after great rains, found in the rivulets: cryſtal, of different colours and forms, abounds in ſeveral parts of the iſland, as well as black and white marble, free-ſtone, limeſtone, and talc: ſmall red and white coral is found on the ſouthern and weſtern coaſts in great abundance The fuel conſiſts chiefly of peat and turf, which are impregnated with iron ore and ſalt-petre; and coal has been diſcovered in ſeveral diſtricts.

The animals are horſes, hogs, ſheep, goats, cows, and deer. The black cattle are here expoſed to all the rigours of the ſevere winter, without any other provender than the tops of the heath and the alga marina; ſo that they appear like mere ſkeletons in the ſpring, though as the graſs grows up, they ſoon become plump and juicy, the beef being ſweet, tender, and finely interlarded. Here are land and water fowl in abundance; eagles, hawks, heathcocks, growſe, ptarmagan, pigeons, plover, wild geeſe, &c. The amphibious animals are ſeals and otters. Among the reptiles they reckon vipers, aſps, weaſels, frogs, toads, and three different kinds of ſerpents; the firſt ſpotted black and white, and very poiſonous; the ſecond, yellow with brown ſpots; and the third of a brown colour, the ſmalleſt and leaſt poiſonous.

All the coaſt of Skie ſwarms with fiſh, cod, ling, mackarel, whiting, haddock, thornback, turbot, and herrings, which they preſerve without ſalt, by gutting and hanging them to dry in the ſmoke. In the bays and anchoring places, the natives find ſhell-fiſh of all kinds. The kyle of Scalpa teems with oyſters, in ſuch a manner that, after ſome ſpring-tides, 20 horſe-loads of them are left upon the ſands. Near the village of Bernſtill, the beach yields muſcles ſufficient to maintain 60 perſons *per* day; this providential ſupply helps to ſupport many poor families in times of ſcarcity.

The people are ſtrong, robuſt, healthy, and prolific. They generally profeſs the Proteſtant religion; are honeſt, brave, innocent, and hoſpitable. They ſpeak the language, wear the habit, and obſerve the cuſtoms that are common to all the Hebrides. The meconium in new-born infants is purged away with freſh butter: the children are bathed every morning and evening in water, and grow up ſo ſtrong, that a child of 10 months is able to walk alone: they never wear ſhoes or ſtockings before the age of eight or ten, and night-caps are hardly known: they keep their feet always wet; they lie on beds of ſtraw or heath, which laſt is an excellent reſtorative: they are quick of apprehenſion, ingenious, and very much addicted to muſic and poetry. They eat heartily of fiſh; but ſeldom regale themſelves with fleſh-meat: their ordinary food conſiſts of butter, cheeſe, milk, potatoes, colewort, brochan, and a diſh called *oon*, which indeed is no other than the froth of boiled milk or whey raiſed with a ſtick like that uſed in making chocolate.

There are two fairs held annually at Portry, on the eaſt ſide of Skie; the firſt on the middle of June, the other about the beginning of September. The commodities here ſold, are horſes, cows, ſheep, goats, hides, butter, cheeſe, fiſh, and wool. The cattle ſold in theſe fairs ſwim over to the main land through a mile or half a mile of ſea. Many thouſands of theſe beaſts are driven up yearly to England, where they are fatted for the market, and counted delicious eating.

In Skie appear many ruins of Daniſh forts, watch-towers, beacons, temples, and ſepulchral monuments. All the forts are known by the term *Dun;* ſuch as Dun-Skudborg, Dun-Derig, Dun-Skerineſs, Dun-David, &c.

SKIFF, the leaſt of two ſhip-boats, ſerving chiefly to go aſhore in when the ſhip is in the harbour.

SKIN, in anatomy, the general covering of the body of any animal. See ANATOMY, n° 73, 75, &c.

SKIN, in commerce, is particularly uſed for the membrane ſtripped off the animal to be prepared by the tanner, ſkinner, parchment-maker, &c. and converted into leather, &c. See TANNING.

SKINNER (Stephen), an Engliſh antiquarian, born in 1622. He travelled, and ſtudied in ſeveral foreign univerſities during the civil wars; and in 1654, returned and ſettled at Lincoln, where he practiſed phyſic with ſucceſs until the year 1667, when he died of a malignant fever. His works were collected in folio, in 1671, by Mr Henſhaw, under the title of *Etymologicon Linguæ Anglicanæ*, &c.

SKIRMISH, in war, a diſorderly kind of combat or encounter, in preſence of two armies, between ſmall parties, who advance from the body for that purpoſe, and introduce to a general and regular fight.

SKULL, in anatomy, the bony caſe in which the brain is incloſed. See ANATOMY, n° 10, &c.

SKY-ISLAND. See SKIE.

SKY, the blue expanſe of air or atmoſphere. For the reaſon of its blue colour and concave figure, ſee OPTICS, N° 137, and p. 5567, col. 1.

SLAB, an outſide ſappy plank or board ſawed off from the ſides of a timber-tree. The word is alſo uſed for a flat piece of marble.

SLATE, (*ſtegania*), a ſtone of a compact texture, and laminated ſtructure, ſplitting into fine plates.

Dr Hill diſtinguiſhes four ſpecies of ſtegania. 1. The whitiſh ſteganium, being a ſoft, friable, ſlaty ſtone, of a tolerably fine and cloſe texture, conſiderably heavy, perfectly dull and deſtitute of brightneſs, variegated with a pale brown or browniſh yellow. This ſpecies is common in many counties of England, lying near the ſurface of the ground. It is generally very full of perpendicular as well as horizontal cavities, many of which are filled up with a ſpar a little purer and more cryſtalline than the reſt; and is commonly uſed for covering houſes. 2. The red ſteganium is a very fine and elegant ſlate, of a ſmooth ſurface, firm and compact texture, conſiderably heavy, and of a very beautiful pale purple, glittering all over with ſmall gloſſy ſpangles: it is compoſed of a multitude of very thin plates or flakes, laid cloſely and evenly over one another, and cohering pretty firmly: this is very common in the northern parts of England, and is much valued as a ſtrong and beautiful covering for houſes. 3. The common blue ſteganium, is very well known as an uſeful and valuable ſtone, of a fine ſmooth texture and gloſſy ſurface, moderately heavy, and of a pale greyiſh blue; compoſed of a multitude of even plates, laid cloſe upon one another, and eaſily ſplitting at the commiſſures of them: this is alſo very common in the north parts of England, and is uſed in moſt places for the covering of houſes. There are other ſpecies of this ſlate, viz. the browniſh blue friable ſteganium, uſually called *coal-ſlate;* the greyiſh black friable ſteganium, commonly called *ſhiver;* and the greyiſh blue ſparkling ſteganium. 4. The friable, aluminous, black ſteganium, being the Iriſh ſlate of the ſhops: this is compoſed of a multitude of thin flakes, laid very evenly and regularly over one another, and ſplits very readily at the commiſſures of them. It is common in many parts of Ireland, and is found in ſome places in England, always lying near the ſurface in very thick ſtrata. In medicine it is uſed in hæmorrhagies of all kinds with ſucceſs, and is taken often as a good medicine in fevers.

SLAVE, a perſon in the abſolute power of a maſter, either by war or conqueſt. See SERVANT.—Menage and Voſſius derive the word from *Sclavus*, the name of a Scythian people, whom Charlemagne condemned to perpetual impriſonment; whence the Italians made their *ſchlavo*, the Germans their *ſchlave*, the French their *eſclave*, and we *ſlave*. The Italians and other nations uſed to buy theſe Sclavi or Sclavonians to make drudges of; whence the proper name of a nation, became in time the name of a ſtate or condition.—The Romans called their ſlaves *ſervi*, from *ſervare*, to "keep, ſave;" as being ſuch as were not killed, but ſaved, to yield money either by ſale or by their work. Though other authors are of opinion that the Roman name *ſervi* might come from that of *Serbi*, as that of *ſlaves* from *Sclavi*, a people.

We find no mention of ſlaves before the deluge; but immediately after, viz. in the curſe of Canaan, Gen. ix. 25.: whence it is eaſily inferred, that ſervitude commenced ſoon after that time; for in Abraham's days we find it generally eſtabliſhed.—Some will have it to have commenced under Nimrod, becauſe it was he who firſt began to make war, and of conſequence to make captives; and to bring ſuch as he took, either in his battles or irruptions, into ſlavery.

Among the Romans, a ſlave, when he was ſet at liberty, changed his name into a ſurname, and took the nomen or prænomen of his maſter; to which he added the cognomen he had been called by when a ſlave. Great part of the Roman wealth conſiſted in ſlaves: they had the power of life and death over them, which no other nation had; but this ſeverity was afterwards moderated by the laws of the emperors. The ſlaves were eſteemed the proper goods of their maſters, and all they got belonged to them; but if the maſter was too cruel in his correction, he was obliged to ſell his ſlave at a moderate price. The Romans not only approved of, but even invented new ways of making ſlaves; for inſtance, a man born free among them might ſell his freedom and become a ſlave. There were generally three ways of obtaining ſlaves; either when they bought them with the booty taken from the enemy, diſtinct from the ſhare reſerved for the public; or of thoſe who took them priſoners in war; or of merchants who dealt in them, and ſold them at fairs.

Slavery is abſolutely aboliſhed in Britain and France, as to perſonal ſervitude. See SERVANTS.

SLAUGHTER. See MAN-SLAUGHTER, HOMICIDE, MURDER, &c.

SLEEP, that ſtate of the body in which, though the vital functions continue, the ſenſes are not affected by the ordinary impreſſions of external objects.

Under the article DREAMS, the nature of ſleep has been inveſtigated ſo fully, that little remains to be ſaid in this place, beſides the obviating a few objections that may be made to the account of it there given.—Sleep we have ſhown to ariſe immediately from the communication between our ſentient principle and external objects being cut off, in conſequence of which memory is alſo loſt, and the perſon becomes inſenſible of exiſtence. This ſtate may be induced either by ſuch cauſes as affect the brain, the nervous ſyſtem, or the blood; though it probably depends in moſt caſes on the ſtate of the vital fluid. The greateſt difficulties that occur in giving a ſolution of the phenomenon of ſleep is, that it may be brought on by ſeemingly oppoſite cauſes. Thus, though moderate fatigue will induce a propenſity to ſleep, the ſame may be brought on by eating a full meal without any fatigue at all. In like manner, tho' moderate fatigue will induce ſleep, too great a degree of fatigue will prevent it altogether.—This, however, may eaſily be ſolved, on the principles laid down in the abovementioned article. It is there ſuppoſed that the maſs of blood contains the vital principle, or what is called the *animal-ſpirits*, like a general reſervoir, to be diſtributed through the whole body. Part of the blood is ſent to the brain, where another collection or reſervoir is made, ſerving in a particular manner for the purpoſes of reaſon, memory, and the reſt of our mental faculties. The reſt of the blood is diſtributed through the whole body, where ſome part of the vital ſpirit is taken up by each of the ſmall extremities of the nerves, and by means of the nerve communicates a certain ſenſation to the brain when theſe extremities are affected by any external object.—As long as the blood continues in a ſound ſtate, and can ſupply a certain quantity of theſe ſpirits, the perſon remains awake; but when the ſupply is interrupted, by whatever means, he neceſſarily falls aſleep. This is the caſe with a perſon when moderately fatigued; the blood being then deprived in ſome meaſure of part of that animating principle which is neceſſary to the exerciſe of our external ſenſes, or for keeping us awake. If the fatigue be carried to too great a length, the craſis of the blood itſelf is injured, and it becomes incapable of retaining the neceſſary quantity for carrying on the operations of life; which, though independent of our ſenſes, are maintained by means of the ſame principle with them. Hence, though the perſon remains awake, he is far from being in health; and if the watchfulneſs continues for any conſiderable time, he is in great danger of becoming delirious.—After a perſon has taken a full meal, he is ſeized with drowſineſs, becauſe the freſh chyle continually pouring into the ſubclavian vein, requires the exertion of great part of the vital power to aſſimilate it to the blood, ſo that enough is not left to affect the ſenſes ſo readily as uſual. In like manner may we underſtand the ſleep which follows the immoderate uſe of ſpirituous liquors, of large doſes of opium, &c. Theſe ſeem to act by rarefying the blood to ſuch a degree, that the fine veſſels are overſtretched, and compreſs the ſmall nervous fibres which every where accompany them, ſo as to deſtroy for a time their power of action. In the ſame manner do the vapours of charcoal or fixed air, anyhow applied, ſeem to act. Hence the beſt cure for perſons affected by theſe things is to cool them as much as poſſible; and hence alſo we may ſee the reaſon why drunk people will bear an expoſure to much greater degrees of cold, without injury, than ſuch as are ſober.—How cold itſelf induces ſleep, is eaſily underſtood. The whole body is then ſo benumbed, that neither the blood can part with its animating principle, nor can the nerves take it up even if it ſhould do ſo; and hence the fatal ſleep which enſues in ſuch caſes.

From what has been advanced concerning the nature of ſleep, we may eaſily ſee, that its uſes are to reſtore the ſpirits and ſtrengthen the body, though too great indulgence in this reſpect has a contrary effect. The night is the moſt proper time for ſleep, by reaſon of the abſence of the ſolar light, which animates the whole creation, and in ſome meaſure prevents that waſte of ſpirits which is the conſequence of watching for any length of time. Hence we ſee why a perſon who has ſat up all night finds a revival of his ſpirits in the morning; and why nocturnal watchings are prejudicial to health, even though a perſon ſhould indulge himſelf in ſleeping throughout the day.

Some animals require much more ſleep than others, and many continue even for months in this ſtate. For the human ſpecies ſix or ſeven hours are generally ſufficient; though from habit many require eight, nine, or even ten hours. Thoſe who addict themſelves to ſtudy, in general require much ſleep, on account of the great waſte of ſpirits which intenſe thought occaſions.

SLEEPERS, in natural hiſtory, a name given to thoſe animals which ſleep all winter; ſuch as bears, marmots, dormice, bats, hedge-hogs, ſwallows, &c. Theſe do not feed in winter, have no ſenſible evacuations, breathe little or none at all, and moſt of the viſcera ceaſe from their functions. Some of theſe creatures ſeem to be dead, and others return to a ſtate like that of the fœtus before birth: in this ſtate they continue, till by length of time maturating the proceſs, or by new heat the fluids are attenuated, and the functions begin where they left off.

Sleepers, in a ſhip, timbers lying before and aft in the bottom of the ſhip, as the rung-heads do: the lowermoſt of them is bolted to the rung-heads, and the uppermoſt to the futtocks and rungs.

SLEIDAN (John), an excellent German hiſtorian, born of obſcure parents, in 1506, at Sleidan, a ſmall town on the confines of the duchy of Juliers. After ſtudying ſome time in his own country, together with his townſman the learned John Sturmius, he went to France, and in 1535 entered into the ſervice of the cardinal and archbiſhop John du Bellay. He retired to Straſburg in 1542, where he acquired the eſteem and friendſhip of the moſt conſiderable perſons, particularly of James Sturmius; by whoſe advice and aſſiſtance he was enabled to write the hiſtory of his own time. He was employed in ſome public negociations; but the death of his wife, in 1555, plunged him into ſo deep a melancholy, that he loſt his memory entirely, and died the year following. In 1555, came out, in folio, *De ſtatu Religionis & Reipublicæ ſub Carolo Quinto*, &c. in 25 books; from the year 1517, when Luther began to preach, to the year of its publication: which hiſtory was preſently tranſlated into almoſt all the languages of Europe. Beſides this his main work, he wrote *De quatuor ſummis Imperiis, libri tres*; with ſome other hiſtorical and political pieces.

SLEIGHT *of* Hand. See Legerdemain.

SLEUT-hounde, the ancient Scots name of the blood-hound. The word is from the Saxon *ſlot*, the impreſſion that a deer leaves of its foot in the mire, and *hound*, a " dog." So they derive their name from following the track. See the article BLOOD-*Hound*.

SLESWICK, an ancient and conſiderable town of Denmark, and capital of a duchy of the ſame name in the province of Gottorp, with a biſhop's ſee, ſecularized in 1586. St Michael's church, which was the cathedral, is a magnificent ſtructure, and has a chapter of noble ladies of the Proteſtant religion. This town was much more conſiderable than it is at preſent, it having ſuffered greatly by the wars of Germany. It is ſeated on the gulph of Sly, where there is a good harbour, 60 miles north-weſt of Lubeck, and 125 ſouth-weſt of Copenhagen. E. Long. 9. 55. N. Lat. 54. 40.

SLESWICK, the duchy of, or *South Jutland*, is about 100 miles in length and 60 in breadth. It is bounded on the north by North Jutland, on the eaſt by the Baltic Sea, on the ſouth by Holſtein, and on the weſt by the ocean. It contains 14 cities, 17 towns, 13 caſtles, 278 pariſhes, 1480 villages, 162 farms, 116 water-mills, and 106 gentlemens ſeats. It is a pleaſant, fertile, populous country, and a ſovereign duchy. Formerly the king of Denmark had half of it, and the other belonged to the houſe of Holſtein-Gottorp; but the former having conquered this duchy, had the poſſeſſion of it confirmed to him by the treaty of the north in 1720. In 1731, a prince of Bareith-Culmbach was made governor of this duchy, and reſides at Gottorp.

SLIGO, an Iriſh county, in the province of Connaught, 25 miles in length, and as much in breadth; bounded on the eaſt by that of Leitrim, on the weſt by the county of Mayo, on the north and north-weſt by the weſtern ocean, and on the ſouth and ſouth-weſt by Roſcommon and Mayo. It contains 5970 houſes, 41 pariſhes, 6 baronies, 1 borough, and ſends 4 members to parliament, two for the county, and two for the borough of the ſame name, which is the only market-town in the county, and is ſeated on a bay of the ſame name, 30 miles weſt of Killalla, and 110 north-eaſt of Dublin. W. Long. 8. 40. N. Lat. 54. 12.

SLING, an inſtrument ſerving for caſting ſtones with great violence. The inhabitants of the Balearic iſlands were famous in antiquity for the dexterous management of the ſling: it is ſaid they bore three kinds of ſlings, ſome longer, others ſhorter, which they uſed according as their enemies were either nearer or more remote. It is added, that the firſt ſerved them for a head-band, the ſecond for a girdle, and that the third they conſtantly carried with them in the hand.

SLOANE (Sir Hans, baronet), an eminent phyſician and naturaliſt, founder of the Britiſh Muſæum, was of Scottiſh extraction, and born at Killileath in the north of Ireland in 1660. The earlieſt bent of his genius was to the ſtudy of nature, and this was encouraged by a proper education. He choſe phyſic for his profeſſion; and to attain a perfect knowledge of its ſeveral branches repaired to London, where he attended all the public lectures of anatomy and medicine, learned chemiſtry, and ſtudied botany in Chelſea garden. His turn to natural hiſtory introduced him to the acquaintance of Mr Boyle and Mr Ray, which he carefully cultivated by communicating to them all his curious or uſeful obſervations. After ſpending four years in London, he went to Paris, where he attended the hoſpitals, and heard the lectures of M. Tournefort, Du Verney, and other eminent maſters. He then went to Montpellier; and having ſpent a year there in collecting plants, travelled through Languedoc with the ſame view, and in 1684 returned to London, when he preſented to Mr Ray a great variety of plants and ſeeds, which the latter has deſcribed, with proper acknowledgments, in his *Hiſtoria Plantarum*. About this time he became acquainted with Dr Sydenham, who took him into his houſe, and recommended to him in the warmeſt manner to practiſe. Soon after, he was choſen a fellow of the Royal Society and of the college of phyſicians. But his deſire to make new diſcoveries in natural hiſtory, induced him to make a voyage to Jamaica, in quality of phyſician to Chriſtopher duke of Albemarle governor of that iſland; and though he ſtaid there but 15 months, he brought from thence ſuch a variety of plants, as greatly ſurpriſed Mr Ray, who did not think there had been ſo many to be found in both the Indies.

Dr Sloane now applied himſelf cloſely to his profeſſion; and on the firſt vacancy was choſen phyſician to Chriſt's-hoſpital: but he applied the money he received from his appointment to the relief of thoſe who were the greateſt objects of compaſſion in the hoſpital, being unwilling to enrich himſelf by the gains he made of giving health to the poor. In 1693 he was choſen ſecretary to the Royal Society; and immediately revived the publication of the Philoſophical Tranſactions, which had been omitted for ſome time, and continued to be the editor of them till 1712. As in his earlieſt days he had been fond of natural knowledge, he enriched his cabinet with every thing that was curious in art or nature; but this received a great augmentation by a bequeſt of William Courten, Eſq; who had employed all his time and the greateſt part of his fortune in collecting curioſities. The ſenſe which the public entertained of this learned phyſician's merit evidently appears by the following honours conferred upon him. He was created a baronet by king Geo. I. choſen a foreign member of the royal academy at Paris, preſident of the college of phyſicians, and, on the death of Sir Iſaac Newton, preſident of the Royal Society. He was the firſt in England who introduced the uſe of the bark into general practice, not only in fevers, but in a variety of other diſtempers, particularly in nervous diſorders, in mortifications, and in violent hæmorrhagies. His receipt for diſeaſes in the eyes is well known, and warranted by ſucceſs. Having faithfully diſcharged the reſpective duties of the places which he filled, he retired in 1740, at 80 years of age, to Chelſea, to enjoy in a peaceful tranquillity the remains of a well-ſpent life. He here continued to receive the viſits of people of diſtinction, and of all learned foreigners; and admittance was never refuſed to the poor who came to conſult him in caſe of ſickneſs. It is remarkable, that at 16 years of age he had been ſeized with a ſpitting of blood, which confined him to his chamber for three years, and that he was always ſubject to it; yet, by his ſobriety, temperance, and moderation, with the occaſional uſe of the bark, he protracted his life to a great length, without even feeling the infirmities of old age; and, after a ſhort illneſs of three days, died in 1752, in his 91ſt year.

He was a liberal benefactor to the poor, and a governor of almoſt every hoſpital about London, to each of which he gave conſiderable benefactions. He zealouſly promoted every propoſal that had for its object the public good. He laid the plan of a diſpenſatory, where the poor might be furniſhed with proper medicines at prime coſt; which, by the aſſiſtance of the college of phyſicians, was afterwards carried into execution. He gave the apothecaries company the entire freehold of their botanical garden at Chelſea, in the centre of which is a ſtatue of him in marble, admirably well executed by Mr Ryſbrack. In 1732 he exerted himſelf in promoting the eſtabliſhment of the colony in Georgia; in 1739, of the foundling-hoſpital, and formed the plan for bringing up the children. His noble cabinet of curioſities he bequeathed to the public, on condition that the ſum of 20,000l. not half the original coſt, ſhould be paid to his family; and alſo his library, conſiſting of above 50,000 volumes, 347 of which were illuſtrated with cuts coloured from nature, and 3566 manuſcripts. He wrote the Natural Hiſtory of Jamaica, in 2 vols folio.

SLOOP, a ſmall veſſel furniſhed with one maſt, the main ſail of which is attached to a gaff above, or to the maſt on its foremoſt edge, and to a long boom below, by which it is occaſionally ſhifted to either quarter. See VESSEL.

SLOOP *of War*, a name given to the ſmalleſt veſſels of war except cutters. They are either rigged as ſhips or ſnows.

SLOUGH, a deep muddy place. The caſt ſkin of a ſnake, the damp of a coal-pit, and the ſcar of a wound, are alſo called by the ſame appellation. The ſlough of a wild boar is the bed, ſoil, or mire, wherein he wallows, or in which he lies in the day-time.

SLUCZK, a large and populous town in Poland, in Lithuania, and capital of a duchy of the ſame name; famous for three battles gained here, by Conſtantine duke of Oſtrog, over the Tartars, in the reign of Sigiſmund I. It is ſeated on the river Sluczk, 72 miles ſouth-eaſt of Minſki, and 70 ſouth of Novogrodeck. E. Long. 28. 24. N. Lat. 52. 36.

SLUICE, in hydraulics, a frame of timber, ſtone, earth, &c. ſerving to retain and raiſe the water of the ſea, a river, &c. and on occaſion to let it paſs: ſuch is the ſluice of a mill, which ſtops and collects the water of a rivulet, &c. in order to diſcharge it at length, in greater plenty, upon the mill-wheel: ſuch alſo are thoſe uſed in drains, to diſcharge the water off lands; and ſuch are the ſluices of Flanders, &c. which ſerve to prevent the waters of the ſea overflowing the lower lands, except when there is occaſion to drown them. See CANAL.

SMACK, a ſmall veſſel, commonly rigged as a ſloop or hoy, uſed in the coaſting or fiſhing trade, or as a tender in the king's ſervice.

SMALAND, or EAST GOTHLAND, a province of Sweden, which makes part of Gothland; and is bounded on the north by Oſtrogothia or eaſt Gothland, on the eaſt by the Baltic Sea, on the ſouth by Schonen and Bleckingia, and on the weſt by Weſtrogothia or Weſt Gothland. It is about 112 miles in length, and 62 in breadth; Calmar is the capital town.

SMALKALD, a town of Germany, in Franconia, and in the county of Henneburg; famous for the confederacy entered into by the German Proteſtants, againſt the emperor, commonly called the *league of Smalkald*. The deſign of it was to defend their religion and liberties. It is ſeated on the river Werra, 35 miles ſouth-weſt of Erford, and 50 north-weſt of Bamberg. E. Long. 10. 37. N. Lat. 50. 43. It is ſubject to the prince of Heſſe-Caſſel.

SMALLAGE, in botany. See APIUM.

SMALT, or ZAFFRE, is a blue glaſs compoſed of the calx of cobalt vitrified with ſome fritt of glaſs or cryſtal. Ground ſmalt is called *azure* or *enamel blue*. See ZAFFRE.

SMARAGDUS, in natural hiſtory. See EMERALD.

SMELL, ODOUR, with regard to the organ, is an impreſſion made on the noſe, by little particles continually exhaling from odorous bodies: With regard to the object, it is the figure and diſpoſition of odorous effluvia, which, ſticking on the organ, excite the ſenſe of ſmelling: And with regard to the ſoul, it is the perception of the impreſſion of the object on the organ, or the affection in the ſoul reſulting therefrom.

The principal organs of ſmelling are, the noſtrils and the olfactory nerves; the minute ramifications of which latter are deſcribed throughout the whole concave of the former. See ANATOMY, n° 404.

SMELT, in ichthyology. See SALMO.

SMELTING, in metallurgy, the fuſion or melting of the ores of metals, in order to ſeparate the metalline part from the earthy, ſtony, and other parts. See METALLURGY, Part III.

SMILAX, ROUGH BINDWEED; a genus of the hexandria order, belonging to the diœcia claſs of plants. There are 10 ſpecies, eight of which are hardy and will bear the winters of this country; the others require to be kept in a green-houſe. They are evergreen climbing plants, that with proper ſupport will riſe to a great height. They are well adapted for thickets, groves, wilderneſs and wood works, planting them towards the front between the trees and ſhrubs, where they will run and ſpread very agreeably. They may be propagated by layers, cuttings, or ſeeds.

SMITH (Edmund), a diſtinguiſhed Engliſh poet, the only ſon of Mr Neale an eminent merchant, by a daughter of baron Lechmere, was born in 1668. By his father's death he was left young to the care of Mr Smith, who had married his father's ſiſter, and who treated him with ſo much tenderneſs, that at the death of his generous guardian he aſſumed his name. His writings are not many, and thoſe are ſcattered about in miſcellanies and collections: his celebrated tragedy of Phædra and Hippolitus was acted in 1707; and being introduced at a time when the Italian opera ſo much engroſſed the polite world, gave Mr Addiſon, who wrote the prologue, an opportunity to rally the vitiated taſte of the public. However, notwithſtanding the eſteem it has always been held in, it is perhaps rather to be conſidered as a fine poem than as a good play. This tragedy, with A Poem to the memory of Mr John Philips, three or four Odes, with a Latin oration ſpoken at Oxford *in laudem Thomæ Bodleii*, were publiſhed as his works by his friend Mr Oldiſworth. Mr Smith died in 1710, ſunk into indolence and intemperance by poverty and diſappointments; the hard fate of many a man of genius.

SMITZ (Gaſpar), who, from painting a great number of Magdalens, was called *Magdalen Smith*, was a Dutch painter, who came to England ſoon after the Reſtoration. For theſe portraits ſat a woman that he kept, and called his wife. A lady, whom he had taught to draw, took him with her to Ireland, where he painted ſmall portraits in oil, had great buſineſs and high prices. His flowers and fruit were ſo much admired, that one bunch of grapes ſold there for 40 l. In his Magdalens he generally introduced a thiſtle on the fore-ground. He had ſeveral ſcholars, particularly Maubert, and one Gawdy of Exeter. Yet, notwithſtanding his ſucceſs, he died poor in Ireland, in 1707.

SMITHERY, a manual art, by which an irregular lump of iron is wrought into any intended ſhape by means of fire, hammering, filing, &c.

SMOKE, a denſe elaſtic vapour, ariſing from burning bodies. As this vapour is extremely diſagreeable to the ſenſes, and often prejudicial to the health, mankind have fallen upon ſeveral contrivances to enjoy the benefit of fire, without being annoyed by ſmoke. The moſt univerſal of theſe contrivances is a tube leading from the chamber in which the fire is kindled to the top of the building, through which the ſmoke aſcends, and is diſperſed into the atmoſphere. Theſe tubes are called *chimneys;* which, when conſtructed in a proper manner, carry off the ſmoke entirely; but, when improperly conſtructed, they carry off the ſmoke imperfectly, to the great annoyance of the inhabitants. As our maſons at preſent ſeem to have a very imperfect knowledge of the manner in which chimneys ought to be built, we can hardly perform a more acceptable ſervice to the public than to point out the manner in which they ought to be conſtructed, ſo as to carry off the ſmoke entirely; as well as to explain the cauſes from which the effects ſo often complained of generally proceed, and the method of removing them.

Although we would naturally imagine, that the cauſes which occaſion ſmoke in rooms are exceedingly various, yet, upon examination, it will be found, that they may all be reduced to one of theſe three general heads, each of which will admit of ſeveral varieties.

I. To a fault in the form of the tube or chimney itſelf.

II. To ſome fault in the other parts of the building, and a wrong poſition of the chimney with reſpect to theſe. Or,

III. To an improper ſituation of the houſe with reſpect to external objects. And as it is of the utmoſt conſequence, in attempting a cure, accurately to diſtinguiſh from which of theſe defects the ſmoke proceeds, it will be neceſſary to point out with care the ſeveral phænomena which are peculiar to each.

I. Of ſmoke occaſioned by a fault in the form of the chimney itſelf. But, before we proceed, it will be neceſſary to premiſe ſomething with regard to the general cauſe of the aſcent of ſmoke in chimneys.

The earth is every where ſurrounded with a great body of air called the *atmoſphere*. This air is an elaſtic fluid ſubjected to many particular laws, as hath been elſewhere fully explained. In particular, it hath, like other fluids, a conſtant tendency to preſerve an equilibrium in all its parts; ſo that if at any time the weight of it at one place is diminiſhed, the heavier air ruſhes from all ſides towards that point, till the equilibrium be again reſtored. It is likewiſe known, that heat is one of the moſt powerful means of diſturbing this general equilibrium of the air, by expanding it to a great degree, and making the ſame quantity occupy a much greater ſpace than it did before, and conſequently become lighter. Hence it neceſſarily follows, that wherever a fire is kindled, the air immediately contiguous to it will be heated, and of conſequence rarefied and made light; which muſt aſcend into the higher regions of the atmoſphere, till it becomes of the ſame gravity with the air contiguous to it; while the denſer cold air below ruſhes toward the point from which it departed, is there heated and rarefied in its turn, and aſcends in the ſame manner, carrying the ſmoke or vapour ariſing from the burning body along with it. In this manner that conſtant ſuction of air towards every fire is produced, and from this cauſe proceeds the conſtant tendency of ſmoke to aſcend upwards from the ſurface of the earth. But as the body of our atmoſphere is often agitated with wind, &c. and as it is an elaſtic fluid, it endeavours to ſpread itſelf every way; from which cauſes the warm air would quickly be diffuſed among the cold air before it could ariſe to any conſiderable height; ſo that the ſmoke would always remain low, and be toſſed about near the ſurface of the earth: all of which inconveniences are avoided by confining this heated air in a tube, which prevents it from mixing with the external air, till it arrive at the height to which we deſire it ſhould aſcend.

To render this ſtill more clear, ſee Plate CCLXXI. where AB (fig. 1.) repreſents the tube of a chimney, having a fire at the bottom at A. It is obvious, that, in this ſituation, the air which was heated by the fire at A will aſcend directly upwards, without mixing with the external air, till it arrives at B, beyond which it will be at liberty to diſperſe in the atmoſphere; and the more weighty air which preſſes in to ſupply its place can have no acceſs to it but at the opening between A and E, where it alſo is heated by the fire, and in its turn aſcends to the top of the chimney, thereby occaſioning a conſtant ſtream of air to aſcend up the vent, which carries the ſmoke along with it. This is the manner in which fuliginous vapours are made to aſcend in chimneys; and by attending to it, we may draw the following corollaries with regard to the conſtruction of this uſeful part of our habitations.

1ſt, The higher the chimney, that is, the greater the diſtance between the fire-place and the top of the chimney, the greater will be the difference between the weight of the column of heated air in the tube, and another column of the atmoſphere of the ſame diameter without the chimney; and conſequently the air will enter with the greater force at the opening AE, and carry up the ſmoke more readily along with it: for as the warm air within the tube continues rarefied to a high degree till it iſſues from the top of the chimney, and is, in every part of its length, lighter than the ſame bulk of external air marked by the dotted line CD, it follows, that the longer theſe two columns of unequal gravity are, the greater muſt be the difference of their weight. Hence it is that high chimneys (*cæteris paribus*) have a greater ſuction of air, and are leſs liable to vent ill, than low ones. A ſmoky chimney may therefore ſometimes be cured by raiſing it higher.

Plate CCLXXI.

higher. It is likewiſe obvious, that if any opening is made into the chimney, as at F, the air will enter with leſs force at E, and carry up the ſmoke with leſs velocity, and by that means be in danger of producing ſmoke in the room; for this opening, as it admits the freſh air into the tube, has nearly the ſame effect as ſhortening the tube ſo much would have.

2d, As the ſmoke is forced up the chimney merely by the rarefaction of the air in conſequence of heat, it is evident, that the more the air is heated, with the greater force (*cæteris paribus*) will it aſcend, becauſe the difference between the weight of the external and internal air will be greater; and as the air will be the more heated the nearer it is made to paſs by the fire in its entry into the chimney, it is evident, that the ſmaller the opening at AE is, or, in other words, the lower the mantle of the chimney is, the air will be forced to paſs the nearer the fire, and therefore be more rarefied, and aſcend with the greater velocity; ſo that lowering the mantle of the chimney will often cure ſmoke.

But it is frequently inconvenient to have the mantle of the chimney too low. However, the ſame effect may often be produced by another contrivance. For as the fire-place is uſually made wider than the length of the grate, a great deal of cool air paſſes at the two ſides of the grate, without being much heated. This greatly diminiſhes the ſuction of the chimney; but it may eaſily be prevented by building up the vacancies at each ſide of the grate, ſo as to allow no air to enter from below, except what comes immediately through or before the fire. For this purpoſe, grates conſiſting of a neat hewed ſtone at each end, with a breaſt and bottom of iron fitted to them, as repreſented at fig. 2. are extremely convenient. But the aperture of the chimney is often not ſuddenly contracted above the mantle, but goes up tapering ſlowly, as in the ſame fig. 2. This ſtructure allows a quantity of cool air to enter at the two corners of the mantle, and ſteal up the tube without coming near the fire. The moſt eaſy and effectual method of remedying this defect, is to place a ſheet of milled iron within the mantle on each ſide, as low down as poſſible, making them ſlant a little upwards towards the middle of the chimney; as at A, fig. 2. the mantle being repreſented by the dotted line. By this contrivance, the air, which enters at the ſide of the mantle, before it can aſcend into the chimney, is forced to paſs very near the fire, and of courſe is much rarefied. The good effects of this would be ſtill more ſtrongly felt if one of theſe plates were placed a little lower than the other, and made ſo long that the ends ſhould croſs each other, as at AB, fig. 2. by which means every particle of air that went up the chimney behoved to paſs immediately above the fire. It is almoſt unneceſſary to obſerve, that theſe plates ought to be ſo contrived as to be taken out at pleaſure to allow the chimney to be cleaned.

A chimney may not only be defective by having the mantle too high, or by being too wide from ſide to ſide, but alſo by being too deep between the fore-ſide and the back, as is often the caſe in very old houſes. In this caſe, the diſtance between the fire and the mantle is ſo great, that much air paſſes up without being ſufficiently rarefied, as is repreſented at fig. 3. This may be ſometimes cured by bringing the grate a little forward, which, by making the fire act more powerfully upon the mantle, rarefies the air more in its paſſage. But this can ſeldom produce the deſired effect, and it often does harm: for when the grate is brought forward, there is a great vacancy left between it and the back of the chimney, ſo that the air paſſes under the grate, and aſcends behind it very little rarefied; ſo that if the feet of the grate are not very low, there will be as much loſt in this way as will be gained in the other; and as there is not enough of heated air in the chimneys of this kind to make the vapour aſcend with rapidity, they are often choaked with thick fuliginous vapours hanging in them, almoſt in equilibrio with the reſt of the atmoſphere, ſo that the leaſt puff of wind beats them down the chimney, and puſhes the ſmoke into the room; whereas, when it is far back, it is driven down upon the hearth, and riſes upwards again when the guſt is over, and a great deal of it is catched within the mantle as it riſes, which in the other caſe would have been diſperſed through the room. When this is the caſe, the moſt effectual method of cure is, to bring the grate forward till the fore-part of it is immediately under the inner edge of the mantle; then build up the vacancy at the back of it the whole width of the fire-place from ſide to ſide, raiſing it perpendicularly till it is as high as the back of the grate, and then bending it forward towards the mantle, as is repreſented at fig. 4. When it is as high as the workman can reach, let it be ſuddenly turned backward again, ſloping a little upward, as in the figure; then fit a ſheet of milled iron to the inſide of the mantle, making it ſlant a little upward toward the back-part, at a ſmall diſtance above the new-erected maſonry, and extending within a few inches of the back-wall, as at A, fig. 4. By this conſtruction, all the air that enters into the chimney is made to paſs immediately above the fire, between it and the heated iron, upon which the flame acts with the greater force, as the back of the fire-place is bent a little forward above the grate, and the heat is likewiſe reflected into the room with the greater force: at the ſame time, if the ſmoke is at any time beat down the chimney by a ſudden guſt of wind, it will be catched by the ſheet of iron, and prevented from coming into the room. If the fire-place be very wide between the one ſide and the other, the new maſonry may be carried quite up to the ſheet of iron on each of the ſides.

3d, As every fire requires a conſtant ſucceſſion of freſh air, the tube for conveying this rarefied air to the higher regions of the atmoſphere muſt be of a ſufficient ſize to contain the whole of it, and allow it a ready paſſage; otherwiſe a part of it will be forced to ſeek ſome other paſſage; by which means the apartment in which the fire is placed will be conſtantly filled with ſmoke. Every chimney, therefore, ought to have a degree of wideneſs ſufficient to carry off the whole of the ſmoke ariſing from the fire uſually burnt in it, otherwiſe the apartment will be almoſt continually filled with ſmoke. This is a fault more common at preſent than any of thoſe already mentioned, eſpecially in large towns, where the number of chimneys in one wall is often ſo great that it is difficult to get a ſufficient ſpace for each. The moſt obvious cure, where the ſituation admits of it, is to widen the chimney, by opening a hole a little above the grate thro'

Plate CCLXXI.

the back-wall of the chimney, ſlanting a little upward, and building on the outſide of the wall a ſmall chimney open from that hole to the top of the building, as in fig. 5. where AB repreſents the new tube going through the wall at the opening at A, which will receive the ſuperfluous ſmoke, and carry it off. This additional chimney muſt always be carried as high as the other. But as there are many ſituations in which this method of cure would be impracticable, we muſt try every method for accelerating the aſcent of the ſmoke, (for the more quickly it aſcends, the more narrow may the tube be); and with that view the chimney may be heightened at top, and contracted at bottom, in any or all the various ways we have mentioned. But if none of theſe methods prove effectual, let the chimney be built quite cloſe at the under part, leaving only as much room as is ſufficient to contain the grate, having a cover of metal fitted to that opening, which can be taken off or put on at pleaſure; by which the whole air that enters into the chimney is made to paſs through the fire like a furnace, and carries the ſmoke up it with great velocity. Theſe are well known in large towns by the name *ſmoke-chimneys*: but as they occaſion a prodigious waſte of fuel without warming the room, and, unleſs attended with very great care, are in danger of ſetting the building on fire, they ought to be as much avoided as poſſible. But if neither this nor any of the other methods prove effectual, the wall muſt either be taken down and rebuilt in a proper manner, or the chimney abandoned as incurable. As this is a defect more difficult to be remedied than any other, we would ſtrongly recommend it to every builder to build his chimneys of a ſufficient width throughout: there is no danger of erring on this extreme, as it is eaſy to remedy any defect that might ariſe from it.

4th, As the air which aſcends through the chimney continues nearly of an equal degree of heat to the top, the tube ſhould be of an equal degree of width at the top as at the bottom, as well as through the whole of its length. It ought not therefore to be made tapering gradually from the fire-place to the top, but to be ſuddenly contracted above the grate, as in fig. 6. from which it ought to be continued of an equal wideneſs throughout its whole length; but if it is narrower at any one place than another, it ought to be at the under part, immediately above the fire, for a very ſhort ſpace; becauſe, as this is within reach of the hand, the ſoot can be cleaned from it as often as is neceſſary; ſo that when the other parts of the chimney are clogged with ſoot, they will not be narrower than this place is at that time.

5th, It ſeldom happens that a chimney can be carried quite ſtraight upwards: and it is an advantage that it is ſo, as they ought always to be bent a little. For if a chimney be ſtraight, and of a proper width to tranſmit the whole of the ſmoke and no more, it will not be ſufficient for that purpoſe, when there is a heavy fall of rain, or ſnow, or hail, with little wind; for the great drops will fall perpendicularly from the top to the bottom of the chimney: and as they occupy a conſiderable ſpace, the ſmoke will not have room to aſcend, but muſt be forced down with the ſhower, and diſperſed in the apartment; whereas, if the chimney is bent, the rain falls upon ſome of the ſides, and glides gently down, without diſturbing the aſcent of the ſmoke. The ſame inconvenience will be felt in a ſtraight chimney, where it is ſo placed as to be expoſed to winds, which ſometimes enter the top, and blow down with a ſudden puff: for if it be ſtraight, the air meets with no interruption till it deſcends into the chamber, and there diſperſes the ſmoke; but if it be crooked, the deſcent of the wind will be obſtructed, its force broken, and the bad effects of it in a great meaſure prevented. Upon the whole, bent chimneys are always preferable to ſtraight ones. However, a perpendicular chimney may be eaſily cured by ſome of the contrivances after mentioned.

Theſe are the moſt general defects ariſing from the ſtructure of the chimney itſelf, which are all reducible to the following cauſes: 1. Too little height; 2. Too great wideneſs of the bottom of the chimney; 3. Too little width; 4. Unequal wideneſs between the top and bottom; and, 5. Straightneſs of the tube. We have pointed out the beſt methods of curing each of theſe defects; and, to finiſh our remarks on this general head, and give the reader a more perfect idea of the beſt form of conſtruction for a chimney, we have drawn two different ſections of one conſtructed on the juſteſt principles, in figures 6. and 7. the ſeveral parts of which appear ſo plain from the figures, and the reaſons for this conſtruction have been already ſo clearly aſſigned, that a very ſhort explanation will be ſufficient. Fig. 6. repreſents a front-view of the fire-place; ſuppoſing the fore-part of the wall taken down, and the chimney laid bare from top to bottom; AB and DC, repreſenting the two ſides of the fire-place; and BC, the mantle, being cut through, to ſhow the manner in which the aperture is ſuddenly contracted, immediately above the fire within the mantle. The tube from the point E to the top ought to be of an equal wideneſs, and bent in any direction that may be convenient. The two planes FF, repreſent the two ſides of the fire-place, which ought to be as much ſloped inward towards the back as the form of the grate will admit of; for the more they are inclined, the more powerfully will they reflect the heat into the apartment. Fig. 7. repreſents a perpendicular ſection of the wall, through the middle of the chimney, to diſcover its ſhape, if viewed from a ſide. And here it is to be obſerved, that it ought ever to be a rule to bring the building at the under part of the chimney immediately behind the grate, as far forward as poſſible, becauſe this throws more heat into the chamber than if it were placed farther back: but as the fore-part of the grate ought never to project beyond the inner edge of the mantle, care ſhould be taken to have the under part of the mantle wrought as thin as the nature of the materials will admit of, making it thicker towards the upper part, ſo as to ſlope inwards above the fire, as repreſented at B, fig. 7. To throw the heat outward, let the upper part of the back of the fire-place be a little inclined outward, as at C; but after it is carried up in this manner a little higher than the mantle, let it be ſuddenly turned back as in the figure, the projection above the mantle inclining backward in the ſame direction, being carried up to the top at an equal wideneſs the whole way.

Although it is neceſſary to have all chimneys pretty wide, yet this on many occaſions is attended with inconve-

Plate CCLXXI.

conveniences: for as they tranſmit a great quantity of heated air, too large a portion of that warm air which ought to heat the chamber is carried off; and as it is only when the fire is firſt kindled that the great quantity of groſs vapour is exhaled, which fills the chimney, and maketh a large tube neceſſary, if it were ſo contrived as to contract or dilate at pleaſure, we might have our chimney of a ſufficient width to convey away the greateſt quantity of ſmoke that could ever have occaſion to paſs through it, at the ſame time that we might never allow more air to paſs off at other times than was neceſſary to carry away the whole of the ſmoke, by which means a much ſmaller quantity of fuel would keep our apartment equally warm. This, we apprehend, might be accompliſhed by the following ſimple apparatus. Let a ſheet of milled iron be fixed at the upper part of the mantle, on the inſide, at B, in ſuch a manner as that, by means of a ſmall wire *de*, paſſing through a ſmall hole left for that purpoſe in the fore-part of the chimney, it might be let down at pleaſure towards C, or drawn up towards B, ſo as to apply quite cloſe to the upper edge of the chimney between B and C. This would leave the tube of its full wideneſs when neceſſary, or cloſe it to any degree at pleaſure, with the greateſt eaſe (A.) It is unneceſſary to add, that the plate at A, fig. 4. might be employed in the ſame manner, when it ſhould be found convenient. So much for what relates to the conſtruction of the chimney itſelf. We now proceed to conſider the ſecond general cauſe of ſmoke, viz.

II. Of ſmoky houſes proceeding from faults of other parts of the building, altogether independent of the ſtructure of the chimney itſelf.

1ſt, The firſt we ſhall mention is too great cloſeneſs of the room. Smoke, as ſhown above, is impelled up the chimney by the preſſure of the air entering at the fire-place and aſcending upwards; but if freſh air is not admitted into the apartment in ſufficient quantities to ſupply the conſumption by the fire, the room will be quickly exhauſted, and the air in it become as light as the external air at the top of the chimney, ſo that the ſmoke will as readily be diſperſed into the chamber as through the chimney. But if any door or window is opened ſo as to admit plenty of free air, the ſmoke will be quickly diſpelled, and the proper circulation eſtabliſhed: the ſame effect will be produced by making a ſmall hole in ſome of the ſides of the room; but unleſs this be done with ſome judgment, it may frequently add to the diſeaſe, as it may concur with ſome of the other cauſes of ſmoky houſes, to be afterwards mentioned. A better method of remedying this evil would be to have a ſmall hole made in the wall at the back of the chimney, and immediately underneath it: or a ſmall perforation, made in the wall in any other convenient manner; the one end of which ſhould communicate with the external air, and the other communicate with the chamber in any place near the grate, and as low down as poſſible, through which a conſtant ſupply of air would be adminiſtered to the fire without the ſmalleſt inconvenience or trouble. If this were practiſed, doors and windows might with ſafety be made much cloſer than at preſent, and our apartments rendered equally warm and comfortable with a much ſmaller quantity of fuel than we uſe at preſent. For as the fire, in the preſent mode of conſtructing chambers, is kept alive by a conſtant ſucceſſion of cold air from the doors, windows, and other crannies of the room, ruſhing towards the chimney in all directions, the air of the room, which, if not cooled by this means, would be quickly heated to a great degree, is conſtantly kept cold, in ſpite of the ſtrong heat of a blazing fire; which, at the ſame time that it ſcorches the parts of our body which are moſt expoſed to it, does not warm the parts which are turned from it; and we experience at the ſame time a burning heat and piercing cold, which is often productive of the moſt diſagreeable effects. But if the fire were ſupplied with air in the manner above-mentioned, there would be leſs air drawn in through the crannies of the room, ſo that the air within would be ſoon warmed, and continue long ſo, even with a ſmall degree of heat. However improper this might be for people in perfect health, it might ſurely be of great uſe for thoſe who are in a weakly habit of body; eſpecially if care were taken to carry off the foul air, by having a ſmall tube leading from the upper part of the room to the top of the houſe, through which the air, which had been rendered noxious by the ſmoke of candles or perſpiration, would be conveyed away, and a ſucceſſion of freſh air admitted from the tube near the fire-place, to ſupply that want. That the reader may more readily comprehend what is here meant, we have repreſented in fig. 6. a view of two ſmall tubes for this purpoſe, ſuppoſed to be laid open by taking away the boxing or inner coating of the wall which ought to cover them. Theſe are of wood, and muſt not be above one inch in diameter. One end, *g g*, goes quite through the outer wall of the houſe, and communicates with the open air, having a ſmall grate upon it to prevent vermin from entering. The other end, *h h*, paſſes behind the two ſlabs, at the ſide of the fire-place, and open in the inſide of the fire-place at *i i*, at which place they have each of them a ſmall bit of braſs fixed to them, being cloſed with two ſliding doors exactly like thoſe that are uſed to cover the end of teleſcopes, by means of which more or leſs air may be admitted at pleaſure.

2d, A ſecond cauſe of ſmoke is the wrong poſition of doors and windows with reſpect to the fire-places.

As the ſmoke is impelled up the chimney by the

(A) If any one ſhould think, that the wire *d* would be a diſagreeable object in the middle of a chimney-piece, it might eaſily be hid by a picture of any kind. The wire might be fixed to a ſmall braſs handle, moving freely upward and downward like that for a bell; only this ſhould have a long ſlit in the middle of it, with notches on each ſide, to receive a pin placed in the middle of the ſlit, by means of which the wire might be lengthened or ſhortened at pleaſure. The whole of this apparatus is repreſented at fig. 16. where (*a*) repreſents the wire faſtened to the braſs plate; (*b*) a piece of braſs, raiſed a little, to ſerve as a handle. The ſlit in the middle is repreſented by the dark line, having notches, *c c c*, at convenient diſtances. The pin *d* is fixed into the wall, but left at liberty to turn about with eaſe; and its head ſtands up a little, ſo as to be eaſily turned with the finger and thumb. The body of this nail is made ſo thin in one direction, that when it is turned half round, it eaſily paſſes thro' the ſlit in the plate; but in the other direction its diameter is greater, ſo that when the plate is brought ſo as to have one of the notches oppoſite to the nail, and it is then turned half round, it catches the plate ſo that it cannot be moved till the nail is again turned about.

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preſſure of the air, if that air is driven away from the fire-place by any cauſe more powerful than the ſuction occaſioned by the fire, the ſmoke muſt alſo be drawn away with it, and follow the ſame directions with that current of air; ſo that whatever tends to draw a current of air from the under-part of the chimney, will alſo tend to produce ſmoke in the houſe; from whence it is eaſy to conceive how doors or windows may occaſion ſmoke when the wind is in certain directions. Thus, ſuppoſe a chamber, A, B, C, D, fig. 8. having a door or window at E, another at F, and a fire-place at G; when the wind is in the direction D A or C B, the general current of air will occaſion a ſort of ſuction at the opening E, ſo that the air will be drawn from the chimney G towards E: and if the current be ſtrong, and the opening at E large, it will become more powerful than the ſuction of the chimney, and produce ſmoke in the apartment. If the window at F ſhould be opened in this caſe, it would not mend the matter; for any wind which ſhould enter at F, would be carried ſtraight out at the opening E, and the current of air would be drawn from the chimney as ſtrong as ever. If the window at E were ſhut, and that at F left open, and the wind ſtill continued in the ſame direction as before, the current of air ruſhing paſt the window would have a tendency to draw the air of the room along with it, and occaſion ſmoke, but not ſo powerfully as if the window at E were open; but if the wind were in the direction D B, it would be very bad: but if it blew in the direction C A, the caſe would be very much altered; for then a quantity of air being forced in at the opening F, and finding no ready paſſage, it would be pent up in the chamber, and force itſelf up the chimney with violence. We omit mentioning what would be the effect if the wind were in other directions, as it is imagined theſe will be ſufficiently obvious to every attentive obſerver. It is only neceſſary here to obſerve, that as doors or windows are ſeldom ſo exactly made, but they produce ſome effect, as they always admit ſome air even when ſhut, and often occaſion ſmoke when the wind blows from a particular quarter; and as workmen and others generally apprehend, when houſes are troubled with ſmoke in this manner, that it is occaſioned by ſome external cauſe, and apply their attention to cure it by altering the top of the chimney, which never can produce the ſmalleſt ſervice in this caſe; we would recommend a more particular attention to be paid to the ſituation of doors and windows than is generally beſtowed; eſpecially in ſuch ſituations where they are expoſed to any violent current of air in a particular direction, as in narrow lanes, or defiles of any ſort, where the wind, when in particular directions, is hurried along with a prodigious rapidity. And, that the effects of different poſitions may be ſtill more obvious, we ſhall produce ſeveral other examples.

Suppoſe a chamber, fig. 9. having a door at A, and two windows B C, with a fire-place D. If the wind came in the direction D A, and if the door tranſmitted as much or more air than was admitted at both the windows, a current of air would run from all parts of the chamber towards A, and therefore would have a tendency to occaſion ſmoke: but if as much or more air came in at the windows than could get out at the door, there could be no ſuch current; but, on the contrary, it would be forced up the chimney, and carry the ſmoke along with it: wherefore, in this ſituation, a room might ſometimes be cured of ſmoke, by making the door as cloſe as poſſible; nothing could be more hurtful in this caſe than boring a hole in the door. But if the houſe was in ſuch a ſituation as to be more frequently expoſed to a wind which came in the direction of A D, it would run little riſk of being troubled with ſmoke.

Suppoſe a room, fig. 10. having a door at A, and two windows B and C, with a fire-place D. If the wind came in the direction C B or B C, and both the windows were open, it is evident that the ſmoke would be drawn from the chimney by the ſtrong current of air paſſing through the room; or if the window upon which the wind came were cloſed, and the oppoſite one open, nearly the ſame effect would be produced: but if the window upon which the wind blew were open, and the oppoſite one and the door ſhut, the room would be immediately cleared of ſmoke entirely. In this ſituation, it is evident, that if the windows were badly made, ſo as to admit much air, it would tend to occaſion ſmoke, eſpecially if the door were in the ſame ſituation; it is therefore of conſequence to attend to this circumſtance in a ſituation ſimilar to this.

Having premiſed ſo much with regard to ſingle rooms, we ſhall now proceed to conſider a more compound ſtructure. Thus, let fig. 11. repreſent a building conſiſting of two chambers, K L, joined by a paſſage. The chamber K having a door B communicating with the paſſage, a window F, and fire-place G; and that at L having a door C, another door or window D, the window E, and fire-place H, the entry to the whole being by the door A. Let us now conſider what would be the effect of the wind coming from different directions upon this building. And firſt, ſuppoſe the wind blew in the direction A M: If all the doors and windows were cloſe ſhut, and very little air were admitted, there would be little riſk of ſmoke; but as there would ſurely be ſome admitted through theſe different openings, there would be ſome chance that the chamber L would be troubled with ſmoke, becauſe ſome of the air which forced its paſſage thro' the chinks of the door A would paſs through the doors C and D, which might produce ſmoke in a ſmall degree. There would be little chance that the chamber K would ſmoke in this caſe; becauſe although there is a general ſuction through the paſſage from B to D, yet as it is in ſome meaſure interrupted by the cloſe door at C, it will be but ſmall; and as the wind is interrupted in its courſe by the wall of the paſſage, ſome of it will be forced through the chinks of the window F, which would more than counterbalance the effects of the other ſuction. But if the door D were open, both the chimneys would ſmoke; eſpecially if the doors B and C were open alſo, as the current would be then very ſtrong towards that point. But in all caſes the ſmoke of this houſe would be prevented by keeping the door at D ſhut, and that at A open; but if the houſe was in ſuch a ſituation as to be more expoſed to that wind than any other, it would be better to cloſe up the door D altogether. If the wind more commonly came from M towards A, it is more than probable that a houſe ſituated like this would be quite free of ſmoke, as the general current of air would be

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towards the chimneys; but the chamber K would run greater riſk than L, as the ſuction might ſometimes be drawn towards the window F; but if the door A were in the oppoſite ſide of the paſſage, that inconvenience would be avoided alſo. If the more general current of air were from K towards L, this houſe behoved to be troubled with ſmoke, unleſs the windows were very cloſe; but there would not be the ſmalleſt chance for that when it came from L towards K.

We might now proceed to give more examples of this ſort: but as it would be impoſſible to enumerate all the variety of caſes that might occur, it is imagined that theſe will be ſufficient to give the reader an idea of the manner in which any building ought to be examined in this reſpect; and he muſt be left to his own diſcretion to apply the principles above explained to all the variety of caſes that may occur. In large complicated buildings, it no doubt requires a greater extent of thought to combine all the various circumſtances together, and draw a general concluſion, than in ſmaller and more ſimple ones; but if the following general rules are attended to, the complaints ariſing from this cauſe would be but few. 1ſt, Avoid as much as may be long paſſages leading to very diſtant parts of a building, as there is often a ſtrong current of air in theſe which helps to diſturb the free circulation of air up the chimneys. 2d, Place the chimneys in general in that ſide of the apartment towards which the wind which in general prevails moſt in the ſituation where the houſe is placed blows. And, 3d, make as many, if not more, doors and windows (eſpecially ſuch as have occaſion to be moſt frequently open) on that ſide of the building *from whence* the moſt prevalent wind does come.

III. The third general cauſe of ſmoke in houſes is the wrong poſition of the houſe with regard to external objects, which, by interrupting the courſe of the air, makes it aſſume various directions, and wheel about in eddies, ſo as to prevent it from aſcending with eaſe from the chimney-top, or beats it down into the room with violence. This is more ſeldom the cauſe of ſmoky houſes than either of the two before-mentioned; although it ſeems to be almoſt the only one attended to by the perſons who pretend to cure ſmoky houſes at preſent, as moſt of their remedies are adapted to remove the diſorders ariſing from this cauſe alone. We ſhall briefly point out the ſeveral caſes in which this can occur, that every one may be enabled to judge for himſelf when theſe cures are proper or not.

The air (as has been ſaid) is a fluid, and wind a current of that fluid; which, when driven along the ſurface of the earth, flows with a ſmooth and equal ſtream, unleſs when oppoſed by ſome object which interrupts its courſe; but when it meets with any object which directly oppoſes its courſe, it is in ſome meaſure puſhed back again, and made to ſpread on every ſide, till it meets with ſome open ſide, towards which it flows with great impetuoſity. It is likewiſe a fluid of conſiderable gravity, and therefore preſſes upon the ſurface of the earth with great force; ſo that, when a current of it flows along the ſurface of our globe, it has a tendency to move forward and preſs downward at the ſame time: from whence it happens, that when a current of air is forced over the top of any high object, the ſide of which deſcends perpendicularly downward, the velocity of the current at firſt overcomes the gravity, and it flies a ſhort way over in that direction; but the power of gravity acting upon the under ſurface, draws it downward, and in a ſhort time overcomes the impetus that it had to ruſh forward, and occaſions a ſort of eddy nearly ſimilar to what we ſee among water behind a ſtone which interrupts the violence of its currents.

To illuſtrate this more plainly, let A B, fig. 12. repreſent a part of a high building, near to which is a ſmaller one CD; and let the dotted line EF repreſent a current of air flowing with conſiderable force in the direction FE. It is plain that it will flow ſtraight forward over the top of the ſmall building; but when it meets with the large object, it will be interrupted in its courſe, and ſpread itſelf on every ſide, as repreſented by the dotted lines GG, &c. at laſt it will flow towards that place through which it can eſcape with the greateſt eaſe. If the oppoſing object be large, and has no opening through which it can iſſue near the ground, then it will aſcend to the top of it, and flow off in that direction, carrying the ſmoke which aſcends from the ſmall chimney C along with it: but if there is any opening below, either a ſtreet or lane, or any other paſſage that will admit the wind to paſs, then will the natural gravity of the air draw the general current downward to flow off through the lower paſſage; in which caſe, the ſmoke which ought to aſcend through the chimney C, meeting with a current of air oppoſing its paſſage, will not be at liberty to iſſue forth, but be forced back again into the room from whence it proceeded, unleſs ſome contrivance is fallen upon to prevent it.

Again, let A, fig. 13. repreſent a ſmall building at the ſide of a great rock B, and the wind coming in the direction CD; when the current of air comes to the point D, being hurried forward with great velocity, it goes a little forward, but ſoon deſcends downward, and gradually is reflected more and more inward, as repreſented by the dotted lines EE, &c. ſo that, deſcending downwards upon the top of the chimney A, the ſmoke is beat back again into the apartments. Thus it is that low houſes, when contiguous to high objects, are in danger of being diſturbed with ſmoke. If the contiguous object be not very high, the diſorder may be cured by heightening the chimney of the low houſe; but if it is very high, it will be neceſſary to cover the top of the chimney in ſuch a manner as to prevent the wind from entering it, at the ſame time that a paſſage is left at ſome of the ſides through which the ſmoke may iſſue with freedom. Many are the contrivances which have been invented for this purpoſe, which are to be met with every-where; and as there is no difficulty in accompliſhing the deſired end by an infinite variety of methods, every one who needs ſuch a thing may pleaſe his own fancy in the choice. We have thought it unneceſſary to add any more but one kind of theſe, fig. 14. which will anſwer the end effectually.

It is evident that houſes ſituated near high hills, or thick woods, will be in ſome meaſure expoſed to the ſame inconvenience; but it is likewiſe plain, that if a houſe be ſituated upon the ſlope of a hill, as at F, fig. 13. it will not be in any danger of ſmoke when the wind blows towards that ſide of the hill upon which it

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is ſituated; for the current of air coming over the houſe-top in the direction G H, is immediately changed by the ſlope of the hill to the direction H C, which powerfully draws the ſmoke upward from the top of the chimney. But it is alſo evident, that a houſe in this ſituation will be liable to ſmoke when the wind blows *from* the hill; for the current of air coming downward in the direction C H, will beat downward on the chimney F, and prevent the ſmoke from aſcending with freedom. But the effect will be much heightened if the doors and windows are chiefly in the lowermoſt ſide of the houſe.

Theſe are ſome of the moſt general circumſtances which prevent the free aſcent of ſmoke, ariſing from external objects: but there are many other leſſer cauſes which may at times occaſion ſmoke, all of which it would be tedious here to enumerate; ſuch as, blaſts of air, reflected from the ſides of mountains, and coming down valleys with great impetuoſity, occaſioning, in particular ſituations, eddies or whirlwinds of different ſorts. In ſhort, whatever in any meaſure diſturbs the free motion of the air, is in danger of producing ſudden guſts, which may occaſion ſmoke. Therefore, whoever builds in a ſituation which is not altogether free, may lay his account with having ſome ſudden guſts of ſmoke, unleſs he forms the top of his chimney ſo as to obviate it. And there are ſome ſituations ſo much expoſed to ſudden guſts of wind, ſometimes whirling round, ſometimes beat ſuddenly downward, or as ſuddenly carried up again, that it is difficult to guard againſt every danger. In theſe ſituations we would recommend ſomething of the form of what is repreſented at fig. 15. which would be proof againſt every wind whatever.

Having thus traced the cauſes of ſmoky houſes, and reduced them to diſtinct claſſes for the ſake of diſtinctneſs; it is neceſſary, before we quit this ſubject, to obſerve, that in many caſes, two or more of theſe may be combined to augment the malady, and therefore it is neceſſary to have all theſe circumſtances in view in every particular caſe. It now only remains that we point out the ſeveral phenomena which may lead us to diſtinguiſh from which of theſe general cauſes the diſorder complained of may proceed. And,

1ſt, If it is owing to a fault in the conſtruction of the chimney itſelf, it will ſmoke almoſt continually, eſpecially in calm weather.

2d, If it does not ſmoke in calm weather, or only when the wind comes from ſome particular quarter, and can then be cured by opening ſome door or window, the fault may be looked for in the diſtribution of the doors or windows of the houſe. The only caſe in which there is a difficulty to diſtinguiſh whether it is owing to the fault of the chimney or the houſe, is when it proceeds from too much cloſeneſs of the apartment. But this may be eaſily known by trying it in a calm: for if it proceeds from this cauſe, there will be no ſmoke in a perfect calm, if the doors are left open; whereas, if the defect proceeds from a fault in the chimney itſelf, it will ſtill continue to ſmoke when calm, even when the doors are open.

3d, When the ſmoke is occaſioned by external cauſes, theſe can be generally ſeen; but it may be likewiſe known by this, that it deſcends in ſudden puffs with great violence at times, even when the doors and windows are not altered. By attending to theſe few rules with care, there will be little danger of miſtaking the cauſe from whence this diſorder proceeds.

We ſhall conclude theſe obſervations with a few remarks on ſome particular caſes, which can hardly be reduced to any of the foregoing heads. And,

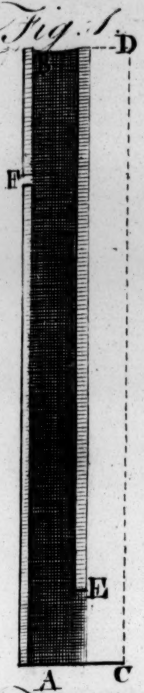
1ſt, It ſometimes happens that the ſmoke is prevented from aſcending with freedom, by having a ſmall part of the top of the chimney broke down, ſo as that ſome parts of it remain higher than others, which in ſome meaſure reduces it to the ſtate of a chimney at the ſide of a higher one. To prevent this, it is always proper to have the top of the chimney finiſhed with ſtones neatly cut, and firmly built. It is not to be doubted but that thoſe things which are placed upon particular chimneys with a view to cure them of ſmoke, do often, from the ſame cauſe, hurt the neighbouring chimneys built in the ſame wall.

2d, A chamber is ſometimes filled with ſmoke, when a fire is kindled in a neighbouring chimney, and none in it, although there is no appearance of ſmoke when it has a fire burning in its own grate. This may ſometimes proceed from a ſmall hole breaking through the thin partition that divides the two chimneys from one another; and as ſmoke is a weighty body, which is only buoyed up by the warm air which paſſes thro' the fire, when it penetrates into the cold chimney it naturally ſubſides, and comes down to the chamber with which the chimney communicates, when there is no fire to carry it off. But this diſeaſe is generally produced by the ſmoke entering at the top of the chimney, and deſcending downwards: if this laſt is the caſe, it may be cured, on many occaſions, by ſetting a pretty high ſtone at the top of the chimney, as a diviſion between each two: but the ſureſt method, in all caſes, is to have a ſmoke-board exactly fitted into the chimney above the grate, which on all occaſions effectually prevents it.

3d, It frequently happens, that a chimney does not carry off the ſmoke well at firſt when the fire is kindled, although there is not the ſmalleſt tendency to it at other times. This proceeds from the narrowneſs of the chimney; for when the fire is kindled, the whole tube is filled with cold air, as weighty as that in the apartment; and being expanded by the fire at the bottom, it endeavours to aſcend upward; but being pent in by the narrowneſs of the tube, and preſſed by the column of cold air above it, it is ſome time before it can wholly overcome that reſiſtance, and ſome of it is forced into the chamber, till by degrees the whole chimney is heated, and then it vents quite well. If the ſmoke produced by this means is not very troubleſome, it may be borne with; but if it be extremely diſagreeable, it may be cured by having a large ſheet of milled iron, large enough to reach between the two ſides of the fire-place, and as deep as to reach from the mantle to the grate, or lower, which might by any contrivance be hung up before the fire at that time to act in ſome meaſure as a *ſmoke-chimney*. This would quickly make the fire burn, and carry off the ſmoke entirely. After that is effected, it might then be removed till another occaſion.

SMOKE *Farthings*. The pentecoſtals, or cuſtomary oblations offered by the diſperſed inhabitants within a dioceſe when they made their proceſſion to the mother-

Fig. 1.



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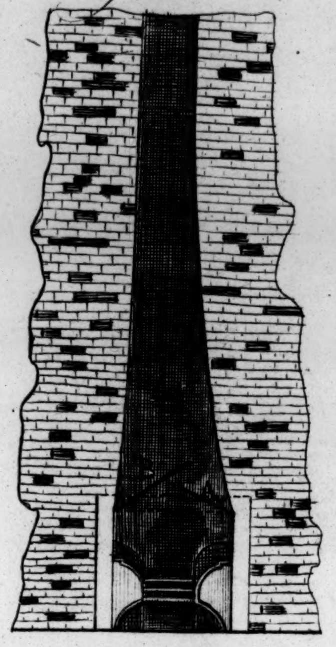
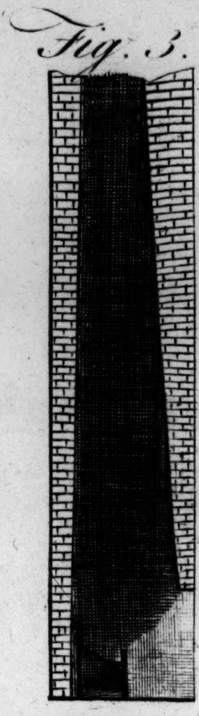


Fig. 3.



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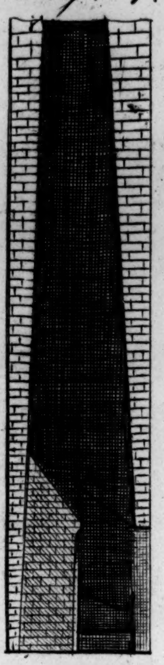

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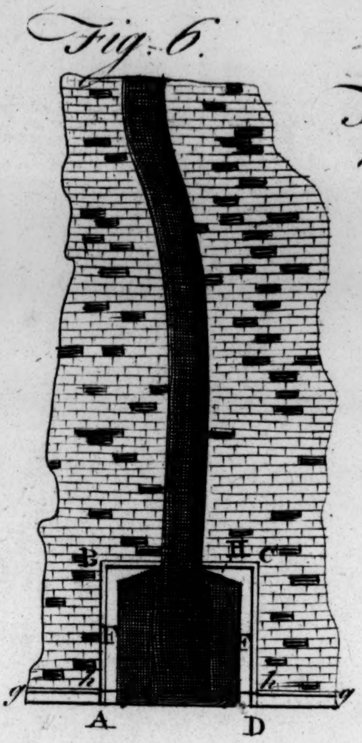
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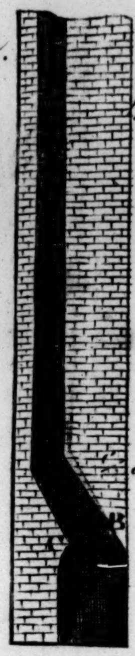

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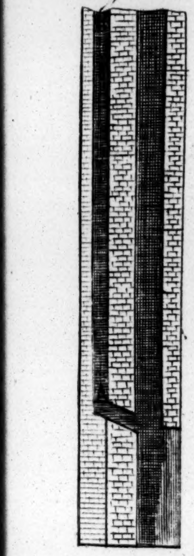

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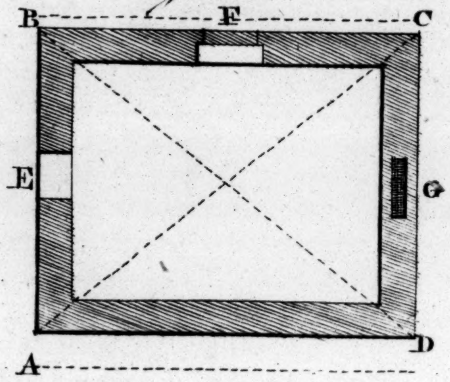

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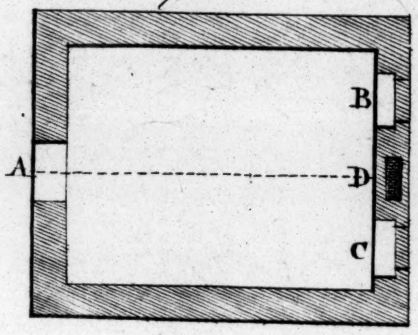

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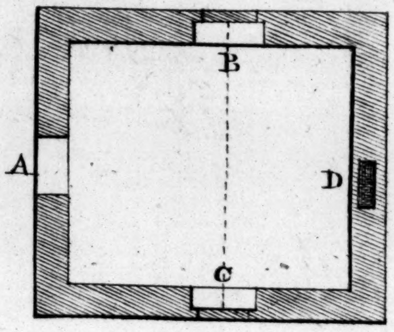

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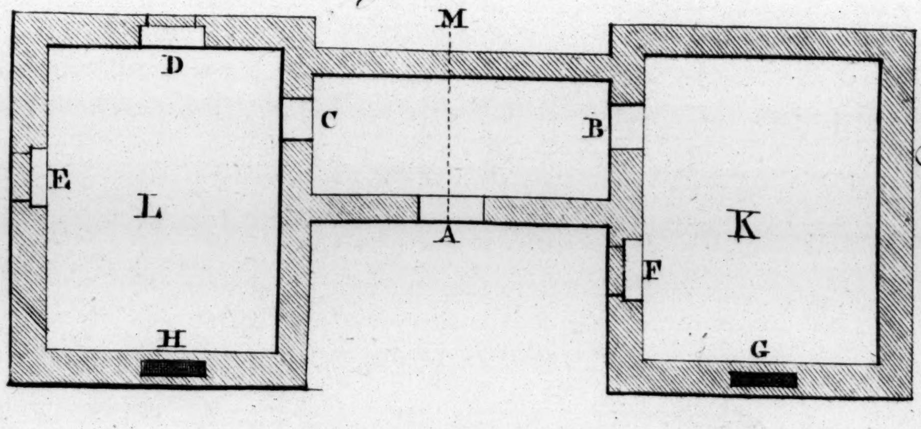
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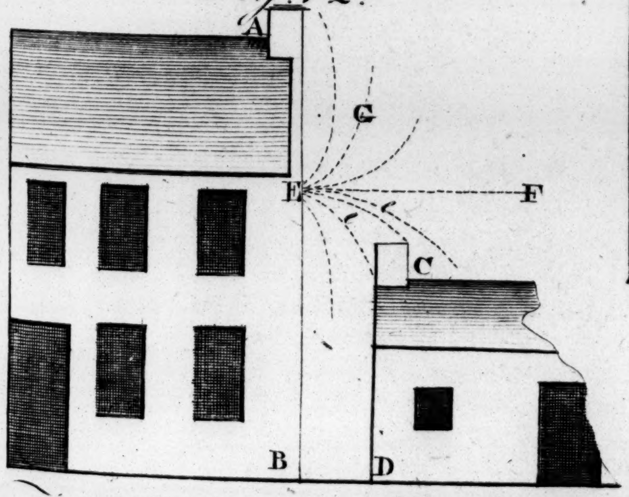
Fig. 12.



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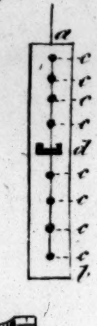


Fig. 18.

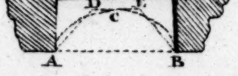


Fig. 13.

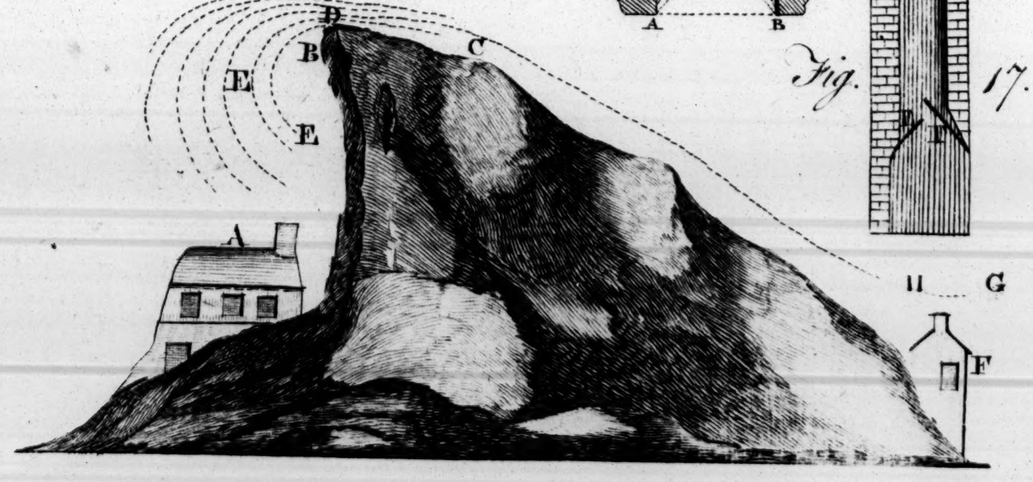


Fig. 17.

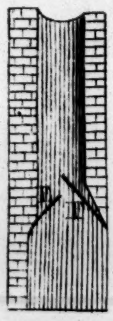


Fig. 14.

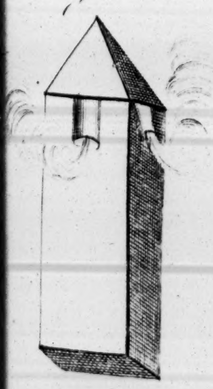
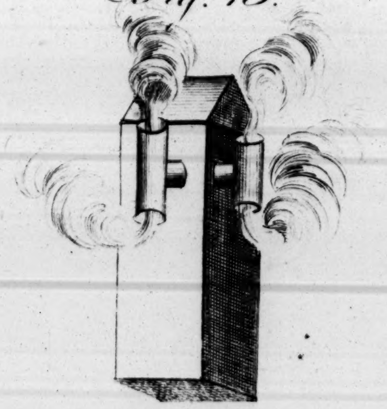


Fig. 15.



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cathedral church, came by degrees into a ſtanding annual-rent, called *ſmoke-farthings*.

Smoke-*Silver*. Lands were holden in ſome places by the payment of the ſum of 6d. yearly to the ſheriff, called *ſmoke-ſilver*. Pat. 4. Edw. VI. Smoke-ſilver and ſmoke-penny are to be paid to the miniſters of divers pariſhes as a *modus* in lieu of tithe-wood: and in ſome manors formerly belonging to religious houſes, there is ſtill paid as appendant to the ſaid manors, the ancient Peter-pence, by the name of *ſmoke-money*. *Twiſd. Hiſt. vindicat.* 77.—The biſhop of London, *anno* 1444, iſſued out his commiſſion, *Ad levandum le* ſmoke-farthings, &c.

SMOLENSKO, a large and ſtrong town of Ruſſia, and capital of a palatinate of the ſame name, with a caſtle, ſeated on a mountain, and a biſhop's ſee. It is ſtrong by its ſituation, being in the middle of a wood, and ſurrounded by almoſt inacceſſible mountains. It has been taken and retaken ſeveral times by the Poles and Ruſſians; but theſe laſt have had poſſeſſion of it ever ſince the year 1687. It is ſeated on the river Nieper, near the frontiers of Lithuania, 188 miles ſouth-weſt of Moſcow. E. Long. 33. 15. N. Lat. 56. 10.

Smolensko, a duchy and palatinate of Ruſſia, bounded on the north by Biela, on the eaſt by the duchy of Moſcow, on the ſouth by that of Severia and the palatinate of Meiſlaw, and on the weſt by the ſame palatinate and by that of Witepſk. It is full of foreſts and mountains; and the capital town is of the ſame name.

SMOLLET (Dr Tobias), was born in Scotland in the year 1720, and in the early part of his life ſerved as a ſurgeon's mate in the navy. The incidents that befel him during his continuance in this capacity ſerved as a foundation for one of the moſt entertaining novels in the Engliſh tongue, The Adventures of Roderic Random, 2 vols, 12mo; a book which ſtill continues to have a moſt extenſive ſale, and firſt eſtabliſhed the Doctor's reputation. All the firſt volume, and the beginning of the ſecond, appears to conſiſt of real incident and character, though certainly a good deal heightened and diſguiſed. The Judge his grandfather, Crab and Potion the two apothecaries, and 'Squire Gawkey, were characters well known in that part of the kingdom where the ſcene was laid. Captains Oakhum and Whiffle, Doctors Mackſhane and Morgan, were alſo ſaid to be real perſonages; but their names we have either never learnt, or have now forgotten. A bookbinder and barber long eagerly contended for being ſhadowed under the name of *Strap*. The Doctor ſeems to have enjoyed a peculiar felicity in deſcribing ſea-characters, particularly the officers and ſailors of the navy. His Trunnion, Hatchway, and Pipes, are highly-finiſhed originals; but what exceeds them all, and perhaps equals any character that has yet been painted by the happieſt genius of ancient or modern times, is his Lieutenant Bowling. This is indeed nature itſelf; original, *unique*, and *ſui generis*.

It is ſurpriſing that, notwithſtanding Dr Smollet was ſo very ſucceſsful in hitting off original characters in narration, he could never ſucceed in the drama. Very early in life, he wrote a tragedy intitled *The Regicide*, founded on the ſtory of the aſſaſſination of James I. of Scotland; which, with all his intereſt and addreſs, he never could get repreſented on the ſtage. He afterwards publiſhed it by ſubſcription; with what ſucceſs we cannot now recollect: but we are much miſtaken if he has not alluded to ſome of his own theatrical occurrences, in the ſtory of Melopoyne, in Roderick Random.

By the publication of that work the Doctor had acquired ſo great a reputation, that henceforth a certain degree of ſucceſs was inſured to every thing known or ſuſpected to proceed from his hand. In the courſe of a few years, The Adventures of Peregrine Pickle appeared; a work of great ingenuity and contrivance in the compoſition, and in which an uncommon degree of erudition is diſplayed, particularly in the deſcription of the entertainment given by the Republican Doctor, after the manner of the ancients. Under this perſonage the late Dr Akenſide, author of a famous poem intitled *The Pleaſures of Imagination*, is ſuppoſed to be typified; and it would be difficult to determine whether profound learning or genuine humour predominate moſt in this epiſode. Another epiſode of The Adventures of a Lady of Quality, likewiſe inſerted in this work, contributed greatly to its ſucceſs, and is indeed admirably well executed; the materials, it is ſaid, the lady herſelf (the celebrated lady *Vane*) furniſhed.

Theſe were not the only original compoſitions of this ſtamp with which the Doctor has favoured the public. Ferdinand Count Fathom and Sir Lancelot Greaves, are ſtill in the liſt of what may be called *reading novels*, and have gone through ſeveral editions; but there is no injuſtice in placing them in a rank far below the former. No doubt invention, character, compoſition, and contrivance, are to be found in both; but then ſituations are deſcribed which are hardly poſſible, and characters are painted which, if not altogether unexampled, are at leaſt incompatible with modern manners; and which ought not to be, as the ſcenes are laid in modern times.

The laſt work which we believe the Doctor publiſhed, was of much the ſame ſpecies, but caſt into a different form—The Expedition of Humphrey Clinker. It conſiſts of a ſeries of letters, written by different perſons to their reſpective correſpondents. He has here carefully avoided the faults which may be juſtly charged to his two former productions. Here are no extravagant characters nor unnatural ſituations. On the contrary, an admirable knowledge of life and manners is diſplayed; and moſt uſeful leſſons are given applicable to intereſting, but to very common ſituations.

It appears from Roderick Random, that Mr Smollet was at the ſiege of Carthegena; of which expedition he gives a faithful, though no very pleaſing account. Soon after his return he muſt have taken his degree of Doctor of Phyſic, though we have not been able to learn at what time and at what place. It is ſaid that, before he took a houſe at Chelſea, he attempted to ſettle as practitioner of phyſic at Bath; and with that view wrote a treatiſe on the waters—but was unſucceſsful, chiefly becauſe he could not render himſelf agreeable to the women, whoſe favour is certainly of great conſequence to all candidates for eminence, whether in medicine or divinity. This, however, was a little extraordinary; for thoſe who remembered Dr Smollet at that time, cannot but acknowledge that he was as graceful and handſome a man as

Smollet.

any of the age he lived in; beſides, there was a certain dignity in his air and manner which could not but inſpire reſpect wherever he appeared. Perhaps he was too ſoon diſcouraged; in all probability, had he perſevered, a man of his great learning, profound ſagacity, and intenſe application, beſides being endued with every other external as well as internal accompliſhment, muſt have at laſt ſucceeded, and, had he attained to common old age, been at the head of his profeſſion.

Abandoning phyſic altogether as a profeſſion, he fixed his reſidence at Chelſea, and turned his thoughts entirely to writing. Yet, as an author, he was not near ſo ſucceſsful as his happy genius and acknowledged merit certainly deſerved. He never acquired a patron among the great, who by his favour or beneficence relieved him from the neceſſity of writing for a ſubſiſtence. The truth is, Dr Smollet poſſeſſed a loftineſs and elevation of ſentiment and character which appears to have diſqualified him for currying favour among thoſe who were able to confer favours. It would be wrong to call this diſpoſition of his pride or haughtineſs; for to his equals and inferiors he was ever polite, friendly, and generous. Bookſellers may therefore be ſaid to have been his only patrons; and from them he had conſtant employment in tranſlating, compiling, and reviewing. He tranſlated Gil Blas and Don Quixote, both ſo happily, that all the former tranſlations of theſe excellent productions of genius are in a fair way of being ſuperſeded by his. His name likewiſe appears to a tranſlation of Voltaire's Proſe Works: but little of it was done by his own hand; he only reviſed it, and added a few notes. He was concerned in a great variety of compilations. His Hiſtory of England was the principal work of that kind. It had a moſt extenſive ſale; and the Doctor is ſaid to have received 2000l. for writing it and the continuation.

In the year 1755 he ſet on foot the Critical Review, and continued the principal manager of it till he went abroad for the firſt time in the year 1763. To ſpeak impartially, he was, perhaps, too acrimonious ſometimes in the conduct of that work. Having, in particular, made ſome very ſevere ſtrictures on a pamphlet publiſhed by Admiral Knowles, as well as on the writer's character, the latter commenced a proſecution againſt the printer, declaring, it was ſaid, he only wanted to know the author, that, if a gentleman, he might obtain the ſatisfaction of a gentleman from him. In this affair the Doctor behaved with great ſpirit. Juſt as ſentence was going to be pronounced againſt the printer, he came into court, avowed himſelf the author of the ſtrictures in queſtion, and declared himſelf ready to give the Admiral any ſatisfaction he choſe. Upon this, the Admiral began a freſh action againſt the Doctor, who was found guilty, fined 100l. and condemned to three months impriſonment in the King's Bench. It is there he is ſaid to have written the Adventures of Sir Lancelot Greaves; in which he has deſcribed ſome remarkable characters, then his fellow-priſoners.

When lord Bute was called to the chief adminiſtration of affairs, he was prevailed upon to write in defence of that nobleman's meaſures; which he did in a weekly paper, called the *Briton*. This gave riſe to the famous North-Briton; wherein, according to the opinion of the public, he was rather baffled. The truth is, the Doctor did not ſeem to poſſeſs the talents neceſſary for political altercation. He wanted temper and coolneſs; and his friends accuſed his patron of having denied him the neceſſary information, and even neglected the fulfilling of ſome of his other engagements with him. Be that as it will, the Doctor is ſaid not to have forgotten him in his ſubſequent performances.

Smollet, Smugglers.

His conſtitution being at laſt greatly impaired by a ſedentary life and aſſiduous application to ſtudy, he went abroad for his health in the year 1763. He wrote an accouut of his travels in a Series of Letters to ſome friends, which were afterwards publiſhed in two volumes 8vo. During all that time he appears to have laboured under a conſtant fit of chagrin. But the ſtate of his mind will be beſt learnt from himſelf. Thus he writes in his firſt letter: "In gratifying your curioſity, I ſhall find ſome amuſement to beguile the tedious hours; which, without ſome ſuch employment, would be rendered inſupportable by diſtemper and diſquiet. You knew and pitied my ſituation, traduced by malice, perſecuted by faction, abandoned by falſe patrons, and overwhelmed by the ſenſe of a domeſtic calamity, which it was not in the power of fortune to repair." By this domeſtic calamity he means the loſs of his only child, a daughter, whom he loved with the tendereſt affection. The Doctor lived to return to his native country: but his health continuing to decline, and meeting with freſh mortifications and diſappointments, he went back to Italy, where he died in October the 21ſt 1771, having been born in the year 1720. He was employed, during the laſt years of his life, in abridging the Modern Univerſal Hiſtory, great part of which he had originally written himſelf, particularly the hiſtories of France, Italy, and Germany.

It would be needleſs to expatiate on the character of a man ſo well known as Dr Smollet, who has, beſides, given ſo many ſtrictures of his own character and manner of living in his writings, particularly in Humphrey Clinker; where he appears under the appellation of *Mr Serle*, and has an interview with Mr Bramble; and his manner of living is deſcribed in another letter, where young Melford is ſuppoſed to dine with him at his houſe in Chelſea. No doubt, he made a great deal of money by his connections with the bookſellers; and had he been a rigid œconomiſt, or endued with the gift of retention, (an expreſſion of his own), he might have lived and died very independent. However, to do juſtice to his memory, his difficulties, whatever they were, proceeded not from extravagance or want of œconomy. He was hoſpitable, but not oſtentatiouſly ſo; and his table was plentiful, but not extravagant. No doubt he had his failings; but ſtill it would be difficult to name a man who was ſo reſpectable for the qualities of his head, or more amiable for the virtues of his heart.

SMUGGLERS, in law, thoſe perſons who conceal or run prohibited goods, or goods that have not paid his majeſty's cuſtoms.

SMUGGLING is reſtrained by a great variety of ſtatutes, which inflict pecuniary penalties and ſeizure of the goods for clandeſtine ſmuggling; and affix the guilt of felony, with tranſportation for ſeven years, upon more open, daring, and avowed practices: but the laſt of them, 19 Geo. II. c. 34. is for this purpoſe *inſtar omnium*; for it makes all forcible acts of ſmuggling, carried on in defiance of the laws, or even in diſguiſe to evade them, felony without benefit of clergy: enacting, that if three or more perſons ſhall aſſemble, with fire-arms or other offenſive weapons, to aſſiſt in the illegal exportation or importation of goods, or in reſcuing the ſame after ſeizure, or in reſcuing offenders in cuſtody for ſuch offences; or ſhall paſs with ſuch goods in diſguiſe; or ſhall wound, ſhoot at, or aſſault any officers of the revenue when in the execution of their duty; ſuch perſons ſhall be felons, without the benefit of clergy. As to that branch of the ſtatute which required any perſon, charged upon oath as a ſmuggler, under pain of death, to ſurrender himſelf upon proclamation, it ſeems to be expired; as the ſubſequent ſtatutes, which continue the original act to the preſent time, do in terms continue only ſo much of the ſaid act as relates to the puniſhment of the offenders, and not to the extraordinary method of apprehending or cauſing them to ſurrender: and for offences of this poſitive ſpecies, where puniſhment (though neceſſary) is rendered ſo by the laws themſelves, which, by impoſing high duties on commodities, increaſe the temptation to evade them, we cannot ſurely be too cautious in inflicting the penalty of death.

SMUT, in huſbandry, a diſeaſe in corn, when the grains, inſtead of being filled with flour, are full of a ſtinking black powder.

As to the cauſe of this diſtemperature, ſome have attributed it to exceſſive rankneſs, or fatneſs of the ſoil; to the manuring the land with rotten vegetables; and to the ſowing ſmutty ſeed. Mr Bradley thinks it is owing to the ſame cauſe with a blight, *viz.* to multitudes of inſects. But Mr Tull is convinced from experiment, that it is cauſed by too much moiſture; for planting ſeveral plants of corn in troughs of very moiſt earth, they all produced ſmutty ears, while very few ſuch were found in the field from whence theſe plants were taken.

There are two remedies for the ſmut, recommended by writers on huſbandry, *viz.* ſteeping the ſeed in ſalt brine, and changing the ſeed.

As to the ſteeping of ſeed, when wheat is intended for drilling, it muſt be ſoaked in a brine of pure ſalt, diſſolved in water, ſince urine is found to be highly prejudicial. The moſt expeditious way of bringing wheat for drilling, is to lay it in a heap, and waſh it with a ſtrong brine ſprinkled on it, ſtirring it up with a ſhovel, that it may be all equally brined, or wetted with it; after this, ſift on ſome fine lime all over the ſurface, and ſtir it up, ſtill ſifting on more in the ſame manner till the whole is duſted with lime, it will then be ſoon dry enough to be drilled without further trouble. It muſt be quicklime in its full ſtrength that is uſed on this occaſion.

The bread made of ſmutty corn is very pernicious, acting as a narcotic, and occaſioning not only ſleepineſs, but vertigoes, and even convulſions.

SMYRNA, a ſea-port town of Turkey in Aſia, and one of the largeſt and richeſt cities of the Levant. The goodneſs of the harbour has cauſed it to be rebuilt ſeveral times, after being deſtroyed by earthquakes. It is the rendezvous of merchants from almoſt all parts of the world, and the magazines of their merchandizes. Some time ago it was thought to contain 15,000 Turks, 10,000 Greeks, 1800 Jews, 200 Armenians, and 200 Franks. The Turks have 19 moſques, the Greeks 2 churches, the Jews 8 ſynagogues, the Armenians 1 church, and the Latins 3 convents. There are three biſhops; one Greek, another Latin, and the third Armenian. The ſtreets are more open, better paved, and the houſes better built, than in other towns of the continent. The ſtreet of the Franks is the fineſt in Smyrna, and lies all along the harbour. It is 8 days journey from Conſtantinople by land, 25 days from Aleppo by the caravans, 6 from Cogna, 7 from Cataya, and 6 from Satalia. The caravans of Perſia often bring 2000 bales of ſilk in a year, beſides drugs and cloths. The other commodities brought here, are thread made of goats hair, cotton yarn, cotton in bags, nut galls, wax, ſcammony, rhubarb, opium, aloes, tutty, galbanum, gum-arabic, gum-tragacanth, gum-ammoniac, frankincenſe, zedoary, and all ſorts of carpets. All the trade paſſes through the hands of the Jews, and they ſeem to have better capacities for trade than other merchants. The Engliſh and Dutch factories have Proteſtant chapels, and taverns are as open here as in Europe. The fortifications conſiſt in a fort, a caſtle, a mountain, and an old citadel. In the year 1778, it was almoſt totally deſtroyed by an earthquake and fire.

SNAFFLE, in the manege, is a very ſlender bit-mouth without any branches, much uſed in England; the true bridles being reſerved for war.

SNAIL, in zoology. See HELIX and LIMAX.

SNAKE, in zoology. See ANGUIS.

Method of Preſerving SNAKES. When the ſnake is killed, it muſt firſt be waſhed clean, and freed from all filth and naſtineſs; then it is to be put into a glaſs of a proper ſize, the tail firſt, and afterwards the reſt of the body, winding it in ſpiral aſcending circles, and diſpoſing the back, which is alway the moſt beautiful, outwardly. A thread, connected to a ſmall glaſs bead, is, by the help of a needle, to be paſſed thro' the upper jaw from within outwardly, and then thro' the cork of the bottle, where it muſt be faſtened; by this means the head will be drawn into a natural poſture, and the mouth kept open by the bead, whereby the teeth, &c. will be diſcovered: the glaſs is then to be filled with rum, and the cork ſealed down to prevent its exhalation. A label, containing the name and properties of the ſnake, is then to be affixed to the wax over the cork; and in this manner the ſnake will make a beautiful appearance, and may be thus preſerved a great number of years; nor will the ſpirits impair or change the luſtre of its colours.

SNAKE-*Root*, in botany. See POLYGALA.

SNAKE-*Weed*, in botany. See POLYGONUM.

SNAPEDRAGON, in botany. See ANTIRRHINUM.

SNEEZING, a convulſive motion of the muſcles of the breaſt, whereby the air is expelled from the noſe with much vehemence and noiſe. It is cauſed by the irritation of the upper membrane of the noſe, occaſioned by acrid ſubſtances floating in the air, or by medicines called *ſternutatory*. See MEDICINE, n° 220.

SNIGGLING, a method of fiſhing for eels, chiefly uſed in the day-time, when they are found to abſcond themſelves near wears, mills, or flood-gates. It is performed thus: Take a ſtrong line and hook, baited with a garden-worm, and obſerving the holes where the eels lie hid, thruſt your bait into them by help of a ſtick; and if there be any, you ſhall be ſure to have a bite; and may, if your tackling hold, get the largeſt of eels.

SNIPE, in ornithology. See Scolopax and Shooting.

Theſe birds are eaſily taken, by means of lime-twigs, in this manner. Take 50 or 60 birchen-twigs, and lime them all very well together; take theſe out into places where there are ſnipes, and having found the places which they moſt frequent, which may be ſeen by their dung, ſet the twigs in theſe places, at about a yard diſtance one from another. Other places, are thoſe where the water lies open in hard froſty and ſnowy weather: in theſe places alſo, and where-ever they are ſuſpected to come to feed, let more lime-twigs be placed in the ſame manner. The twigs are not to be placed perpendicularly in the ground, but ſloping, ſome one way, ſome another; the ſportſman is then to retire to a diſtance, and watch the coming of the birds to theſe places. When they fly to them, they naturally take a ſweep round the earth, and by this means they will almoſt always be caught by one or other of the twigs. When a firſt ſnipe is taken, the ſportſman is not to run to take it up, for it will feed with the twig under its wings, and this will be a means of bringing down more of them to the place. When three or four are taken, they may be taken up, only leaving one faſt to entice others: and thus the ſport may be continued, as long as there are any birds of this kind about the place. It may be very proper, when the twigs are planted, to go about, and beat all the open and watery places near, that they may be raiſed from thence, and fly to thoſe places where the twigs are placed to receive them.

SNORING, in medicine, otherwiſe called *rhencos* or *ſtertor*, is a ſound like that of the cerchnon, but greater and more manifeſt. A *ſtertor* is that ſound which is ſuppoſed to be made betwixt the palate and noſtrils, by perſons aſleep; *cerchon*, or *cerchnon*, is that bubbling noiſe which is made in reſpiration, from the larynx, or the aſpera arteria. Theſe affections are owing to a weakneſs of nature.

SNOW, a well-known meteor, formed by the freezing of the vapours in the atmoſphere. It differs from hail and hoar-froſt in being as it were cryſtallized, which they are not. This appears on examination of a flake of ſnow by a magnifying glaſs; when the whole of it will appear to be compoſed of fine ſhining ſpicula diverging like rays from a centre. As the flakes fall down through the atmoſphere, they are continually joined by more of theſe radiated ſpicula, and thus increaſe in bulk like the drops of rain or hailſtones. Dr Grew, in a diſcourſe of the nature of ſnow, obſerves, that many parts thereof are of a regular figure, for the moſt part ſo many little rowels or ſtars of ſix points, and are as perfect and tranſparent ice as any we ſee on a pond, &c. Upon each of theſe points are other collateral points, ſet at the ſame angles as the main points themſelves: among which there are divers other irregular, which are chiefly broken points, and fragments of the regular ones. Others alſo, by various winds, ſeem to have been thawed, and froze again into irregular cluſters; ſo that it ſeems as if the whole body of ſnow were an infinite maſs of icicles irregularly figured. That is, a cloud of vapours being gathered into drops, the ſaid drops forthworth deſcend; upon which deſcent, meeting with a freezing air as they paſs through a colder region, each drop is immediately frozen into an icicle, ſhooting itſelf forth into ſeveral points; but theſe ſtill continuing their deſcent, and meeting with ſome intermitting gales of warmer air, or in their continual waſtage to and fro touching upon each other, ſome of them are a little thawed, blunted, and again froze into cluſters, or intangled ſo as to fall down in what we call *flakes*.

The lightneſs of ſnow, although it is firm ice, is owing to the exceſs of its ſurface, in compariſon to the matter contained under it; as gold itſelf may be extended in ſurface, till it will ride upon the leaſt breath of air.

According to Signior Beccaria, clouds of ſnow differ in nothing from clouds of rain, but in the circumſtance of cold that freezes them. Both the regular diffuſion of the ſnow, and the regularity of the ſtructure of its parts (particularly ſome figures of ſnow or hail which fall about Turin, and which he calls *roſette*) ſhow that clouds of ſnow are acted upon by ſome uniform cauſe like electricity; and he endeavours to ſhow how electricity is capable of forming theſe figures. He was confirmed in his conjectures by obſerving, that his apparatus for obſerving the electricity of the atmoſphere never failed to be electrified by ſnow as well as rain. Profeſſor Winthrop ſometimes found his apparatus electrified by ſnow when driven about by the wind though it had not been affected by it when the ſnow itſelf was falling. A more intenſe electricity, according to Beccaria, unites the particles of hail more cloſely than the more moderate electricity does thoſe of ſnow, in the ſame manner as we ſee that the drops of rain which fall from thunder-clouds are larger than thoſe which fall from others, though the former deſcend through a leſs ſpace.

In the northern countries, the ground is covered with ſnow for ſeveral months; which proves exceedingly favourable for vegetation, by preſerving the plants from thoſe intenſe froſts which are common in ſuch countries, and which would certainly deſtroy them. Bartholin aſcribes great virtues to ſnow-water, but experience does not ſeem to warrant his aſſertions. Snow or ice-water is always deprived of its fixed air; and thoſe nations who live among the Alps, and uſe it for their conſtant drink, are ſubject to affections of the throat, which are thought to be occaſioned by it.

From ſome late experiments on the quantity of water yielded by ſnow, it appears that the latter gives only about one-tenth of its bulk.

Snow, in ſea-affairs, is generally the largeſt of all two-maſted veſſels employed by Europeans, and the moſt convenient for navigation.

The ſails and rigging on the main-maſt and fore-maſt of a ſnow are exactly ſimilar to thoſe on the ſame maſts in a ſhip; only that there is a ſmall maſt behind the main-maſt of the former, which carries a ſail nearly reſembling the mizen of a ſhip. The foot of this maſt is fixed on a block of wood on the quarter-deck abaft the main-maſt; and the head of it is attached to the after-top of the main-top. The ſail which is called the *try-ſail* is extended from its maſt towards the ſtern of the veſſel

When the ſloops of war are rigged as ſnows, they are furniſhed with a horſe, which anſwers the purpoſe of the try-ſail maſt, the fore-part of the ſail being attached by rings to the ſaid horſe, in different places of its height.

SNOWDON-hill, the name of a mountain in Caernarvonſhire in Wales, generally thought to be the higheſt in Britain; though ſome have been of opinion that its height is equalled, or even exceeded, by mountains in the Highlands of Scotland. The mountain is ſurrounded by many others, called in the Welſh language *Crib Coch*, *Crib y Diſtill*, *Lliweddy yr Arran*, &c.

According to Mr Pennant *, this mountainous tract yields ſcarcely any corn. Its produce is cattle and ſheep; which, during ſummer, keep very high in the mountains, followed by their owners with their families, who reſide during that ſeaſon in *havodtys*, or "ſummer dairy-houſes," as the farmers in the Swiſs Alps do in their *ſennes*. Theſe houſes conſiſt of a long low room, with a hole at one end to let out the ſmoke from the fire which is made beneath. Their furniture is very ſimple; ſtones are ſubſtituted for ſtools, and their beds are of hay, ranged along the ſides. They manufacture their own cloaths, and dye them with the *lichen omphaloides* and *lichen parietinus*, moſſes collected from the rocks. During ſummer the men paſs their time in tending their herds, or in making hay, &c. and the women in milking, or making butter and cheeſe. For their own uſe they milk both ewes and goats, and make cheeſe of the milk. Their diet conſiſts of milk, cheeſe, and butter; and their ordinary drink is whey, though they have, by way of reſerve, a few bottles of very ſtrong beer, which they uſe as a cordial when ſick. They are people of good underſtanding, wary, and circumſpect; tall, thin, and of ſtrong conſtitutions. In the winter-time they deſcend into the *hen dref*, or "old dwelling," where they paſs their time in inactivity.

* *Journey to Snowdon.*

The view from the higheſt peak of Snowdon is very extenſive. From hence Mr Pennant ſaw the county of Cheſter, the high hills of Yorkſhire, part of the north of England, Scotland, and Ireland; a plain view of the iſle of Man; and that of Angleſea appeared like a map extended under his feet, with every rivulet viſible. Our author took much pains to have this view to advantage; ſat up at a farm on the weſt till about 12, and walked up the whole way. The night was remarkably fine and ſtarry; towards morning the ſtars faded away, leaving an interval of darkneſs, which, however, was ſoon diſpelled by the dawn of day. The body of the ſun appeared moſt diſtinct, with the roundneſs of the moon, before it appeared too brilliant to be looked at. The ſea, which bounded the weſtern part of the proſpect, appeared gilt with the ſun-beams, firſt in ſlender ſtreaks, and at length glowed with redneſs. The proſpect was diſcloſed like the gradual drawing up of a curtain in a theatre; till at laſt the heat became ſufficiently ſtrong to raiſe miſts from the various lakes, which in a ſlight degree obſcured the proſpect. The ſhadow of the mountain extended many miles, and ſhowed its bicapitated form; the Wyddfa making one head, and Crib y Diſtil the other. At this time he counted between 20 and 30 lakes either in Caernarvon, or in Merionethſhire. In making another viſit, the ſky was obſcured very ſoon after he got up. A vaſt miſt involved the whole circuit of the mountain, and the proſpect down was horrible. It gave an idea of numbers of abyſſes, concealed by a thick ſmoke furiouſly circulating around them. Very often a guſt of wind made an opening in the clouds, which gave a fine and diſtinct viſto of lake and valley. Sometimes they opened in one place, at others in many at once; exhibiting a moſt ſtrange and perplexing ſight of water, fields, rocks, and chaſms. They then cloſed again, and every thing was involved in darkneſs; in a few minutes they would ſeparate again, and repeat the above-mentioned ſcene with infinite variety. From this proſpect our traveller deſcended with great reluctance; but before he had reached the place where his horſes were left, he was overtaken by a thunder-ſtorm. The rolling of the thunder-claps, being reiterated by the mountains, was inexpreſſibly awful; and after he had mounted, he was in great danger of being ſwept away by the torrents which poured down in conſequence of a very heavy rain.

It is very rare (Mr Pennant obſerves), that the traveller gets a proper day to aſcend the hill: for it very often appears clear; but by the evident attraction of the clouds by this lofty mountain, it becomes ſuddenly and unexpectedly enveloped in miſt, when the clouds have juſt before appeared very high and very remote. At times he obſerved them lower to half their height; and notwithſtanding they have been diſperſed to the right and left, yet they have met from both ſides, and united to involve the ſummit in one great obſcurity.

The height of Snowdon was meaſured, in 1682, by one Mr Caſwell, with inſtruments made by Flamſtead: according to his menſuration, the height is 3720 feet; but more modern computations make it only 3568, reckoning from the quay at Caernarvon to the higheſt peak. The ſtone that compoſes this mountain is exceſſively hard. Large coarſe cryſtals, and frequently cubic pyrites are found in the fiſſures. An immenſe quantity of water ruſhes down the ſides of Snowdon and the neighbouring mountains, inſomuch that Mr Pennant ſuppoſes, if collected into one ſtream, they would exceed the waters of the Thames.

SNOW-*Drop*, in botany. See CHIONANTHUS.

SNUFF, a powder chiefly made of tobacco, the uſe of which is too well known to need any deſcription here.

The many miſchiefs attending the practice of taking this powder of tobacco at the noſtrils, have been deſcribed by the writers in general on theſe ſubjects, ſince this pernicious cuſtom has reigned in the world; but one of the moſt remarkable accidents occaſioned by it, is related in the *Acta Eruditorum*.

The caſe is this. A fat perſon, greatly addicted to the taking Spaniſh ſnuff, after many years continued uſe of it, complained one day of a mighty uneaſineſs which it occaſioned in the middle of his œſophagus, and ſoon after this he began to find his ſwallowing difficult. He applied for relief to a phyſician; and naming nothing of the pain which had preceded this difficulty of ſwallowing, it was treated as a complaint ariſing from ſome glutinous humour in the œſophagus. It is no wonder that the medicines in this intention had no effect. The patient grew worſe; and, tired of this doctor, applied to another, who, ſuppoſing the complaint aroſe from ſome ſharp humour vellicating the parts, gave medicines in that intention, equally without ſucceſs. After this a common quack tried the moſt violent medicines on him, but without ſucceſs. Finally, he applied to the uſe of the *excutia ventriculi*, an inſtrument made to be thruſt down the œſophagus into the ſtomach: but this he could never get down; and in the uſe of this inſtrument he firſt felt that there was abſolutely a lump of fleſh, which ſtopped its paſſage farther than the place where the ſeat of his complaint was. The diſtemper after this increaſed upon him, till he could only ſwallow liquids, and thoſe at laſt by no other means but by ſucking them thro' a quill, by which means he could get down milk, water-gruel, and the like, by a little at a time. At length conſulting another phyſician, and telling him of the immoderate quantity of Spaniſh ſnuff he had been uſed to take, and that it often happened to him on taking the drieſt ſnuff of this kind, that it got into his œſophagus, and occaſioned violent pain, coughing, and ſpitting of blood, he ſoon concluded that a polypus had formed itſelf in the œſophagus, wounded by this ſharp powder; and that there was no relief, but that the death of the patient was quickly approaching. The man, from a very corpulent habit, was ſo extenuated, that he appeared a mere ſkeleton; he died ſome little time after of abſolute hunger, the œſophagus being ſo entirely filled up by this unnatural ſwelling, that not the leaſt drop of a liquid could get down.

After death the œſophagus was opened, and a fleſhy excreſcence, or polypus, was diſcovered, of the bigneſs of the cavity of the part; and, taking its origin about the middle, from the back-part of the œſophagus, it reached down to the pylorus. This was of a whitiſh colour, and much reſembled a large worm; and its ſubſtance was fibrous, and very tender.

SNYDERS (Francis), a Flemiſh painter, born at Antwerp in 1579, and bred under his countryman Henry Van Balen. His genius firſt diſplayed itſelf in painting fruit: he afterwards attempted animals, huntings, fiſh, &c. in which he exceeded all his predeceſſors. He alſo painted kitchens, &c. and gave dignity to ſubjects that ſeemed incapable of it. He was made painter to Ferdinand and Iſabella, archduke and ducheſs, and became attached to the houſe of the cardinal infant of Spain. The king of Spain and the elector Palatine adorned their palaces with huntings by this artiſt. Rubens, Jordaens, and Snyders, uſed to co-operate in the enriching of each other's pictures according to their ſeveral talents; and thus they became more valuable than if finiſhed by either of them ſingly. Snyders died in 1657.

SOAL-FISH, in ichthyology. See PLEURONECTES.

SOAP, a compoſition of cauſtic, fixed alkaline ſalt, and oil, ſometimes hard and dry, ſometimes ſoft and liquid; much uſed in waſhing, whitening linens, and by dyers and fullers.—Soap may be made by ſeveral methods, which, however, all depend upon the ſame principle. The ſoap which is uſed in medicine is made without heat; ſee CHEMISTRY, n° 326.

In manufactures where large quantities of it are prepared, ſoap is made with heat. A lixivium of quicklime and ſoda is made, but is leſs concentrated than that above referred to, and only ſo much that it can ſuſtain a freſh egg. A part of this lixivium is to be even diluted, and mixed with an equal weight of oil of olives. The mixture is to be put on a gentle fire, and agitated, that the union may be accelerated. When the mixture begins to unite well, the reſt of the lixivium is to be added to it; and the whole is to be digeſted with a very gentle heat, till the ſoap be completely made. A trial is to be made of it, to examine whether the juſt proportion of oil and alkali has been obſerved. Good ſoap of this kind ought to be firm, and very white when cold; not ſubject to become moiſt by expoſure to air, and entirely miſcible with pure water, to which it communicates a milky appearance, but without any drops of oil floating on the ſurface. When the ſoap has not theſe qualities, the combination has not been well made, or the quantity of ſalt or of oil is too great, which faults muſt be corrected.

In ſoft or liquid ſoaps, green or black ſoaps, cheaper oils are employed, as oil of nuts, of hemp, of fiſh, &c. Theſe ſoaps, excepting in conſiſtence, are not eſſentially different from white ſoap.

Any fixed alkalis are much diſpoſed to unite with oils that are not volatile, both vegetable and animal, ſince this union can be made even without heat. The compound reſulting from this union partakes at the ſame time of the properties of oil and of alkali; but theſe properties are modified and tempered by each other, according to the general rule of combinations. Alkali formed into ſoap has not nearly the ſame acrimony as when it is pure; it is even deprived of almoſt all its cauſticity, and its other ſaline alkaline properties are almoſt entirely aboliſhed. The ſame oil contained in ſoap is leſs combuſtible than when pure, from its union with the alkali, which is an uninflammable body. It is miſcible, or even ſoluble, in water, to a certain degree, by means of the alkali. Soap is entirely ſoluble in ſpirit of wine; and ſtill better in aqua-vitæ ſharpened by a little alkaline ſalt, according to an obſervation of Mr Geoffroy.

When oil unites with alkali in the formation of ſoap, it is little altered in the connection of its principles; for it may be ſeparated from the alkali by decompoſing ſoap with any acid, and may be obtained nearly in its original ſtate.

Concerning the decompoſition of ſoap by means of acids, we muſt obſerve, firſt, that all acids, even the weakeſt vegetable acids, may occaſion this decompoſition, becauſe every one of them has a greater affinity than oil with fixed alkali. Secondly, theſe acids, even when united with any baſis, excepting a fixed alkali, or the inflammable principle, are capable of occaſioning the ſame decompoſition; whence all ammoniacal ſalts, all ſalts with baſis of earth, and all thoſe with metallic baſes, are capable of decompoſing ſoap, in the ſame manner as diſengaged acids are; with this difference, that the oil ſeparated from the fixed alkali, by the acid of theſe ſalts, may unite more or leſs intimately with the ſubſtance which was the baſis of the neutral ſalt employed for the decompoſition.

Soap may alſo be decompoſed by diſtillation, as Lemery has done. When firſt expoſed to fire, it yields a phlegm called by him a *ſpirit;* which nevertheleſs is neither acid nor alkaline, but ſome water which enters into the compoſition of ſoap. It becomes more and more coloured and empyreumatic as the fire is increaſed, which ſhows that it contains the moſt ſubtle part of the oil. It ſeems even to raiſe along with it, by help of the oil and action of the fire, a ſmall part of the alkali of the ſoap: for, as the ſame chemiſt obſerves, it occaſions a precipitate in a ſolution of corroſive ſublimate. After this phlegm, the oil riſes altered, preciſely as if it had been diſtilled from quicklime, that is, empyreumatic, ſoluble in ſpirit of wine, at firſt ſufficiently ſubtle and afterwards thicker. An alkaline reſiduous coal remains in the retort, conſiſting chiefly of the mineral alkali contained in the ſoap, and which may be diſengaged from the coal by calcination in an open fire, and obtained in its pure ſtate.

Alkaline ſoaps are very uſeful in many arts and trades, and alſo in chemiſtry and medicine. Their principal utility conſiſts in a deterſive quality that they receive from their alkali, which, although it is in ſome meaſure ſaturated with oil, is yet capable of acting upon oily matters, and of rendering them ſaponaceous and miſcible with water. Hence ſoap is very uſeful to cleanſe any ſubſtances from all fat matters with which they happen to be ſoiled. Soap is therefore daily uſed for the waſhing and whitening of linen, for the cleanſing of woolen-cloths from oil, and for whitening ſilk and freeing it from the reſinous varniſh with which it is naturally covered. Pure alkaline lixiviums, being capable of diſſolving oils more effectually than ſoap, might be employed for the ſame purpoſes; but when this activity is not mitigated by oil, as it is in ſoap, they are capable of altering, and even of deſtroying entirely by their cauſticity, moſt ſubſtances, eſpecially animal-matters, as ſilk, wool, and others: whereas ſoap cleanſes from oil almoſt as effectually as pure alkali, without danger of altering or deſtroying; which renders it very uſeful.

Soap furniſhes medicine with a very efficacious and valuable remedy. Till lately, that Mrs Stephens's lithontriptic remedy has been publiſhed, phyſicians attended little to the medicinal qualities of ſoap. They ſoon found that ſoap, which is the principal ingredient of this famous remedy, is alſo the only one which has any real efficacy. And although this remedy has been found to be inſufficient to diſſolve moſt ſtones of the bladder, yet experience and obſervation have ſufficiently evinced that it can prevent the enlargement, or even the formation, of ſtones in perſons diſpoſed to that diſeaſe; that it can, in a word, attenuate, divide, and expel, the ſtony particles generated in the urinary paſſages, and which are the firſt materials of the ſtone. And accordingly ſoap is frequently uſed ſucceſsfully in theſe caſes. When ſoap was once diſcovered to act ſenſibly on the glue or binding ſubſtance of that urinary ſand, gravel, and even of ſome ſtones, it was naturally ſuppoſed to be capable of acting more powerfully on other thickened matters, which are too frequent cauſes of many obſtinate diſeaſes. Theſe conſiderations have induced the beſt practitioners to preſcribe ſoap as a reſolving, aperitive, and deobſtruent remedy; and we are certain that it has been employed as ſuch with great ſucceſs.

From the properties of ſoap we may know that it muſt be a very effectual and convenient anti-acid. It abſorbs acids as powerfully as pure alkalis and abſorbent earths, without having the cauſticity of the former, and without oppreſſing the ſtomach by its weight like the latter.

Laſtly, we may perceive that ſoap muſt be one of the beſt of all antidotes to ſtop quickly, and with the leaſt incovenience, the bad effects of acid corroſive poiſons, as aqua-fortis, corroſive ſublimate, &c.

SOAP (*Starkey's*.) See CHEMISTRY, n° 327.

Acid SOAP. This is formed by the addition of concentrated acids to the expreſſed oils. Thus the oil is rendered partially ſoluble in water; but the union is not ſufficiently complete to anſwer any valuable purpoſe.

SOAP-*Earth*. See STEATITES.

SOAPWORT. See SAPONARIA.

SOC, (Sax.) ſignifies power or liberty to miniſter juſtice or execute laws: alſo the circuit or territory wherein ſuch power is exerciſed. Whence our law-Latin word *ſoca* is uſed for a ſeigniory or lordſhip enfranchiſed by the king, with the liberty of holding or keeping a court of his *ſockmen*: And this kind of liberty continues in divers parts of England to this day, and is known by the names of *ſoke* and *ſoken*.

SOCAGE, in its moſt general and extenſive ſignification, ſeems to denote a tenure by any certain and determinate ſervice. And in this ſenſe it is by our ancient writers conſtantly put in oppoſition to chivalry, or knight-ſervice, where the render was precarious and uncertain. The ſervice muſt therefore be certain, in order to denominate it ſocage; as to hold by fealty and 20s. rent; or, by homage, fealty, and 20s. rent; or, by homage and fealty without rent; or, by fealty and certain corporal ſervice, as ploughing the lord's land for three days; or by fealty only without any other ſervice: for all theſe are tenures in ſocage.

Socage is of two ſorts: free-ſocage, where the ſervices are not only certain, but honourable; and villein-ſocage, where the ſervices, though certain, are of a baſer nature. See VILLENAGE. Such as hold by the former tenure are called, in Glanvil and other ſubſequent authors, by the name of *liberi ſokemanni*, or tenants in free-ſocage. The word is derived from the Saxon appellation *ſoc*, which ſignifies liberty or privilege; and, being joined to a uſual termination, is called *ſocage*, in Latin *ſocagium*; ſignifying thereby a free or privileged tenure.

It ſeems probable that the ſocage-tenures were the relics of Saxon liberty; retained by ſuch perſons as had neither forfeited them to the king, nor been obliged to exchange their tenure for the more honourable, as it was called, but at the ſame time more burthenſome, tenure of knight-ſervice. This is peculiarly remarkable in the tenure which prevails in Kent, called *gavelkind*, which is generally acknowledged to be a ſpecies of ſocage-tenure; the preſervation whereof inviolate from the innovations of the Norman conqueror is a fact univerſally known. And thoſe who thus preſerved their liberties were ſaid to hold in free and common ſocage.

As therefore the grand criterion and diſtinguiſhing mark of this ſpecies of tenure are the having its renders or ſervices aſcertained, it will include under it all other methods of holding free lands by certain and invariable rents and duties; and in particular, *Petit* SERJEANTY, Tenure in BURGAGE, and GAVELKIND. See theſe articles.

SOCIETY, in general, denotes a number of perſons united together for their mutual aſſiſtance, ſecu-

Society. rity, intereſt, or entertainment.

The ſocial principle in man is of ſuch an expanſive nature, that it cannot be confined within the circuit of a family, of friends, of a neighbourhood: it ſpreads into wider ſyſtems, and draws men into larger communities and commonwealths; ſince it is in theſe only that the more ſublime powers of our nature attain the higheſt improvement and perfection of which they are capable.

Royal Society, an academy or college, eſtabliſhed by charter by king Charles II. for promoting natural knowledge and uſeful arts by experiments.

It conſiſts of ſeveral hundred fellows or members, moſtly Britiſh; ſome perſons of the higheſt rank, and many eminent gentlemen and learned men of other nations. Their meetings are held once a-week, at their houſe in Crane-court, Fleet-Street, London; where they diſcourſe upon the productions and rarities of nature and art, and conſider how the ſame may be improved for the good of mankind: here are alſo read letters and other philoſophical papers ſent by ingenious perſons both at home and abroad; upon which they diſcourſe in the plaineſt manner, without affecting ſtudied ſpeeches.

This ſociety, of which his Britannic majeſty is perpetual patron, is governed by a council of twenty-one members, ten of whom are yearly choſen out of the ſociety, on St Andrew's day. The chief of the council bears the title of Preſident, whoſe proper office is to call and diſſolve the meetings; to propoſe the matter to be debated; call for experiments; and admit ſuch members as ſhall be elected, which muſt be by a majority of at leaſt twenty-one votes; whereupon he is admitted, after paying 40s. and ſubſcribing that he will endeavour to promote the good of the Royal Society of London by the improvement of natural knowledge; and being thus admitted, he afterwards pays 13s. a-quarter, as long as he continues a member of the ſociety.

Society-*Iſlands*, the name of certain iſlands diſcovered in the South Sea. They had this general name from Captain Cook in 1769. They are ſix in number, and lie very near to each other. The particular names which they bear among the natives are, *Ulietea* or *Raietea*, *Otaha*, *Balabola*, *Huabine*, *Tubai*, and *Maurua*. They are ſituated between the longitude of 15° 57′, and 152° weſt; and from latitude 16° 10′ to 16° 55′ ſouth, the neareſt iſland being about 40 leagues to the weſtward of Otaheitee.

"Here," ſays Captain Cook, "benevolent nature has ſpread her luxuriant ſweets with a laviſh hand; and the natives, copying the bounty of nature, are equally liberal, contributing plentifully and cheerfully to the wants of navigators." And Mr Forſter deſcribes the inhabitants of theſe fruitful regions, as ready at all times to perform kind offices to their eſteemed gueſts; they would carry them in and out of the boats on their backs, to prevent the ſurf from wetting their feet; they often loaded themſelves with the curioſities which had been purchaſed, and rarely refuſed to go into the water for any bird which had been ſhot. If the rain caught any of the ſhip's company on their excurſions into the country, or the heat of the ſun and fatigue of the journey oppreſſed them, they were invited to repoſe in their dwellings, and feaſted on their beſt proviſions. Their friendly hoſt ſtood at a diſtance, and never taſted of any thing till they intreated him; all the while ſome one of the family was employed in fanning them with a leaf or the bough of a tree. Before they left the houſe, they were commonly adopted according to their different ages, in the quality of father, brother, or ſon: which circumſtance took its riſe from an opinion that all the gentlemen of the ſhip were related. The chiefs of all the Society-Iſlands are deſcended from the ſame family; the officers therefore, and all who dined or meſſed together, were by them conſidered as relations. Their hoſpitality was frequently quite diſintereſted, and led their viſitors to form the moſt favourable concluſions concerning their conduct towards each other." In ſhort, ſays Mr Forſter, "they are hoſpitable without ſeeming to know it, and leave to ſtrangers who viſit them the pleaſing and grateful taſk of recording their virtues."

Socinians, Socinus. **SOCINIANS**, in church-hiſtory, a ſect of Chriſtian heretics, ſo called from their founder Fauſtus Socinus. See Socinus.—They maintain, "That Jeſus Chriſt was a mere man, who had no exiſtence before the Virgin Mary; that the Holy Ghoſt is no diſtinct perſon, but that the Father is truly and properly God. They own that the name of God is given in the holy ſcriptures to Jeſus Chriſt; but contend, that it is only a deputed title, which, however, inveſts him with an abſolute ſovereignty over all created beings, and renders him an object of worſhip to men and angels. They deny the doctrines of ſatisfaction and imputed righteouſneſs; and only ſay that Chriſt preached the truth to mankind, ſet before them in himſelf an example of heroic virtue, and ſealed his doctrines with his blood. Original ſin and abſolute predeſtination they eſteem ſcholaſtic chimeras. They likewiſe maintain the ſleep of the ſoul, which they ſay becomes inſenſible at death, and is raiſed again with the body at the reſurrection, when the good will be eſtabliſhed in the poſſeſſion of eternal felicity, while the wicked will be conſigned to a fire that will not torment them eternally, but conſume both their ſouls and bodies for a certain duration proportioned to their demerits."

SOCINUS (Lælius), the firſt author of the ſect of the Socinians, was born at Sienna, in 1525. Being deſigned by his father for the law, he began very early to ſearch for the foundation of that ſcience in the Word of God; and, by that ſtudy, diſcovered that the Romiſh religion taught many things contrary to revelation; when, being deſirous of penetrating farther into the true ſenſe of the ſcriptures, he ſtudied Greek, Hebrew, and even Arabic. In 1547, he left Italy, to go and converſe with the Proteſtants; and ſpent four years in travelling into France, England, the Netherlands, Germany, and Poland, and at length ſettled at Zurich. He, by this means, became acquainted with the moſt learned men of his time, who teſtified, by their letters, the eſteem they had for him: but as he diſcovered to them his doubts, he was greatly ſuſpected of hereſy. He, however, conducted himſelf with ſuch addreſs, that he lived among the capital enemies of his opinions, without receiving the leaſt injury. He met with ſome diſciples, who heard his inſtructions with reſpect; theſe were Italians who left their native country on account of religion, and wandered about in Germany and Poland. He communicated

Socinus
Socmans.

nicated likewiſe his ſentiments to his relations by his writings, which he cauſed to be conveyed to them at Sienna. He died at Zurich in 1562. Thoſe who were of the oppoſite ſentiments to his, and were perſonally acquainted with him, confeſs that his outward behaviour was blameleſs. He wrote a Paraphraſe on the firſt Chapter of St John; and other works are aſcribed to him.

SOCINUS (Fauſtus), nephew of the preceding, and principal founder of the Socinian ſect, was born at Sienna in 1539. The letters which his uncle Lælius wrote to his relations, and which infuſed into them many ſeeds of hereſy, made an impreſſion upon him; ſo that, knowing himſelf not innocent, he fled as well as the reſt when the inquiſition began to perſecute that family. He was at Lyon's when he heard of his uncle's death, and departed immediately to take poſſeſſion of his writings. He returned to Italy; and made himſelf ſo agreeable to the grand duke, that the charms which he found in that court, and the honourable poſts he filled there, hindered him for twelve years from remembering that he had been conſidered as the perſon who was to put the laſt hand to the ſyſtem of ſamoſatenian divinity, of which his uncle Lælius had made a rough draught. At laſt he went into Germany in 1574, and paid no regard to the grand duke's advices to return. He ſtaid three years at Baſil, and ſtudied divinity there; and having fallen into a ſet of principles very different from the ſyſtem of Proteſtants, he reſolved to maintain and propagate them; for which purpoſe he wrote a treatiſe *De Ieſu Chriſto Servatore*. In 1579, Socinus retired into Poland, and deſired to be admitted into the communion of the Unitarians; but as he differed from them in ſome points, and refuſed to be ſilent upon them, he met with a repulſe. However, he did not ceaſe to write in defence of their churches againſt thoſe who attacked them. At length his book againſt James Paleologus furniſhed his enemies with a pretence to exaſperate the king of Poland againſt him; but though the mere reading of it was ſufficient to refute his accuſers, Socinus thought proper to leave Cracow, after having reſided there four years. He then lived under the protection of ſeveral Poliſh lords, and married a lady of a good family: but her death, which happened in 1587, ſo deeply afflicted him as to injure his health; and to complete his ſorrow, he was deprived of his patrimony by the death of Francis de Medicis great duke of Florence. The conſolation he found in ſeeing his ſentiments at laſt approved by ſeveral miniſters, was greatly interrupted in 1598; for he met with a thouſand inſults at Cracow, and was with great difficulty ſaved from the hands of the rabble. His houſe was plundered, and he loſt his goods; but this loſs was not ſo uneaſy to him as that of ſome manuſcripts, which he extremely regretted. To deliver himſelf from ſuch dangers, he retired to a village about nine miles diſtant from Cracow, where he ſpent the remainder of his days at the houſe of Abraham Blonſki, a Poliſh gentleman, and died there in 1604. All Fauſtus Socinus's works are contained in the two firſt volumes of the *Bibliotheca Fratrum Polonorum*.

SOCMANS, SOKEMANS, or *Socmen*, (*Socmanni*), are ſuch tenants as hold their lands and tenements by ſocage-tenure. See SOCAGE.

SOCOTORA, an iſland lying between Aſia and Arabia Felix; about 150 miles in length, and 22 in breadth. It is particularly noted for its fine aloes, known by the name of *Socotrine aloes*. The religion of the natives is a mixture of Mahometaniſm and Paganiſm; but they are civil to ſtrangers who call there in their paſſage to the Eaſt Indies. It abounds in fruit and cattle; and they have a king of their own, who is dependent on Arabia.

Socrates.

SOCRATES, the greateſt of the ancient philoſophers, "the very founder of philoſophy itſelf," as the earl of Shafteſbury calls him, was born at Alopece, a ſmall village of Attica, in the fourth year of the 77th olympiad, or about 467 years before Chriſt. His parents were very mean; Sophroniſcus his father being a ſtatuary or carver of images in ſtone, and Phœnareta his mother a midwife. However, he is obſerved to have been ſo far from being aſhamed of his parents, that he often took occaſion to mention them. Plutarch ſays, that as ſoon as he was born, Sophroniſcus his father, conſulting the oracle, was adviſed to ſuffer his ſon to do what he pleaſed, neither compelling him to what he diſliked, nor diverting him from what he was inclined to; in ſhort, to be nowiſe ſolicitous about him, ſince he had one guide of life within him, meaning his Genius, who was better than 500 maſters. But Sophroniſcus, regardleſs of the oracle's direction, put him to his own trade of carving ſtatues; which, though contrary to the inclination of Socrates, yet afterwards ſtood him in good ſtead: for his father dying, and his money and effects being loſt by being placed in bad hands, he was neceſſitated to continue his trade for ordinary ſubſiſtence. But being naturally averſe to this profeſſion, he only followed it when neceſſity compelled him; and upon getting a little before-hand, would for a while lay it entirely aſide. Theſe intermiſſions of his trade were beſtowed upon philoſophy, to which he was naturally addicted; and this being obſerved by Crito, a rich philoſopher of Athens, Socrates was at length taken from his ſhop, and put into a condition of philoſophiſing at his eaſe and leiſure.

The firſt maſter of Socrates was Anaxagoras, and then Archelaus: by the laſt of whom he was much beloved, and travelled with him to Samos, to Pytho, and to the Iſthmus. He was ſcholar likewiſe of Damon, whom Plato calls a *moſt pleaſing teacher of muſic*, and of all other things that he himſelf would teach to young men. He heard alſo Prodicus the ſophiſt; to which muſt be added Diotyma and Aſpaſia, women excellently learned. Diotyma was ſuppoſed to have been inſpired with a ſpirit of prophecy; and Aſpaſia taught him rhetoric. Of Euenus he learned poetry; of Ichomachus, huſbandry; of Theodorus, geometry.

At length he began himſelf to teach; and was ſo eloquent, that he could lead the mind to approve or diſapprove whatever he pleaſed; but never uſed this talent for any other purpoſe than to conduct his fellow-citizens into the path of virtue. As to his ſchool, and the particular method of his teaching, Plato mentions the academy Lycæum, and a pleaſant meadow without the city on the ſide of the river Ilyſſus, as places frequented by him and his auditors. Xenophon affirms, that he was continually abroad; that in the morning he viſited the places of public walking and exerciſe; when it was full, the forum; and that the reſt of the day he ſought out the moſt populous meetings, where he diſputed openly for every one to hear that would: and Plutarch relates, that he did not only teach when the benches were prepared and himſelf in the chair, or in ſet hours of reading and diſcourſe, or at appointments in walking with his friends; but even when he played, or eat, or drank, or was in the camp or market, or finally when he was in priſon: thus making every place a ſchool of virtue. His method of rouſing the ſoul, and enabling her to recollect her own original ideas, was twofold; by irony, and induction. He is ſaid to have exceeded all men living in irony. His way was, to leſſen and detract from himſelf in diſputation, and to attribute ſomewhat more to thoſe he meant to confute; ſo that he always diſſembled with much gravity his own opinions, till he had led others, by a ſeries of queſtions, called *induction*, to the point he aimed at. He profeſſed only to know this, "That he knew nothing;" and uſed modeſtly to ſay, that his ſkill reſembled that of his mother, "he being nothing more than a kind of midwife, who aſſiſted others in bringing forth what they had within themſelves." However, he was, as Xenophon repreſents him, excellent in all kinds of learning. Xenophon inſtances only in arithmetic, geometry, and aſtrology: Plato mentions natural philoſophy; Idomeneus, rhetoric; Laertius, medicine. Cicero affirms, that by the teſtimony of all the learned, and the judgment of all Greece, he was, as well in wiſdom, acuteneſs, politeneſs, and ſubtlety, as in eloquence, variety, and richneſs, in whatever he applied himſelf to, without exception, the prince of all. As to his philoſophy, it may be neceſſary to obſerve, that having ſearched into all kinds of ſcience, he noted theſe inconveniences and imperfections: firſt, that it was wrong to neglect thoſe things which concern human life, for the ſake of inquiring into thoſe things which do not; ſecondly, that the things men have uſually made the objects of their inquiries, are above the reach of human underſtanding, and the ſource of all the diſputes, errors, and ſuperſtitions, which have prevailed in the world; and thirdly, that ſuch divine myſteries cannot be made ſubſervient to the uſes of human life. Thus eſteeming ſpeculative knowledge, ſo far only as it conduces to practice, he cut off in all the ſciences what he conceived to be of leaſt uſe. In ſhort, remarking how little advantage ſpeculation brought to mankind, he reduced her to action: and thus, ſays Cicero, "firſt called philoſophy away from things involved by nature in impenetrable ſecreſy, which had yet employed all the philoſophers till his time, and brought her to common life, to inquire after virtue and vice, good and evil." See SOCRATIC *Philoſophy*.

That Socrates had an attendant ſpirit, genius, or dæmon, which diverted from dangers, is teſtified by Plato, Xenophon, and Antiſthenes, who were his contemporaries, and confirmed by innumerable authors of antiquity; but what this attendant ſpirit, genius, or dæmon was, or what we are to underſtand by it, neither ancient nor modern writers have been able to determine. There is ſome diſagreement concerning the name, and more concerning the nature of it: only it is agreed, that the advice it gave him was always diſſuaſive; "never impelling," ſays Cicero, "but often reſtraining him." It is commonly named his *dæmon*, by which title he himſelf owned it. Plato ſometimes calls it his *guardian*, and Apuleius his *god;* becauſe the name of *dæmon*, as St Auſtin tells us, at laſt grew odious. As for the ſign or manner in which this dæmon or genius foretold, and by foretelling guarded him againſt evils to come, nothing certain can be collected about it. Plutarch conjectured, firſt, that it might be ſome apparition; but at laſt concludes, that it was his obſervation of ſome inarticulate unaccuſtomed ſound or voice, conveyed to him by ſome extraordinary way, as we ſee in dreams. Others confine this foreknowledge of evils within the ſoul of Socrates himſelf; and when he ſaid, that "his genius adviſed him," interpret him as if he had ſaid, that "his mind foreboded and ſo inclined him." But this is ſaid to be inconſiſtent with the deſcription which Socrates himſelf gives of a voice and ſigns from without. Laſtly, ſome conceive it to be one of thoſe ſpirits that have a particular care of men; which Maximius Tyrius and Apuleius deſcribe in ſuch a manner, that they want only the name of a *good angel:* and this Lactantius has ſupplied, when having proved, that God ſends angels to guard mankind, he adds, "and Socrates affirmed, that there was a dæmon conſtantly near him, which had kept him company from a child, and by whoſe beck and inſtruction he guided his life."

It is obſerved by many, that Socrates little affected travel; his life being wholly ſpent at home, excepting when he went out upon military ſervices. In the Peloponneſian war, he was thrice perſonally engaged: firſt, at the ſiege of Potidæa; ſecondly, at Delium, a town in Bæotia, which the Athenians took; and thirdly, at Amphipolis, when it was taken by Braſidas the Lacedemonian general. We are told in Plutarch's Sympoſium, and in the perſon of Alcibiades, that "he outwent all the ſoldiers in hardineſs: and if at any time, (ſaith Alcibiades), as it often happens in war, the proviſions failed, there were none who could bear the want of meat and drink like Socrates; yet, on the other hand, in times of feaſting, he alone ſeemed to enjoy them: and though of himſelf he would not drink, yet being invited, he far out-drank every body, and (which is moſt ſtrange) was never ſeen drunk."—He forbore to accept any office in the commonwealth, except in his latter years that of ſenator: either, as Ælian ſaith, becauſe he ſaw the Athenian government approaching to a tyranny; or, as himſelf profeſſeth, becauſe he was diſſuaded by his dæmon from meddling in public affairs.

To this great philoſopher Greece was principally obliged for her glory and ſplendour. He formed the manners of the moſt celebrated perſons of Greece, as Alcibiades, Xenophon, Plato, &c. But his ſervices and the great qualities of his mind could not ſecure him from envy, perſecution, and calumny. The 30 tyrants forbad his inſtructing youth; and as he derided the plurality of the Pagan deities, he was charged with impiety. The day of trial being come, Socrates made his own defence, without procuring an advocate, as the cuſtom was, to plead for him. He did not defend himſelf with the tone and language of a ſuppliant or guilty perſon, but, as if he were maſter of the judges themſelves, with freedom, firmneſs, and ſome degree of contumacy. Many of his friends alſo ſpoke in his behalf; and laſtly, Plato went up into the chair, and began a ſpeech in theſe words: "Though I, Athenians, am the youngeſt of thoſe that come up into this place"—but they ſtopped him, crying out, "of thoſe that go down," which he was thereupon conſtrained to do; and then proceeding to vote, they caſt Socrates by 281 voices. It was the cuſtom of Athens, as Cicero informs us, when any one was caſt, if the fault were not capital, to impoſe a pecuniary mulct; when the guilty perſon was aſked the higheſt rate at which he eſtimated his offence. This was propoſed to Socrates, who told the judges, that to pay a penalty was to own an offence; and that, inſtead of being condemned for what he ſtood accuſed, he deſerved to be maintained at the public charge out of the Prytanæum. This was the greateſt honour the Grecians could confer: and the anſwer ſo exaſperated the judges, that they condemned him to death by 80 votes more.

The ſentence being paſſed, he was ſent to priſon: which, ſays Seneca, he entered with the ſame reſolution and firmneſs with which he had oppoſed the 30 tyrants; and took away all ignominy from the place, which could not be a priſon while he was there. He lay here in fetters 30 days; and was conſtantly viſited by Crito, Plato, and other friends, with whom he paſſed the time in diſpute after his uſual manner. He was often ſolicited by them to an eſcape; which he not only refuſed, but derided; aſking, "If they knew any place out of Attica whither death would not come?" The manner of his death is thus related by Plato, who was an eye-witneſs of it. 'Socrates, the day he was to die, had been diſcourſing to his friends upon the immortality of the ſoul; and "when he had made an end of ſpeaking, Crito aſked him, if he had any directions to give concerning his ſons or other things in which they could ſerve him? I deſire no more of you, ſaith Socrates, than what I have always told you: if you take care of yourſelves, whatſoever you do will be acceptable to me and mine, though you promiſe nothing; if you neglect yourſelves and virtue, you can do nothing acceptable to us, though you promiſe ever ſo much." That, anſwered Crito, we will obſerve; but how will you be buried? "As you think good," ſays he, "if you can catch me, and I do not give you the ſlip." Then with a ſmile applying himſelf to us, "I cannot perſuade Crito," ſays he, "that I am that Socrates who was haranguing juſt now, or any thing more than the carcaſs you will preſently behold; and therefore he is taking all this care of my interment. It ſeems that what I juſt now explained in a long diſcourſe, has made no impreſſion at all upon him; namely, that as ſoon as I ſhall have drank the poiſon, I ſhall not remain longer with you, but depart immediately to the ſeats of the bleſſed. Theſe things, with which I have been endeavouring to comfort you and myſelf, have been ſaid to no purpoſe. As therefore Crito was bound to the judges for my appearance, ſo you muſt now be bound to Crito for my departure; and when he ſees my body burnt or buried, let him not ſay, that Socrates ſuffers any thing, or is any way concerned: for know, dear Crito, ſuch a miſtake were a wrong to my ſoul. I tell you, that my body is only buried; and let that be done as you ſhall think fit, or as ſhall be moſt agreeable to the laws and cuſtoms of the country." This ſaid, he aroſe and retired to an inner room, taking Crito with him, and leaving us, who like orphans were to be deprived of ſo dear a father, to diſcourſe upon our own miſery. After his bathing, came his wife, and the other women of his family, with his ſons, two of them children, one of them a youth; and when he had given proper directions about his domeſtic affairs, he diſmiſſed them and came out to us. It was now near ſun-ſet, for he had ſtaid long within; when coming out he ſat down, and did not ſpeak much after. Then entered an officer, and approaching him ſaid, Socrates, I am perſuaded that I ſhall have no reaſon to blame you, for what I have been accuſtomed to blame in others; who have been angry at me and loaded me with curſes, for only doing what the magiſtrate commands, when I have preſented the poiſon to them. But I know you to be the moſt generous, the moſt mild, the beſt of all men that ever entered this place; and am certain, that if you entertain any reſentment upon this occaſion, it will not be at me, but at the real authors of your misfortune. You know the meſſage I bring: farewell; and endeavour to bear with patience what muſt be borne. "And (ſaid Socrates to the officer, who went out weeping) fare thee well: I will. How civil is this man! I have found him the ſame all the time of my impriſonment: he would often viſit me, ſometimes diſcourſe with me, always uſed me kindly; and now ſee how generouſly he weeps for me. But come, Crito; let us do as he bids us: if the poiſon be ready, let it be brought in; if not, let ſomebody prepare it." The ſun is yet among the mountains, and not ſet, ſays Crito: I myſelf have ſeen others drink it later, who have even eat and drank freely with their friends after the ſign has been given; be not in haſte, there is time enough. "Why, yes, (ſays Socrates): they who do ſo, think they gain ſomething! but what ſhall I gain by drinking it late? Nothing, but to be laughed at for appearing too deſirous of life; pray, let it be as I ſay." Then Crito ſent one of the attendants, who immediately returned, and with him the man who was to adminiſter the poiſon, bringing a cup in his hand; to whom Socrates ſaid, "Prithee, my good friend, for thou art verſed in theſe things, what muſt I do?" Nothing, ſaid the man, but walk about as ſoon as you ſhall have drank, till you perceive your legs to fail; and then ſit down. Then he preſented the cup; which Socrates took without the leaſt change of countenance, or any emotion whatever, and ſwallowed the draught with the greateſt eaſe. Many of us, who till then had refrained from tears, when we ſaw him put the cup to his mouth and drink off the poiſon, were not able to refrain any longer, but gave vent to our grief; which Socrates obſerving, "Friends, (ſaith he), what mean you? I ſent away the women for no other reaſon but that they might not diſturb us with this; for I have heard, that we ſhould die with gratulation and applauſe: be quiet then, and behave yourſelves like men." Theſe words made us with ſhame ſuppreſs our tears. When he had walked a while, and perceived his legs to fail, he lay down on his back, as the executioner directed; who in a little time looking upon his feet, and pinching them pretty hard, aſked him if he perceived it? Socrates ſaid, "No." Then he did the ſame by his legs; and ſhowing us how every part ſucceſſively grew cold and ſtiff, obſerved, that when that chillneſs reached his heart, he would die. After lying a while, he ſtretched himſelf forth; when the executioner uncovering him found his eyes fixed, which were cloſed by Crito. This, ſays Plato, was the end of the beſt, the wiſeſt, and the juſteſt of men.' And this account of it by Plato, Tully profeſſes, he could never read without tears.

He died, according to Plato, when he was more than 70 years of age. He was buried with many tears and much ſolemnity by his friends, among whom the exceſſive grief of Plato is obſerved by Plutarch: yet as ſoon as they had performed that laſt ſervice, fearing the cruelty of the 30 tyrants, they ſtole out of the city; the greater part to Megara, to Euclid, who received them kindly; the reſt to other places. Soon after, however, the Athenians were awakened to a ſenſe of the injuſtice they had committed againſt Socrates; and became ſo exaſperated, that nothing would ſerve them but that the authors of it ſhould be put to death; as Melitus was, while Anytus was baniſhed. In farther teſtimony of their penitence, they called home his friends to their former liberty of meeting; they forbad public ſpectacles of games and wreſtlings for a time; they cauſed his ſtatue, made in braſs by Lyſippus, to be ſet up in the Pompeium; and a plague enſuing, which they imputed to this unjuſt act, they made an order that no man ſhould mention Socrates publicly and on the theatre, in order to forget the ſooner what they had done.

As to his perſon, he was very homely; was bald, had a dark complexion, a flat noſe, eyes ſticking out, and a ſevere downcaſt look. In ſhort, his countenance promiſed ſo ill, that Zopyrus a phyſiognomiſt pronounced him incident to various paſſions, and given to many vices; which when Alcibiades and others that were preſent laughed at, knowing him to be free from every thing of that kind, Socrates juſtified the ſkill of Zopyrus, by owning, that "he was by nature prone to thoſe vices, but ſuppreſſed his inclination by reaſon." The defects of his perſon were amply compenſated by the virtues and accompliſhments of his mind. The oracle at Delphi declared him the wiſeſt of all men, for profeſſing only to know that he knew nothing: Apollo, as Tully ſays, conceiving the only wiſdom of mankind to conſiſt in not thinking themſelves to know thoſe things of which they are ignorant. He was a man of all virtues; and ſo remarkably frugal, that how little ſoever he had, it was always enough. When he was amidſt a great variety of rich and expenſive objects, he would often ſay to himſelf, "How many things are there which I do not want!"

He had two wives, one of which was the noted Xantippe; whom Aulus Gellius deſcribes as an accurſed froward woman, chiding and ſcolding always, by day and by night. Several inſtances are recorded of her impatience and his long-ſuffering. One day before ſome of his friends, ſhe fell into the uſual extravagances of her paſſion; when he, without anſwering a word, went abroad with them: but he was no ſooner out of the door, than ſhe, running up into the chamber, threw water down upon his head; upon which, turning to his friends, "Did not I tell you (ſays he), that after ſo much thunder we ſhould have rain?" Another time ſhe pulled his cloak from his ſhoulders in the open forum; and ſome of his friends adviſing him to beat her, "Yes, (ſays he), that while we two fight, you may all ſtand by, and cry, Well done Socrates; to him, Xantippe!" He choſe his wife, we are told, for the ſame reaſon that thoſe who would excel in horſemanſhip chooſe the rougheſt and moſt ſpirited horſes; ſuppoſing if they are able to manage them, they may be able to manage any other. It is doubtful whether Socrates ever convinced any one beſide himſelf by this reaſoning; or whether he owes any part of his reputation for wiſdom, to this rule for chooſing a wife!

They who affirm that Socrates wrote nothing, as Cicero, Plutarch, and others, mean only in reſpect to his philoſophy; for it is atteſted and allowed, that he aſſiſted Euripides in compoſing tragedies, and was the author of ſome pieces of poetry. Dialogues alſo, and epiſtles, are aſcribed to him. His philoſophical diſputations were committed to writing by his ſcholars; by Plato and Xenophon chiefly. Xenophon ſet the example to the reſt in doing it firſt, and alſo with the greateſt punctuality; as Plato did it with the moſt liberty, intermixing ſo much of his own, that it is not eaſy, if poſſible, to diſtinguiſh the maſter from the ſcholar. Hence Socrates, hearing him recite his Lyſis, cried out, "How many things doth this young man feign of me!"

Socrates, was alſo the name of an eccleſiaſtical hiſtorian of the 5th century, born at Conſtantinople in the beginning of the reign of Theodoſius: he profeſſed the law, and pleaded at the bar, whence he obtained the name of *Scholaſticus*. He wrote an eccleſiaſtical hiſtory from the year 309, where Euſebius ended, down to 440; and wrote with great exactneſs and judgment. An edition of Euſebius and Socrates, in Greek and Latin, with notes by Reading, was publiſhed at London in 1720.

SOCRATIC PHILOSOPHY, the doctrines and opinions with regard to morality and religion, maintained and taught by Socrates. To him is aſcribed the firſt introduction of moral philoſophy, which is what is meant by that uſual ſaying, "That Socrates firſt called philoſophy down from heaven to earth; that is, from the contemplation of the heavens and heavenly bodies, he led men to conſider themſelves, their own paſſions, opinions, faculties, duties, actions, &c."—Man, who was the ſole ſubject of his philoſophy, having a twofold relation to things divine and human, his doctrines were with regard to the former metaphyſical, to the latter moral. The morality of Socrates we ſhall paſs over, as reſembling in its general branches what others taught in common with him; yet more pure, more exact, more refined. His metaphyſical opinions are thus collected out of Plato, Xenophon, Plutarch, and others. "There are three principles of all things, God, matter, and ideas. God is the univerſal intellect: matter the ſubject of generation and corruption: idea, an incorporeal ſubſtance, the intellect of God; God the intellect of the world.—God is one, perfect in himſelf, giving the being and well-being of every creature: what he is, I know not; what he is not, I know.—That God, not chance, made the world and all creatures, is demonſtrable from the reaſonable diſpoſition of their parts, as well for uſe as defence; from their care to preſerve themſelves, and continue their ſpecies.—That he particularly regards man in his body, appears from the noble upright form thereof, and from the gift of ſpeech; in his ſoul, from the excellency thereof above others.—That God takes care of all creatures, is demonſtrable from the benefit he gives them of light, water, fire, and fruits of the earth in due ſeaſon: that he hath a particular regard of man, from the deſtination of all plants and creatures for his ſervice; from their ſubjection to man, though they exceeded him ever ſo much in ſtrength; from the variety of man's ſenſe, accommodated to the variety of objects, for neceſſity, uſe, and pleaſure; from reaſon, whereby he diſcourſeth through reminiſcence from ſenſible objects; from ſpeech, whereby he communicates all he knows, gives laws, and governs ſtates: finally, that God, though inviſible himſelf, is ſuch and ſo great, that he at once ſees all, hears all, is everywhere, and orders all." As to the other great object of metaphyſical reſearch, the ſoul, Socrates taught, that "it is pre-exiſtent to the body, endued with the knowledge of eternal ideas, which in her union to the body ſhe loſeth, as ſtupefied, until awakened by diſcourſe from ſenſible objects; on which account all her learning is only reminiſcence, a recovery of her firſt knowledge: that the body being compounded is diſſolved by death; but that the ſoul being ſimple paſſeth into another life, incapable of corruption: that the ſouls of men are divine: that the ſouls of the good after death are in a happy eſtate, united to God in a bleſſed inacceſſible place; that the bad in convenient places ſuffer condign puniſhment: but that to define what thoſe places are, is the attempt of a man who hath no underſtanding; whence, being once aſked what things were in the other world? he anſwered, "Neither was I ever there, nor ever did I ſpeak with any that came from thence."

All the Grecian ſects of philiſophers refer their origin to the diſcipline of Socrates; particularly the Platonics, Peripatetics, Academics, Cyrenaics, Stoics, &c. but the greateſt part of his philoſophy we have in the works of Plato.

SODA (Salt *of*), a name for the foſſile alkali, or baſis of ſea-ſalt. In the eaſtern countries this alkali is found native, either in a pretty pure ſtate, or mixed with earthy ſubſtances, from which it is eaſily ſeparated by means of water; and Dr Heberden found it in conſiderable plenty on the peak of Teneriffe. It is alſo obtained from the aſhes of the plant kali, and from thoſe of the alga marina, which laſt form our kelp; but this is the moſt impure ſtate in which it ever is obtained. The beſt ſort of that artificially procured is made by burning the plant kali; and is prepared at Alicant in Spain, from an annual procumbent kali with ſhort leaves like thoſe of horſeleek. Theſe aſhes are called *ſoude* or *ſode* in France, where they are uſed as one of the common kinds of potaſh. They are brought to this country under the name of *Spaniſh aſhes*, *bariglia* or *barilla*, in hard ſpongy maſſes, partly whitiſh or grey, and partly blackiſh. From theſe the ſaline part is extracted pure by powdering and diſſolving in water. This, however, contains alſo a portion of vegetable alkali, and ſome ſea-ſalt. A work has lately been erected in England for decompoſing ſea-ſalt and extracting the pure alkali from it, which is commonly ſold in the ſhops under the name of *Engliſh pearl-aſhes*; but it is much leſs pure than that which comes from Alicant; being mixed with a large quantity of ſea-ſalt. The proceſs for decompoſing the ſalt in this work is ſaid to be mixing it with lime, and taking off the ſaline effloreſcence which appears on the ſurface.

This mineral alkali will ſaturate fully as much acid as the vegetable, though its atraction for acids is not ſo great. It is certain, that if a quantity of vegetable alkali be added to a ſolution of Glauber's ſalt, or to ſea-ſalt, they will be decompoſed, and the mineral alkali will be obtained in its pure form: but whether this would alſo take place if the vegetable alkali were deprived of its fixed air, has not been aſcertained; indeed it has been obſerved, that the two alkalis when rendered cauſtic are much leſs eaſily diſtinguiſhed than when combined with fixed air. The mineral alkali eaſily then diſtinguiſhes itſelf by its ſuperior mildneſs and readineſs to cryſtallize. For the combinations of the ſalt of ſoda, ſee Chemistry, n° 124, 185, 231, 270, 275, 296.

Soda is alſo a name for a heat in the ſtomach, or heart-burn. See Medicine, n° 406.

SODOM, formerly a town of Paleſtine in Aſia, famous in ſcripture for the wickedneſs of its inhabitants, and their deſtruction by fire from heaven on account of that wickedneſs. The place where it ſtood is now covered by the waters of the Dead Sea, or the Lake Aſphaltites.

SODOMY, the unnatural crime of buggery, thus called from the city of Sodom, which was deſtroyed by fire for the ſame. See Buggery.

The Levitical law adjudged thoſe guilty of this execrable crime to death; and the civil law aſſigns the ſame puniſhment to it. The law of England makes it felony. There is no ſtatute in Scotland againſt Sodomy; the libel of the crime is therefore founded on the divine law, and practice makes its puniſhment to be burned alive.

SODOR, a little village in Columbkill, one of the weſtern iſles of Scotland, near that of Mull. It was formerly a biſhop's ſee, which comprehended all the iſlands, together with the iſle of Man; for which reaſon the biſhop is ſtill called the *biſhop of Sodor and Man.*

SOFA, in the Turkiſh cuſtoms, a bench of wood raiſed from the ground about a foot high, and placed round a hall or chamber for the people to ſit down upon or to lie along, and in that poſture to take a view of what paſſes in the ſtreets, &c. for theſe benches are ſurrounded with windows; they are covered with fine Turky carpets; and upon that are placed cuſhions of ſattin flowered with gold, or ſome other rich ſtuff.

SOFFITA, or Soffit, in architecture, any plafond or ceiling formed of croſs beams of flying corniches, the ſquare compartiments or pannels of which are enriched with ſculpture, painting, or gilding; ſuch are thoſe in the palaces of Italy, and in the apartments of Luxembourg at Paris.

SOFI, or Sophi. See Sophi.

SOFTENING, in painting, the mixing and diluting of colours with the bruſh or pencil.

SOIL, in agriculture and gardening, denotes earth or ground conſidered with regard to the quality of its mould for the production and growth of vegetables. See Earth.

SOISSONS, an ancient, large, and conſiderable town, in the iſle of France, and capital of the Soiſſonnois, with a biſhop's ſee. The cathedral has one of the moſt conſiderable chapters in the kingdom; and the biſhop, when the archbiſhop of Rheims is abſent, has a right to conſecrate the king. It has 12 pariſhes, 6 abbeys, and a French academy, founded in 1694; is ſeated in a very pleaſant and fertile valley, on the river Aiſne, 30 miles weſt of Rheims, and 60 north-eaſt of Paris. E. Long. 3. 24. N. Lat. 49. 23. The Soiſſonnois is bounded on the north by Laonnois; on the eaſt by Champagne; on the ſouth by La Brie; and on the weſt by Valois. It bounds in corn, wood, and paſtures.

SOKE, or SOC. See SOCAGE.

SOKEMANS. See SOC and SOCAGE.

SOL, in muſic, the fifth note of the gammut, *ut, re, mi, fa, ſol, la*. See GAMMUT.

SOL, or *Sou*, a French coin made up of copper mixed with a little ſilver. See the article COIN.

SOL, the *Sun*, in aſtronomy, aſtrology, &c. See ASTRONOMY, *paſſim*.

SOL, in chemiſtry, is gold; thus called from an opinion that this metal is in a particular manner under the influence of the ſun.

SOL, in heraldry, denotes Or, the golden colour in the arms of ſovereign princes.

SOLÆUS, or SOLARIS, in anatomy, one of the extenſor muſcles of the foot, riſing from the upper and hinder part of the tibia and fibula.

SOLAND-GOOSE, in ornithology. See PELICANUS.

SOLANUM, NIGHTSHADE, comprehending the love-apple and potato; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are 30 ſpecies; the moſt remarkable of which are, 1. The lycoperſicon, wolf's peach, love-apple, or tomentos, riſes with ſtrong herbaceous procumbent ſtalks branching out to the length of ſix or eight feet with large pinnated, rank-ſcented leaves, with four or five pairs of cut lobes, and ſimple racemous cluſters of ſmall yellow flowers at the axillas, ſucceeded by large compreſſed roundiſh furrowed fruit, of a red colour and ſoft. The varieties are, the common large love-apple, with furrowed fruit; the cherry-fruited love-apple, having ſmooth round fruit of a red colour, the ſize of large cherries; yellow cherry-fruited; ſcentleſs-leaved; and burnet-leaved. It is a native of the hot parts of America. 2. The nigrum, or common black nightſhade, riſes with upright herbaceous ſtalks, branching two or three feet high; oval, angular, indented leaves; and, from the ſides of the branches, roundiſh nodding umbels of white flowers ſucceeded by black and other coloured berries in the varieties. 3. The dulcamara, bitter ſweet, or climbing woody night-ſhade, riſes with long flexuous, inermous, woody ſtalks, climbing by ſupport many feet high; oblong, pointed leaves, with the upper ones halbert-ſhaped; and cymoſe cluſters of ſmall blue flowers, ſucceeded by bunches of ſmall, oval, red berries. The varieties are, the white flowered; the variegated white ſtriped leaved; gold ſtriped leaved; the African thick leaved, formerly conſidered as a diſtinct ſpecies, but now found to be only a variety of this. 4. The tuberoſum, tuberous-rooted Peruvian nightſhade, commonly called *potato*. This hath a tuberous root, emitting numerous fibres, productive of many roundiſh and oblongiſh fleſhy, edible tubers. Immediately from the root riſe herbaceous, flexuoſe, ſmooth ſtalks, ſomewhat erectly, a yard long, garniſhed with large pinnated leaves, of ſeveral pair of entire lobes, and terminated by ſubdivided peduncles ſupporting bunches of ſmall purple or white flowers in the different varieties, and ſucceeded by ripe ſeed in autumn. This ſpecies comprehends two principal varieties, viz. the red-rooted potato with white flowers, and the white-rooted potato with white flowers. Each of theſe comprehends ſeveral intermediate ones, ſuch as the round red, oblong red, pale red, rough red, ſmooth red, red and white, early dwarf red, kidney-ſhaped white potato, round white, large oblong white, large red-ended white kidney ſhaped; large conglomerated American potato, being generally cluſtered together conſiderably, each root or tuber attaining a prodigious large ſize, and principally in eſtimation for feeding of cattle.

Culture. The firſt ſpecies, though a native of hot climates, will ſucceed here in the open air in ſummer, being previouſly raiſed in hot-beds, and thence tranſplanted. As it is a trailing plant, it ſhould be well ſupported by walls, pales, or ſtakes, and ſhould alſo have a ſunny ſituation, or the fruit will not ripen. The common black nightſhade grows wild in gardens, fields, and dunghills, in this country; and becoming a troubleſome weed, is rarely cultivated. The dulcamara is alſo hardy, and will ſucceed any where; excepting the African thick-leaved kind, which requires to be potted, and treated as a green-houſe plant. It is propagated by layers and cuttings.—The method of cultivating and managing potatoes is mentioned under the articles AGRICULTURE, n° 127—129, and POTATO.

Uſes. The leaves of the deadly nightſhade have been ſuppoſed diſcutient and cooling when applied externally, and poiſonous when taken inwardly. Of late it has been ſhown, that an infuſion of half a grain, or a grain, of the dried leaves, may be taken with ſafety, and that afterwards the doſe may by degrees be increaſed to five or ſix grains. They generally occaſion ſome conſiderable evacuation, and ſometimes, eſpecially when taken in large doſes, alarming diſturbances in the nervous ſyſtem; which, however, go off with the operation of the medicine. It was expected, that the great activity of this vegetable would make it very ſerviceable in many obſtinate diſorders; but this expectation has not been verified by experience, and the colleges both of London and Edinburgh have rejected theſe leaves from their materia medica. The twigs and roots of the dulcamara, or woody nightſhade, have been recommended as deobſtruents for reſolving coagulated blood, &c. and are generally ſaid to occaſion ſome conſiderable evacuation by ſweat, urine, or ſtool, particularly the latter. The fruit of the lycoperſicon is of great eſtimation in Spain and Portugal for improving ſoups, alſo for ſtewing, ſauces, &c. The uſes of the potato as an eſculent plant are well known.

SOLAR, ſomething belonging to the SUN.

SOLAR *Spots*. See SPOTS, and ASTRONOMY, n° 14—18. 33, 34, 35. 39.

SOLDER, SODDER, or *ſoder*, a metallic or mineral compoſition uſed in ſoldering or joining together other metals. See the next article.

Solders are made of gold, ſilver, copper, tin, biſmuth, and lead; uſually obſerving, that in the compoſition there be ſome of the metal that is to be ſoldered mixed with ſome higher and finer metals. Goldſmiths uſually make four kinds of ſolder, viz. ſolder of eight, where to ſeven parts of ſilver there is one of braſs or copper; ſolder of ſix, where only a ſixth part is copper; ſolder of four, and ſolder of three. It is the mixture of copper in the ſolder that makes raiſed plate come always cheaper than flat. The ſolder uſed by plumbers is made of two pounds of lead to one of block-tin. Its goodneſs is tried by melting it and pouring the bigneſs of a crown-piece upon a table; for if good, there will ariſe little bright ſhining ſtars therein. The ſolder for copper is made, like that of the plumbers, only with copper and tin; for very nice works, inſtead of tin they ſometimes uſe a quantity of ſilver. Solder for tin is made of two thirds of tin and one of lead; but where the work is any thing delicate, as in organ-pipes, where the juncture is ſcarce diſcernable, it is made of one part of biſmuth and three parts of pewter.

SOLDERING, among mechanics, the joining and faſtening together two pieces of the ſame metal, or of two different metals, by the fuſion and application of ſome metallic compoſition on the extremities of the metals to be joined. See the preceding article.

To ſolder upon ſilver, braſs, or iron: Take ſilver, five pennyweight; braſs, four pennyweight; melt them together for ſoft ſolder, which runs ſooneſt. Take ſilver, five pennyweight; copper, three pennyweight; melt them together for hard ſolder. Beat the ſolder thin, and lay it on the place to be ſoldered, which muſt be firſt fitted and bound together with wire, as occaſion requires; then take borax in powder, and temper it like pap, and lay it upon the ſolder, letting it dry; then cover it with quick coals, and blow, and it will run immediately; take it preſently out of the fire, and it is done. It is to be obſerved, that if any thing is to be ſoldered in two places, which cannot well be done at one time, you muſt firſt ſolder with the harder ſolder, and then with the ſoft; for if it be firſt done with the ſoft, it will unſolder again before the other is faſtened. Let it be obſerved, that if you would not have your ſolder run about the piece that is to be ſoldered, you muſt rub ſuch places over with chalk.—In the ſoldering either of gold, ſilver, copper, or either of the metals abovementioned, there is generally uſed borax in powder, and ſometimes roſin. As to iron, it is ſufficient that it be heated red hot, and the two extremities thus hammered together, by which means they will become incorporated with each other. For the finer kinds of iron and ſteel inſtruments, however, gold proves an excellent ſolder. This metal will diſſolve twice or thrice its weight of iron in a degree of heat very far leſs than that in which iron itſelf melts; hence, if a ſmall plate of gold is wrapped round the parts to be joined, and afterwards melted by a blow-pipe, it ſtrongly unites the pieces together without any injury to the inſtrument, however delicate.

SOLDIER, a military man liſted to ſerve a prince or ſtate in conſideration of a certain daily pay.

Soldier-*Crab*. See Cancer.

SOLE, in the manege, a nail or ſort of horn under a horſe's foot, which is much more tender than the other horn that encompaſſes the foot, and by reaſon of its hardneſs is properly called the *horn* or *hoof*.

Sole, in ichthyology. See Pleuronectes.

SOLEÆ, among the Romans, a kind of ſandals or ſlippers which covered only the ſole of the feet, and bound on with thongs of leather; inſtead of which the women and the effeminate ones of the other ſex, tied them on with purple coloured ribbons, or ſuch as were curiouſly adorned with gold and ſilver.

SOLECISM, in grammar, a falſe manner of ſpeaking, contrary to the uſe of language and the rules of grammar, either in reſpect of declenſion, conjugation, or ſyntax.—The word is Greek, σολοικισμος, derived from the *Soli*, a people of Attica, who being tranſplanted to Cilicia, loſt the purity of their ancient tongue, and became ridiculous to the Athenians for their improprieties therein.

Soleciſms, on ſome occaſions, are pardonable: *Impetratum eſt à ratione ut peccare ſuavitatis cauſa liceret*. Vaugelas is frequently repeating that of Quintilian, *Aliud eſt Latinè, aliud grammaticè loqui*.

SOLEMN, ſomething performed with much pomp, ceremony, and expence. Thus we ſay, ſolemn feaſts, ſolemn funerals, ſolemn games, &c.—In law, *ſolemn* ſignifies ſomething authentic, or that is clothed in all its formalities.

SOLEN, the razor-fish, a genus of inſects belonging to the order of vermes teſtacea. The ſhell is oblong, bivalved, and opening at both ſides; the cardo has a ſubulated reflected tooth, not inſerted into the oppoſite valve. There are eleven ſpecies, diſtinguiſhed by peculiarities in their ſhells. Three of them, viz. the ſiliqua, vagina, and enſis, are found on the Britiſh coaſts, and lurk in the ſand near the low-water mark in a perpendicular direction. When in want of food, they elevate one end a little above the ſurface, and protrude their bodies far out of the ſhell. On the approach of danger they dart deep into the ſand, ſometimes two feet at leaſt. Their place is known by a ſmall dimple on the ſurface. Sometimes they are dug out with a ſhovel; at other times they are taken by ſtriking a barbed dart ſuddenly into them. When the ſea is down, theſe fiſh uſually run deep into the ſand; and to bring them up, the common cuſtom is to throw a little ſalt into the holes, on which the fiſh raiſes itſelf, and in a few minutes appears at the mouth of its hole. When half the ſhell is diſcovered, the fiſherman has nothing more to do than to take hold of it with his fingers and draw it out: but he muſt be cautious not to loſe the occaſion, for the creature does not continue a moment in that ſtate; and if by any means the fiſherman has touched it, and let it ſlip away, it is gone for ever; for it will not be decoyed again out of its hole by ſalt; ſo that there is then no way of getting it but by digging under it, and throwing it up with the ſand. The fiſh has two pipes; each compoſed of four or five rings or portions of a hollow cylinder, of unequal lengths, joined one to another; and the places where they join are marked by a number of fine ſtreaks or rays. Now the reaſon why the ſalt makes theſe creatures come up out of their holes, is, that it gives them violent pain, and even corrodes theſe pipes. This is ſomewhat ſtrange, as the creature is nouriſhed by means of ſalt-water; but it is very evident, in that if a little ſalt be ſtrewed upon theſe pipes in a fiſh taken out of its habitation, it will corrode the joinings of the rings, and often make one or more joints drop off: the creature, to avoid this miſchief, ariſes out of its hole, and throws off the ſalt, and then retires back again. The uſe of theſe pipes to the animal, is the ſame with that of many other pipes of a like kind in other ſhell-fiſh; they all ſerve to take in water: they are only a continuation of the outer membrane of the fiſh, and ſerve indifferently for the taking in and throwing out the water, one receiving, and the other diſcharging it, and either anſwering equally well to their purpoſe.

When one of theſe fiſh is taken out of its hole, and laid upon the ſand, if any thing touches it, it immediately gets in order for its progreſſive motion. It throws out a long cylindric part, of half the length of the ſhell, and of the ſhape of a clapper of a bell; this is ſuſpended to the middle of the animal by a ligament, but in all other parts it is looſe: this ſerves as a leg to the creature. As it lies upon the ſand, it extends this about an inch from the end of the ſhell, and changes its cylindric figure to a flat one, which terminates in a point, flat and ſharp at the edges; with this it opens its paſſage into the ſand. When the opening is made, it extends this part ſtill farther, and buries it deeper; and after this bends it back again in ſuch a manner, that its point turns up towards the ſhell: thus it gives this part the figure of a hook, and by this hook it draws its whole body and ſhell down. In this attempt it brings the edges of the ſhells every where cloſe together; and inſtead of lying flat upon the ſand, it now by degrees gets into a vertical poſition, and then there remains nothing to do but to draw it deeper into the ſand. To effect this, it now again extends its leg, which it eaſily paſſes into the ſand in its flatted ſhape; and when it has thus pierced to its utmoſt length, the creature inflates, and extends it by degrees to the ſize of the ſhell, and to a round or cylindric figure; the conſequence of which is, that there is now a hole made of the ſhape of the ſhell, and equal to its diameter, into which it can eaſily ſink: to facilitate this, however, the creature ſwells out the extremity of the leg into a ſort of button, which holding faſt in its place, nothing more is neceſſary than to contract the reſt of the leg, in order to pull down the ſhell after it. This operation is repeated as often as is neceſſary, and the creature, at every movement of this kind, getting down half the length of its ſhell, or thereabouts, is very ſoon plunged as deep as its occaſions require.

When it has occaſion to aſcend out of its hole, the ſame leg ſerves for that purpoſe; nothing more being required, than the putting out the end of the leg, ſwelling it, and thus thruſting itſelf up to the length of that leg; then retracting it into the ſhell again, and thruſting out and inflating its end for a ſecond movement of the ſame kind. Theſe motions may be all perceived in the creature when out of the ſand, particularly that by which it buries itſelf; for if held up in the fingers, it thruſts out the leg, and performs all the motions as if in the ſand, making a fruitleſs attempt to ſave itſelf in its old way.

Theſe fiſh were uſed as food by the ancients; and Athenæus, from Sophron, ſpeaks of them as great delicacies, and particularly grateful to widows. They are often uſed as food at preſent, and are brought up to table fried in eggs.

SOLFAING, in muſic, the naming or pronouncing the ſeveral notes of a ſong by the ſyllables *ut*, *re*, *mi*, *fa*, *ſol*, &c. in learning to ſing it.

Of the ſeven notes in the French ſcale *ut*, *re*, *mi*, *fa*, *ſol*, *la*, *ſi*, only four are uſed among us in ſinging, as *mi*, *fa*, *ſol*, *la*: their office is principally, in ſinging, that by applying them to every note of the ſcale, it may not only be pronounced with more eaſe, but chiefly that by them the tones and ſemitones of the natural ſcale may be better marked out and diſtinguiſhed. This deſign is obtained by the four ſyllables *fa*, *ſol*, *la*, *mi*. Thus from *fa* to *ſol* is a tone, alſo from *ſol* to *la*, and from *la* to *mi*, without diſtinguiſhing the greater or leſs tone; but from *la* to *fa*, alſo from *mi* to *fa*, is only a ſemitone. If then theſe be applied in this order, *fa*, *ſol*, *la*, *fa*, *ſol*, *la*, *mi*, *fa*, &c. they expreſs the natural ſeries from C; and if that be repeated to a ſecond or third octave, we ſee by them how to expreſs all the different orders of tones and ſemi-tones in the diatonic ſcale; and ſtill above *mi* will ſtand *fa*, *ſol*, *la*, and below it the ſame inverted *la*, *ſol*, *fa*, and one *mi* is always diſtant from another an octave; which cannot be ſaid of any of the reſt, becauſe after *mi* aſcending come always *fa*, *ſol*, *la*, which are repeated invertedly deſcending.

To conceive the uſe of this, it is to be remembered, that the firſt thing in learning to ſing, is to make one raiſe a ſcale of notes by tones and ſemi-tones to an octave, and deſcend again by the ſame; and then to raiſe and fall by greater intervals at a leap, as thirds and fourths, &c. and to do all this by beginning at notes of different pitch. Then thoſe notes are repreſented by lines and ſpaces, to which theſe ſyllables are applied, and the learners taught to name each line and ſpace thereby, which makes what we call *ſolfaing*; the uſe whereof is, that while they are learning to tune the degrees and intervals of ſound, expreſſed by notes on a line or ſpace, or learning a ſong to which no words are applied, they may not only do it the better by means of articulate ſounds, but chiefly, that by knowing the degrees and intervals expreſſed by thoſe ſyllables, they may more readily know the places of the ſemi-tones, and the true diſtance of the notes. See the article Singing.

SOLFATERRA, a mountain of Italy in the kingdom of Naples, and Terra di Lavoro. This mountain appears evidently to have been a volcano in ancient times; and the ſoil is yet ſo hot, that the workmen employed there in making alum need nothing elſe, beſides the heat of the ground, for evaporating their liquids †. Of this mountain we have the following account by Sir William Hamilton.—"Near Aſtruni (another mountain, formerly a volcano likewiſe) riſes the Solfaterra, which not only retains its cone and crater, but much of its former heat. In the plain within the crater, ſmoke iſſues from many parts, as alſo from its ſides: here, by means of ſtones and tiles heaped over the crevices, through which the ſmoke paſſes, they collect in an aukward manner what they call *ſale armoniaco*; and from the ſand of the plain they extract ſulphur and alum. This ſpot, well attended to, might certainly produce a good revenue, whereas I doubt if they have hitherto ever cleared 200l. a-year by it. The hollow ſound produced by throwing a heavy ſtone on the plain of the crater of the Solfaterra, ſeems to indicate that it is ſupported by a ſort of arched natural vault; and one is induced to think that there is a pool of water beneath this vault (which boils by the heat of a ſubterraneous fire ſtill deeper), by the very moiſt ſtream that iſſues from the cracks in the plain of the Solfaterra, which, like that of boiling water, runs off a ſword or knife, preſented to it, in great drops. On the outſide, and at the foot of the cone of the Solfaterra, towards the lake of Agnano, water ruſhes out of the rocks ſo hot, as to raiſe the quickſilver in Fahrenheit's thermometer to the degree of boiling water (A); a fact of which I was myſelf an eye-witneſs. This place, well worthy the obſervation of the curious, has been taken little notice of; it is called the *Piſciarelli.* The common people of Naples have great faith in the efficacy of this water; and make much of it in all cutaneous diſorders, as well as for another diſorder that prevails here. It ſeems to be impregnated chiefly with ſulphur and alum. When you approach your ear to the rocks of the Piſciarelli, from whence this water ouzes, you hear a horrid boiling noiſe, which ſeems to proceed from the huge cauldron that may be ſuppoſed to be under the plain of the Solfaterra. On the other ſide of the Solfaterra, next the ſea, there is a rock which has communicated with the ſea, till part of it was cut away to make the road to Puzzole; this was undoubtedly a conſiderable lava, that ran from the Solfaterra when it was an active volcano. Under this rock of lava, which is more than 70 feet high, there is a ſtratum of pumice and aſhes. This ancient lava is about a quarter of a mile broad; you meet with it abruptly before you come in ſight of Puzzole, and it finiſhes as abruptly within about 100 paces of the town. The ancient name of the Soltaferra was *Forum Vulcani;* a ſtrong proof of its origin from ſubterraneous fire. The degree of heat that the Solfaterra has preſerved for ſo many ages, ſeems to have calcined the ſtones upon its cone and in its crater, as they are very white, and crumble eaſily in the hotteſt parts.

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† See *Chemiſtry*, nº 134.

SOLICITOR, a perſon employed to take care of and manage ſuits depending in the courts of law or equity; and thoſe of the lower ſort, it is obſerved, are too often made uſe of, to the damage of the people, and the increaſe of champerty and maintenance. Solicitors are within the ſtatute to be ſworn, and admitted by the judges, before they are allowed to practiſe in our courts, in like manner as attorneys.

There is alſo a great officer of the law, next to the attorney-general, who is ſtyled the king's ſolicitor-general; who holds his office by patent during the king's pleaſure, has the care and concern of managing the king's affairs, and has fees for pleading, beſides other fees ariſing by patents, &c. He hath his attendance on the privy-council; and the attorney-general and he were anciently reckoned among the officers of the exchequer; they have their audience, and come within the bar in all other courts.

SOLID, in philoſophy, a body whoſe parts are ſo firmly connected together, as not to give way or ſlip from each other upon the ſmalleſt impreſſion; in which ſenſe *ſolid* ſtands oppoſed to *fluid.*

Geometricians define a ſolid to be the third ſpecies of magnitude, or that which has three dimenſions, viz. length, breadth, and thickneſs or depth.

Solids are commonly divided into regular and irregular. The regular ſolids are thoſe terminated by regular and equal planes, and are only five in number, viz. the tetrahedron, which conſiſts of four equal triangles; the cube, or hexahedron, of ſix equal ſquares; the octahedron, of eight equal triangles; the dodecahedron, of twelve; and the icoſihedron, of twenty equal triangles.

The irregular ſolids are almoſt infinite, comprehending all ſuch as do not come under the definition of regular ſolids; as the ſphere, cylinder, cone, parallelogram, priſm, parallelopiped, &c.

SOLIDS, in anatomy, &c. denote the continent parts of the human body; being a congeries of pipes, or veſſels, which contain a liquor.

The ſolid parts of the body, though equally compoſed of veſſels, are different with regard to their conſiſtence; ſome being hard, and others ſoft. The hard, as the bones and cartilages, give firmneſs and attitude to the body, and ſuſtain the other parts: the ſoft parts, either alone or together with the hard, ſerve to execute the animal-functions. See ANATOMY.

SOLIDITY, that property of matter, or body, by which it excludes all other bodies from the place which itſelf poſſeſſes; and as it would be abſurd to ſuppoſe that two bodies could poſſeſs one and the ſame place at the ſame time, it follows, that the ſofteſt bodies are equally ſolid with the hardeſt.

Among geometricians, the ſolidity of a body denotes the quantity or ſpace contained in it, and is called alſo its ſolid content.

SOLILOQUY, a reaſoning or diſcourſe which a man holds with himſelf; or, more properly, according to Papias, it is a diſcourſe by way of anſwer to a queſtion that a man propoſes to himſelf.

Soliloquies are become very common things on the modern ſtage; yet can nothing be more inartificial, or more unnatural, than an actor's making long ſpeeches to himſelf, to convey his intentions to the audience. Where ſuch diſcoveries are neceſſary to be made, the poet ſhould rather take care to give the dramatic perſons ſuch confidants as may neceſſarily ſhare their inmoſt thoughts; by which means they will be more naturally conveyed to the audience: yet is even this a ſhift an accurate poet would not be found to have occaſion for. The uſe and abuſe of ſoliloquies is well delivered by the duke of Buckingham in the following lines:

> Soliloquies had need be very few,
> Extremely ſhort, and ſpoke in paſſion too.
> Our lovers talking to themſelves, for want
> Of others, make the pit their confidant:
> Nor is the matter mended yet, if thus
> They truſt a friend, only to tell it us.

SOLIS (Antonio de), an ingenious Spaniſh writer, of an ancient and illuſtrious family, born at Placenza in

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(A) I have remarked, that after a great fall of rain, the degree of heat in this water is much leſs; which will account for what the Padre Torre ſays, (in his book, intitled, *Hiſtoire et Phenomenes du Veſuve*), that when he tried it in company with Monſieur de la Condamine, the degree of heat, upon Reaumur's thermometer, was 68°.

in Old Caſtile, in 1610. He was intended to ſtudy the law; but his inclination toward poetry prevailed, and he cultivated it with great ſucceſs. Philip IV. of Spain made him one of his ſecretaries; and after his death the queen-regent appointed him firſt hiſtoriographer of the Indies, a place of great profit and honour: his Hiſtory of the Conqueſt of Mexico ſhows that ſhe could not have named a fitter perſon. He is better known by this hiſtory abroad, than by his poetry and dramatic writings, though he was excellent in that way. He turned prieſt at 57 years of age, and died in 1686.

SOLITARY, ſomething retired, or in private, remote from the company or commerce of others of the ſame ſpecies.

SOLITARIES, a denomination of nuns of St Peter of Alcantara, inſtituted in 1676, the deſign of which is to imitate the ſevere penitent life of that ſaint. Thus they are to keep a continual ſilence, never to open their mouths to any body but themſelves; employ their time wholly in ſpiritual exerciſes, and leave the temporal concerns to a number of maids, who have a particular ſuperior in a ſeparate part of the monaſtery: they always go bare-footed, without ſandals; gird themſelves with a thick cord, and wear no linen.

SOLO, in muſic, a term uſed in pieces conſiſting of ſeveral parts, to mark thoſe that are to perform alone.

SOLOMON, the ſon of David king of Iſrael, renowned in ſcripture for his wiſdom, riches, and magnificent temple and other buildings. Towards the end of his life he ſullied all his former glory by his apoſtacy from GOD; from which cauſe vengeance was denounced againſt his houſe and nation. He died about 975 B. C.

SOLOMON's *Seal*, in botany; a ſpecies of CONVALLARIA.

SOLON, one of the ſeven wiſe men of Greece, was born at Athens about 369 B. C. His courage having procured him the government of his country, he abrogated Draco's laws, and publiſhed others more equitable. Piſiſtratus having made himſelf maſter of Athens, Solon retired into Lydia, where, Crœſus having aſked him on a time if he did not think him happy? he anſwered, that none could be accounted ſo before their laſt breath; which Crœſus afterwards found fully verified. Solon died at the age of 80.

SOLSTICE, in aſtronomy, that time when the ſun is in one of the ſolſtitial points; that is, when he is at his greateſt diſtance from the equator; thus called becauſe he then appears to ſtand ſtill, and not to change his diſtance from the equator for ſome time; an appearance owing to the obliquity of our ſphere, and which thoſe living under the equator are ſtrangers to.

The ſolſtices are two in each year; the æſtival or ſummer ſolſtice, and the hyemal or winter ſolſtice. The ſummer ſolſtice is when the ſun ſeems to deſcribe the tropic of cancer, which is on June 22. when he makes the longeſt day: the winter ſolſtice is when the ſun enters the firſt degree, or ſeems to deſcribe the tropic of capricorn, which is on December 22. when he makes the ſhorteſt day. This is to be underſtood as in our northern hemiſphere; for in the ſouthern, the ſun's entrance into capricorn makes the ſummer ſolſtice, and that into cancer the winter ſolſtice. The two points of the ecliptic, wherein the ſun's greateſt aſcent above the equator, and his deſcent below it, are terminated, are called the *ſolſtitial points*; and a circle, ſuppoſed to paſs through the poles of the world and theſe points, is called the *ſolſtitial colure*. The ſummer ſolſtitial point is in the beginning of the firſt degree of cancer, and is called the *æſtival* or *ſummer point*; and the winter ſolſtitial point is in the beginning of the firſt degree of capricorn, and is called the *winter point*. Theſe two points are diametrically oppoſite to each other.

SOLUTION, in chemiſtry, denotes an intimate mixture of ſolid bodies with fluids, ſo as ſeemingly to form one homogene liquor: the diſſolving fluid is termed the *diſſolvent* or *menſtruum*.

The moſt celebrated chemiſts have aſſerted, that water is capable of diſſolving a certain proportion of ſalt without having its bulk increaſed thereby in the leaſt; but, from ſome late experiments, this is contradicted; and it is maintained, that all ſalts, in whatever proportion they may be added, do actually increaſe the bulk of the ſolution, though, when the ſalt is at firſt thrown in, the bulk is conſtantly diminiſhed. From theſe experiments it is alſo affirmed, that when water is completely ſaturated with one kind of ſalt, it will not take up any more of another, without letting fall ſome of the former.

SOLVENT, the ſame with diſſolvent. See the article DISSOLVENT.

SOLWAY MOSS. See *Moving* MOSS.

SOMBRERO, the name of an uninhabited iſland in the Weſt Indies in the form of an hat, whence the name is derived. It is alſo the name of one of the Newbar iſlands in the Eaſt Indies.

SOMBRERO, *Wonderful Plant of*, is a ſtrange kind of ſenſitive plant growing in the Eaſt Indies, in ſandy bays and in ſhallow water. It appears like a ſlender ſtraight ſtick; but when you attempt to touch it, immediately withdraws itſelf into the ſand. Mr Miller gives an account of it in his deſcription of Sumatra *. He ſays the Malays call it *lalan lout*, that is, ſea-graſs. He never could obſerve any tentacula; but, after many unſucceſsful attempts, drew out a broken piece about a foot long. It was perfectly ſtraight and uniform, and reſembled a worm drawn over a knitting needle. When dry it is a coral.

SOMERS (John), lord high chancellor of England, was born at Worceſter in 1652. He was educated at Oxford, and afterward entered himſelf of the Middle-Temple, where he ſtudied the law with great vigour. In 1688 he was of council for the ſeven biſhops at their trial, and argued with great learning and eloquence againſt the diſpenſing power. In the convention which met by the prince of Orange's ſummons, January 22. 1689, he repreſented Worceſter; and was one of the managers for the houſe of commons, at a conference with the houſe of lords upon the word *abdicated*. Soon after the acceſſion of king William and queen Mary to the throne, he was appointed ſolicitor-general, and received the honour of knighthood. In 1692 he was made attorney-general, and in 1603 advanced to the poſt of lord keeper of the great ſeal of England. In 1695 he propoſed an expedient to prevent the practice of clipping the coin. In 1697 he was created lord Somers, baron of Eveſham, and made lord high chancellor of England. In the beginning of 1700 he was removed from his poſt of lord chancellor, and the year after was impeached of high crimes and miſdemeanours by the houſe of commons, of which he was acquitted upon trial by the houſe of lords. He then retired to a ſtudious courſe of life, and was choſen preſident of the royal ſociety. In 1706 he propoſed a bill for the regulation of the law; and the ſame year was one of the principal managers for the union between England and Scotland. In 1708 he was made lord preſident of the council; from which poſt he was removed in 1710, upon the change of the miniſtry. In the latter end of queen's Anne's reign, his lordſhip grew very infirm in his health; which indiſpoſition is ſuppoſed to be the reaſon that he held no other poſt than a ſeat at the council-table, after the acceſſion of king George I. He died of an apoplectic fit in 1716. Mr Addiſon has drawn his character very beautifully in the Freeholder.

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* *Phil. Tranſ.* vol. 68. p. 178.

SOMERSETSHIRE, a county of England, taking its name from Somerton, once the capital. It is bounded on the weſt by Devonſhire, on the ſouth by Dorſetſhire, on the north by Briſtol Channel or the Severn Sea, on the north-eaſt by a ſmall part of Glouceſterſhire, and on the eaſt by Wiltſhire. It is one of the largeſt counties in England, extending in length from eaſt to weſt about 60 miles; in breadth, where broadeſt, from ſouth to north, about 50; and 150 in circumference. It is divided into 42 hundreds, in which are 3 cities, 30 market-towns, 1700 villages, 385 pariſhes, of which 132 are vicarages, containing more than 100,0000 of acres, and about 280,000 ſouls. It ſends 18 members to parliament, viz. two for Briſtol, two for Bath, two for Wells, two for Taunton, two for Bridgewater, two for Ilcheſter, two for Milbourn-port, and two for Minehead.

The air of this county is very mild and wholeſome, eſpecially that of the hilly part. The ſoil in general is exceeding rich, ſo that ſingle acres very commonly produce forty or fifty buſhels of wheat, and there have been inſtances of ſome producing ſixty of barley. As there is very fine paſture both for ſheep and black cattle, it abounds in both, which are as large as thoſe of Lincolnſhire, and their fleſh of a finer grain. In conſequence of this abundance of black cattle, great quantities of cheeſe are made in it, of which that of Cheddar is thought equal to Parmeſan. In the hilly parts are found coal, lead, copper, lapis calaminaris, and okre. Wood thrives in it as well as in any county of the kingdom. It abounds alſo in peaſe, beans, beer, cyder, fruit, wild fowl, and ſalmon; and its mineral waters are celebrated all over the world.

The riches of this county, both natural and acquired, exceed thoſe of any other in the kingdom, Middleſex and Yorkſhire excepted. The woollen manufacture in all its branches is carried on to a very great extent; and in ſome parts of the county great quantities of linen are made. If to theſe the produce of various other commodities in which it abounds is added, the amount of the whole muſt undoubtedly be very great. Its foreign trade muſt alſo be allowed to be very extenſive, when it is conſidered that it has a large trade for ſea-coal, and poſſeſſes, beſides other ports, that of Briſtol, a town of the greateſt trade in England, next to London.

Beſides leſſer ſtreams, it is well watered and ſupplied with fiſh by the rivers Severn, Avon, Parrel, Froome, Ax, Torre, and Tone. Its greateſt hills are Mendip, Pouldon, and Quantock, of which the firſt abounds in coal, lead, &c. The rivers Severn and Parrel breed very fine ſalmon. The chief town is Briſtol.

SOMNAMBULI, a name for perſons who walk in their ſleep. See NOCTAMBULI.

SOMNER (William), an eminent Engliſh antiquary in the 17th century, was born in 1606. His firſt treatiſe was that on the Antiquities of Canterbury (his native city), dedicated to archbiſhop Laud. He then applied himſelf to the ſtudy of the Saxon language; and having made himſelf maſter of it, he perceived that the old gloſſary prefixed to Sir Roger Twiſden's edition of the laws of king Henry I. printed in 1644, was faulty in many places; he therefore wrote notes and obſervations, large and learned, on that edition, with a very uſeful gloſſary. His Treatiſe of Gavelkind was finiſhed about 1648, though not publiſhed till 1660. Our author was zealouſly attached to king Charles I. and in 1648 he publiſhed a poem on his ſufferings and death. His ſkill in the Saxon tongue led him to inquire into moſt of the European languages ancient and modern. He aſſiſted Dugdale and Dodſworth in compiling the *Monaſticon Anglicanum.* His Saxon Dictionary was printed at Oxford in 1659. He died in 1669.

SON, an appellation given to a male child conſidered in the relation he bears to his parents. See PARENT *and Child.*

SONATA, in muſic, a piece or compoſition, intended to be performed by inſtruments only; in which ſenſe it ſtands oppoſed to *cantata*, or a piece deſigned for the voice. See CANTATA.

There are ſonatas from one to eight parts; but uſually they are performed by a ſingle violin, or with two violins and a thorough-baſs for the harpſichord, and frequently a more figured baſs for the baſs-viol.

Sonatas, though extremely numerous, are reduced by the Italians to two kinds: 1. Thoſe proper for church-muſic, which uſually begin with a grave and ſolemn motion, and afterwards ſtrike into a briſker and gayer manner; theſe are what they more peculiarly call *ſonatas*. 2. Thoſe for the chamber, being little pieces for dancing.

SONG, in poetry, a little compoſition, conſiſting of eaſy and natural verſes, ſet to a tune in order to be ſung. See POETRY, n° 54.

SONG, in muſic, is applied in general to a ſingle piece of muſic, whether contrived for the voice or an inſtrument. See AIR.

SONNA, a book of Mahometan traditions, wherein all the orthodox muſſulmen are required to believe.

SONNET, in poetry, a compoſition contained in 14 verſes, viz. two ſtanzas or meaſures of four verſes each, and two of three, the eight firſt verſes being all in three rhimes.

SONNITES, among the Mahometans, an appellation given to the orthodox muſſulmen or true believers; in oppoſition to the ſeveral heretical ſects, particularly the Shiites, or followers of Ali.

SOOJU, or SOY. See DOLICHOS.

SOOT, a volatile matter ariſing from wood and other fuel along with the ſmoke; or rather, it is the ſmoke itſelf, fixed and gathered to the ſides of the chimney. Though once volatile, however, ſoot cannot be again reſolved into vapour; but, if diſtilled by a ſtrong fire, yields a volatile alkali and empyreumatic oil, a conſiderable quantity of fixed matter remaining at the bottom of the diſtilling veſſel. If burnt in an open fire, it flames with a thick ſmoke, from whence other ſoot is produced. It is uſed as a material for making ſal ammoniac, and as a manure. See CHEMISTRY, n° 231; and AGRICULTURE, n° 21.

SOOT-*Black*. See COLOUR-*Making*.

SOPHI, or SOFI, a title given to the emperor of Perſia; importing as much as wiſe, ſage, or philoſopher. There is no prince in the world whoſe authority is more abſolute than that of the ſophi of Perſia.

SOPHISM, in logic, &c. an argument which carries much of the appearance of truth, and yet leads into error.

SOPHIST, a perſon who uſes ſophiſms with a view to deceive thoſe he would perſuade or convince.

SOPHISTICATION, the adulterating any thing with what is not good or genuine; a practice too common in the making up medicines for ſale; as alſo among vintners, diſtillers, and others, who are accuſed of ſophiſticating their wines, ſpirits, oils, &c. by mixing with them cheaper and coarſer materials; and in many caſes the cheat is carried on ſo artfully as to deceive the beſt judges.

SOPHOCLES, the celebrated Greek tragic poet, was archon or chief magiſtrate of Athens; in which ſtation he commanded the forces of the republic, and ſignalized himſelf by his valour on ſeveral occaſions. Of 100 tragedies which he is ſuppoſed to have written, only ſeven have been preſerved to our time: they are tranſlated into Latin, with the Greek Scholia, by our countryman Johnſon, and into Engliſh by Dr Franklin. Sophocles died about 406 B. C. aged 91.

SOPORIFIC, or SOPORIFEROUS, a medicine that has the faculty of procuring ſleep. Such are opium, laudanum, &c. The word is formed from the Latin *ſopor*, "ſleep." The Greeks in lieu hereof uſe the word *hypnotic*.

SORBON, or SORBONNE, the houſe or college of the faculty of theology eſtabliſhed in the univerſity of Paris. It was founded in 1252 by St Louis, or rather by Robert de Sorbon his confeſſor and almoner, firſt canon of Cambray, and afterwards of the church of Paris; who gave his own name to it, which he himſelf took from the village of Sorbon or Serbon, near Sens, where he was born. The foundation was laid in 1250; queen Blanche, in the abſence of her huſband, furniſhing him with a houſe which had formerly been the palace of Julian the apoſtate, whereof ſome remains are ſtill ſeen. Afterwards the king gave him all the houſes he had in the ſame place, in exchange for ſome others in another. The college has been ſince magnificently rebuilt by the cardinal de Richelieu. The deſign of its inſtitution was for the uſe of poor ſtudents in divinity. There are lodgings in it for 36 doctors, who are ſaid to be of the *ſociety of the Sorbonne;* thoſe admitted into it without being doctors, are ſaid to be of the *hoſpitality of the Sorbonne.* Six regent doctors hold lectures every day for an hour and half each; three in the morning, and three in the afternoon.

SORBON, is alſo uſed in the general for the whole faculty of theology at Paris; in regard the aſſemblies of the whole body are held in the houſe of the Sorbon; and that the bachelors of the other houſes of the faculty, as the houſe of Navarre, &c. come here to hold their *ſorbonnique*, or act for being admitted doctor in divinity.

SORBUS, the SERVICE TREE; a genus of the trigynia order, belonging to the icoſandria claſs of plants. There are three ſpecies. 1. The aucuparia, mountain-aſh, quicken-tree, quick-beam, or roan-tree, riſes with a ſtraight upright ſtem and regular branching head, twenty or thirty feet high or more, covered with a ſmooth greyiſh brown bark; pinnated leaves of eight or ten pair of long, narrow, ſerrated folioles, and an odd one, ſmooth on both ſides; and large umbellate cluſters of white flowers at the ſides and ends of the branches, ſucceeded by cluſters of fine red berries, ripe in autumn and winter. There is a variety yellow ſtriped leaved. This ſpecies grows wild in many parts of this iſland, on mountainous places, woods, and hedge-rows, often arriving to the growth of timber; and is admitted in moſt ornamental plantations, for the beauty of its growth, foliage, flowers, and fruit; the latter, in particular, being produced in numerous red large bunches all over the tree, exhibit a fine appearance in autumn and winter, till devoured by the birds, eſpecially the blackbird and thruſh, which are ſo allured by theſe fruit as to flock from all parts and feed on them voraciouſly. 2. The domeſtica, or cultivated ſervice-tree, with eatable fruit, grows with an upright ſtem, branching thirty or forty feet high or more, having a browniſh bark, and the young ſhoots in ſummer covered with a mealy down; pinnated leaves of eight or ten pair of broadiſh deeply ſerrated lobes and an odd one, downy underneath, and large umbellate cluſters of white flowers at the ſides and ends of the branches, ſucceeded by bunches of large, fleſhy, edible red fruit, of various ſhapes and ſizes in the varieties. This tree is a native of the ſouthern warm parts of Europe, where its fruit is in high eſteem to ſerve up in deſſerts, and is cultivated here in many of our gardens, both as a fruit-tree and to diverſify hardy plantations. 3. The hebrida, or mongrel ſervice-tree of Gothland, grows twenty or thirty feet high, it has half-pinnated leaves, very downy underneath; and cluſters of white flowers, ſucceeded by bunches of round reddiſh berries in autumn.

As to the merit of theſe trees in gardening, they all demand culture in every eminent ſhrubbery and other hardy plantations; being introduced as ſtandards, they will effect a fine variety in aſſemblage, with their elegant pinnated leaves and cluſters of flowers and fruit: the wild ſervice particularly ſhould be plenteouſly interſperſed in all extenſive ſhrubberies, for the ſingularity of their numerous cluſters of berries in autumn and winter, which alſo prove food to encourage plenty of ſinging birds in the plantations. But the ſorbus aucuparia may alſo be introduced as a foreſt-tree in timber plantations; and being moſtly all heart, is valued for many purpoſes.

They are all eaſily propagated, by ſeed, in the open ground; alſo by layers, though the ſeedlings generally make the handſomeſt plants.

SORCERY, (*ſortilegium*), witchcraft, or divination by lots; a crime of which our ancient books are full, and of which we know not well what account to give. To deny the poſſibility, nay actual exiſtence, of witchcraft and ſorcery, is at once flatly to contradict the revealed word of God, in various paſſages both of the Old and New Teſtament; and the thing itſelf is a truth to which every nation in the world hath in its turn borne teſtimony, either by examples ſeemingly well atteſted, or by prohibitory laws, which at leaſt ſuppoſe the poſſibility of a commerce with evil ſpirits. The civil law puniſhes with death not only the ſorcerers themſelves, but alſo thoſe who conſult them; imitating in the former the expreſs law of God, "Thou ſhalt not ſuffer a witch to live." And our own laws, both before and ſince the conqueſt, have been equally penal; ranking this crime in the ſame claſs with hereſy, and condemning both to the flames. The Preſident Monteſquieu ranks them alſo both together, but with a very different view; laying it down as an important maxim, that we ought to be very circumſpect in the proſecution of magic and hereſy; becauſe the moſt unexceptionable conduct, the pureſt morals, and the conſtant practice of every duty in life, are not a ſufficient ſecurity againſt the ſuſpicion of crimes like theſe. And indeed, the ridiculous ſtories that are generally told, and the many impoſtures and deluſions that have been diſcovered in all ages, are enough to demoliſh all faith in ſuch a dubious crime, if the contrary evidence were not alſo extremely ſtrong. Wherefore it ſeems to be the moſt eligible way to conclude, with an ingenious writer of our own, That in general there has been ſuch a thing as witchcraft, though one cannot give credit to any particular modern inſtance of it.

Our forefathers were ſtronger believers when they enacted, by ſtat. 33 Hen. VIII. c. 8. all witchcraft and ſorcery to be felony without benefit of clergy; and again, by ſtat. 1 Jac. I. c. 12. that all perſons invoking any evil ſpirit, or conſulting, covenanting with, entertaining, employing, feeding, or rewarding any evil ſpirit; or taking up dead bodies from their graves to be uſed in any witchcraft, ſorcery, charm, or inchantment; or killing or otherwiſe hurting any perſon by ſuch infernal arts; ſhould be guilty of felony without benefit of clergy, and ſuffer death. And if any perſon ſhould attempt by ſorcery to diſcover hidden treaſure, or to reſtore ſtolen goods, or to provoke unlawful love, or to hurt any man or beaſt, though the ſame were not effected, he or ſhe ſhould ſuffer impriſonment and pillory for the firſt offence, and death for the ſecond. Theſe acts continued in force till lately, to the terror of all ancient females in the kingdom; and many poor wretches were ſacrificed thereby to the prejudice of their neighbours and their own illuſions, not a few having by ſome means or other confeſſed the fact at the gallows. But all executions for this dubious crime are now at an end; our legiſlature having at length followed the wiſe example of Louis XIV. in France, who thought proper by an edict to reſtrain the tribunals of juſtice from receiving informations of witchcraft. And accordingly it is with us enacted, by ſtatute 9 Geo. II. c. 5. that no proſecution ſhall for the future be carried on againſt any perſon for conjuration, witchcraft, ſorcery, or inchantment. But the miſdemeanor of perſons pretending to uſe witchcraft, tell fortunes, or diſcover ſtolen goods, by ſkill in the occult ſciences, is ſtill deſervedly puniſhed with a year's impriſonment, and ſtanding four times in the pillory.

SOREX, the SHREW-MOUSE; a genus of quadrupeds, belonging to the order of glires. The moſt remarkable ſpecies are, 1. The araneus, or field ſhrew-mouſe, with ſhort rounded ears; eyes ſmall, and almoſt hid in the fur; noſe long and ſlender, upper part the longeſt; head and upper part of the body of a browniſh red; belly of a dirty white; length, from noſe to tail, two inches and a half; tail one and a half. Inhabits Europe: lives in old walls, heaps of ſtones, or holes in the earth; is frequently near hayricks, dunghills, and neceſſary-houſes; lives on corn, inſects, and any filth; is often obſerved rooting in ordure, like a hog; from its food, or the places it frequents, has a diſagreeable ſmell; cats will kill, but not eat it: it brings four or five young at a time. The ancients believed it was injurious to cattle; an error now detected. There ſeems to be an annual mortality of theſe animals in Auguſt, numbers being then found dead in the paths.

2. The fodiens, or water-ſhrew, has a long ſlender noſe; very minute ears; very ſmall eyes, hid in the fur; colour of the head and upper part of the body black; throat, breaſt, and belly, of a light aſh-colour; beneath the tail, a triangular duſky ſpot; much larger than the laſt; length, from noſe to tail, three inches three quarters; tail, two inches. Inhabits Europe: long ſince known in England, but loſt till May 1768, when it was diſcovered in the fens near Reveſley Abbey, Lincolnſhire; burrows in the banks near the water; is called by the fen-men the *blind mouſe*.

3. The minutus, or minute ſhrew, has a head near as big as the body: very ſlender noſe; broad ſhort naked ears; whiſkers reaching to the eyes; eyes ſmall, and capable of being drawn in; hair very fine and ſhining; grey above, white beneath; no tail; the leaſt of quadrupeds, according to Linnæus. Inhabits Siberia; lives in a neſt made of lichens, in ſome moiſt place beneath the roots of trees; feeds on ſeeds; it digs; runs ſwiftly; has the voice of a bat.

4. The tucan, or Mexican ſhrew, has a ſharp noſe; ſmall round ears; without ſight; two long fore-teeth above and below; thick, fat, and fleſhy body; ſhort legs, ſo that the belly almoſt touches the ground; long crooked claws; tawny hair; ſhort tail; length, from noſe to tail, nine inches. Inhabits Mexico; burrows, and makes ſuch a number of cavities, that travellers can ſcarce tread with ſafety; if it gets out of its hole, does not know how to return, but begins to dig another; grows very fat, and is eatable; feeds on roots, kidney-beans, and other ſeeds. M. de Buffon thinks it a mole; but by the ears, it ſhould be claſſed here.

SORITES, in logic, a ſpecies of reaſoning in which a great number of propoſitions are ſo linked together, that the predicate of the one becomes continually the ſubject of the next following, till at laſt a concluſion is formed by bringing together the ſubject of the firſt propoſition and the predicate of the laſt. See LOGIC, nº 96, 97.

SORNERS, in Scots law. See LAW, Nº clxxxvi. 30.

SORREL, in botany. See Rumex.

Wood-**Sorrel**, in botany. See Oxalis.

Sorrel-*Colour*, in the manege, is a reddiſh colour, generally thought to be a ſign of a good horſe.

SORTILEGE, (*ſortilegium*,) a ſpecies of divination performed by by means of *ſortes* or lots.

The *ſortes Preneſtinæ*, famous in antiquity, conſiſted in putting a number of letters, or even whole words, into an urn; and then, after ſhaking them together, they were thrown on the ground; and whatever ſentences could be made out from them, conſtituted the anſwer of the oracle. Another kind of *ſortes* conſiſted in taking ſome celebrated poet, as Homer or Virgil, and opening the book, whatever preſented itſelf firſt to the eye made the anſwer: and hence it got the name of *ſortes Homericæ*, *ſortes Virgilianæ*, &c.

The ſuperſtitious among the ancient Chriſtians practiſed a ſimilar kind of divination, by opening the Old and New Teſtament; whence it got the name of *ſortes ſanctorum*.

SOTERIA, in antiquity, ſacrifices offered to the gods for delivering a perſon from danger; as alſo poetical pieces compoſed for the ſame purpoſe.

SOUBISE, a town of France, in the province of Guienne, and territory of Saintonge, with the title of a principality. It is ſeated on the river Charente, in W. Long. 1. 0 N. Lat. 45. 54.

SOUGH, among miners, denotes a paſſage dug under ground, to convey off water from mines. See Mine.

SOVEREIGN, in matters of government, is applied to the ſupreme magiſtrate or magiſtrates of an independent government or ſtate; by reaſon their authority is only bounded by the laws of God, of nature, and the fundamental laws of the ſtate: ſuch are kings, princes, &c.

Sovereign *Power*, or **Sovereignty**, in the Britiſh polity, is the power of making laws; for whereever that power reſides, all others muſt conform to it, and be directed by it, whatever appearance the outward form and adminiſtration of the government may put on. For it is at any time in the option of the legiſlature to alter that form and adminiſtration by a new edict or rule, and to put the execution of the laws into whatever hands it pleaſes: and all the other powers of the ſtate muſt obey the legiſlative power in the execution of their ſeveral functions, or elſe the conſtitution is at an end. *Blackſt. Com.* Vol. I. p. 49. In our conſtitution the law aſcribes to the king the attribute of ſovereignty: but that is to be underſtood in a qualified ſenſe, i. e. as ſupreme magiſtrate, not as ſole legiſlator; as the legiſlative power is veſted in the king, lords, and commons, not in any of the three eſtates alone.

SOUL, a ſpiritual ſubſtance, which animates the bodies of living creatures; it is the principle of life and activity within them.

Various have been the opinions of philoſophers concerning the ſubſtance of the human ſoul. The Carteſians make thinking the eſſence of the ſoul. Others again hold, that man is endowed with three kinds of ſouls, viz. the rational, which is purely ſpiritual, and infuſed by the immediate inſpiration of God; the irrational, or ſenſitive, which is common to man and brutes; and laſtly, the vegetative ſoul, or principle of growth and nutrition.

That the ſoul is an immaterial ſubſtance appears from hence, that its primary operations of willing and thinking have not only no connection with the known properties of body, but ſeem plainly inconſiſtent with ſome of its moſt eſſential qualities. For the mind diſcovers no relation between thinking and the motion and arrangement of parts.

As to the immortality of the human ſoul, the arguments to prove it may be reduced to the following heads: 1. The nature of the ſoul itſelf, its deſires, ſenſe of moral good and evil, gradual increaſe in knowledge and perfection, &c. 2. The moral attributes of God.

Under the former of theſe heads it is urged, that the ſoul, being an immaterial intelligent ſubſtance, does not depend on the body for its exiſtence; and therefore may, nay, and muſt, exiſt after the diſſolution of the body, unleſs annihilated by the ſame power which gave it a being at firſt. This argument, eſpecially if the infinite capacity of the ſoul, its ſtrong deſire after immortality, its rational activity and advancement towards perfection, be likewiſe conſidered, will appear perfectly concluſive to men of a philoſophical turn; becauſe nature, or rather the God of nature, does nothing in vain.

But arguments drawn from the latter head, viz. the moral attributes of the Deity, are not only better adapted to convince men unacquainted with abſtract reaſoning, but equally certain and concluſive with the former: for as the juſtice of God can never ſuffer the wicked to eſcape unpuniſhed, nor the good to remain always unrewarded; therefore, arguments drawn from the manifeſt and conſtant proſperity of the wicked, and the frequent unhappineſs of good men in this life, muſt convince every thinking perſon, that there is a future ſtate wherein all will be ſet right, and God's attributes of wiſdom, juſtice, and goodneſs, fully vindicated. We ſhall only add, that had the virtuous and conſcientious part of mankind no hopes of a future ſtate, they would be of all men moſt miſerable: but as this is abſolutely inconſiſtent with the moral character of the Deity, the certainty of ſuch a ſtate is clear to a demonſtration. See Moral *Philoſophy*, n° 228—238.

Soul *of Brutes*. See Brutes.

SOUND, a ſimple perception or idea, communicated to the ſoul by means of the ear, which is the primary organ of hearing. See Acoustics.

Sound, in geography, denotes in general any ſtrait or inlet of the ſea between two head-lands. However, the name *ſound* is given by way of eminence, to the ſtrait between Sweden and Denmark, joining the German ocean to the Baltic, being about four miles over. See Denmark, n° 24.

SOUNDING, the operation of trying the depth of the water, and the quality of the ground, by means of a plummet ſunk from a ſhip to the bottom.

There are two plummets uſed for this purpoſe in navigation; one of which is called the *hand-lead*, weighing about eight or nine pounds; and the other the *deep ſea-lead*, which weighs from 25 to 30 pounds; and both are ſhaped like the fruſtum of a cone or pyramid. The former is uſed in ſhallow waters, and the latter at a great diſtance from the ſhore; particularly on approaching the land after a ſea-voyage. Accordingly the lines employed for this purpoſe are called the *deep-ſea lead-line*, and the *hand lead-line*.

The hand-lead line, which is uſually 20 fathoms in length, is marked at every two or three fathoms; ſo that the depth of the water may be aſcertained either in the day or night. At the depth of two and three fathoms, there are marks of black leather; at 5 fathom, there is a white rag; at ſeven, a red rag; at 10, black leather; at 13, black leather; at 15, a white rag; and at 17, a red ditto.

Sounding with the hand-lead, which is called *heaving the lead* by ſeamen, is generally performed by a man who ſtands in the main-chains to windward. Having the line all ready to run out without interruption, he holds it nearly at the diſtance of a fathom from the plummet; and having ſwung the latter backwards and forwards three or four times, in order to acquire the greater velocity, he ſwings it round his head, and thence as far forward as is neceſſary; ſo that, by the lead's ſinking whilſt the ſhip advances, the line may be almoſt perpendicular when it reaches the bottom. The perſon ſounding then proclaims the depth of the water in a kind of ſong reſembling the cries of hawkers in a city. Thus, if the mark of five fathoms is cloſe to the ſurface of the water, he calls, 'By the mark five!' and as there is no mark at four, ſix, eight, &c. he eſtimates thoſe numbers, and calls, 'By the dip four,' &c. If he judges it to be a quarter or an half more than any particular number, he calls, 'And a quarter five! and a half four,' &c. If he conceives the depth to be three quarters more than a particular number, he calls it a quarter leſs than the next: thus, at four fathom and three fourths, he calls, 'A quarter leſs five!' and ſo on.

The deep-ſea lead is marked with two knots at 20 fathom, three at 30, four at 40, and ſo on to the end. It is alſo marked with a ſingle knot in the middle of each interval, as at 25, 35, 45 fathoms, &c. To uſe this lead more effectually at ſea, or in deep water on the ſea-coaſt, it is uſual previouſly to bring to the ſhip, in order to retard her courſe: the lead is then thrown as far as poſſible from the ſhip on the line of her drift, ſo that, as it ſinks, the ſhip drives more perpendicularly over it. The pilot, feeling the lead ſtrike the bottom, readily diſcovers the depth of the water by the mark on the line neareſt its ſurface. The bottom of the lead being alſo well rubed over with tallow, retains the diſtinguiſhing marks of the bottom, as ſhells, ooze, gravel, &c. which naturally adhere to it.

The depth of the water, and the nature of the ground, which is called the *ſoundings*, are carefully marked in the log-book, as well to determine the diſtance of the place from the ſhore, as to correct the obſervations of former pilots.

SOUR CROUT; a preparation of cabbage, very uſeful at ſea. See *Means of Preſerving the Health of* SEAMEN.

SOUR-*Gourd*, or *African Calabaſh-tree*. See ADANSONIA and BAOBAB.

SOUTH (Dr Robert), an eminent divine, was the ſon of Mr William South a merchant of London, and was born at Hackney near that city in 1633. He ſtudied at Weſtminſter ſchool, and afterwards in Chriſt-church college, Oxford. In 1654 he wrote a copy of Latin verſes to congratulate Cromwell upon the peace concluded with the Dutch; and the next year a Latin poem, intitled *Muſica Incantans*. In 1660 he was elected public orator of the univerſity; and the next year became domeſtic chaplain to Edward earl of Clarendon, lord high chancellor of England. In 1663 he was inſtalled prebendary of Weſtminſter, admitted to the degree of doctor of divinity, and had a ſinecure beſtowed on him in Wales by his patron the earl of Clarendon; after whoſe retirement into France in 1667 he became chaplain to the duke of York. In 1670 he was inſtalled canon of Chriſt-church in Oxford; and in 1676 attended as chaplain to Laurence Hyde, Eſq; ambaſſador extraordinary to the king of Poland. In 1678 he was preſented to the rectory of Iſlip in Oxfordſhire; and in 1680 rebuilt the chancel of that church, as he afterwards did the rectory-houſe belonging to it. After the revolution he took the oath of allegiance to king William and queen Mary, though he excuſed himſelf from accepting a great dignity in the church, vacated by the perſonal refuſal of that oath. His health began to decline ſeveral years before his death, which happened in 1716. He was interred in Weſtminſter Abbey, where a monument is erected to his memory. He publiſhed, 1. Animadverſion on Dr Sherlock's Vindication of the Holy and Ever Bleſſed Trinity. 2. A Defence of his Animadverſions. 3. Sermons, 8 vols. 8vo. And after his deceaſe were publiſhed his *Opera Poſthuma Latina*, and his poſthumous Engliſh works. Dr South was remarkable for his wit, which abounds in all his writings, and particularly in his ſermons; but at the ſame time they equally abound in ill-humour, ſpleen, and ſatire. He was remarkable for being a time-ſerver. During the life of Cromwell he was a ſtaunch Preſbyterian, and then railed againſt the Independents: at the Reſtoration, he exerted his pulpit-eloquence againſt the Preſbyterians; and in the reign of Queen Anne, was a warm advocate for Sacheverel.

SOUTH, one of the four cardinal points from which the winds blow. See NAVIGATION and WIND.

SOUTH-*Sea*, or *Pacific Ocean*, is that vaſt body of water interpoſed between Aſia and America. It does not, however, ſtrictly ſpeaking, reach quite to the continent of Aſia, excepting to the northward of the peninſula of Malacca; for the water interpoſed between the eaſtern coaſt of Africa and the peninſula juſt mentioned has the name of the *Indian Ocean*. The South-Sea, then, is bounded on one ſide by the weſtern coaſt of America, through its whole extent, from the unknown regions in the north to the ſtraits of Magellan and Terra del Fuego where it communicates with the ſouthern part of the Atlantic. On the other ſide, it is bounded by the coaſt of Aſia, from the northern promontory of Tſchuſki Noſs, to the peninſula of Malacca already mentioned. From thence it is bounded to the ſouthward by the northern coaſts of Borneo, Celebes, Macaſſar, New Guinea, New Holland, and the other iſlands in that quarter, which divide it from the Indian Ocean. Then, waſhing the eaſtern coaſt of the great iſland of New Holland, it communicates with that vaſt body of water encompaſſing the whole ſouthern part of the globe, and which has the general name of the *Southern Ocean* all round. Thus does this vaſt ocean occupy almoſt the ſemicircumference of the globe, extending almoſt from one pole to the other, and about the equatorial parts extending almoſt 180° in longitude, or 12,500 of our miles.

The northern parts of the Pacific Ocean are entirely deſtitute of land; not a ſingle iſland having yet been diſcovered in it from the latitude of 40° north and upwards, excepting ſuch as are very near the coaſts either of Aſia or America; but in the ſouthern part there are a great number, the ſituation and diſtances of which will appear from the annexed map. A geographical account of theſe iſlands, together with the manners and cuſtoms of the inhabitants, is given under the different articles as they occur in the alphabetical order; and the plate ſhows their figure and dreſſes better than could be expreſſed by any verbal deſcription.

Till very lately the South-Sea was in a great meaſure unknown. From the great extent of ice which covers the ſouthern part of the globe, it was imagined that much more land exiſted there than in the northern regions: but that this could not be juſtly inferred merely from that circumſtance, is plain from what has been advanced under the article AMERICA, n° 3—24; and the ſouthern continent, long known by the name of TERRA AUSTRALIS, has eluded the ſearch of the moſt expert navigators ſent out from Britain and France by royal authority.

The firſt of theſe voyages was made by commodore now admiral Byron, in the Dolphin, a man of war of the ſixth rate, accompanied by the Tamar frigate, captain Mouat. He ſailed from Plymouth the 21ſt of July 1764; and, paſſing through the ſtraits of Magellan, diſcovered ſeveral iſlands in the ſouthern hemiſphere. He then proceeded to the Ladrone iſlands; refreſhed his crew at Tinian, which is one of them; proceeded to Batavia; and, returning to Europe by the Cape of Good Hope, caſt anchor in Plymouth Sound the 9th of May 1766. In the Auguſt following, captain Wallis, in the Dolphin, ſailed on a ſecond circumnavigation of the globe, accompanied by captain Carteret in the Swallow ſloop. Having paſſed the ſtraits of Magellan, the two ſhips parted company. Captain Wallis directed his courſe more weſtwardly than any former navigator within the tropics; he diſcovered ſeveral iſlands, but particularly O-Taheitee, which he named *King George's Iſland*. Captain Carteret, beſides ſeveral iſlands, diſcovered the ſtraits which divide New Britain from what is now called *New Ireland*. Captain Wallis returned to England by the Eaſt Indies in May 1768, and captain Carteret by the ſame route in March 1769. In November 1766, commodore Bougainville ſailed from France with a frigate and a ſtore-ſhip: he entered the Pacific Ocean by the Straits of Magellan; touched at O-Taheitee, the northern part of Tiera del Eſperitu Santo; refreſhed his crews in the very port which captain Carteret had not long left in New Ireland, touched at Batavia ſoon after the Swallow's departure from thence, fell into company with that ſloop after leaving the Cape of Good Hope, and returned to France much about the ſame time. In 1766, the Royal Society preferred a memorial to his majeſty, repreſenting the advantages that would be derived to ſcience, if an accurate obſervation of the tranſit of Venus over the ſun, which was to happen in June 1769, was taken in ſome part of the South-Sea; in conſequence of which, orders were given for the Endeavour bark, of 370 tons, to be fitted out for that purpoſe, the command of which was given to lieutenant James Cook. This gentleman, and Mr Charles Green, were appointed by that learned body to make obſervations on the tranſit. Mr Banks, a gentleman of large fortune, and zealouſly devoted to the acquiſition of knowledge, accompanied by Dr Solander, a learned diſciple of the great Linnæus, embarked on this expedition; and captain Wallis returning juſt as they were about to ſail, the iſland of O-Taheitee, which he had diſcovered, was pointed out as the moſt eligible ſpot for the purpoſe of making the obſervation. Lieutenant Cook ſailed in July 1768, and went round Cape Horn. With indefatigable zeal he traverſed the ſouthern regions of the great Pacific Ocean, and minutely examined the coaſt of New Zeeland: With undaunted courage he perſevered amidſt rocks and ſhoals in tracing the eaſtern coaſt of New Holland; and having found it to be ſeparated from New Guinea by a ſtrait, he returned to England by the way of the Eaſt Indies, and came to an anchor in the Downs on the 12th of July 1771. Soon after the return of the Endeavour, a voyage to determine, with preciſion, the exiſtence of a ſouthern continent, was reſolved upon under the ſame royal auſpices which had given birth to the former expeditions. Two veſſels, the Reſolution and Adventure, were fitted out as king's ſhips for that purpoſe: captain Cook had the conduct of the expedition, and had the Reſolution for his ſhip; captain Furneaux, who had already ſailed round the world with captain Wallis as his firſt lieutenant, had the command of the Adventure. Dr Forſter, and his ſon Mr George Forſter, were appointed to embark in this expedition, to collect, deſcribe, and draw the objects of natural hiſtory which ſhould preſent themſelves; Mr Wales was appointed aſtronomer on board the Reſolution, and Mr William Bayley on board the Adventure; alſo Mr William Hodges, a very able artiſt, whoſe department it was to take drawings of perſons and proſpects that were curious and important. On the 13th of July 1772, the two ſhips ſailed on their voyage round the world, than which none was ever more productive of valuable information, or more beneficial to the advancement of ſcience. The Adventure having twice parted company from the Reſolution, returned to England in 1774; but the Reſolution did not arrive till the 3d July 1775. Neither ſhip touched at any of the Eaſt India ſettlements. In 1776 Captain Cook was once more ſent out to explore the Pacific Ocean; but was ordered to direct his chief attention to the northern part, eſpecially where the continents of Aſia and America approach each other. This taſk he executed with the ſame intrepidity and ſucceſs which have all along diſtinguiſhed him from other navigators: but his unfortunate death, and that of Capt. Clerk who ſucceeded him, have undoubtedly rendered that voyage much leſs uſeful to ſcience than otherwiſe it would have been; and no authentic account of the diſcoveries actually yet made has appeared.

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SOUTH SEA.

Plate CCLXXII.

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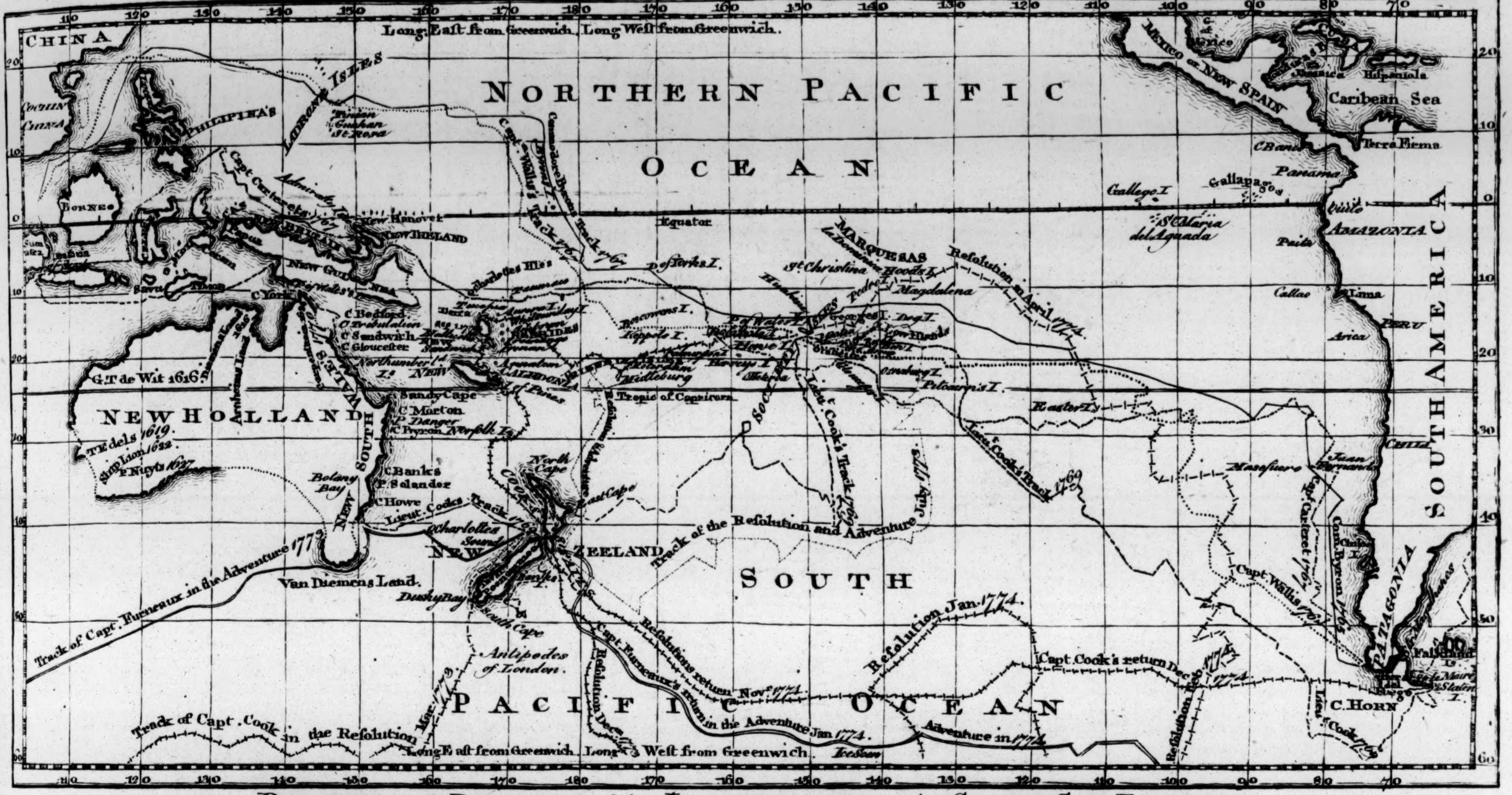
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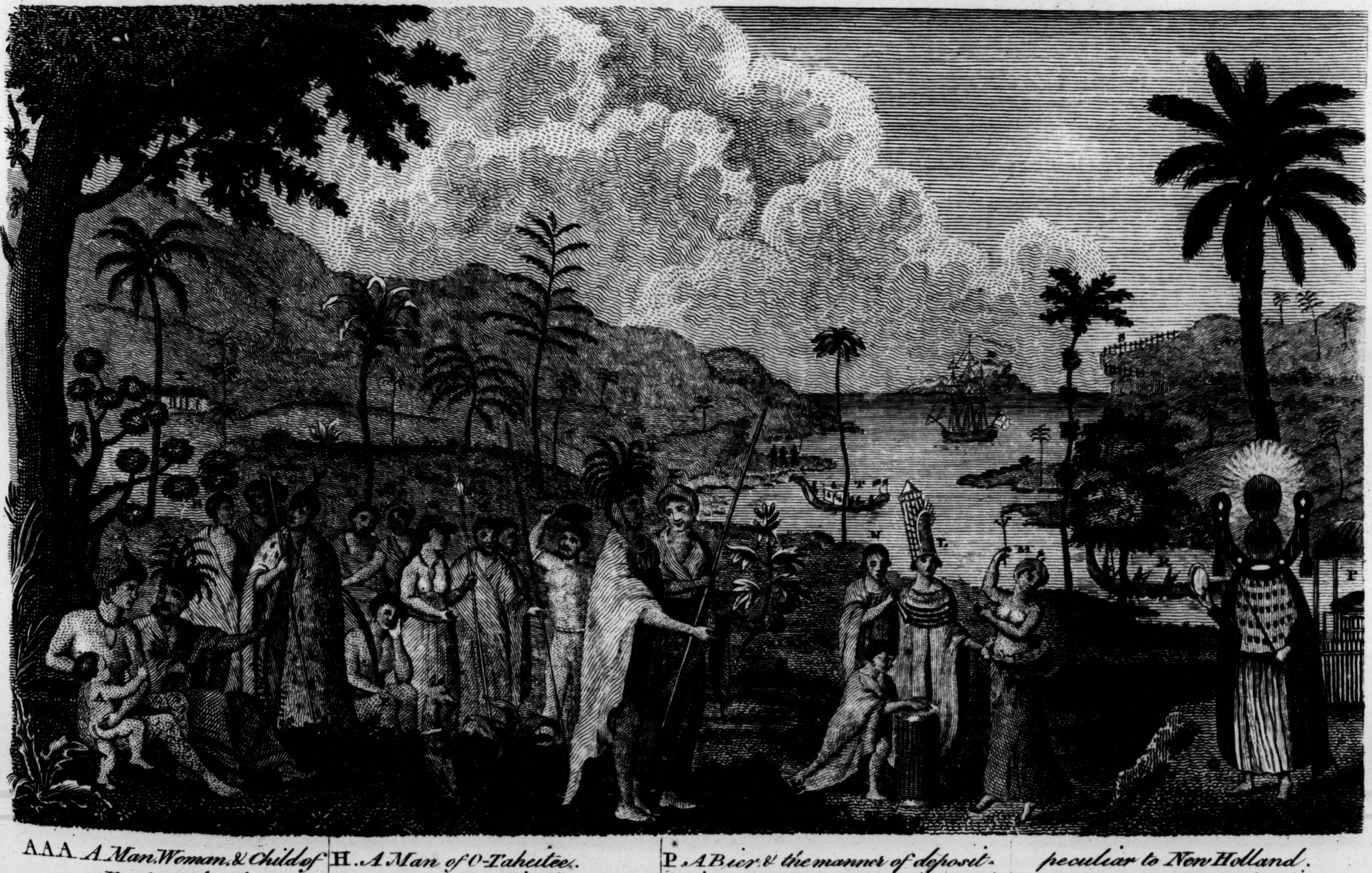
NORTHERN PACIFIC OCEAN
CHINA
PHILIPINA'S
LADRONE ISLES
BORNEO
Equator
NEW IRELAND
New Guinea
New Hanover
MARQUESAS
St. Christina
Magdalena
Resolution in April 1774.
Gallego I.
Gallapagos
St. Maria del Agnada
MEXICO or NEW SPAIN
Caribean Sea
Hispaniola
Panama
Terra Firma
C. Blanco
Quito
AMAZONIA
Paita
Callao
Lima
PERU
Arica
CHILI
SOUTH AMERICA
PATAGONIA
Juan Fernandes
Massafuero
Capt. Wallis 1767
Capt. Byron 1764
C. HORN
Falkland Is.
Easter I.
Pitcairn's I.
Tropic of Capricorn
NEW HOLLAND
G. T. de Wit 1616
Botany Bay
C. Howe
Sandy Cape
New South Wales
Norfolk I.
Van Diemens Land
NEW ZEELAND
Charlottes Sound
Dusky Bay
South Cape
Antipodes of London
SOUTH PACIFIC OCEAN
Track of the Resolution and Adventure July 1773.
Resolution Jan. 1774.
Resolution's return Nov. 1774.
Capt. Cook's return Dec. 1774.
Capt. Furneaux's return in the Adventure Jan. 1774.
Adventure in 1774.
Track of Capt. Furneaux in the Adventure 1773.
Track of Capt. Cook in the Resolution 1773
Capt. Cook's Track 1769
Long. East from Greenwich. Long. West from Greenwich.

PERSONS and DRESSES of the INHABITANTS of the SOUTH SEA ISLANDS.



A.A.A. *A Man, Woman, & Child of Easter Island.*
B. *Woman of New Zeeland.*
C. *A New Zeeland Warrior.*
D. *Native of New Caledonia.*
E. *Woman of New Holland.*
F. *Woman of O-Taheitee.*
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M. *Dancing Girl at Ulietea.*
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A. Bell Sculp.t

vaſt ocean occupy almoſt the ſemicircumference of the globe, extending almoſt from one pole to the other, and about the equatorial parts extending almoſt 180° in longitude, or 12,500 of our miles.

The northern parts of the Pacific Ocean are entirely deſtitute of land; not a ſingle iſland having yet been diſcovered in it from the latitude of 40° north and upwards, excepting ſuch as are very near the coaſts either of Aſia or America; but in the ſouthern part there are a great number, the ſituation and diſtances of which will appear from the annexed map. A geographical account of theſe iſlands, together with the manners and cuſtoms of the inhabitants, is given under the different articles as they occur in the alphabetical order; and the plate ſhows their figure and dreſſes better than could be expreſſed by any verbal deſcription.

Till very lately the South-Sea was in a great meaſure unknown. From the great extent of ice which covers the ſouthern part of the globe, it was imagined that much more land exiſted there than in the northern regions: but that this could not be juſtly inferred merely from that circumſtance, is plain from what has been advanced under the article AMERICA, n° 3—24; and the ſouthern continent, long known by the name of TERRA AUSTRALIS, has eluded the ſearch of the moſt expert navigators ſent out from Britain and France by royal authority.

The firſt of theſe voyages was made by commodore now admiral Byron, in the Dolphin, a man of war of the ſixth rate, accompanied by the Tamar frigate, captain Mouat. He ſailed from Plymouth the 21ſt of July 1764; and, paſſing through the ſtraits of Magellan, diſcovered ſeveral iſlands in the ſouthern hemiſphere. He then proceeded to the Ladrone iſlands; refreſhed his crew at Tinian, which is one of them; proceeded to Batavia; and, returning to Europe by the Cape of Good Hope, caſt anchor in Plymouth Sound the 9th of May 1766. In the Auguſt following, captain Wallis, in the Dolphin, ſailed on a ſecond circumnavigation of the globe, accompanied by captain Carteret in the Swallow ſloop. Having paſſed the ſtraits of Magellan, the two ſhips parted company. Captain Wallis directed his courſe more weſtwardly than any former navigator within the tropics; he diſcovered ſeveral iſlands, but particularly O-Taheitee, which he named *King George's Iſland*. Captain Carteret, beſides ſeveral iſlands, diſcovered the ſtraits which divide New Britain from what is now called *New Ireland*. Captain Wallis returned to England by the Eaſt Indies in May 1768, and captain Carteret by the ſame route in March 1769. In November 1766, commodore Bougainville ſailed from France with a frigate and a ſtore-ſhip: he entered the Pacific Ocean by the Straits of Magellan; touched at O-Taheitee, the northern part of Tiera del Eſperitu Santo; refreſhed his crews in the very port which captain Carteret had not long left in New Ireland, touched at Batavia ſoon after the Swallow's departure from thence, fell into company with that ſloop after leaving the Cape of Good Hope, and returned to France much about the ſame time. In 1766, the Royal Society preferred a memorial to his majeſty, repreſenting the advantages that would be derived to ſcience, if an accurate obſervation of the tranſit of Venus over the ſun, which was to happen in June 1769, was taken in ſome part of the South-Sea; in conſequence of which, orders were given for the Endeavour bark, of 370 tons, to be fitted out for that purpoſe, the command of which was given to lieutenant James Cook. This gentleman, and Mr Charles Green, were appointed by that learned body to make obſervations on the tranſit. Mr Banks, a gentleman of large fortune, and zealouſly devoted to the acquiſition of knowledge, accompanied by Dr Solander, a learned diſciple of the great Linnæus, embarked on this expedition; and captain Wallis returning juſt as they were about to ſail, the iſland of O-Taheitee, which he had diſcovered, was pointed out as the moſt eligible ſpot for the purpoſe of making the obſervation. Lieutenant Cook ſailed in July 1768, and went round Cape Horn. With indefatigable zeal he traverſed the ſouthern regions of the great Pacific Ocean, and minutely examined the coaſt of New Zeeland: With undaunted courage he perſevered amidſt rocks and ſhoals in tracing the eaſtern coaſt of New Holland; and having found it to be ſeparated from New Guinea by a ſtrait, he returned to England by the way of the Eaſt Indies, and came to an anchor in the Downs on the 12th of July 1771. Soon after the return of the Endeavour, a voyage to determine, with preciſion, the exiſtence of a ſouthern continent, was reſolved upon under the ſame royal auſpices which had given birth to the former expeditions. 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SOUTH SEA.

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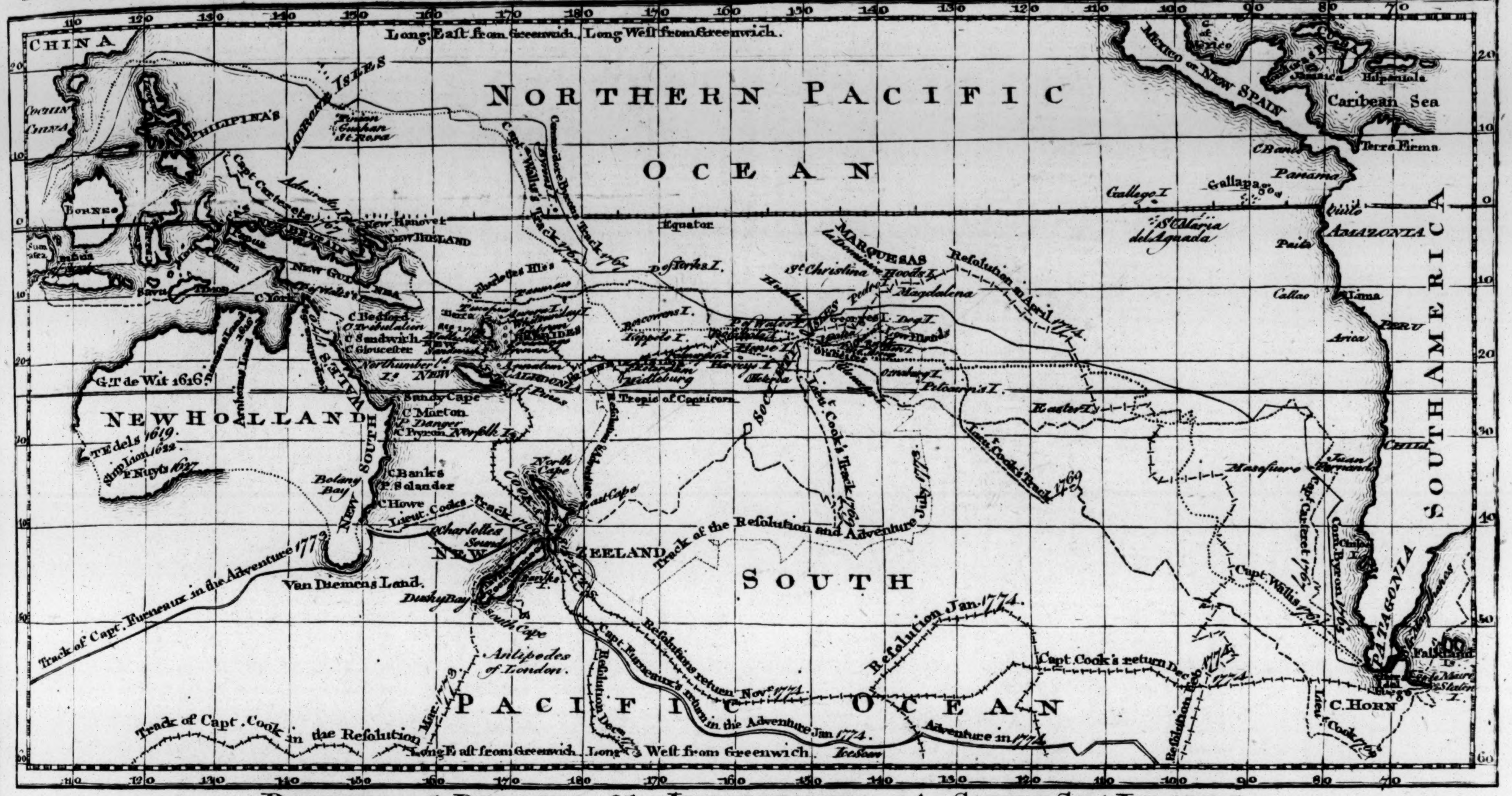
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St. Christina
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Resolution in April 1774
Gallapagos
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MEXICO or NEW SPAIN
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Callao
Tropic of Capricorn
Easter I.
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G. T. de Wit 1616
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Lewin 1622
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C. Solander
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Adventure in 1774
SOUTH PACIFIC OCEAN
Juan Fernandes
CHILI
Capt. Wallis 1767
PATAGONIA
Falkland I.
C. Horn
SOUTH AMERICA

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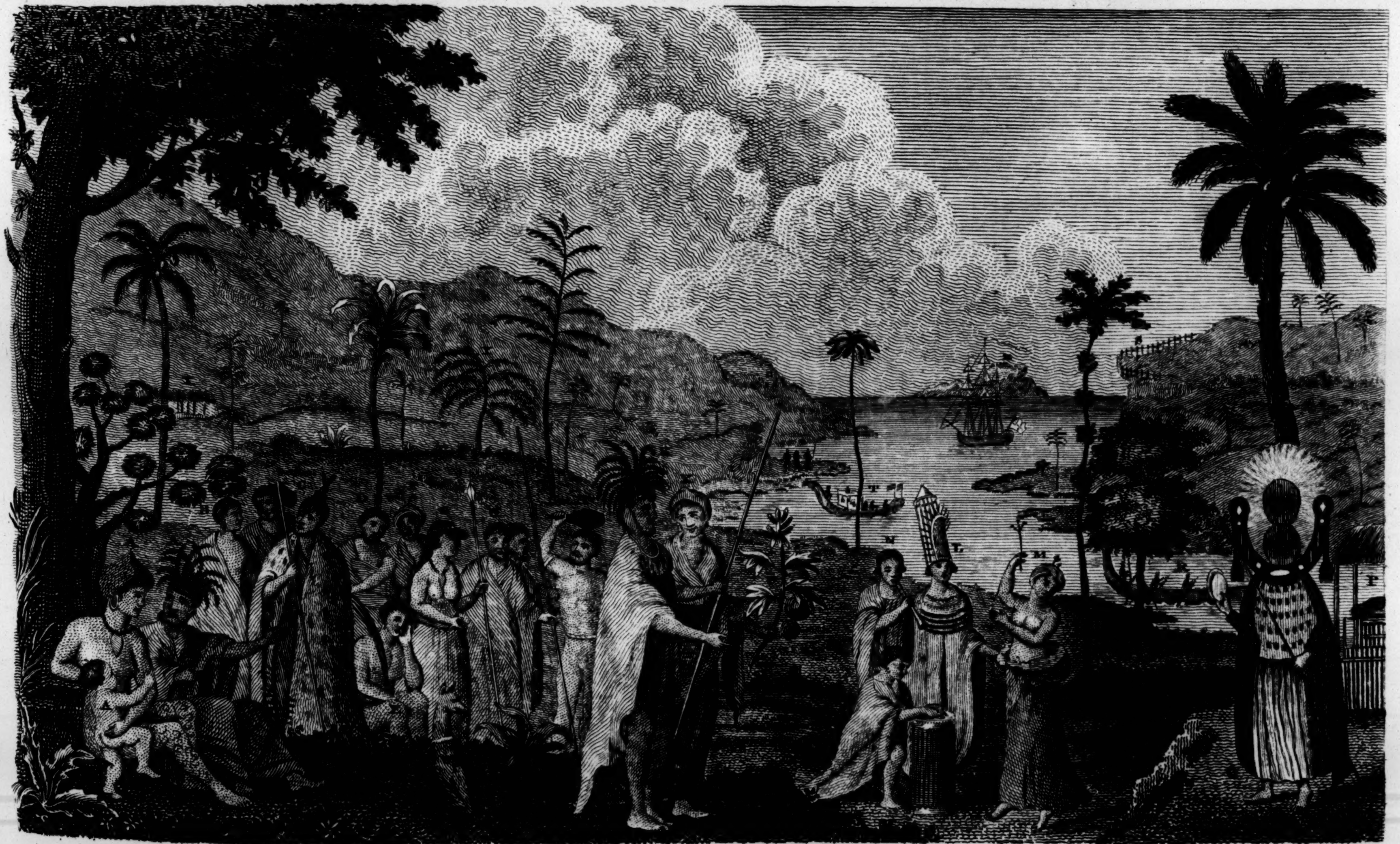

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A. Bell Sculp.t

3 MA 55

towers, and had a ſtrong caſtle to defend the harbour, now in ruins. It is a corporation and a county of itſelf, with the title of an earldom, and ſends two members to parliament. W. Long. 1. 30. N. Lat. 50.55.

SOUTHERN (Thomas), an eminent dramatic writer, was born at Dublin in 1660, and received his education in the univerſity there. He came young to London to ſtudy law; but inſtead of that devoted himſelf to poetry and writing of plays. His Perſian Prince, or Loyal Brother, was introduced in 1682, when the Tory intereſt was triumphant in England; and the character of the loyal brother being intended to compliment James duke of York, he rewarded the author when he came to the throne with a commiſſion in the army. On the Revolution taking place, he retired to his ſtudies, and wrote ſeveral plays, from which he is ſuppoſed to have derived a very handſome ſubſiſtence, being the firſt who raiſed the advantage of play-writing to a ſecond and third night. The moſt finiſhed of all his plays is Oroonoko, or The Royal Slave, which is built on a true ſtory related in one of Mrs Behn's novels. Mr Southern died in 1746, in the 86th year of his age; the latter part of which he ſpent in a peaceful ſerenity, having, by his commiſſion as a ſoldier, and the profits of his dramatic works, acquired a handſome fortune; and being an exact œconomiſt, he improved what fortune he gained to the beſt advantage. He enjoyed the longeſt life of all our poets; and died the richeſt of them, a very few excepted. His plays are printed in two volumes 12mo.

SOUTHERN *Continent*. See SOUTH-*Sea*, and TERRA *Auſtralis*.

SOUTHERNWOOD, in botany. See ARTEMISIA.

SOUTHWARK, a town of Surry, part of which now belongs to the city of London, and the whole is reckoned a ſuburb thereto, though it ſends two members to parliament on its own account. The principal ſtreet runs from London-bridge to St George's church; beſides which there are three others, and two famous hoſpitals, namely, St Thomas's and Guy's, which are ſeated in that part called the *Borough*. There are alſo two priſons for debt, the King's-Bench and the Marſhalſea; and one for criminals, called the *New Gaol*. The famous bridge which joins Southwark to London is now greatly altered, the houſes being taken down, which rendered the paſſage over it very incommodious.

SOW, in zoology. See SUS.

SOW, in the iron works, the name of the block or lump of metal they work at once in the iron furnace.

SOWING, in agriculture and gardening, the depoſiting any kind of ſeed in the earth in order for a future crop. See AGRICULTURE.

Drill-SOWING. See DRILL-*Sowing*.

SOY. See DOLICHOS.

SPA, or SPAW, a town of Germany, in the circle of Weſtphalia, and in the biſhopric of Liege. It contains about 300 houſes, and is famous for its mineral waters known all over Europe. The inhabitants are very civil to ſtrangers, and ready to do them all manner of good offices, but muſt be paid for their labour. It is ſeated in a valley, ſurrounded with mountains. That called the *Old Spaw* conſiſts of miſerable cottages, and is properly nothing but the ſuburb to the other. The inhabitants ſend out ſwarms of children when ſtrangers arrive, to get what they can by begging. The houſes of the New Spaw are all wood, old-faſhioned, dark, and ſmall; and yet it is affirmed they can make 1200 beds for ſtrangers. The church of the capuchins, and the pariſh-church, are both ſeated upon eminences, and look very well at a diſtance. The inn, called the *Court of London*, is very large, the beſt in the place, and moſt frequented. The names of the five principal wells are, *Pouhon*, *Geronſterd*, *Saviniere*, *Watpotz*, and *Tunnelet*. The inhabitants are employed in making toys and other little things for ſtrangers. Near it there are excellent fiſh and good game. It is 17 miles S. E. of Liege. E. Lon. 5. 50. N. Lat. 50. 32.

SPACE is defined by Mr Locke to be a ſimple idea, which we attain both by our ſight and touch; the modes whereof are diſtance, capacity, extenſion, duration, &c. See METAPHYSICS, n° 56, 58.

SPACE, in geometry, denotes the area of any figure, or that which fills the interval or diſtance between the lines that terminate it.

SPADIX, in botany, anciently ſignified the receptacle of the palms. It is now uſed to expreſs every flower-ſtalk that is protruded out of a ſpatha or ſheath.

The ſpadix of the palms is branched; that of all other plants, ſimple. This laſt caſe admits of ſome variety; in calla, dracontium and pothos, the florets cover it on all ſides; in arum, they are diſpoſed on the lower part only; and in zoſtera, on one ſide.

SPAGIRIC ART, a name given by authors to that ſpecies of chemiſtry which works on metals, and is employed in the ſearch of the philoſopher's ſtone.

SPAHIS, horſemen in the Ottoman army, chiefly raiſed in Aſia. The great ſtrength of the grand ſeignior's army conſiſts in the janiſaries, who are the foot; and the ſpahis, who are the horſe.

SPAIN, a country of Europe, famous both in ancient and modern hiſtory, ſituated in that large peninſula which forms the ſouth-weſtern part of Europe. It is bounded on the ſouth and eaſt by the Mediterranean ſea and ſtraights of Gibraltar, on the north and weſt by the bay of Biſcay and Atlantic Ocean, on the ſouth-weſt by Portugal, and on the north-eaſt by the Pyrenees.

1
Different names of Spain.

The moſt ancient name of Spain was Iberia, ſuppoſed by ſome to be derived from the Iberians, a people inhabiting Mount Caucaſus, a colony of whom ſettled in this country. Others derive it from the Phenician word *Ebra* or *Ibra*, ſignifying a paſſage or limit. By the Romans it was called *Spania* or *Hiſpania*, from the Phenician name *Sphanija*; and this again from *ſhaphan*, a Phenician word ſignifying a rabbit, becauſe the weſtern part of Spain abounded with thoſe animals.

Spain, as well as the reſt of Europe, was probably peopled by the Celtes; but the Spaniſh hiſtorians derive the origin of their nation from Tubal the fifth ſon of Japhet, aſſerting that Spain had been a monarchy for 2226 years before the coming of the Celtes into it. Till the coming of the Carthaginians into Spain, however, nothing certain can be affirmed of the Spaniards; and this happened not long before the commencement of the firſt Punic war. Their ſucceſs in reducing the country, and their final expulſion

2
Conqueſts of the Carthaginians in Spain.

ſion by the Romans, has already been related under the articles **Rome** and **Carthage**; we have here therefore only to take notice of the ſtate of Spain under the Roman government, until the Romans were in their turn expelled by the northern barbarians.

3
Exceeding great riches of the country.

At the time of the Roman conqueſt, Spain, though prodigious quantities of ſilver had been carried out of it by the Carthaginians and Tyrians, was yet a very rich country. In the moſt ancient times, indeed, its riches are ſaid to have exceeded what is related of the moſt wealthy country in America. Ariſtotle aſſures us, that when the Phenicians firſt arrived in Spain, they exchanged their naval commodities for ſuch immenſe quantities of ſilver, that their ſhips could neither contain nor ſuſtain its load, though they uſed it for ballaſt, and made their anchors and other implements of ſilver. When the Carthaginians firſt came to Spain, they found the quantity of ſilver nothing leſſened; ſince the inhabitants at that time made all their utenſils, and even mangers, of that precious metal. In the time of the Romans this amazing plenty was very much diminiſhed; however, their gleanings were by no means deſpicable, ſince, in the ſpace of nine years, they carried off 111,542 pounds of ſilver, and 4095 of gold, beſides an immenſe quantity of coin and other things of value. The Spaniards were always remarkable for their bravery, and ſome of Hannibal's beſt troops were brought from thence. But as the Romans penetrated farther into the country than the Carthaginians had done, they met with nations whoſe love of liberty was equal to their valour, and whom the whole ſtrength of their empire was ſcarce able to ſubdue. Of theſe the moſt formidable were the Numantines, Cantabrians, and Aſturians.

5
Viriathus oppoſes the Roman power with ſucceſs.

In the time of the third Punic war, one Viriathus, a celebrated hunter, and afterwards the captain of a gang of banditti, took upon him the command of ſome nations who had been in alliance with Carthage, and ventured to oppoſe the Roman power in that part of Spain called *Luſitania*, now Portugal. The prætor, named *Vetilius*, who commanded in thoſe parts, marched againſt him with 10,000 men; but was defeated and killed, with the loſs of 4000 of his troops. The Romans immediately diſpatched another prætor with 10,000 foot and 1300 horſe: but Viriathus having firſt cut off a detachment of 4000 of them, engaged the reſt in a pitched battle; and having entirely defeated them, reduced great part of the country. Another prætor, who was ſent with a new army, met with the ſame fate; ſo that, after the deſtruction of Carthage, the Romans thought proper to ſend a conſul named *Quintus Fabius*, who defeated the Luſitanians in ſeveral battles, and regained two important places which had long been in the hands of the rebels. After the expiration of Fabius's conſulate, Viriathus continued the war with his uſual ſucceſs, till the ſenate thought proper to ſend againſt him the conſul Q. Cæcilius Metellus, an officer of great valour and experience. With him Viriathus did not chooſe to venture a pitched battle, but contented himſelf with acting on the defenſive; in conſequence of which the Romans recovered a great many cities, and the whole of Tarraconian Spain was obliged to ſubmit to their yoke. The other conſul, named *Servilianus*, met with quite different ſucceſs; being entirely defeated, and having his camp in great danger of being taken by Viriathus. Notwithſtanding all the ſucceſs of Metellus, however, he could not withſtand the intrigues of his countrymen againſt him, and he was not allowed to finiſh the war he had begun with ſo much ſucceſs. In reſentment for this he took all imaginable pains to weaken the army under his command; he diſbanded the flower of his troops, exhauſted the magazines, let the elephants die, broke in pieces the arrows which had been provided for the Cretan archers, and threw them into a river. Yet, after all, the army which he gave up to his ſucceſſor Q. Pompeius, conſiſting of 30,000 foot and 2000 horſe, was ſufficient to have cruſhed Viriathus if the general had known how to uſe it. But, inſtead of oppoſing Viriathus with ſucceſs, the imprudent conſul procured much more formidable enemies. The Termantians and Numantians, who had hitherto kept themſelves independent, offered very advantageous terms of peace and alliance with Rome; but Pompeius inſiſted on their delivering up their arms. Upon this, war was immediately commenced. The conſul with great confidence inveſted Numantia; but being repulſed with conſiderable loſs, he ſat down before Termantia, where he was attended with ſtill worſe ſucceſs. The very firſt day, the Termantines killed 700 of his legionaries; took a great convoy which was coming to the Roman camp; and having defeated a conſiderable body of their horſe, puſhed them from poſt to poſt till they came to the edge of a precipice, where they all tumbled down, and were daſhed to pieces. In the mean time Servilian, who had been continued in his command with the title of *proconſul*, managed matters ſo ill, that Viriathus ſurrounded him on all ſides, and obliged him to ſue for peace. The terms offered to the Romans were very moderate; being only that Viriathus ſhould keep the country he at that time poſſeſſed, and the Romans remain maſters of all the reſt. This peace the proconſul was very glad to ſign, and afterwards got it ſigned by the ſenate and people of Rome.

5
Is reduced to great ſtraits by Metellus.

6
War between the Romans and Numantians.

7
The Romans ſurrounded on all ſides, and forced to conclude a peace with Viriathus.

The next year Q. Pompeius was continued in his command againſt the Numantines in Farther Spain, while Q. Servilius Cæpio, the new conſul, had for his province Hither Spain, where Viriathus had eſtabliſhed his new ſtate. Pompeius undertook to reduce Numantia by turning aſide the ſtream of the Durius, now the Douro, by which it was ſupplied with water; but, in attempting this, ſuch numbers of his men were cut off, that, finding himſelf unable to contend with the enemy, he was glad to make peace with them on much worſe terms than they had offered of their own accord. The peace, however, was ratified at Rome; but in the mean time Cæpio, deſirous of ſhowing his prowеſs againſt the renowned Viriathus, prevailed upon the Romans to declare war againſt him without any provocation. As Cæpio commanded an army greatly ſuperior to the Luſitanians, Viriathus thought proper to ſue for peace; but finding that Cæpio would be ſatisfied with nothing leſs than a ſurrender at diſcretion, he reſolved to ſtand his ground. But in the mean time, the latter having bribed ſome of the intimate companions of Viriathus to murder him in his ſleep, he by that infamous method put an end to a war which had laſted fourteen years, very little to the honour of the republic.

7
Viriathus treacherouſly murdered.

Spain.

8 The Romans defeated by the Numantines.

After the death of Viriathus, the Romans with like treachery ordered their new conſul Popilius to break the treaty with the Numantines. His infamous conduct met with the reward it deſerved; the Numantines, ſallying out, put the whole Roman army to flight with ſuch ſlaughter, that they were in no condition to act during the whole campaign. Mancinus, who ſucceeded Popilius, met with ſtill worſe ſucceſs; his great army, conſiſting of 30,000 men, was utterly defeated by 4000 Numantines, and 20,000 of them killed in the purſuit. The remaining 10,000, with their general, were pent up by the Numantines in ſuch a manner that they could neither advance nor retreat, and would certainly have been all put to the ſword or made priſoners, had not the Numantines, with a generoſity which their enemies never poſſeſſed, offered to let them depart upon condition that a treaty was concluded with them upon very moderate terms. This the conſul very willingly promiſed, but found himſelf unable to perform. On the contrary, the people, not ſatisfied with declaring his treaty null and void, ordered him to be delivered up to the Numantines. The latter refuſed to accept him, unleſs he had along with him the 10,000 men whom they had relieved as above related. At laſt, after the conſul had remained a whole day before the city, his ſucceſſor Furius, thinking this a ſufficient recompence to the Numantines for breaking the treaty, ordered him to be received again into the camp. However, Furius did not chooſe to engage with ſuch a deſperate and reſolute enemy as the Numantines had ſhowed themſelves; and the war with them was diſcontinued till the year 133 B. C. when Scipio Æmilianus, the deſtroyer of Carthage, was ſent againſt them.

9 ipio Æ-
ilianus
nt againſt
em.

Againſt this renowned commander the Numantines with all their valour were not able to cope. Scipio, having with the utmoſt care introduced ſtrict diſcipline among his troops, and reformed the abuſes which his predeceſſors had ſuffered in their armies, by degrees brought the Romans to face their enemies, which at his arrival they had abſolutely refuſed to do. Having then ravaged all the country round about the town, it was ſoon blocked up on all ſides, and the inhabitants began to feel the want of proviſions. At laſt they reſolved to make one deſperate attempt for their liberty, and either to break through their enemies, or periſh in the attempt. With this view they marched out in good order by two gates, and fell upon the works of the Romans with the utmoſt fury. The Romans, unable to ſtand this deſperate ſhock, were on the point of yielding; but Scipio, haſtening to the places attacked, with no fewer than 20,000 men, the unhappy Numantines were at laſt driven into the city, where they ſuſtained for a little longer the miſeries of famine. Finding at laſt, however, that it was altogether impoſſible to hold out, it was reſolved by the majority to ſubmit to the pleaſure of the Roman commander.

10 ferable
of the
ple.

But this reſolution was not univerſally approved. Many ſhut themſelves up in their houſes, and died of hunger, while even thoſe who had agreed to ſurrender repented their offer, and ſetting fire to their houſes, periſhed in the flames with their wives and children, ſo that not a ſingle Numantine was left alive to grace the triumph of the conqueror of Carthage.

After the deſtruction of Numantia the whole of Spain ſubmitted to the Roman yoke; and nothing remarkable happened till the times of the Cimbri, when a prætorian army was cut off in Spain by the Luſitanians. From this time nothing remarkable occurs in the hiſtory of Spain till the civil war between Marius and Sylla. The latter having cruſhed the Marian faction, as related under the article Rome, proſcribed all thoſe that had ſided againſt him whom he could not immediately deſtroy.

11 Sertorius ſupports the Marian faction in Spain.

Among theſe was Sertorius, a man of conſummate valour and experience in war. He had by Marius been appointed prætor of Spain; and, upon the overthrow of Marius, retired to that province. Sylla no ſooner heard of his arrival in that country, than he ſent thither one Caius Annius with a powerful army to drive him out. As Sertorius had but few troops along with him, he diſpatched one Julius Salinator with a body of 6000 men to guard the paſſes of the Pyrenees, and prevent Annius from entering the country. But Salinator having been treacherouſly murdered by aſſaſſins hired by Annius for that purpoſe, he no longer met with any obſtacle;

12 Is driven out, and undergoes many hardſhips,

and Sertorius was obliged to embark for the coaſt of Africa with 3000 men, being all he had now remaining. With theſe he landed in Mauritania; but as his men were ſtraggling careleſsly about, great numbers of them were cut off by the Barbarians. This new misfortune obliged Sertorius to re-embark for Spain; but finding the whole coaſt lined with the troops of Annius, he put to ſea again, not knowing what courſe to ſteer. In this new voyage he met with a ſmall fleet of Cilician pirates; and having prevailed with them to join him, he made a deſcent on the coaſt of Yvica, overpowered the garriſon left there by Annius, and gained a conſiderable booty. On the news of this victory Annius ſet ſail for Yvica, with a conſiderable ſquadron, having 5000 land-forces on board. Sertorius, not intimidated by the ſuperiority of the enemy, prepared to give them battle. But a violent ſtorm ariſing, moſt of the ſhips were driven on ſhore and daſhed to pieces, Sertorius himſelf with great difficulty eſcaping with the ſmall remains of his fleet. For ſome time he continued in great danger, being prevented from putting to ſea by the fury of the waves, and from landing by the enemy; at laſt, the ſtorm abating, he paſſed the ſtraits of Gades, now Gibraltar, and landed near the mouth of the river Bæotis. Here he met with ſome ſeamen newly arrived from the Atlantic, or Fortunate Iſlands; and was ſo taken with the account they gave him of thoſe happy regions, that he reſolved to retire thither to ſpend the reſt of his life in quiet and happineſs. But having communicated this deſign to the Cilician pirates, they immediately abandoned him, and ſet ſail for Africa, with an intention to aſſiſt one of the barbarous kings againſt his ſubjects who had rebelled.

13 Lands in Africa, and carries on a ſucceſsful war in that country.

Upon this Sertorius ſailed thither alſo, but took the oppoſite ſide; and having defeated the king named *Aſcalis*, obliged him to ſhut himſelf up in the city of Tingis, now Tangier, which he cloſely beſieged. But in the mean time Pacianus, who had been ſent by Sylla to aſſiſt the king, advanced with a conſiderable army againſt Sertorius. Upon this the latter, leaving part of his forces before the city, marched with the reſt to meet Pacianus, whoſe army, though greatly ſuperior to his own in number, he entirely defeated;

14 Returns to Spain, and defeats the Romans there.

killed the general, and took all his forces priſoners.—The fame of this victory ſoon reached Spain; and the Luſitanians, being threatened with a new war from Annius, invited Sertorius to head their armies. With this requeſt he very readily complied, and ſoon became very formidable to the Romans. Titus Didius, governor of that part of Spain called *Bætica*, firſt entered the liſts with him; but he being defeated, Sylla next diſpatched Metellus, reckoned one of the beſt commanders in Rome, to ſtop the progreſs of this new enemy. But Metellus, notwithſtanding all his experience, knew not how to act againſt Sertorius, who was continually changing his ſtation, putting his army into new forms, and contriving new ſtratagems. On his firſt arrival he ſent for L. Domitius, then prætor of Hither Spain, to his aſſiſtance; but Sertorius being informed of his march, detached Hirtuleius, or Herculeius, his quæſtor, againſt him, who gave him a total overthrow. Metellus then diſpatched Lucius Lollius prætor of Narbonne Gaul againſt Hirtuleius; but he met with no better ſucceſs, being utterly defeated, and his lieutenant-general killed.

15 Erects Luſitania into a republic.

The fame of theſe victories brought to the camp of Sertorius ſuch a number of illuſtrious Roman citizens of the Marian faction, that he formed a deſign of erecting Luſitania into a republic, in oppoſition to that of Rome. Sylla was continually ſending freſh ſupplies to Metellus; but Sertorius with an handful of men, accuſtomed to range about the mountains, to endure hunger and thirſt, and live expoſed to the inclemencies of the weather, ſo harraſſed the Roman army, that Metellus himſelf began to be quite diſcouraged. At laſt, Sertorius, hearing that Metellus had ſpoken diſreſpectfully of his courage, challenged his antagoniſt to end the war by ſingle combat; however, Metellus very prudently declined the combat, as being advanced in years; yet this refuſal brought upon him the contempt of the unthinking multitude, upon which Metellus reſolved to retrieve his reputation by ſome ſignal exploit, and therefore laid ſiege to Lacobriga, a conſiderable city in thoſe parts. This he hoped to reduce in two days, as there was but one well in the place; but Sertorius, having previouſly removed all thoſe who could be of no ſervice during the ſiege, and conveyed 6000 ſkins full of water into the city, Metellus continued a long time before it without making any impreſſion. At laſt, his proviſions being almoſt ſpent, he ſent out Aquinus at the head of 6000 men to procure a new ſupply; but Sertorius falling unexpectedly upon them, cut in pieces or took the whole detachment; the commander himſelf being the only man who eſcaped to carry the news of the diſaſter; upon which Metellus was obliged to raiſe the ſiege with diſgrace.

16 Obliges Metellus to raiſe the ſiege of Lacobriga.

17 Civilizes the Luſitanians

And now Sertorius, having gained ſome intervals of eaſe in conſequence of the many advantages he had obtained over the Romans, began to civilize his new ſubjects. Their ſavage and furious manner of fighting he changed for the regular order and diſcipline of a well-formed army; he beſtowed liberally upon them gold and ſilver to adorn their arms, and by converſing familiarly with them, prevailed upon them to lay aſide their own dreſs for the Roman *toga*. He ſent for all the children of the principal people, and placed them in the great city of Oſca, now Hereſca, in the kingdom of Arragon, where he appointed them maſters to inſtruct them in the Roman and Greek learning, that they might, as he pretended, be capable of ſharing with him the government of the republic. Thus he made them really hoſtages for the good behaviour of their parents; however, the latter were greatly pleaſed with the care he took of their children, and all Luſitania were in the higheſt degree attached to their new ſovereign. This attachment he took care to heighten by the power of ſuperſtition; for having procured a young hind of a milk-white colour, he made it ſo tame that it followed him wherever he went; and Sertorius gave out to the ignorant multitude, that this hind was inſpired by Diana, and revealed to him the deſigns of his enemies, of which he always took care to be well informed by the great numbers of ſpies he employed.

18 Pompey the Great ſent againſt him.

While Sertorius was thus employed in eſtabliſhing his authority, the republic of Rome, alarmed at his ſucceſs, reſolved to cruſh him at all events. Sylla was now dead, and all the eminent generals in Rome ſolicited this honourable though dangerous employment. After much debate a decree was paſſed in favour of Pompey the Great, but without recalling Metellus. But in the mean time, the troops of one Perpenna, or Perperna, had, in ſpite of all that their general could do, abandoned him and taken the oath of allegiance to Sertorius. This was a moſt ſignal advantage to Sertorius; for Perperna commanded an army of 33,000 men, and had come into Spain with a deſign to ſettle there as Sertorius had done; but as he was deſcended from one of the firſt families in Rome, he thought it below his dignity to ſerve under any general, however eminent he might be. But the troops of Perperna were of a different opinion; and therefore declaring that they would ſerve none but a general who could defend himſelf, they to a man joined Sertorius; upon which Perperna himſelf, finding he could do no better, conſented to ſerve alſo as a ſubaltern.

19 Sertorius beſieges Lauron.

On the arrival of Pompey in Spain, ſeveral of the cities which had hitherto continued faithful to Sertorius, began to waver; upon which the latter reſolved by ſome ſignal exploit, to convince them that Pompey could no more ſcreen them from his reſentment than Metellus. With this view he laid ſiege to Lauron, now Lirias, a place of conſiderable ſtrength. Pompey, not doubting but he ſhould be able to raiſe the ſiege, marched quite up to the enemy's lines, and found means to inform the garriſon that thoſe who beſieged them were themſelves beſieged, and would ſoon be obliged to retire with loſs and diſgrace. On hearing this meſſage, "I will teach Sylla's diſciple," ſaid Sertorius, "that it is the duty of a general to look behind as well as before him." Having thus ſpoken, he ſent orders to a detachment of 6000 men, who lay concealed among the mountains, to come down and fall upon his rear if he ſhould offer to force the lines. Pompey, ſurpriſed at their ſudden appearance, durſt not ſtir out of his camp; and in the mean time the beſieged, deſpairing of relief, ſurrendered at diſcretion; upon which Sertorius granted them their lives and liberty, but reduced their city to aſhes.

20 Takes and burns it in the ſight of Pompey.

While Sertorius was thus ſucceſsfully contending with Pompey, his quæſtor Hirtuleius was entirely defeated by Metellus, with the loſs of 20,000 men; upon which Sertorius advanced with the utmoſt expedition

21
Defeats
Pompey on
he banks
f the
ucro.

to the banks of the Sucro in Tarraconian Spain, with a deſign to attack Pompey before he could be joined by Metellus. Pompey, on his part, did not decline the combat; but, fearing that Metellus might ſhare the glory of the victory, advanced with the greateſt expedition. Sertorius put off the battle till towards the evening; Pompey, tho' he knew that the night would prove diſadvantageous to him, whether vanquiſhed or victorious, becauſe his troops were unacquainted with the country, reſolved to venture an engagement, eſpecially as he feared that Metellus might arrive in the mean time, and rob him of part of the glory of conquering ſo great a commander. Pompey, who commanded his own right wing, ſoon obliged Perperna, who commanded Sertorius's left, to give way. Hereupon Sertorius himſelf, taking upon him the command of that wing, brought back the fugitives to the charge, and obliged Pompey to fly in his turn. In his flight he was overtaken by a gigantic African, who had already lifted up his hand to diſcharge a blow at him with his broad-ſword; but Pompey prevented him by cutting off his right hand at one blow. As he ſtill continued his flight, he was wounded and thrown from his horſe; ſo that he would certainly have been taken priſoner, had not the Africans who purſued him quarrelled about the rich furniture of his horſe. This gave an opportunity to the general to make his eſcape; ſo that at length he reached his camp with much difficulty. But in the mean time Afranius, who commanded the left wing of the Roman army, had entirely defeated the wing which Sertorius had left, and even purſued them ſo cloſe that he entered the camp along with them. Sertorius, returning ſuddenly, found the Romans buſy in plundering the tents; when, taking advantage of their ſituation, he drove them out with great ſlaughter, and retook his camp. Next day he offered battle a ſecond time to Pompey; but Metellus then coming up with all his forces, he thought proper to decline an engagement with both commanders. In a few days, however, Pompey and Metellus agreed to attack the camp of Sertorius. Metellus attacked Perperna, and Pompey fell upon Sertorius. The event was ſimilar to that of the former battle; Metellus defeated Perperna, and Sertorius routed Pompey. Being then informed of Perperna's misfortune, he haſtened to his relief; rallied the fugitives, and repulſed Metellus in his turn, wounded him with his lance, and would certainly have killed him, had not the Romans, aſhamed to leave their general in diſtreſs, haſtened to his aſſiſtance, and renewed the fight with great fury. At laſt Sertorius was obliged to quit the field, and retire to the mountains. Pompey and Metellus haſtened to beſiege him; but while they were forming their camp, Sertorius broke through their lines, and eſcaped into Luſitania. Here he ſoon raiſed ſuch a powerful army, that the Roman generals, with their united forces, did not think proper to venture an engagement with him. They could not, however, reſiſt the perpetual attacks of Sertorius, who now drove them from place to place, till he obliged them to ſeparate, one into Gaul, and the other to the foot of the Pyrenees.

22
ompey de-
ated a ſe-
ond time.

23
ompey
d Metel-
s driven
t of Spain
Serto-
s.

Thus did this celebrated commander triumph over all the power of the Romans; and there is little doubt that he would have continued to make head againſt all the other generals whom the republic could have ſent; but, by the infamous treachery of Perperna, Sertorius was aſſaſſinated at an entertainment, in 73 B. C. after he had made head againſt the Roman forces for almoſt ten years. Pompey was no ſooner informed of his death, than, without waiting for any new ſuccours, he marched againſt the traitor, whom he eaſily defeated and took priſoner; and having cauſed him to be executed, thus put an end, with very little glory, to a moſt dangerous war.

24
Sertorius
treacherouſ-
ly murdered

Many of the Spaniſh nations, however, ſtill continued to bear the Roman yoke with great impatience; and as the civil wars which took place firſt between Julius Cæſar and Pompey, and afterwards between Octavianus and Anthony, diverted the attention of the republic from Spain, by the time that Auguſtus had become ſole maſter of the Roman empire, they were again in a condition to aſſert their liberty. The **CANTABRIANS** and **ASTURIANS** were the moſt powerful and valiant nations at that time in Spain; but, after incredible efforts, they were obliged to lay down their arms, or rather were almoſt exterminated, by Agrippa, as is related under theſe articles. From this time the Spaniards continued in quiet ſubjection to the Romans; but on the decline of the empire they were attacked by the northern nations, who put an end to the Roman name in the weſt. As the inhabitants had by that time entirely loſt their ancient valour, the barbarians met with no reſiſtance but from one another. In the reign of the emperor Honorius, the Vandals, Alans, and Suevians, entered this country; and having made themſelves maſters of it, divided the provinces among themſelves. In 444, the Romans made one effort more to recover their power in this part of the world; but being utterly defeated by the Suevians, the latter eſtabliſhed a kingdom there which laſted till the year 584, when it was utterly overthrown by the Viſigoths under Leovigilde. The Gothic princes continued to reign over a conſiderable part of Spain till the beginning of the eighth century, when their empire was entirely overthrown by the Saracens. During this period, they had entirely expelled the eaſtern emperors from what they poſſeſſed in Spain, and even made conſiderable conqueſts in Barbary; but towards the end of the ſeventh century the Saracens over-ran all that part of the world with a rapidity which nothing could reſiſt; and having ſoon poſſeſſed themſelves of the Gothic dominions in Barbary, they made a deſcent upon Spain about the year 711 or 712. The king of the Goths at that time was called *Roderic*, and by his bad conduct had occaſioned great diſaffection among his ſubjects. He therefore determined to put all to the iſſue of a battle, knowing that he could not depend upon the fidelity of his own people if he allowed the enemy time to tamper with them. The two armies met in a plain near Xeres in Andaluſia. The Goths began the attack with great fury; but though they fought like men in deſpair, they were at laſt defeated with exceſſive ſlaughter, and their king himſelf was ſuppoſed to have periſhed in the battle, being never more heard of.

25
Spain entirely reduced by the Romans.

26
Seized by barbarous nations on the decline of the weſtern empire.

27
The Gothic kingdom overthrown by the Saracens.

By this battle the Moors in a ſhort time rendered themſelves maſters of almoſt all Spain. The poor remains of the Goths were obliged to retire into the mountainous parts of Aſturias, Burgos, and Biſcay:

28 The power of the Goths revives under Pelagio.

the inhabitants of Arragon, Catalonia, and Navarre, though they might have made a conſiderable ſtand againſt the enemy, choſe for the moſt part to retire into France. In 718, however, the power of the Goths began again to revive under Don Pelagio or Pelayo, a prince of the royal blood, who headed thoſe that had retired to the mountains after the fatal battle of Xeres. The place where he firſt laid the foundation of his government was in the Aſturias, in the province of Liebana, about nine leagues in length and four in breadth. This is the moſt inland part of the country, full of mountains enormouſly high, and ſo much fortified by nature, that its inhabitants are capable of reſiſting almoſt any number of invaders. Alakor the Saracen governor was no ſooner informed of this revival of the Gothiſh kingdom, than he ſent a powerful army, under the command of one Alchaman, to cruſh Don Pelagio before he had time to eſtabliſh his power. The king, though his forces were ſufficiently numerous, (every one of his ſubjects arrived at man's eſtate being a ſoldier), did not think proper to venture a general engagement in the open field; but taking poſt with part of them himſelf in a cavern in a very high mountain, he concealed the reſt among precipices, giving orders to them to fall upon the enemy as ſoon as they ſhould perceive him attacked by them. Theſe orders were punctually executed, tho' indeed Don Pelagio himſelf had repulſed his enemies, but not without a miracle, as the Spaniſh hiſtorians pretend. The ſlaughter was dreadful; for the troops who lay in ambuſcade joining the reſt, and rolling down huge ſtones from the mountains upon the Moors, (the name by which the Saracens were known in Spain, no fewer than 124,000 of theſe unhappy people periſhed in one day. The remainder fled till they were ſtopped by a river, and beginning to coaſt it, part of a mountain ſuddenly fell down, ſtopped up the channel of the river, and either cruſhed or drowned, by the ſudden riſing of the water, almoſt every one of that vaſt army.

29 He gives the Saracens a dreadful overthrow.

30 Another army cut in pieces or taken.

The Moors were not ſo much diſheartened by this diſaſter but that they made a ſecond attempt againſt Don Pelagio. Their ſucceſs, however, was as bad as ever, the greateſt part of their army being cut in pieces or taken; in conſequence of which, they loſt all the Aſturias, and never dared to enter the liſts with Pelagio afterwards. Indeed, their bad ſucceſs had in a great meaſure taken from them the deſire of conquering a country where little or nothing was to be got; and therefore they rather directed their force againſt France, where they hoped for more plunder. Into this country they poured in prodigious multitudes; but were utterly defeated, in 732, by Charles Martel, with the loſs of 300,000 men, as the hiſtorians of thoſe times pretend.

31 The Saracens utterly defeated by Charles Martel.

Don Pelagio died in 737, and ſoon after his death ſuch inteſtine diviſions broke out among the Moors, as greatly favoured the increaſe of the Chriſtian power. In 745 Don Alonſo the Catholic, ſon-in-law to Pelagio, in conjunction with his brother Froila, paſſed the mountains, and fell upon the northern part of Galicia; and meeting with little reſiſtance, he recovered almoſt the whole of that province in a ſingle campaign. Next year he invaded the plains of Leon and Caſtile; and before the Moors could aſſemble any force to oppoſe him, he reduced Aſtorgas, Leon, Saldagna, Montes de Oca, Amaya, Alava, and all the country at the foot of the mountains. The year following he puſhed his conqueſts as far as the borders of Portugal, and the next campaign ravaged the country as far as Caſtile. Being ſenſible, however, that he was yet unable to defend the flat country which he had conquered, he laid the whole of it waſte, obliged the Chriſtians to retire to the mountains, and carried off all the Moors for ſlaves. Thus ſecured by a deſert frontier, he met with no interruption for ſome years; during which time, as his kingdom advanced in ſtrength, he allowed his ſubjects gradually to occupy part of the flat country, and to rebuild Leon and Aſtorgas, which he had demoliſhed. He died in 757, and was ſucceeded by his ſon Don Froila. In his time Abdelrahman, the khaliff's viceroy in Spain, threw off the yoke, and rendered himſelf independent, fixing the ſeat of his government at Cordova. Thus the inteſtine diviſions among the Moors were compoſed; yet their ſucceſs ſeems to have been little better than before: for, ſoon after, Froila encountered the Moors with ſuch ſucceſs, that 54,000 of them were killed on the ſpot, and their general taken priſoner. Soon after, he built the city of Oviedo, which he made the capital of his dominions, in order to be in a better condition to defend the flat country, which he now determined to people.

32 Conqueſts of the Chriſtians.

33 The Saracens in Spain throw off the yoke of the khaliff.

34 Hiſtory of the kingdom of Navarre.

In the year 758 the power of the Saracens received another blow by the riſe of the kingdom of Navarre. This kingdom, we are told, took its origin from an accidental meeting of gentlemen, to the number of 600, at the tomb of an hermit named *John*, who had died among the Pyrenees. At this place, where they had met on account of the ſuppoſed ſanctity of the deceaſed, they took occaſion to converſe on the cruelty of the Moors, the miſeries to which the country was expoſed, and the glory that would reſult from throwing off their yoke; which, they ſuppoſed, might eaſily be done, by reaſon of the ſtrength of their country. On mature deliberation, the project was approved; one Don Garcia Ximenes was appointed king, as being of illuſtrious birth, and looked upon as a perſon of great abilities. He recovered Ainſa, one of the principal towns of the country, out of the hands of the infidels, and his ſucceſſor Don Garcia Inigas extended his territories as far as Biſcay; however, the Moors ſtill poſſeſſed Portugal, Murcia, Andaluſia, Valentia, Granada, Tortoſa, with the interior part of the country as far as the mountains of Caſtile and Saragoſſa. Their internal diſſenſions, which revived after the death of Abdelrahman, contributed greatly to reduce the power of the infidels in general. In 778, Charles the Great being invited by ſome diſcontented Mooriſh governors, entered Spain with two great armies; one paſſing through Catalonia, and the other through Navarre, where he puſhed his conqueſts as far as the Ebro. On his return he was attacked and defeated by the Moors; though this did not hinder him from keeping poſſeſſion of all thoſe places he had already reduced. At this time he ſeems to have been maſter of Navarre: however, in 831, count Aznar, revolting from Pepin ſon to the emperor Lewis, again revived the independency of Navarre; but the ſovereigns did not aſſume the title of kings till the time of Don Garcia, who began to reign in 857.

35 Conqueſts of Charles the Great.

In the mean time, the kingdom founded by Don

Pelagio, now called the kingdom of *Leon* and *Oviedo*, continued to increaſe rapidly in ſtrength, and many advantages were gained over the Moors, who having two enemies to contend with, loſt ground every day. In 921, however, they gained a great victory over the united forces of Navarre and Leon, by which the whole force of the Chriſtians in Spain muſt have been entirely broken, had not the victors conducted their affairs ſo wretchedly that they ſuffered themſelves to be almoſt entirely cut in pieces by the remains of the Chriſtian army.

36 xploits of lmanzor Saracen eneral.

In ſhort, the Chriſtians became at length ſo terrible to the Moors, that it is probable they could not long have kept their footing in Spain, had not a great general, named *Mohammed Ebn Amir Almanzor*, appeared, in 979, to ſupport their ſinking cauſe. This man was vizir to the king of Cordova, and being exceedingly provoked againſt the Chriſtians on account of what his countrymen had ſuffered from them, made war with the moſt implacable fury. He took the city of Leon, murdered the inhabitants, and reduced the houſes to aſhes. Barcelona ſhared the ſame fate; Caſtile was reduced to a deſart, Galicia and Portugal ravaged; and he is ſaid to have overcome the Chriſtians in fifty different engagements. At laſt, having taken and demoliſhed the city of Compoſtella, and carried off in triumph the gates of the church of St James, a flux happened to break out among his troops, which the ſuperſtitious Chriſtians ſuppoſed to be a divine judgment on account of his ſacrilege. Taking it for granted, therefore, that the Moors were now entirely deſtitute of all heavenly aid, they fell upon them with ſuch fury in the next engagement, that all the valour and conduct of Almanzor could not prevent a defeat.

37 is defeated, and ves himto th.

Overcome with ſhame and deſpair at this misfortune, he deſired his followers to ſhift for themſelves, while he himſelf retired to Medina Cœli, and put an end to his life by abſtinence, in the year 998.

38 ſtory of king- n of ſtile.

During this period a new Chriſtian principality appeared in Spain, namely that of Caſtile, which is now diſtinguiſhed into the Old and New Caſtile. The Old Caſtile was recovered long before that called the *New*. It was ſeparated from the kingdom of Leon on one ſide by ſome little rivers; on the other it was bounded by the Aſturias, Biſcay, and the province of Rioja. On the ſouth, it had the mountains of Segovia and Avila; thus lying in the middle between the Chriſtian kingdom of Leon and Oviedo, and the Mooriſh kingdom of Cordova. Hence this diſtrict ſoon became an object of contention between the kings of Leon and thoſe of Cordova; and as the former were generally victorious, ſome of the principal Caſtilian nobility retained their independency under the protection of the Chriſtian kings, even when the power of the Moors was at its greateſt height. In 884 we firſt hear of Don Rodriguez aſſuming the title of *count of Caſtile*, though it does not appear that either his territory or title were given him by the king of Leon. Nevertheleſs, this monarch having taken upon him to puniſh ſome of the Caſtilian lords as rebels, the inhabitants made a formal renunciation of their allegiance, and ſet up a new kind of government. The ſupreme power was now veſted in two perſons of quality, ſtyled *judges;* however, this method did not long continue to give ſatisfaction, and the ſovereignty was once more veſted in a ſingle perſon. By degrees Caſtile fell entirely under the power of the kings of Leon and Oviedo; and, in 1035, Don Sanchez beſtowed it on his eldeſt ſon Don Ferdinand, with the title of *king;* and thus the territories of Caſtile were firſt firmly united to thoſe of Leon and Oviedo, and the ſovereigns were thenceforth ſtyled *kings of Leon and Caſtile*.

39 Hiſtory of Arragon.

Beſides all theſe, another Chriſtian kingdom was ſet up in Spain about the beginning of the 11th century. This was the kingdom of Arragon. The inhabitants were very brave, and lovers of liberty, ſo that it is probable they had in ſome degree maintained their independency, even when the power of the Moors was at the greateſt. The hiſtory of Arragon, however, during its infancy, is much leſs known than that of any of the others hitherto mentioned.

40 State of Spain in the beginning of the 11th century.

We are only aſſured, that about the year 1035, Don Sanchez, ſurnamed the *Great*, king of Navarre, erected Arragon into a kingdom in favour of his ſon Don Ramira, and afterwards it became very powerful. At this time, then, we may imagine the continent of Spain divided into two unequal parts by a ſtraight line drawn from eaſt to weſt, from the coaſts of Valentia to a little below the mouth of the Duro. The country north of this belonged to the Chriſtians, who, as yet, had the ſmalleſt and leaſt valuable ſhare, and all the reſt to the Moors. In point of wealth and real power, both by land and ſea, the Moors were greatly ſuperior; however, their continual diſſenſions greatly weakened them, and every day facilitated the progreſs of the Chriſtians. Indeed, had either of the parties been united, the other muſt ſoon have yielded; for though the Chriſtians did not make war upon each other conſtantly as the Moors did, their mutual feuds were yet ſufficient to have ruined them, had their adverſaries made the leaſt uſe of the advantages thus afforded them. But among the Moors almoſt every city was a kingdom; and as theſe petty ſovereignties ſupported one another very indifferently, they fell a prey one after another to their enemies. In 1080, the king of Toledo was engaged in a war with the king of Seville, another Mooriſh potentate; which being obſerved by Alphonſo king of Caſtile, he alſo invaded his territories;

41 Toledo and Madrid taken by the Chriſtians.

and in four years made himſelf maſter of the city of Toledo, with all the places of importance in its neighbourhood; from thenceforth making Toledo the capital of his dominions. In a ſhort time the whole province of New Caſtile ſubmitted; and Madrid, the preſent capital of Spain, fell into the hands of the Chriſtians, being at that time but a ſmall place.

42 A ſignal victory gained over the Moors.

The Moors were ſo much alarmed at theſe conqueſts, that they not only entered into a general confederacy againſt the Chriſtians, but invited to their aſſiſtance Mahomet Ben Joſeph the ſovereign of Barbary. He accordingly came, attended by an incredible multitude; but was utterly defeated by the Chriſtians in the defiles of the Black Mountain, or Sierra Morena, on the borders of Andaluſia. This victory happened on the 16th of July 1212, and the anniverſary is ſtill celebrated at Toledo. This victory was not improved; the Chriſtian army immediately diſperſed themſelves, while the Moors of Andaluſia were ſtrengthened by the remains of the African army;

yet, inſtead of being taught, by their paſt misfortunes, to unite among themſelves, their diſſenſions became worſe than ever, and the conqueſts of the Chriſtians became daily more rapid. In 1236, Don Ferdinand of Caſtile and Leon took the celebrated city of Cordova, the reſidence of the firſt Mooriſh kings; at the ſame time that James I. of Arragon diſpoſſeſſed them of the iſland of Majorca, and drove them out of Valentia. Two years after, Ferdinand made himſelf maſter of Murcia, and took the city of Seville; and in 1303 Ferdinand IV. reduced Gibraltar.

43 England interferes in the Spaniſh affairs.

In the time of Edward III. we find England, for the firſt time, interfering in the affairs of Spain, on the following occaſion. In the year 1284 the kingdom of Navarre had been united to that of France by the marriage of Donna Joanna queen of Navarre with Philip the Fair of France. In 1328, however, the kingdoms were again ſeparated, though the ſovereigns of Navarre were ſtill related to thoſe of France. In 1350, Charles, ſurnamed *the Wicked*, aſcended the throne of Navarre, and married the daughter of John king of France. Notwithſtanding this alliance, and that he himſelf was related to the royal family of France, he ſecretly entered into a negociation with England againſt the French monarch, and even drew into his ſchemes the dauphin Charles, afterwards ſurnamed *the Wiſe*. The young prince, however, was ſoon after made fully ſenſible of the danger and folly of the connections into which he had entered; and, by way of atonement, promiſed to ſacrifice his aſſociates. Accordingly he invited the king of Navarre, and ſome of the principal nobility of the ſame party, to a feaſt at Rouen, where he betrayed them to his father. The moſt obnoxious were executed, and the king of Navarre was thrown into priſon. In this extremity, the party of the king of Navarre had recourſe to England. The prince of Wales, ſurnamed *the Black Prince*, invaded France, defeated king John at Poictiers, and took him priſoner †; which unfortunate event produced the moſt violent diſturbances in that kingdom. The dauphin, now about 19 years of age, naturally aſſumed the royal power during his father's captivity; but poſſeſſed neither experience nor authority ſufficient to remedy the prevailing evils. In order to obtain ſupplies, he aſſembled the ſtates of the kingdom: but that aſſembly, inſtead of ſupporting his adminiſtration, laid hold of the preſent opportunity to demand limitations of the prince's power, the puniſhment of paſt malverſations, and the liberty of the king of Navarre. Marcel provoſt of the merchants of Paris, and firſt magiſtrate of that city, put himſelf at the head of the unruly populace, and puſhed them to commit the moſt criminal outrages againſt the royal authority. They detained the dauphin in a kind of captivity, murdered in his preſence Robert de Clermont and John de Conflans, mareſchals of France; threatened all the other miniſters with the like fate; and when Charles, who had been obliged to temporize and diſſemble, made his eſcape from their hands, they levied war againſt him, and openly rebelled. The other cities of the kingdom, in imitation of the capital, ſhook off the dauphin's authority, took the government into their own hands, and ſpread the contagion into every province.

44 The king of Navarre impriſoned by John king of France.

45 Eſcapes, and heads the French malcontents.

Amidſt theſe diſorders, the king of Navarre made his eſcape from priſon, and preſented a dangerous leader to the furious malcontents. He revived his pretenſions to the crown of France: but in all his operations he acted more like a leader of banditti than one who aſpired to be the head of a regular government, and who was engaged by his ſtation to endeavour the re-eſtabliſhment of order in the community. All the French, therefore, who wiſhed to reſtore peace to their country, turned their eyes towards the dauphin; who, though not remarkable for his military talents, daily gained, by his prudence and vigilance, the aſcendant over his enemies. Marcel, the ſeditious provoſt of Paris, was ſlain in attempting to deliver that city to the king of Navarre. The capital immediately returned to its duty: the moſt conſiderable bodies of the mutinous peaſants were diſperſed or put to the ſword; ſome bands of military robbers underwent the ſame fate; and France began once more to aſſume the appearance of civil government.

John was ſucceeded in the throne of France by his ſon Charles V. a prince educated in the ſchool of adverſity, and well qualified, by his prudence and experience, to repair the loſſes which the kingdom had ſuſtained from the errors of his predeceſſors. Contrary to the practice of all the great princes of thoſe times, who held nothing in eſtimation but military courage, he ſeems to have laid it down as a maxim, never to appear at the head of his armies; and he was the firſt European monarch that ſhowed the advantage of policy and foreſight over a raſh and precipitate valour.

46 Is defeated and obliged to ſubmit to the terms preſcribed by Char. V. of France.

Before Charles could think of counterbalancing ſo great a power as England, it was neceſſary for him to remedy the many diſorders to which his own kingdom was expoſed. He accordingly turned his arms againſt the king of Navarre, the great diſturber of France during that age; and he defeated that prince, and reduced him to terms, by the valour and conduct of Bertrand du Gueſclin, one of the moſt accompliſhed captains of thoſe times, whom Charles had the diſcernment to chooſe as the inſtrument of his victories. He alſo ſettled the affairs of Britanny, by acknowledging the title of Mountfort, and receiving homage for his dominions. But much was yet to do. On the concluſion of the peace of Bretigni, the many military adventurers who had followed the fortunes of Edward, being diſperſed into the ſeveral provinces, and poſſeſſed of ſtrong-holds, refuſed to lay down their arms, or relinquiſh a courſe of life to which they were now accuſtomed, and by which alone they could earn a ſubſiſtence. They aſſociated themſelves with the banditti, who were already inured to the habits of rapine and violence; and, under the name of *companies* and *companions*, became a terror to all the peaceable inhabitants. Some Engliſh and Gaſcon gentlemen of character were not aſhamed to take the command of theſe ruffians, whoſe number amounted to near 40,000, and who bore the appearance of regular armies rather than bands of robbers. As Charles was not able by power to redreſs ſo enormous a grievance, he was led by neceſſity, as well as by the turn of his character, to correct it by policy; to diſcover ſome method of diſcharging into foreign countries this dangerous and inteſtine evil; and an occaſion now offered.

47 Account of the banditti called *companies* or *companions*.

Alphonſo XI. king of Caſtile, who took the city of Algezira,

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† See *France* nº 44.

Spain.

48 eign of eter the ruel, king f Caſtile.

Algezira from the Moors, after a famous ſiege of two years, during which artillery are ſaid firſt to have been uſed by the beſieged, had been ſucceeded by his ſon Peter I. ſurnamed *the Cruel;* a prince equally perfidious, debauched, and bloody. He began his reign with the murder of his father's miſtreſs Leonora de Guſman: his nobles fell every day the victims of his ſeverity: he put to death his couſin and one of his natural brothers, from groundleſs jealouſy; and he cauſed his queen Blanche de Bourbon, of the blood of France, to be thrown into priſon, and afterwards poiſoned, that he might enjoy in quiet the embraces of Mary de Padella, with whom he was violently enamoured.

49 he Companies employed againſt him.

Henry count of Traſtamara, the king's natural brother, alarmed at the fate of his family, and dreading his own, took arms againſt the tyrant; but having failed in the attempt, he fled to France, where he found the minds of men much inflamed againſt Peter, on account of the murder of the French princeſs. He aſked permiſſion of Charles to enliſt the *companies* in his ſervice, and to lead them into Caſtile againſt his brother. The French king, charmed with the project, employed du Gueſclin in negociating with the leaders of theſe banditti. The treaty was ſoon concluded; and du Gueſclin having completed his levies, led the army firſt to Avignon, where the Pope then reſided, and demanded, ſword in hand, abſolution for his ruffian ſoldiers, who had been excommunicated, and the ſum of 200,000 livres for their ſubſiſtence. The firſt was readily promiſed him; but ſome difficulty being made with regard to the ſecond, du Gueſclin replied, "My fellows, I believe, may make a ſhift to do without your abſolution, but the money is abſolutely neceſſary." His Holineſs then extorted from the inhabitants of the city and its neighbourhood the ſum of 100,000 livres, and offered it to du Gueſclin. "It is not my purpoſe," cried that generous warrior, "to oppreſs the innocent people. The Pope and his cardinals can ſpare me double the ſum from their own pockets. I therefore inſiſt, that this money be reſtored to the owners; and if I hear they are defrauded of it, I will myſelf return from the other ſide of the Pyrenees, and oblige you to make them reſtitution." The Pope found the neceſſity of ſubmitting, and paid from his own treaſury the ſum demanded.

50 e is driven t, but af ted by the ack rince.

A body of experienced and hardy ſoldiers, conducted by ſo able a general, eaſily prevailed over the king of Caſtile, whoſe ſubjects were ready to join the enemy againſt their oppreſſor. Peter fled from his dominions, took ſhelter in Guienne, and craved the protection of the prince of Wales, whom his father had inveſted with the ſovereignty of the ceded provinces, under the title of the *principality of Aquitaine.* The prince promiſed his aſſiſtance to the dethroned monarch; and having obtained his father's conſent, he levied an army, and ſet out on his enterpriſe.

The firſt loſs which Henry of Traſtamara ſuffered from the interpoſition of the prince of Wales, was the recalling of the companies from his ſervice; and ſo much reverence did they pay to the name of Edward, that great numbers of them immediately withdrew from Spain, and inliſted under his ſtandard. Henry, however, beloved by his new ſubjects, and ſupported by the king of Arragon, was able to meet the enemy with an army of 100,000 men, three times the number of thoſe commanded by the Black Prince: yet du Gueſclin, and all his experienced officers, adviſed him to delay a deciſive action; ſo high was their opinion of the valour and conduct of the Engliſh hero! But Henry, truſting to his numbers, ventured to give Edward battle on the banks of the Ebro, between Najara and Navarette; where the French and Spaniards were defeated, with the loſs of above 20,000 men, and du Gueſclin and other officers of diſtinction taken priſoners. All Caſtile ſubmitted to the victor; Peter was reſtored to the throne, and Edward returned to Guienne with his uſual glory; having not only overcome the greateſt general of his age, but reſtrained the moſt blood-thirſty tyrant from executing vengeance on his priſoners.

51 The Spaniards defeated and Peter reſtored.

This gallant warrior had ſoon reaſon to repent of his connections with a man like Peter, loſt to all ſenſe of virtue and honour. The ungrateful monſter refuſed the ſtipulated pay to the Engliſh forces. Edward abandoned him: he treated his ſubjects with the utmoſt barbarity; their animoſity was rouſed againſt him; and du Gueſclin having obtained his ranſom, returned to Caſtile with the count of Traſtamara, and ſome forces levied anew in France. They were joined by the Spaniſh malcontents; and having no longer the Black Prince to encounter, they gained a complete victory over Peter in the neighbourhood of Toledo. The tyrant now took refuge in a caſtle, where he was ſoon after beſieged by the victors, and taken priſoner in endeavouring to make his eſcape. He was conducted to his brother Henry; againſt whom he is ſaid to have ruſhed in a tranſport of rage, diſarmed as he was. Henry ſlew him with his own hand, in reſentment of his cruelties; and, though a baſtard, was placed on the throne of Caſtile, which he tranſmitted to his poſterity.

52 Is again driven out, defeated, and put to death.

After the death of Peter the Cruel, nothing remarkable happened in Spain for almoſt a whole century; but the debaucheries of Henry IV. of Caſtile rouſed the reſentment of his nobles, and produced a moſt ſingular inſurrection, which led to the aggrandiſement of the Spaniſh monarchy.

53 Reign of Henry the Impotent.

This prince, ſurnamed the *Impotent,* though continually ſurrounded with women, began his unhappy reign in 1454. He was totally enervated by his pleaſures; and every thing in his court conſpired to ſet the Caſtilians an example of the moſt abject flattery and moſt abandoned licentiouſneſs. The queen, a daughter of Portugal, lived as openly with her paraſites and her gallants as the king did with his minions and his miſtreſſes. Pleaſure was the only object, and effeminacy the only recommendation to favour: the affairs of the ſtate went every day into diſorder; till the nobility, with the archbiſhop of Toledo at their head, combining againſt the weak and flagitious adminiſtration of Henry, arrogated to themſelves, as one of the privileges of their order, the right of trying and paſſing ſentence on their ſovereign, which they executed in a manner unprecedented in hiſtory.

54 He is formally depoſed.

All the malcontent nobility were ſummoned to meet at Avila: a ſpacious theatre was erected in a plain without the walls of the town: an image, repreſenting the king, was ſeated on a throne, clad in royal robes, with a crown on its head, a ſceptre in its hand, and the ſword of juſtice by its ſide. The accuſation againſt Henry was read, and the ſentence of depoſition pronounced, in preſence of a numerous aſſembly. At the cloſe of the firſt article of the charge, the archbiſhop of Toledo advanced, and tore the crown from the head of the image; at the cloſe of the ſecond, the Conde de Placentia ſnatched the ſword of juſtice from its ſide; at the cloſe of the third, the Conde de Benavente wreſted the ſceptre from its hand; and at the cloſe of the laſt, Don Diego Lopez de Stuniga tumbled it headlong from the throne. At the ſame inſtant, Don Alphonſo, Henry's brother, a boy of about twelve years of age, was proclaimed king of Caſtile and Leon in his ſtead.

55 Is obliged to acknowledge his ſiſter Iſabella to be heireſs to the kingdom.

56 She is married to Ferdinand of Arragon.

This extraordinary proceeding was followed by a civil war, which did not ceaſe till ſome time after the death of the young prince, on whom the nobles had beſtowed the kingdom. The archbiſhop and his party then continued to carry on war in the name of Iſabella, the king's ſiſter, to whom they gave the title of *Infanta;* and Henry could not extricate himſelf out of theſe troubles, nor remain quiet upon his throne, till he had ſigned one of the moſt humiliating treaties ever extorted from a ſovereign: he acknowledged his ſiſter Iſabella the only lawful heireſs of his kingdom, in prejudice to the rights of his reputed daughter Joan, whom the malcontents affirmed to be the offspring of an adulterous commerce between the queen and Don la Cueva. The grand object of the malcontent party now was the marriage of the princeſs Iſabella, upon which, it was evident, the ſecurity of the crown and the happineſs of the people muſt in a great meaſure depend. The alliance was ſought by ſeveral princes: the king of Portugal offered her his hand; the king of France demanded her for his brother, and the king of Arragon for his ſon Ferdinand. The malcontents very wiſely preferred the Arragonian prince, and Iſabella prudently made the ſame choice: articles were drawn up; and they were privately married by the archbiſhop of Toledo.

Henry was enraged at this alliance, which he foreſaw would utterly ruin his authority, by furniſhing his rebellious ſubjects with the ſupport of a powerful neighbouring prince. He diſinherited his ſiſter, and eſtabliſhed the rights of his daughter. A furious civil war deſolated the kingdom. The names of Joan and Iſabella reſounded from every quarter, and were every where the ſummons to arms. But peace was at length brought about. Henry was reconciled to his ſiſter and Ferdinand; though it does not appear that he ever renewed Iſabella's right to the ſucceſſion: for he affirmed in his laſt moments, that he believed Joan to be his own daughter. The queen ſwore to the ſame effect; and Henry left a teſtamentary deed, tranſmitting the crown to this princeſs, who was proclaimed queen of Caſtile at Placentia. But the ſuperior fortune and ſuperior arms of Ferdinand and Iſabella prevailed: the king of Portugal was obliged to abandon his niece and intended bride, after many ineffectual ſtruggles, and ſeveral years of war. Joan retired into a convent; and the death of Ferdinand's father, which happened about this time, added the kingdoms of Arragon and Sicily to thoſe of Leon and Caſtile.

57 Union of the kingdoms of Arragon and Sicily with Leon and Caſtile.

58 Adminiſtration of Ferdinand and Iſabella.

Ferdinand and Iſabella were perſons of great prudence, and, as ſovereigns, highly worthy of imitation; but they do not ſeem to have merited all the praiſes beſtowed upon them by the Spaniſh hiſtorians. They did not live like man and wife, having all things in common under the direction of the huſband; but like two princes in cloſe alliance: they neither loved nor hated each other; were ſeldom in company together; had each a ſeparate council; and were frequently jealous of one another in the adminiſtration. But they were inſeparably united in their common intereſts; always acting upon the ſame principles, and forwarding the ſame ends. Their firſt object was the regulation of their government, which the civil wars had thrown into the greateſt diſorder. Rapine, outrage, and murder, were become ſo common, as not only to interrupt commerce, but in a great meaſure to ſuſpend all intercourſe between one place and another. Theſe evils the joint ſovereigns ſuppreſſed by their wiſe policy, at the ſame time that they extended the royal prerogative.

59 Inſtitution of the Holy Brotherhood.

About the middle of the 13th century, the cities in the kingdom of Arragon, and after their example thoſe in Caſtile, had formed themſelves into an aſſociation, diſtinguiſhed by the name of the *Holy Brotherhood.* They exacted a certain contribution from each of the aſſociated towns; they levied a conſiderable body of troops, in order to protect travellers and purſue criminals; and they appointed judges, who opened courts in various parts of the kingdom. Whoever was guilty of murder, robbery, or any act that violated the public peace, and was ſeized by the troops of the Brotherhood, was carried before their judges; who, without paying any regard to the excluſive juriſdiction which the lord of the place might claim, who was generally the author or abettor of the injuſtice, tried and condemned the criminals. The nobles often murmured againſt this ſalutary inſtitution; they complained of it as an encroachment on one of their moſt valuable privileges, and endeavoured to get it aboliſhed. But Ferdinand and Iſabella, ſenſible of the beneficial effects of the Brotherhood, not only in regard to the police of their kingdom, but in its tendency to abridge, and by degrees annihilate, the territorial juriſdiction of the nobility, countenanced the inſtitution upon every occaſion, and ſupported it with the whole force of royal authority; by which means the prompt and impartial adminiſtration of juſtice was reſtored, and with it tranquillity and order returned.

60 And of the Inquiſition.

But at the ſame time that their Catholic majeſties (for ſuch was the title they now bore) were giving vigour to their civil government, and ſecuring their ſubjects from violence and oppreſſion, an intemperate zeal led them to eſtabliſh an eccleſiaſtical tribunal, equally contrary to the natural rights of humanity and the mild ſpirit of the goſpel. This was the court of inquiſition; which decides upon the honour, fortune, and even the life, of the unhappy wretch who happens to fall under the ſuſpicion of hereſy, or a contempt of any thing preſcribed by the church, without his knowing, being confronted with his accuſers, or permitted either defence or appeal. Six thouſand perſons were burnt by order of this ſanguinary tribunal, within four years after the appointment of Torquemada, the firſt inquiſitor-general; and upwards of 100,000 felt its fury. The ſame zeal, however, which led to the depopulation

population, and the barbarizing of Spain, led alſo to its aggrandiſement.

61 Conqueſt of Granada.

The kingdom of Granada now alone remained of all the Mahometan poſſeſſions in Spain. Princes equally zealous and ambitious were naturally diſpoſed to turn their eyes on that fertile territory, and to think of increaſing their hereditary dominions, by expelling the enemies of Chriſtianity, and extending its doctrines. Every thing conſpired to favour their project: the Mooriſh kingdom was a prey to civil wars; when Ferdinand, having obtained the bull of Sixtus IV. authoriſing a cruſade, put himſelf at the head of his troops, and entered Granada. He continued the war with rapid ſucceſs: Iſabella attended him in ſeveral expeditions; and they were both in great danger at the ſiege of Malaga; an important city, which was defended with great courage, and taken in 1487. Baza was reduced in 1489, after the loſs of 20,000 men. Guadix and Almeria were delivered up to them by the Mooriſh king Alzagel, who had firſt dethroned his brother Alboacen, and afterwards been chaſed from his capital by his nephew Abdali. That prince engaged in the ſervice of Ferdinand and Iſabella; who, after reducing every other place of eminence, undertook the ſiege of Granada. Abdali made a gallant defence; but all communication with the country being cut off, and all hopes of relief at an end, he capitulated, after a ſiege of eight months, on condition that he ſhould enjoy the revenue of certain places in the fertile mountains of Alpujarros; that the inhabitants ſhould retain the undiſturbed poſſeſſion of their houſes, goods, and inheritances; the uſe of their laws, and the free exerciſe of their religion. Thus ended the empire of the Arabs in Spain, after it had continued about 800 years. They introduced the arts and ſciences into Europe at a time when it was loſt in darkneſs; they poſſeſſed many of the luxuries of life, when they were not even known among the neighbouring nations; and they ſeem to have given birth to that romantic gallantry which ſo eminently prevailed in the ages of chivalry, and which, blending itſelf with the veneration of the northern nations for the ſofter ſex, ſtill particularly diſtinguiſhes ancient from modern manners. But the Moors, notwithſtanding theſe advantages, and the eulogies beſtowed upon them by ſome writers, appear always to have been deſtitute of the eſſential qualities of a poliſhed people, humanity, generoſity, and mutual ſympathy.

62 ws expel- l from ain.

The conqueſt of Granada was followed by the expulſion, or rather the pillage and baniſhment, of the Jews, who had engroſſed all the wealth and commerce of Spain. The inquiſition exhauſted its rage againſt theſe unhappy people, many of whom pretended to embrace Chriſtianity, in order to preſerve their property. About the ſame time their Catholic majeſties concluded an alliance with the emperor Maximilian, and a treaty of marriage for their daughter Joan with his ſon Philip, archduke of Auſtria and ſovereign of the Netherlands. About this time alſo the contract was concluded with Chriſtopher Columbus for the diſcovery of new countries; and the counties of Rouſſillon and Cerdagne were agreed to be reſtored by Charles VIII. of France, before his expedition into Italy. The diſcovery of America was ſoon followed by extenſive conqueſts in that quarter, as is related under the articles MEXICO, PERU, CHILI, &c. which tended to raiſe the Spaniſh monarchy above any other in Europe.

63 ſcovery America,

64 Acceſſion of Charles V.

On the death of Iſabella, which happened in 1506, Philip archduke of Auſtria came to Caſtile in order to take poſſeſſion of that kingdom as heir to his mother-in-law; but he dying in a ſhort time after, his ſon Charles V. afterwards emperor of Germany, became heir to the crown of Spain. His father at his death left the king of France governor to the young prince, and Ferdinand at his death left cardinal Ximenes ſole regent of Caſtile, till the arrival of his grandſon. This man, whoſe character is no leſs ſingular than illuſtrious, who united the abilities of a great ſtateſman with the abject devotion of a ſuperſtitious monk, and the magnificence of a prime miniſter with the ſeverity of a mendicant, maintained order and tranquillity in Spain, notwithſtanding the diſcontents of a turbulent and high-ſpirited nobility. When they diſputed his right to the regency, he coolly ſhowed them the teſtament of Ferdinand, and the ratification of that deed by Charles; but theſe not ſatisfying them, and argument proving ineffectual, he led them inſenſibly towards a balcony, whence they had a view of a large body of troops under arms, and a formidable train of artillery. "Behold," ſaid the cardinal, "the powers which I have received from his Catholic majeſty: by theſe I govern Caſtile; and will govern it, till the king, your maſter and mine, ſhall come to take poſſeſſion of his kingdom." A declaration ſo bold and determined ſilenced all oppoſition; and Ximenes maintained his authority till the arrival of Charles in 1517.

65 Diſgrace and death of cardinal Ximenes.

The young king was received with univerſal acclamations of joy; but Ximenes found little cauſe to rejoice. He was ſeized with a violent diſorder, ſuppoſed to be the effect of poiſon; and when he recovered, Charles, prejudiced againſt him by the Spaniſh grandees and his Flemiſh courtiers, ſlighted his advice, and allowed him every day to ſink into neglect. The cardinal did not bear this treatment with his uſual fortitude of ſpirit. He expected a more grateful return from a prince to whom he delivered a kingdom more flouriſhing than it had been in any former age, and authority more extenſive and better eſtabliſhed than the moſt illuſtrious of his anceſtors had ever poſſeſſed. Conſcious of his own integrity and merit, he could not therefore refrain from giving vent, at times, to indignation and complaint. He lamented the fate of his country, and foretold the calamities to which it would be expoſed from the inſolence, the rapaciouſneſs, and the ignorance of ſtrangers. But in the mean time he received a letter from the king, diſmiſſing him from his councils, under pretence of eaſing his age of that burden which he had ſo long and ſo ably ſuſtained. This letter proved fatal to the miniſter; for he expired in a few hours after reading it.

66 Maximilian attempts to get Charles elected emperor.

While Charles was taking poſſeſſion of the throne of Spain, in conſequence of the death of one grandfather, another was endeavouring to obtain for him the imperial crown. With this view Maximilian aſſembled a diet at Augſburg, where he cultivated the favour of the electors by many acts of benificence, in order to engage them to chooſe that young prince as his ſucceſſor. But Maximilian himſelf never having been crowned by the pope, a ceremony deemed eſſential in that age, as well as in the preceding, he was conſidered only as king of the Romans, or emperor elect; and no example occurring in hiſtory of any perſon being choſen ſucceſſor to a king of the Romans, the Germans, always tenacious of their forms, obſtinately refuſed to confer upon Charles a dignity for which their conſtitution knew no name.

But though Maximilian could not prevail upon the German electors to chooſe his grandſon of Spain king of the Romans, he had diſpoſed their minds in favour of that prince; and other circumſtances, on the death of the emperor, conſpired to the exaltation of Charles. The imperial crown had ſo long continued in the Auſtrian line, that it began to be conſidered as hereditary in that family; and Germany, torn by religious diſputes, ſtood in need of a powerful emperor, not only to preſerve its own internal tranquillity, but alſo to protect it againſt the victorious arms of the Turks, who under Selim I. threatened the liberties of Europe. This fierce and rapid conqueror had already ſubdued the Mamalukes, and made himſelf maſter of Egypt and Syria. The power of Charles appeared neceſſary to oppoſe that of Selim. The extenſive dominions of the houſe of Auſtria, which gave him an intereſt in the preſervation of Germany; the rich ſovereignty of the Netherlands and Franche-Compté; the entire poſſeſſion of the great and warlike kingdom of Spain, together with that of Naples and Sicily, all united to hold him up to the firſt dignity among Chriſtian princes; and the new world ſeemed only to be called into exiſtence that its treaſures might enable him to defend Chriſtendom againſt the infidels. Such was the language of his partiſans.

67 Francis I. aſpires to the ſame dignity.

Francis I. however, no ſooner received intelligence of the death of Maximilian, than he declared himſelf a candidate for the empire; and with no leſs confidence of ſucceſs than Charles. He truſted to his ſuperior years and experience; his great reputation in arms; and it was farther urged in his favour, that the impetuoſity of the French cavalry, added to the firmneſs of the German infantry, would prove irreſiſtible, and not only be ſufficient, under a warlike emperor, to ſet limits to the ambition of Selim, but to break entirely the Ottoman power, and prevent it from ever becoming dangerous again to Germany.

Both claims were plauſible. The dominions of Francis were leſs extenſive, but more united than thoſe of Charles. His ſubjects were numerous, active, brave, lovers of glory, and lovers of their king. Theſe were ſtrong arguments in favour of his power, ſo neceſſary at this juncture: but he had no natural intereſt in the Germanic body; and the electors, hearing ſo much of military force on each ſide, became more alarmed for their own privileges than the common ſafety. They determined to reject both candidates, and offered the imperial crown to Frederic, ſurnamed the *Wiſe*, duke of Saxony. But he, undazzled by the ſplendour of an object courted with ſo much eagerneſs by two mighty monarchs, rejected it with a magnanimity no leſs ſingular than great.

68 Speech of Frederic duke of Saxony in favour of Charles.

“In times of tranquillity,” ſaid Frederic, “we wiſh for an emperor who has no power to invade our liberties; times of danger demand one who is able to ſecure our ſafety. The Turkiſh armies, led by a warlike and victorious monarch, are now aſſembling: they are ready to pour in upon Germany with a violence unknown in former ages. New conjectures call for new expedients. The imperial ſceptre muſt be committed to ſome hand more powerful than mine or that of any other German prince. We poſſeſs neither dominions, nor revenues, nor authority, which enable us to encounter ſuch a formidable enemy. Recourſe muſt be had, in this exigency, to one of the rival monarchs. Each of them can bring into the field forces ſufficient for our defence. But as the king of Spain is of German extraction, as he is a member and prince of the empire by the territories which deſcend to him from his grandfather, and as his dominions ſtretch along that frontier which lies moſt expoſed to the enemy, his claim, in my opinion, is preferable to that of a ſtranger to our language, to our blood, and to our country.” Charles was elected in conſequence of this ſpeech, in the year 1520.

69 He is elected in conſequence of this ſpeech.

The two candidates had hitherto conducted their rivalſhip with emulation, but without enmity. They had even mingled their competition with many expreſſions of friendſhip and regard. Francis in particular, declared with his uſual vivacity, that his brother Charles and he were fairly and openly ſuitors to the ſame miſtreſs: “The moſt aſſiduous and fortunate,” added he, “will win her; and the other muſt reſt contented.” But the preference was no ſooner given to his rival, than Francis diſcovered all the paſſions natural to diſappointed ambition. He could not ſuppreſs his chagrin and indignation at being baulked in his favourite purſuit, and rejected, in the face of all Europe, for a youth yet unknown to fame. The ſpirit of Charles reſented ſuch contempt: and from this jealouſy, as much as from oppoſition of intereſts, aroſe that emulation between thoſe two great monarchs which involved them in almoſt perpetual hoſtilities, and kept their whole age in movement.

70 A mutual hatred tak place between Charles an Francis.

Charles and Francis had many interfering claims in Italy; and the latter thought himſelf bound in honour to reſtore the king of Navarre to his dominions, unjuſtly ſeized by the crown of Spain. They immediately began to negociate; and as Henry VIII. of England was the third prince of the age in power and in dignity, his friendſhip was eagerly courted by each of the rivals. He was the natural guardian of the liberties of Europe. Senſible of the conſequence which his ſituation gave him, and proud of his pre-eminence, Henry knew it to be his intereſt to keep the balance even between the contending powers, and to reſtrain both, by not joining entirely with either; but he was ſeldom able to reduce his ideas to practice. Vanity and reſentment were the great ſprings of all his undertakings; and his neighbours, by touching theſe, found an eaſy way to draw him into their meaſures, and force him upon many raſh and inconſiderate enterpriſes.

71 Both court the friendſhip of Henry VIII. of England.

All the impolitic ſteps in Henry's government muſt not, however, be imputed to himſelf; many of them were occaſioned by the ambition and avarice of his prime miniſter and favourite cardinal Wolſey. This man, who, by his talents and accompliſhments, had riſen from one of the loweſt conditions in life to the higheſt employments both in church and ſtate, enjoyed a greater degree of power and dignity than any Engliſh ſubject ever poſſeſſed, and governed the haughty, preſumptuous, and untractable ſpirit of Henry with abſo-

Spain.

abſolute authority. Francis was equally well acquainted with the character of Henry and of his miniſter. He had ſucceſsfully flattered Wolſey's pride, by honouring him with particular marks of his confidence, and beſtowing upon him the appellations of *Father*, *Tutor*, and *Governor;* and he had obtained the reſtitution of Tournay, by adding a penſion to thoſe reſpectful titles. He now ſolicited an interview with the king of England near Calais; in hopes of being able, by familiar converſation, to attach him to his friendſhip and intereſt, while he gratified the cardinal's vanity, by affording him an opportunity of diſplaying his magnificence in the preſence of two courts, and of diſcovering to the two nations his influence over their monarchs. Charles dreaded the effects of this projected interview between two gallant princes, whoſe hearts were no leſs ſuſceptible of friendſhip than their manners were of inſpiring it. Finding it impoſſible, however, to prevent a viſit, in which the vanity of all parties was ſo much concerned, he endeavoured to defeat its purpoſe, and to pre-occupy the favour of the Engliſh monarch, and of his miniſter, by an act of complaiſance ſtill more flattering and more uncommon. Relying wholly upon Henry's generoſity for his ſafety, he landed at Dover, in his way from Spain to the Low Countries. The king of England, who was on his way to France, charmed with ſuch an inſtance of confidence, haſtened to receive his royal gueſt; and Charles, during his ſhort ſtay, had the addreſs not only to give Henry favourable impreſſions of his character and intentions, but to detach Wolſey entirely from the intereſt of Francis. The tiara had attracted the eye of that ambitious prelate; and as the emperor knew that the papacy was the ſole point of elevation, beyond his preſent greatneſs, at which he could aſpire, he made him an offer of his intereſt on the firſt vacancy.

72
An inter-
iew pro-
ected be-
ween Fran-
is and
Henry.

73
Charles vi-
ts Henry
England.

The day of Charles's departure, Henry went over to Calais with his whole court, in order to meet Francis. Their interview was in an open plain between Guiſnes and Ardres; where the two kings and their attendants diſplayed their magnificence with ſuch emulation and profuſe expence, as procured it the name of the *Field of the Cloth of Gold.* Here Henry erected a ſpacious houſe of wood and canvas, framed in London, on which, under the figure of an Engliſh archer, was the following motto: "He prevails whom I favour;" alluding to his own political ſituation, as holding in his hands the balance of power among the potentates of Europe. Feats of chivalry, however, parties of gallantry, and ſuch exerciſes as were in that age reckoned manly or elegant, rather than ſerious buſineſs, occupied the two courts during the time that they continued together, which was 18 days.

74
Henry viſits
rancis in
rance.

After taking leave of this ſcene of diſſipation, the king of England paid a viſit to the emperor and Margaret of Savoy at Gravelines, and engaged them to go along with him to Calais; where the artful and politic Charles completed the impreſſion which he had begun to make on Henry and his favourite, and effaced all the friendſhip to which the frank and generous nature of Francis had given birth. He renewed his aſſurances of aſſiſting Wolſey in obtaining the papacy; and he put him in preſent poſſeſſion of the revenues belonging to the ſees of Badajox and Palencia in Spain. He flattered Henry's pride, by convincing him of his own importance, and of the juſtneſs of the motto which he had choſen; offering to ſubmit to his ſole arbitration any difference that might ariſe between him and Francis.

Spain.

75
Charles inveſted with the imperial crown at Aix-la-Chapelle.

This important point being ſecured, Charles repaired to Aix-la-Chapelle, where he was ſolemnly inveſted with the crown and ſceptre of Charlemagne, in preſence of a more ſplendid and numerous aſſembly than had appeared on any former inauguration. About the ſame time Solyman the Magnificent, one of the moſt accompliſhed, enterpriſing, and victorious of the Turkiſh princes, and a conſtant and formidable rival to the emperor, aſcended the Ottoman throne.

The firſt act of Charles's adminiſtration was, to appoint a diet of the empire, to be held at Worms, in order to concert with the princes proper meaſures for checking the progreſs of "thoſe new and dangerous opinions which threatened to diſturb the peace of Germany, and to overturn the religion of their anceſtors." The opinions propagated by Luther and his followers were here meant. But all his efforts for that purpoſe were inſufficient, as is related under the articles LUTHER and REFORMATION.

76
War between Francis and Charles.

In 1521 the Spaniards, diſſatisfied with the departure of their ſovereign, whoſe election to the empire they foreſaw would interfere with the adminiſtration of his own kingdom, and incenſed at the avarice of the Flemings, to whom the direction of public affairs had been committed ſince the death of cardinal Ximenes, ſeveral grandees, in order to ſhake off this oppreſſion, entered into an aſſociation, to which they gave the name of the *Sancta Juncta;* and the ſword was appealed to as the means of redreſs. This ſeemed to Francis a favourable juncture for reinſtating the family of John d'Albret in the kingdom of Navarre. Charles was at a diſtance from that part of his dominions, and the troops uſually ſtationed there had been called away to quell the commotions in Spain. A French army, under Andrew de Foix, ſpeedily conquered Navarre; but that young and inexperienced nobleman, puſhed on by military ardour, ventured to enter Caſtile. The Spaniards, though divided among themſelves, united againſt a foreign enemy, routed his forces, took him priſoner, and recovered Navarre in a ſhorter time than he had ſpent in ſubduing it.

Hoſtilities thus begun in one quarter, between the rival monarchs, ſoon ſpread to another. The king of France encouraged the duke of Bouillon to make war againſt the emperor, and invade Luxembourg. Charles, after humbling the duke, attempted to enter France; but was repelled and worſted before Mezieres, by the famous chevalier Bayard, diſtinguiſhed among his cotemporaries by the appellation of *The Knight without fear and without reproach;* and who united the talents of a great general to the punctilious honour and romantic gallantry of the heroes of chivalry. Francis broke into the Low Countries, where, by an exceſs of caution, an error not natural to him, he loſt an opportunity of cutting off the whole imperial army; and, what was of ſtill more conſequence, he diſguſted the conſtable Bourbon, by giving the command of the van to the duke of Alençon.

During theſe operations in the field, an unſucceſsful congreſs was held at Calais, under the mediation of

Henry VIII. It ſerved only to exaſperate the parties which it was intended to reconcile. A league was ſoon after concluded, by the intrigues of Wolſey, between the pope, Henry, and Charles, againſt France. Leo had already entered into a ſeparate league with the emperor, and the French were faſt loſing ground in Italy.

77 Rapid conqueſts of Charles.

The inſolence and exactions of Mareſhal de Lautrec, governor of Milan, had totally alienated the affections of the Milaneſe from France. They reſolved to expel the troops of that nation, and put themſelves under the government of Francis Sforza, brother to Maximilian their late duke. In this reſolution they were encouraged by the pope, who excommunicated Lautrec, and took into his pay a conſiderable body of Swiſs. The papal army, commanded by Proſper Colonna, an experienced general, was joined by ſupplies from Germany and Naples; while Lautrec, neglected by his court, and deſerted by the Swiſs in its pay, was unable to make head againſt the enemy. The city of Milan was betrayed by the inhabitants to the confederates; Parma and Placentia were united to the eccleſiaſtical ſtate; and of their conqueſts in Lombardy, only the town of Cremona, the caſtle of Milan, and a few inconſiderable forts, remained in the hands of the French.

Leo X. received the accounts of this rapid ſucceſs with ſuch tranſports of joy, as are ſaid to have brought on a fever, which occaſioned his death. The ſpirit of the confederacy was broken, and its operations ſuſpended by this accident. The Swiſs were recalled; ſome other mercenaries diſbanded for want of pay; and only the Spaniards, and a few Germans in the emperor's ſervice, remained to defend the duchy of Milan. But Lautrec, who with the remnant of his army had taken ſhelter in the Venetian territories, deſtitute both of men and money, was unable to improve this favourable opportunity as he wiſhed. All his efforts were rendered ineffectual by the vigilance and ability of Colonna and his aſſociates.

Meantime much diſcord prevailed in the conclave. Wolſey's name, notwithſtanding all the emperor's magnificent promiſes, was ſcarcely mentioned there. Julio de Medici, Leo's nephew, thought himſelf ſure of the election; when, by an unexpected turn of fortune, cardinal Adrian of Utrecht, Charles's preceptor, who at that time governed Spain in the emperor's name, was unanimouſly raiſed to the papacy, to the aſtoniſhment of all Europe and the great diſguſt of the Italians.

78 Francis invades Italy.

Francis, rouſed by the riſing conſequence of his rival, reſolved to exert himſelf with freſh vigour, in order to wreſt from him his late conqueſts in Lombardy. Lautrec received a ſupply of money, and a recruit of 10,000 Swiſs. With this reinforcement he was enabled once more to act offenſively, and even to advance within a few miles of the city of Milan; when money again failing him, and the Swiſs growing mutinous, he was obliged to attack the imperialiſts in their camp at Bicocca, where he was repulſed with great ſlaughter, having loſt his braveſt officers and beſt troops. Such of the Swiſs as ſurvived ſet out immediately for their own country; and Lautrec, deſpairing of being able to keep the field, retired into France. Genoa, which ſtill remained ſubject to Francis, and made it eaſy to execute any ſcheme for the recovery of Milan, was ſoon after taken by Colonna: the authority of the emperor and his faction was every where eſtabliſhed in Italy. The citadel of Cremona was the ſole fortreſs which remained in the hands of the French.

The affliction of Francis for ſuch a ſucceſſion of miſfortunes was augmented by the unexpected arrival of an Engliſh herald, who in the name of his ſovereign declared war againſt France. The courage of this excellent prince, however, did not forſake him; tho' his treaſury was exhauſted by expenſive pleaſures, no leſs than by hoſtile enterpriſes, he aſſembled a conſiderable army, and put his kingdom in a poſture of defence for reſiſting this new enemy, without abandoning any of the ſchemes which he was forming againſt the emperor. He was ſurpriſed, but not alarmed, at ſuch a denunciation.

79 Charles viſits England a ſecond time.

Meanwhile Charles, willing to draw as much advantage as poſſible from ſo powerful an ally, paid a ſecond viſit to the court of England in his way to Spain, where his preſence was become neceſſary. His ſucceſs exceeded his moſt ſanguine expectations. He not only gained the entire friendſhip of Henry, who publicly ratified the treaty of Bruges; but diſarmed the reſentment of Wolſey, by aſſuring him of the papacy on Adrian's death; an event ſeemingly not diſtant, by reaſon of his age and infirmities. In conſequence of theſe negociations an Engliſh army invaded France, under the command of the earl of Surrey; who, at the end of the campaign, was obliged to retire, with his forces greatly reduced, without being able to make himſelf maſter of one place within the French frontier. Charles was more fortunate in Spain: he ſoon quelled the tumults which had there ariſen in his abſence.

80 Rhodes taken by Solyman.

While the Chriſtian princes were thus waſting each other's ſtrength, Solyman the Magnificent entered Hungary, and made himſelf maſter of Belgrade, reckoned the chief barrier of that kingdom againſt the Turkiſh power. Encouraged by this ſucceſs, he turned his victorious arms againſt the iſland of Rhodes, at that time the ſeat of the knights of St John of Jeruſalem; and though every prince in that age acknowledged Rhodes to be the great bulwark of Chriſtendom in the eaſt, ſo violent was their animoſity againſt each other, that they ſuffered Solyman without diſturbance to carry on his operations againſt that city and iſland. Liſle Adam, the grand-maſter, made a gallant defence; but, after incredible efforts of courage, patience, and military conduct, during a ſiege of ſix months, he was obliged to ſurrender the place, having obtained an honourable capitulation from the ſultan, who admired and reſpected his heroic qualities. See RHODES and MALTA. Charles and Francis were equally aſhamed of having occaſioned ſuch a loſs to Chriſtendom by their conteſts; and the emperor, by way of reparation, granted to the knights of St John the ſmall iſland of Malta, where they fixed their reſidence, and continued long to retain their ancient ſpirit, though much diminiſhed in power and ſplendour.

Adrian VI. though the creature of the emperor and devoted to his intereſt, endeavoured to aſſume the impartiality which became the common father of

Chriſtendom, and laboured to reconcile the contending princes, that they might unite in a league againſt Solyman, whoſe conqueſt of Rhodes rendered him more formidable than ever to Europe. The Italian ſtates were no leſs deſirous of peace than the pope: and ſo much regard was paid by the hoſtile powers to the exhortations of his holineſs, and to a bull which he iſſued, requiring all Chriſtian princes to conſent to a truce for three years, that the imperial, the French, and the Engliſh ambaſſadors at Rome, were empowered to treat of that matter; but while they waſted their time in fruitleſs negociations, their maſters were continuing their preparations for war; and other negociations ſoon took place. The confederacy againſt France became more formidable than ever.

81
A powerful confederacy againſt Francis.

The Venetians, who had hitherto adhered to the French intereſt, formed engagements with the emperor for ſecuring Francis Sforza in the poſſeſſion of the duchy of Milan; and the pope, from a perſuaſion that the ambition of the French monarch was the only obſtacle to peace, acceded to the ſame alliance. The Florentines, the dukes of Ferrara and Mantua, and all the Italian powers, followed this example. Francis was left, without a ſingle ally, to reſiſt the efforts of a multitude of enemies, whoſe armies every where threatened, and whoſe territories encompaſſed his dominions. The emperor in perſon menaced France with an invaſion on the ſide of Guienne; the forces of England and the Netherlands hovered over Picardy, and a numerous body of Germans was preparing to ravage Burgundy.

82
Francis marches towards Italy, but is obliged to return by a domeſtic conſpiracy.

The dread of ſo many and ſuch powerful adverſaries, it was thought, would have obliged Francis to keep wholly on the defenſive, or at leaſt have prevented him from entertaining any thoughts of marching into Italy. But before his enemies were able to ſtrike a blow, Francis had aſſembled a great army, with which he hoped to diſconcert all the emperor's ſchemes, by marching it in perſon into Italy: and this bold meaſure, the more formidable becauſe unexpected, could ſcarcely have failed of the deſired effect, had it been immediately carried into execution. But the diſcovery of a domeſtic conſpiracy, which threatened the deſtruction of his kingdom, obliged Francis to ſtop ſhort at Lyons.

Charles duke of Bourbon, lord high conſtable of France, was a prince of the moſt ſhining merit: his great talents equally fitted him for the council or the field, while his eminent ſervices to the crown entitled him to its firſt favour. But unhappily Louiſa ducheſs of Angouleme, the king's mother, had contracted a violent averſion againſt the houſe of Bourbon, and had taught her ſon, over whom ſhe had acquired an abſolute aſcendant, to view all the conſtable's actions with a jealous eye. After repeated affronts he retired from court, and began to liſten to the advances of the emperor's miniſters. Meantime the ducheſs of Bourbon died; and as the conſtable was no leſs amiable than accompliſhed, the ducheſs of Angouleme, ſtill ſuſceptible of the tender paſſions, formed the ſcheme of marrying him. But Bourbon, who might have expected every thing to which an ambitious mind can aſpire, from the doating fondneſs of a woman who governed her ſon and the kingdom, incapable of imitating Louiſa in her ſudden tranſition from hate to love, or of meanly counterfeiting a paſſion for one who had ſo long purſued him with unprovoked malice, rejected the match with diſdain, and turned the propoſal into ridicule. At once deſpiſed and inſulted by the man whom love only could have made her ceaſe to perſecute, Louiſa was filled with all the rage of diſappointed woman; ſhe reſolved to ruin, ſince ſhe could not marry Bourbon. For this purpoſe ſhe commenced an iniquitous ſuit againſt him; and by the chicanery of chancellor du Prat, the conſtable was ſtripped of his whole family-eſtate. Driven to deſpair by ſo many injuries, he entered into a ſecret correſpondence with the emperor and the king of England; and he propoſed, as ſoon as Francis ſhould have croſſed the Alps, to raiſe an inſurrection among his numerous vaſſals, and introduce foreign enemies into the heart of France.

Happily Francis got intimation of this conſpiracy before he left the kingdom: but not being ſufficiently convinced of the Conſtable's guilt, he ſuffered ſo dangerous a foe to eſcape; and Bourbon, entering into the emperor's ſervice, employed all the force of his enterpriſing genius, and his great talents for war, to the prejudice of his prince and his native country.

83
A French army enters Italy.

In conſequence of the diſcovery of this plot, and the eſcape of the powerful conſpirator, Francis relinquiſhed his intention of leading his army in perſon into Italy. He was ignorant how far the infection had ſpread among his ſubjects, and afraid that his abſence might encourage them to make ſome deſperate attempt in favour of a man ſo much beloved. He did not, however, abandon his deſign on the Milaneſe, but ſent forward an army of 30,000 men, under the command of admiral Bonnivet. Colonna, who was entruſted with the defence of that duchy, was in no condition to reſiſt ſuch a force; and the city of Milan, on which the whole territory depends, muſt have fallen into the hands of the French, had not Bonnivet, who poſſeſſed none of the talents of a general, waſted his time in frivolous enterpriſes, till the inhabitants recovered from their conſternation. The imperial army was reinforced. Colonna died; and Lannoy, viceroy of Naples, ſucceeded him in the command: but the chief direction of military operations was committed to Bourbon and the marquis de Peſcara, the greateſt generals of their age. Bonnivet, deſtitute of troops to oppoſe this new army, and ſtill more of the talents which could render him a match for its leaders, after various movements and encounters, was reduced to the neceſſity of attempting a retreat into France. He was followed by the imperial generals, and routed at Biagraſſa, where the famous chevalier Bayard was killed.

84
Defeated at Biagraſſa.

85
Francis determines to enter Italy in perſon.

The emperor and his allies were leſs ſucceſsful in their attempts upon France. They were baffled in every quarter: and Francis, though ſtripped of his Italian dominions, might ſtill have enjoyed in ſafety the glory of having defended his native kingdom againſt one half of Europe, and have bid defiance to all his enemies; but underſtanding that the king of England, diſcouraged by his former fruitleſs enterpriſes, and diſguſted with the emperor, was making no preparations for any attempt on Picardy, his ancient ardour ſeized him for the conqueſt of Milan, and he determined, notwithſtanding the advanced ſeaſon, to march into Italy.

The French army no ſooner appeared in Piedmont, than the whole Milaneſe was thrown into conſternation. The capital opened its gates. The forces of the emperor and Sforza retired to Lodi: and had Francis been ſo fortunate as to purſue them, they muſt have abandoned that poſt, and been totally diſperſed; but his evil genius led him to beſiege Pavia, a town of conſiderable ſtrength, well garriſoned, and defended by Antonio de Leyva, one of the braveſt officers in the Spaniſh ſervice; before which place he was defeated and taken priſoner, as related under the article FRANCE, n° 73.

86 Is defeated and taken priſoner at Pavia.

87 Hypocritical conduct of Charles.

The captivity of Francis filled all Europe with alarm. Almoſt the whole French army was cut off; Milan was immediately abandoned; and in a few weeks not a Frenchman was left in Italy. The power of the emperor, and ſtill more his ambition, became an object of univerſal terror; and reſolutions were every where taken to ſet bounds to it. Meanwhile Francis, deeply impreſſed with a ſenſe of his misfortune, wrote to his mother Louiſa, whom he had left regent of the kingdom, the following ſhort, but expreſſive letter: "All, Madam, is loſt but honour." The ſame courier that carried this letter, carried alſo diſpatches to Charles; who received the news of the ſignal and unexpected ſucceſs which had crowned his arms with the moſt hypocritical moderation. He would not ſuffer any public rejoicings to be made on account of it; and ſaid, he only valued it, as it would prove the occaſion of reſtoring peace to Chriſtendom. Louiſa, however, did not truſt to thoſe appearances; if ſhe could not preſerve what was yet left, ſhe determined at leaſt that nothing ſhould be loſt through her negligence or weakneſs. Inſtead of giving herſelf up to ſuch lamentations as were natural to a woman ſo remarkable for maternal tenderneſs, ſhe diſcovered all the foreſight, and exerted all the activity of a conſummate politician. She took every poſſible meaſure for putting the kingdom in a poſture of defence, while ſhe employed all her addreſs to appeaſe the reſentment and to gain the friendſhip of England; and a ray of comfort from that quarter ſoon broke in upon the French affairs.

88 France aſſiſted by Henry VIII.

Though Henry VIII. had not entered into the war againſt France from any concerted political views, he had always retained ſome imperfect idea of that balance of power which it was neceſſary to maintain between Charles and Francis; and the preſervation of which he boaſted to be his peculiar office. By his alliance with the emperor, he hoped to recover ſome part of thoſe territories on the continent which had belonged to his anceſtors; and therefore willingly contributed to give him the aſcendency above his rival; but having never dreamt of any event ſo deciſive and fatal as the victory at Pavia, which ſeemed not only to have broken, but to have annihilated the power of Francis, he now became ſenſible of his own danger, as well as that of all Europe, from the loſs of a proper counterpoiſe to the power of Charles. Inſtead of taking advantage of the diſtreſſed condition of France, Henry therefore determined to aſſiſt her in her preſent calamities. Some diſguſts alſo had taken place between him and Charles, and ſtill more between Charles and Wolſey. The elevation of the cardinal of Medici to St Peter's chair, on the death of Adrian, under the name of Clement VII. had made the Engliſh miniſter ſenſible of the inſincerity of the emperor's promiſes, while it extinguiſhed all his hopes of the papacy; and he reſolved on revenge. Charles, too, had ſo ill ſupported the appearance of moderation which he aſſumed, when firſt informed of his good fortune, that he had already changed his uſual ſtyle to Henry; and inſtead of writing to him with his own hand, and ſubſcribing himſelf "your affectionate ſon and couſin," he dictated his letters to a ſecretary, and ſimply ſubſcribed himſelf "Charles." Influenced by all theſe motives, together with the glory of raiſing a fallen enemy, Henry liſtened to the flattering ſubmiſſions of Louiſa; entered into a defenſive alliance with her as regent of France, and engaged to uſe his beſt offices in order to procure the deliverance of her ſon from a ſtate of captivity.

89 Francis ſeverely uſed by his conqueror.

Meanwhile Francis was rigorouſly confined; and ſevere conditions being propoſed to him as the price of his liberty, he drew his dagger, and, pointing it at his breaſt, cried, "'Twere better that a king ſhould die thus!" His hand was with-held; and flattering himſelf, when he grew cool, that ſuch propoſitions could not come directly from Charles, he deſired that he might be removed to Spain, where the emperor then reſided. His requeſt was complied with; but he languiſhed long before he obtained a ſight of his conqueror. At laſt he was favoured with a viſit; and the emperor dreading a general combination againſt him, or that Francis, as he threatened, might, in the obſtinacy of his heart, reſign his crown to the dauphin, agreed to abate ſomewhat of his former demands. A treaty was accordingly concluded at Madrid; in conſequence of which Francis obtained his liberty. The chief article in this treaty was, that Burgundy ſhould be reſtored to Charles as the rightful inheritance of his anceſtors, and that Francis's two eldeſt ſons ſhould be immediately delivered up as hoſtages for the performance of the conditions ſtipulated. The exchange of the captive monarch for his children was made on the borders between France and Spain. The moment that Francis entered his own dominions, he mounted a Turkiſh horſe, and putting it to its ſpeed, waved his hand, and cried aloud ſeveral times, "I am yet a king! I am yet a king!"

90 Is at laſt releaſed.

91 Refuſes to execute the conditions of his releaſe.

Francis never meant to execute the treaty of Madrid; he had even left a proteſt in the hands of notaries before he ſigned it, that his conſent ſhould be conſidered as an involuntary deed, and be deemed null and void. Accordingly, as ſoon as he arrived in France, he aſſembled the ſtates of Burgundy, who proteſted againſt the article relative to their province; and Francis coldly replied to the imperial ambaſſadors, who urged the immediate execution of the treaty, that he would religiouſly perform the articles relative to himſelf, but in thoſe affecting the French monarchy, he muſt be directed by the ſenſe of the nation. He made the higheſt acknowledgments to the king of England for his friendly interpoſition, and offered to be entirely guided by his counſels. Charles and his miniſters ſaw that they were over-reached in theſe very arts of negociation in which they ſo much excelled, while the Italian ſtates obſerved with pleaſure, that Francis was reſolved not to execute a treaty which they conſidered as dangerous to the liberties of Europe. Clement abſolved him from the oath which he had taken at Madrid; and the kings of France and England, the Pope, the Swiſs, the Venetians, the Florentines, and the duke of Milan, entered into an alliance, to which they gave the name of the *Holy League*, becauſe his Holineſs was at the head of it, in order to oblige the emperor to deliver up Francis's two ſons on the payment of a reaſonable ranſom, and to re-eſtabliſh Sforza in the quiet poſſeſſion of the Milaneſe.

In conſequence of this league, the confederate army took the field, and Italy once more became the ſcene of war. But Francis, who it was thought would have infuſed ſpirit and vigour into the whole body, had gone through ſuch a ſcene of diſtreſs, that he was become diffident of himſelf, diſtruſtful of his fortune, and deſirous of tranquillity. He flattered himſelf, that the dread alone of ſuch a confederacy would induce Charles to liſten to what was equitable, and therefore neglected to ſend due reinforcements to his allies in Italy. Meantime the duke of Bourbon, who commanded the Imperialiſts, had made himſelf maſter of the whole Milaneſe, of which the emperor had promiſed him the inveſtiture; and his troops beginning to mutiny for want of pay, he led them to Rome, and promiſed to enrich them with the ſpoils of that city. He was as good as his word; for though he himſelf was ſlain in planting a ſcaling ladder againſt the walls, his ſoldiers, rather enraged than diſcouraged by his death, mounted to the aſſault with the utmoſt ardour, animated by the greatneſs of the prize, and, entering the city ſword in hand, plundered it for ſeveral days.

92
Rome taken by the imperialiſts.

93
And moſt cruelly plundered.

Never did Rome in any age ſuffer ſo many calamities, not even from the Barbarians, by whom ſhe was often ſubdued, the Huns, Vandals, or Goths, as now from the ſubjects of a Chriſtian and Catholic monarch. Whatever was reſpectable in modeſty, or ſacred in religion, ſeemed only the more to provoke the rage of the ſoldiery. Virgins ſuffered violation in the arms of their parents, and upon thoſe altars to which they had fled for ſafety. Venerable prelates, after enduring every indignity and every torture, were thrown into dungeons, and menaced with the moſt cruel death, in order to make them reveal their ſecret treaſures. Clement himſelf, who had neglected to make his eſcape in time, was taken priſoner, and found that the ſacredneſs of his character could neither procure him liberty nor reſpect. He was confined till he ſhould pay an enormous ranſom impoſed by the victorious army, and ſurrender to the emperor all the places of ſtrength belonging to the church.

94
The Pope confined.

95
hameful ypocriſy of harles.

Charles received the news of this extraordinary event with equal ſurpriſe and pleaſure; but in order to conceal his joy from his Spaniſh ſubjects, who were filled with horror at the inſult offered to the ſovereign pontiff, and to leſſen the indignation of the reſt of Europe, he expreſſed the moſt profound ſorrow for the ſucceſs of his arms. He put himſelf and his court into mourning; ſtopped the rejoicings for the birth of his ſon Philip, and ordered prayers to be put up in all the churches of Spain for the recovery of the Pope's liberty, which he could immediately have procured by a letter to his generals.

The concern expreſſed by Henry and Francis for the calamity of their ally was more ſincere. Alarmed at the progreſs of the imperial arms, they had, even before the taking of Rome, entered into a cloſer alliance, and agreed to invade the Low-Countries with a powerful army; but no ſooner did they hear of the Pope's captivity, than they changed, by a new treaty, the ſcene of the projected war from the Netherlands to Italy, and reſolved to take the moſt vigorous meaſures for reſtoring him to liberty. Henry, however, contributed only money. A French army entered Italy, under the command of Marſhal Lautrec; Clement obtained his freedom: and war was for a time carried on by the confederates with ſucceſs; but the death of Lautrec, and the revolt of Andrew Doria, a Genoeſe admiral in the ſervice of France, entirely changed the face of affairs. The French army was utterly ruined; and Francis, diſcouraged and almoſt exhauſted by ſo many unſucceſsful enterpriſes, began to think of peace, and of obtaining the releaſe of his ſons by conceſſions, not by the terror of his arms.

96
A French army enters Italy, but is utterly ruined.

At the ſame time Charles, notwithſtanding the advantages he had gained, had many reaſons to wiſh for an accommodation. Sultan Solyman having over-run Hungary, was ready to break in upon the Auſtrian territories with the whole force of the Eaſt; and the progreſs of the Reformation in Germany threatened the tranquillity of the empire. In conſequence of this ſituation of affairs, though pride made both parties conceal or diſſemble their real ſentiments, two ladies were permitted to reſtore peace to Europe. Margaret of Auſtria, Charles's aunt, and Louiſa, Francis's mother, met in 1529 at Cambray, and ſettled the terms of accommodation between the French king and the emperor. Francis agreed to pay two millions of crowns as the ranſom of his two ſons, to reſign the ſovereignty of Flanders and Artois, and forego all his Italian claims; and Charles ceaſed to demand the reſtitution of Burgundy.

97
Peace concluded at Cambray.

All the ſteps of this negociation had been communicated to the king of England; and Henry was, on that occaſion, ſo generous to his friend and ally Francis, that he ſent him an acquittal of near ſix hundred thouſand crowns, in order to enable him to fulfil his agreement with Charles. But Francis's Italian confederates were leſs ſatisfied with the treaty of Cambray. They were almoſt wholly abandoned to the will of the emperor; and ſeemed to have no other means of ſecurity left but his equity and moderation. Of theſe, from his paſt conduct, they had not formed the moſt advantageous idea. But Charles's preſent circumſtances, more eſpecially in regard to the Turks, obliged him to behave with a generoſity inconſiſtent with his character. The Florentines alone, whom he reduced under the dominion of the family of Medici, had reaſon to complain of his ſeverity. Sforza obtained the inveſtiture of Milan and his pardon; and every other power experienced the lenity of the conqueror.

98
Charles goes into Germany.

After having received the imperial crown from the hands of the Pope at Bologna, Charles proceeded on his journey to Germany, where his preſence was become highly neceſſary; for although the conduct and valour of his brother Ferdinand, on whom he had conferred the hereditary dominions of the houſe of Auſtria, and who had been elected king of Hungary, had obliged Solyman to retire with infamy and loſs, his return was to be feared, and the diſorders of religion were daily increaſing; an account of which, and of the emperor's tranſactions with the Proteſtants, is given under the article Reformation.

99 He undertakes an expedition againſt the ſtate of Barbary.

Charles having exerted himſelf as much as he could againſt the reformers, undertook his firſt expedition againſt the piratical ſtates of Africa. Barbary, or that part of the African continent lying along the coaſt of the Mediterranean ſea, was then nearly in the ſame condition which it is at preſent. Morocco, Algiers, and Tunis, were its principal ſtates; and the two laſt were neſts of pirates. Barbaroſſa, a famous Corſair, had ſucceeded his brother in the kingdom of Algiers, which he had formerly aſſiſted him to uſurp. He regulated with much prudence the interior police of his kingdom, carried on his piracies with great vigour, and extended his conqueſts on the continent of Africa; but perceiving that the natives ſubmitted to his government with impatience, and fearing that his continual depredations would one day draw upon him a general combination of the Chriſtian powers, he put his dominions under the protection of the grand ſeignor. Solyman, flattered by ſuch an act of ſubmiſſion, and charmed with the boldneſs of the man, offered him the command of the Turkiſh fleet. Proud of this diſtinction, Barbaroſſa repaired to Conſtantinople, and made uſe of his influence with the ſultan to extend his own dominion. Partly by force, partly by treachery, he uſurped the kingdom of Tunis; and being now poſſeſſed of greater power, he carried on his depredations againſt the Chriſtian ſtates with more deſtructive violence than ever.

Daily complaints of the piracies and ravages committed by the galleys of Barbaroſſa were brought to the emperor by his ſubjects, both in Spain and Italy; and all Chriſtendom ſeemed to look up to him, as its greateſt and moſt fortunate prince, for relief from this new and odious ſpecies of oppreſſion. At the ſame time Muley-Haſcen, the exiled king of Tunis, finding none of the African princes able or willing to ſupport him in recovering his throne, applied to Charles for aſſiſtance againſt the uſurper. Equally deſirous of delivering his dominions from the dangerous neighbourhood of Barbaroſſa, of appearing as the protector of an unfortunate prince, and of acquiring the glory annexed in that age to every expedition againſt the Mahometans, the emperor readily concluded a treaty with Muley-Haſcen, and ſet ſail for Tunis with a formidable armament. The Goletta, a ſea-port town, fortified with 300 pieces of cannon, was taken, together with all Barbaroſſa's fleet: he was defeated in a pitched battle; and 10,000 Chriſtian ſlaves, having knocked off their fetters, and made themſelves maſters of the citadel, Tunis was preparing to ſurrender; but while Charles was deliberating on the conditions, his troops fearing that they would be deprived of the booty which they had expected, broke ſuddenly into the town, and pillaged and maſſacred without diſtinction. Thirty thouſand perſons periſhed by the ſword, and 10,000 were made priſoners. The ſceptre was reſtored to Muley-Haſcen, on condition that he ſhould acknowledge himſelf a vaſſal of the crown of Spain, put into the emperor's hands all the fortified ſea-ports in the kingdom of Tunis, and pay annually 12,000 crowns for the ſubſiſtence of the Spaniſh garriſon in the Goletta. Theſe points being ſettled, and 20,000 Chriſtian ſlaves freed from bondage either by arms or by treaty, Charles returned to Europe, where his preſence was become neceſſary; while Barbaroſſa, who had retired to Bona, recovered new ſtrength, and again became the tyrant of the ocean.

100 Tunis taken, and the inhabitants cruelly maſſacred.

101 Francis attempts in vain to revive his pretenſions to Italy.

The king of France took advantage of the emperor's abſence to revive his pretenſions in Italy. The treaty of Cambray had covered up, but not extinguiſhed, the flames of diſcord. Francis in particular, who waited only for a favourable opportunity of recovering the territories and reputation which he had loſt, continued to negociate againſt his rival with different courts. But all his negociations were diſconcerted by unforeſeen accidents. The death of Clement VII. (whom he had gained by marrying his ſon the duke of Orleans, afterwards Hen. II. to Catharine of Medici, the niece of that pontiff), deprived him of all the ſupport which he hoped to receive from the court of Rome. The king of England, occupied with domeſtic cares and projects, declined engaging in the affairs of the continent; and the Proteſtant princes, aſſociated by the league of Smalkalde, to whom alſo Francis had applied, and who ſeemed diſpoſed at firſt to liſten to him, filled with indignation and reſentment at the cruelty with which ſome of their reformed brethren had been treated in France, refuſed to have any connection with the enemy of their religion.

102 His barbarity to the Proteſtants.

Francis was neither cruel nor bigotted: he was too indolent to concern himſelf about religious diſputes; but his principles becoming ſuſpected, at a time when the emperor was gaining immortal glory by his expedition againſt the Infidels, he found it neceſſary to vindicate himſelf by ſome extraordinary demonſtration of reverence for the eſtabliſhed faith. The indiſcreet zeal of ſome Proteſtant converts furniſhed him with the occaſion. They had affixed to the gates of the Louvre, and other public places, papers containing indecent reflections on the rites of the Romiſh church. Six of the perſons concerned in this raſh action were ſeized; and the king, pretending to be ſtruck with horror at their blaſphemies, appointed a ſolemn proceſſion, in order to avert the wrath of heaven. The holy ſacrament was carried through the city of Paris in great pomp: Francis walked uncovered before it, bearing a torch in his hand; the princes of the blood ſupported the canopy over it; the nobles walked behind. In preſence of this numerous aſſembly, the king declared, that if one of his hands were infected with hereſy, he would cut it off with the other; "and I would ſacrifice," added he, "even my own children, if found guilty of that crime." As an awful proof of his ſincerity, the ſix unhappy perſons who had been ſeized were publicly burnt, before the proceſſion was finiſhed, and in the moſt cruel manner. They were fixed upon a machine which deſcended into the flames, and retired alternately, until they expired.—Little wonder that the Proteſtant princes were incenſed at ſuch barbarity!

103 Cauſes an army march towards Italy.

But Francis, though unſupported by any ally, commanded his army to advance towards the frontiers of Italy, under pretence of chaſtiſing the duke of Milan for a breach of the law of nations, in putting to death his ambaſſador. The operations of war, however, ſoon took a new direction. Inſtead of marching directly to the Milaneſe, Francis commenced hoſtilities againſt the duke of Savoy, with whom he had cauſe to be diſſatisfied, and on whom he had ſome claims; and before the end of the campaign, that feeble prince ſaw himſelf ſtripped of all his dominions, except the province of Piedmont. To complete his misfortunes, the city of Geneva, the ſovereignty of which he claimed, and where the reformed opinions had already got footing, threw off his yoke; and its revolt drew along with it the loſs of the adjacent territory. Geneva was then an imperial city, and has ever ſince remained entirely free.

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In this extremity, the duke of Savoy ſaw no reſource but in the emperor's protection; and as his misfortunes were chiefly occaſioned by his attachment to the imperial intereſt, he had a title to immediate aſſiſtance. But Charles, who was juſt returned from his African expedition, was not able to lend him the neceſſary ſupport. His treaſury was entirely drained, and he was obliged to diſband his army till he could raiſe new ſupplies. Mean time the death of Sforza duke of Milan entirely changed the nature of the war, and afforded the emperor full leiſure to prepare for action. The French monarch's pretext for taking up arms was at once cut off; but as the duke died without iſſue, all Francis's rights to the duchy of Milan, which he had yielded only to Sforza and his deſcendents, returned to him in full force. He inſtantly renewed his claim to it; and if he had ordered his army immediately to advance, he might have made himſelf maſter of it. But he unfortunately waſted his time in fruitleſs negociations, while his more politic rival took poſſeſſion of the duchy as a vacant fief of the empire; and though Charles ſeemed ſtill to admit the equity of Francis's claim, he delayed granting the inveſtiture under various pretences, and was ſecretly taking every poſſible meaſure to prevent his regaining footing in Italy.

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During the time gained in this manner, Charles had recruited his finances, and of courſe his armies; and finding himſelf in a condition for war, he at laſt threw off the maſk under which he had ſo long concealed his deſigns from the court of France. Entering Rome with great pomp, he pronounced before the pope and cardinals, aſſembled in full conſiſtory, a violent invective againſt Francis, by way of reply to his propoſitions concerning the inveſtiture of Milan. Yet Francis, by an unaccountable fatality, continued to negociate, as if it had been ſtill poſſible to terminate their differences in an amicable manner; and Charles, finding him ſo eager to run into the ſnare, favoured the deception, and, by ſeeming to liſten to his propoſals, gained yet more time for the execution of his ambitious projects.

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If misfortunes had rendered Francis too diffident, ſucceſs had made Charles too ſanguine. He preſumed on nothing leſs than the ſubverſion of the French monarchy; nay, he conſidered it as an infallible event. Having chaſed the forces of his rival out of Piedmont and Savoy, he puſhed forward at the head of 50,000 men, contrary to the advice of his moſt experienced miniſters and generals, to invade the ſouthern provinces of France; while other two armies were ordered to enter it, the one on the ſide of Picardy, the other on the ſide of Champagne. He thought it impoſſible that Francis could reſiſt ſo many unexpected attacks on ſuch different quarters; but he found himſelf miſtaken.

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108
But is diſappointed in his deſigns.

The French monarch fixed upon the moſt effectual plan for defeating the invaſion of a powerful enemy; and he prudently perſevered in following it, though contrary to his own natural temper and to the genius of his people. He determined to remain altogether upon the defenſive, and to deprive the enemy of ſubſiſtence by laying waſte the country before them. The execution of this plan was committed to the mareſchal Montmorency its author, a man happily fitted for ſuch a truſt by the inflexible ſeverity of his diſpoſition. He made choice of a ſtrong camp, under the walls of Avignon, at the confluence of the Rhone and Durance, where he aſſembled a conſiderable army; while the king, with another body of troops, encamped at Valence, higher up the Rhone. Marſeilles and Arles were the only towns he thought it neceſſary to defend; and each of theſe he furniſhed with a numerous garriſon of his beſt troops. The inhabitants of the other towns were compelled to abandon their habitations; the fortifications of ſuch places as might have afforded ſhelter to the enemy were thrown down; corn, forage, and proviſions of every kind were carried off or deſtroyed; the mills and ovens were ruined, and the wells filled up or rendered uſeleſs.

This devaſtation extended from the Alps to Marſeilles, and from the ſea to the confines of Dauphiny; ſo that the emperor, when he arrived with the van of his army on the confines of Provence, inſtead of that rich and populous country which he expected to enter, beheld nothing but one vaſt and deſart ſolitude. He did not, however, deſpair of ſucceſs, though he ſaw that he would have many difficulties to encounter; and as an encouragement to his officers, he made them liberal promiſes of lands and honours in France. But all the land which any of them obtained was a grave, and their maſter loſt much honour by this raſh and preſumptuous enterpriſe. After unſucceſsfully inveſting Marſeilles and Arles, after attempting in vain to draw Montmorency from his camp at Avignon, and not daring to attack it, Charles, having ſpent two inglorious months in Provence, and loſt one half of his troops by diſeaſe or by famine, was under the neceſſity of ordering a retreat; and though he was ſome time in motion before the enemy ſuſpected his intention, it was conducted with ſo much precipitation and diſorder, as to deſerve the name of a flight, ſince the light troops of France turned it into a perfect rout. The invaſion of Picardy was not more ſucceſsful; the imperial forces were obliged to retire without effecting any conqueſt of importance.

Charles had no ſooner conducted the ſhattered remains of his army to the frontiers of Milan, than he ſet out for Genoa; and, unwilling to expoſe himſelf to the ſcorn of the Italians after ſuch a reverſe of fortune, he embarked directly for Spain.

109
Violent animoſity between him and Francis.

Meanwhile Francis gave himſelf up to that vain reſentment which had formerly diſgraced the proſperity of his rival. They had frequently, in the courſe of their quarrels, given each other the lie, and mutual challenges had been ſent; which, though productive of no ſerious conſequences between the parties, had a powerful tendency to encourage the pernicious practice of duelling. Charles, in his invective pronounced at Rome, had publicly accuſed Francis of perfidy and breach of faith; Francis now exceeded Charles in the indecency of his accuſations. The Dauphin dying ſuddenly, his death was imputed to poiſon: Montecuculi his cup-bearer was put to the rack; and that unhappy nobleman, in the agonies of torture, accuſed the emperor's generals, Gonzaga and de Leyva, of inſtigating him to the deteſtable act. The emperor himſelf was ſuſpected; nay, this extorted confeſſion, and ſome obſcure hints, were conſidered as inconteſtable proofs of his guilt; though it was evident to all mankind, that neither Charles nor his generals could have any inducement to perpetrate ſuch a crime, as Francis was ſtill in the vigour of life himſelf, and had two ſons beſides the dauphin, grown up to a good age.

110 Charles ſummoned to appear at Paris.

But the incenſed monarch's reſentment did not ſtop here. Francis was not ſatisfied with endeavouring to blacken the character of his rival by an ambiguous teſtimony which led to the moſt injurious ſuſpicions, and upon which the moſt cruel conſtructions had been put; he was willing to add rebellion to murder. For this purpoſe he went to the parliament of Paris; where being ſeated with the uſual ſolemnities, the advocate-general appeared, and accuſed Charles of Auſtria (ſo he affected to call the emperor) of having violated the treaty of Cambray, by which he was freed from the homage due to the crown of France for the counties of Artois and Flanders; adding, that this treaty being now void, he was ſtill to be conſidered as a vaſſal of France, and conſequently had been guilty of rebellion in taking arms againſt his ſovereign. The charge was ſuſtained, and Charles was ſummoned to appear before the parliament of Paris at a day fixed. The term expired; and no perſon appearing in the emperor's name, the parliament gave judgment, that Charles of Auſtria had forfeited, by rebellion and contumacy, the counties of Flanders and Artois, and declared theſe fiefs reunited to the crown of France.

Francis, ſoon after this vain diſplay of his animoſity, marched into the Low Countries, as if he had intended to execute the ſentence pronounced by his parliament; but a ſuſpenſion of arms took place, thro' the interpoſition of the queens of France and Hungary, before any thing of conſequence was effected: and this ceſſation of hoſtilities was followed by a truce, concluded at Nice, through the mediation of the reigning pontiff Paul III. of the family of Farneſe, a man of a venerable character and pacific diſpoſition.

111 Francis leagues with the Turks.

Each of theſe rival princes had ſtrong reaſons to incline them to peace. The finances of both were exhauſted; and the emperor, the moſt powerful of the two, was deeply impreſſed with the dread of the Turkiſh arms, which Francis had drawn upon him by a league with Solyman. In conſequence of this league, Barbaroſſa with a great fleet appeared on the coaſt of Naples; filled that kingdom with conſternation; landed without reſiſtance near Taranto; obliged Caſtro, a place of ſome ſtrength, to ſurrender; plundered the adjacent country; and was taking meaſures for ſecuring and extending his conqueſts, when the unexpected arrival of Doria, the famous Genoeſe admiral, together with the pope's galleys and a ſquadron of the Venetian fleet, made it prudent for him to retire. The ſultan's forces alſo invaded Hungary, where Mahmet the Turkiſh general, after gaining ſeveral inferior advantages, defeated the Germans in a great battle at Eſſek on the Drave. Happily for Charles and Europe, it was not in Francis's power, at this juncture, either to join the Turks or aſſemble an army ſtrong enough to penetrate into the Milaneſe. The emperor, however, was ſenſible that he could not long reſiſt the efforts of two ſuch powerful confederates, nor expect that the ſame fortunate circumſtances would concur a ſecond time in his favour; he therefore thought it neceſſary, both for his ſafety and reputation, to give his conſent to a truce: and Francis choſe rather to run the riſk of diſobliging his new ally the ſultan, than to draw on his head the indignation, and perhaps the arms of all Chriſtendom, by obſtinately obſtructing the re-eſtabliſhment of tranquillity, and contributing to the aggrandiſement of the Infidels.

112 A truce concluded.

113 Interview between Francis and Charles.

Theſe conſiderations inclined the contending monarchs to liſten to the arguments of the holy father; but he found it impoſſible to bring about a final accommodation between them, each inflexibly perſiſting in aſſerting his own claims. Nor could he prevail on them to ſee one another, though both came to the place of rendezvous: ſo great was the remains of diſtruſt and rancour, or ſuch the difficulty of adjuſting the ceremonial! Yet, improbable as it may ſeem, a few days after ſigning the truce, the emperor, in his paſſage to Barcelona, being driven on the coaſt of Provence, Francis invited him to come aſhore; frankly viſited him on board his galley, and was received and entertained with the warmeſt demonſtrations of eſteem and affection. Charles, with an equal degree of confidence, paid the king next day a viſit at Aigues-mortes; where theſe two hoſtile rivals and vindictive enemies, who had accuſed each other of every kind of baſeneſs, converſing together with all the cordiality of brothers, ſeemed to vie with each other in expreſſions of reſpect and friendſhip.

114 Advantages gained by the pope from this pacification.

Beſides the glory of having reſtored tranquillity to Europe, the pope gained a point of much conſequence to his family. He obtained for his grandſon Margaret of Auſtria, the emperor's natural daughter, formerly wife of Alexander de Medici, whom Charles had raiſed to the ſupreme power in Florence. Lorenzo de Medici, the kinſman and intimate companion of Alexander, had aſſaſſinated him by one of the blackeſt treaſons recorded in hiſtory. Under pretence of having ſecured him an aſſignation with a lady of the higheſt rank and great beauty, he drew him into a ſecret apartment of his houſe, and there ſtabbed him as he lay careleſsly on a couch, expecting the embrace of the lovely fair, whom he had often ſolicited in vain. Lorenzo, however, did not reap the fruits of his crime; for though ſome of his countrymen extolled him as a third Brutus, and endeavoured to ſeize this occaſion for recovering their liberties, the government of Florence paſſed into the hands of Coſmo II. another kinſman of Alexander. Coſmo was deſirous of marrying the widow of his predeceſſor; but the emperor choſe rather to oblige the pope, by beſtowing his daughter upon Octavio Farneſe, ſon of the duke of Parma.

115 Charles diſtreſſed

Charles had ſoon farther cauſe to be ſenſible of his obligations to the holy father for bringing about the treaty of Nice. His troops every where mutinied for want of pay, and the ability of his generals only could have prevented a total revolt. He had depended, as his chief reſource for diſcharging the arrears due to his ſoldiers, upon the ſubſidies which he expected from his Caſtilian ſubjects. For this purpoſe he aſſembled the cortez of Caſtile at Toledo; and having repreſented to them the great expence of his military operations, he propoſed to levy ſuch ſupplies as the preſent exigency of affairs demanded, by a general exciſe on commodities; but the Spaniards, who already felt themſelves oppreſſed by a load of taxes unknown to their anceſtors; and who had often complained that their country was drained of its wealth and inhabitants, in order to proſecute quarrels in which they had no intereſt, determined not to add voluntarily to their own burdens. The nobles, in particular, inveighed with great vehemence againſt the impoſition propoſed, as an encroachment on the valuable and diſtinguiſhing privilege of their order, that of being exempted from the payment of any tax. After employing arguments and promiſes in vain, Charles diſmiſſed the aſſembly with indignation; and from that period neither the nobles nor the prelates have been called to the Cortes, on pretence that ſuch as pay no part of the public taxes ſhould not claim a vote in laying them on. Theſe aſſemblies have ſince conſiſted merely of the procurators or repreſentatives of eighteen cities, two from each; in all thirty-ſix members, who are abſolutely at the devotion of the crown.

116 he Spani-ds refuſe aſſiſt m with oney.

117 abitants Ghent el.

The citizens of Ghent, ſtill more bold, broke out not long after into open rebellion againſt the emperor's government, on account of a tax which they judged contrary to their ancient privileges, and a deciſion of the council of Mechlin in favour of the imperial authority. Enraged at an unjuſt impoſition, and rendered deſperate on ſeeing their rights betrayed by that very court which was bound to protect them, they flew to arms, ſeized ſeveral of the emperor's officers, and drove ſuch of the nobility as reſided among them out of the city. Senſible, however, of their inability to ſupport what their zeal had prompted them to undertake, and deſirous of ſecuring a protector againſt the formidable forces with which they might expect ſoon to be attacked, they offered to acknowledge the king of France as their ſovereign; to put him into immediate poſſeſſion of their city, and to aſſiſt him in recovering thoſe provinces in the Netherlands which had anciently belonged to his crown. True policy directed Francis to comply with this propoſal. The counties of Flanders and Artois were more valuable than the duchy of Milan, for which he had ſo long contended; and their ſituation in regard to France made it more eaſy to conquer or to defend them. But Francis over-rated the Milaneſe. He had lived in friendſhip with the emperor ever ſince their interview at Aigues-mortes, and Charles had promiſed him the inveſtiture of that duchy. Forgetting, therefore, all his paſt injuries, and the deceitful promiſes by which he had been ſo often duped, the credulous, generous Francis, not only rejected the propoſitions of the citizens of Ghent, but communicated to the emperor his whole negociation with the malcontents.

118 eme lity of cis.

Judging of Charles's heart by his own, Francis hoped by this ſeemingly diſintereſted proceeding to obtain at once the inveſtiture of Milan; and the emperor, well acquainted with the weakneſs of his rival, flattered him in this apprehenſion, for his own ſelfiſh purpoſes. His preſence being neceſſary in the Netherlands, he demanded a paſſage through France. It was immediately granted him; and Charles, to whom every moment was precious, ſet out, notwithſtanding the remonſtrances of his council and the fears of his Spaniſh ſubjects, with a ſmall but ſplendid train of 100 perſons. He was met on the frontiers of France by the dauphin and the duke of Orleans, who offered to go into Spain, and remain there as hoſtages, till he ſhould reach his own dominions; but Charles replied, that the king's honour was ſufficient for his ſafety, and proſecuted his journey without any other ſecurity. The king entertained him with the utmoſt magnificence at Paris, and the two young princes did not take leave of him till he entered the Low Countries; yet he ſtill found means to evade his promiſe, and Francis continued to believe him ſincere.

119 He allows Charles to paſs thro' his dominions.

120 Severity of Charles to the city of Ghent.

The citizens of Ghent, alarmed at the approach of the emperor, who was joined by three armies, ſent ambaſſadors to implore his mercy, and offered to throw open their gates. Charles only condeſcended to reply, "that he would appear among them as a ſovereign and a judge, with the ſceptre and the ſword." He accordingly entered the place of his nativity on the anniverſary of his birth; and inſtead of that lenity which might have been expected, exhibited an awful example of his ſeverity. Twenty-ſix of the principal citizens were put to death; a greater number were baniſhed; the city was declared to have forfeited its privileges; a new ſyſtem of laws and political adminiſtration was preſcribed; and a large fine was impoſed on the inhabitants, in order to defray the expence of erecting a citadel, together with an annual tax for the ſupport of a garriſon. They were not only deſpoiled of their ancient immunities, but made to pay, like conquered people, for the means of perpetuating their own ſlavery.

121 His baſe treatment of Francis.

Having thus re-eſtabliſhed his authority in the Low Countries, and being now under no neceſſity of continuing that ſcene of falſehood and diſſimulation with which he had amuſed the French monarch, Charles began gradually to throw aſide the veil under which he had concealed his intentions with reſpect to the Milaneſe, and at laſt peremptorily refuſed to give up a territory of ſuch value, or voluntarily to make ſuch a liberal addition to the ſtrength of an enemy by diminiſhing his own power. He even denied that he had ever made any promiſe which could bind him to an action ſo fooliſh, and ſo contrary to his own intereſt.

This tranſaction expoſed the king of France to as much ſcorn as it did the emperor to cenſure. The credulous ſimplicity of Francis ſeemed to merit no other return, after experiencing ſo often the duplicity and artifices of his rival. He remonſtrated, however, and exclaimed as if this had been the firſt circumſtance in which the emperor had deceived him. The inſult offered to his underſtanding affected him even more ſenſibly than the injury done to his intereſt; and he diſcovered ſuch reſentment as made it obvious that he would ſeize on the firſt opportunity of revenge, and that a new war would ſoon deſolate the European continent.

122 He is obliged to make conceſſions to the Proteſtants.

Meanwhile Charles was obliged to turn his attention towards the affairs of Germany. The Proteſtants having in vain demanded a general council, preſſed him earneſtly to appoint a conference between a ſelect number of divines of each party, in order to examine the points in diſpute. For this purpoſe a diet was aſſembled at Ratiſbon: and ſuch a conference, notwithſtanding the oppoſition of the pope, was held with great ſolemnity in the preſence of the emperor. But the divines choſen to manage the controverſy, though men of learning and moderation, were only able to ſettle a few ſpeculative opinions, all points relative to worſhip and juriſdiction ſerving only to inflame the minds of the diſputants. Charles, therefore, finding his endeavours to bring about an accommodation ineffectual, and being impatient to cloſe the diet, prevailed on a majority of the members to approve of the following edict of receſs; viz. That the articles concerning which the divines had agreed, ſhould be held as points decided; that thoſe about which they had differed, ſhould be referred to the determination of a general council, or if that could not be obtained, to a national ſynod; and ſhould it prove impracticable alſo to aſſemble a ſynod of Germany, that a general diet of the empire ſhould be called within 18 months, in order to give final judgment on the whole controverſy; that, in the mean time, no innovations ſhould be attempted, nor any endeavours employed to gain proſelytes.

This diet gave great offence to the pope. The bare mention of allowing a diet, compoſed chiefly of laymen, to paſs judgment in regard to articles of faith, appeared to him no leſs criminal and profane than the worſt of thoſe hereſies which the emperor ſeemed ſo zealous to ſuppreſs. The Proteſtants alſo were diſſatisfied with it, as it conſiderably abridged the liberty which they at that time enjoyed. They murmured loudly againſt it; and Charles, unwilling to leave any ſeeds of diſcontent in the empire, granted them a private declaration, exempting them from whatever they thought injurious or oppreſſive in the receſs, and aſcertaining to them the full poſſeſſion of all their former privileges.

The ſituation of the emperor's affairs at this juncture made theſe extraordinary conceſſions neceſſary. He foreſaw a rupture with France to be unavoidable, and he was alarmed at the rapid progreſs of the Turks in Hungary. A great revolution had happened in that kingdom. John Zapol Scæpus, by the aſſiſtance of Solyman, had wreſted from the king of the Romans a conſiderable part of the country. John died, and left an infant ſon. Ferdinand attempted to take advantage of the minority, in order to repoſſeſs himſelf of the whole kingdom; but his ambition was diſappointed by the activity and addreſs of George Martinuzzi, biſhop of Waradin, who ſhared the regency with the queen. Senſible that he was unable to oppoſe the king of the Romans in the field, Martinuzzi ſatisfied himſelf with holding out the fortified towns, all of which he provided with every thing neceſſary for defence: and at the ſame time he ſent ambaſſadors to Solyman, beſeeching him to extend towards the ſon that imperial protection which had ſo generouſly maintained the father on his throne. Ferdinand uſed his utmoſt endeavours to thwart this negociation, and even meanly offered to hold the Hungarian crown on the ſame ignominious condition by which John had held it, that of paying tribute to the porte. But the ſultan ſaw ſuch advantages from eſpouſing the intereſt of the young king, that he inſtantly marched into Hungary; and the Germans, having formed the ſiege of Buda, were defeated with great ſlaughter before that city. Solyman, however, inſtead of becoming the protector of the infant-ſovereign whom he had relieved, made uſe of this ſucceſs to extend his own dominions: he ſent the queen and her ſon into Tranſilvania, which province he allotted them, and added Hungary to the Ottoman empire.

113 Undertakes an unſucceſsful expedition againſt Algiers.

Happily for the Proteſtants, Charles received intelligence of this revolution ſoon after the diet at Ratiſbon; and by the conceſſions which he made them, he obtained ſuch liberal ſupplies, both of men and money, as left him under little anxiety about the ſecurity of Germany. He therefore haſtened to join his fleet and army in Italy, in order to carry into execution a great and favourite enterpriſe which he had concerted againſt Algiers; though it would certainly have been more conſiſtent with his dignity to have conducted the whole force of the empire againſt Solyman, the common enemy of Chriſtendom, who was ready to enter his Auſtrian dominions. But many reaſons induced Charles to prefer the African expedition: he wanted ſtrength, or at leaſt money, to combat the Turks in ſo diſtant a country as Hungary; and the glory which he had formerly acquired in Barbary led him to hope for the like ſucceſs, while the cries of his Spaniſh ſubjects rouſed him to take vengeance on their ravagers. But the unfortunate event of this expedition has already been related under the article ALGIERS, nº 14—20.

114 War between Francis and Charles.

The loſs which the emperor ſuffered in this calamitous expedition encouraged the king of France to begin hoſtilities, on which he had been for ſome time reſolved; and an action diſhonourable to civil ſociety furniſhed him with too good a pretext for taking arms. The marquis del Guaſto, governor of the Milaneſe, having got intelligence of the motions and deſtination of two ambaſſadors, Rincon and Fergoſo, whom Francis had diſpatched, the one to the Ottoman porte, the other to the republic of Venice; knowing how much his maſter wiſhed to diſcover the intentions of the French monarch, and of what conſequence it was to retard the execution of his meaſures, he employed ſome ſoldiers belonging to the garriſon of Pavia to lie in wait for theſe ambaſſadors as they ſailed down the Po, who murdered them and moſt of their attendants, and ſeized their papers. Francis immediately demanded reparation for this barbarous outrage; and as Charles endeavoured to put him off with an evaſive anſwer, he appealed to all the courts of Europe, ſetting forth the heinouſneſs of the injury, the iniquity of the emperor in diſregarding his juſt requeſt, and the neceſſity of vengeance. But Charles, who was a more profound negociator, defeated in a great meaſure the effects of theſe repreſentations: he ſecured the fidelity of the Proteſtant princes in Germany, by granting them new conceſſions; and he engaged the king of England to eſpouſe his cauſe, under pretence of defending Europe againſt the Infidels; while Francis was only able to form an alliance with the kings of Denmark and Sweden,

den, (who for the firſt time intereſted themſelves in the quarrels of the more potent monarchs of the ſouth), and to renew his treaty with Solyman, which drew on him the indignation of Chriſtendom.

But the activity of Francis ſupplied all the defects of his negociation. Five armies were ſoon ready to take the field, under different generals, and with different deſtinations. Nor was Charles wanting in his preparations. He and Henry a ſecond time made an ideal diviſion of the kingdom of France. But as the hoſtilities which followed terminated in nothing deciſive, and were diſtinguiſhed by no remarkable event, except the battle of Ceriſoles (gained by count d'Enguien over the imperialiſts, and in which 10,000 of the emperor's beſt troops fell), at laſt Francis and Charles, mutually tired of harraſſing each other, concluded at Creſpy a treaty of peace, in which the king of England was not mentioned; and from being implacable enemies, became once more, to appearance, cordial friends, and even allies by the ties of blood.

125 Peace concluded at Creſpy.

The chief articles of this treaty were, that all the conqueſts which either party had made ſince the truce of Nice ſhould be reſtored; that the emperor ſhould give in marriage to the duke of Orleans, either his own eldeſt daughter, with the Low Countries, or the ſecond daughter of his brother Ferdinand, with the inveſtiture of the Milaneſe; that Francis ſhould renounce all pretenſions to the kingdom of Naples, as well as to the ſovereignty of Flanders and Artois, and Charles give up his claim to the duchy of Burgundy; and that both ſhould unite in making war againſt the Turks.

The emperor was chiefly induced to grant conditions ſo advantageous to France, by a deſire of humbling the Proteſtant princes in Germany. With the papal juriſdiction, he foreſaw they would endeavour to throw off the imperial authority; and he determined to make his zeal for the former a pretence for enforcing and extending the latter. However, the death of the duke of Orleans before the conſummation of his marriage, diſentangled the emperor from the moſt troubleſome ſtipulation in the treaty of Creſpay; and that the French monarch, being ſtill engaged in hoſtilities with England, was unable to obtain any reparation for the loſs which he ſuffered by this unforeſeen event. Theſe hoſtilities, like thoſe between Charles and Francis, terminated in nothing deciſive. Equally tired of a ſtruggle attended with no glory or advantage to either, the contending princes concluded, at Campe, near Ardies, a treaty of peace; in which it was ſtipulated, that France ſhould pay the arrears due by former treaties to England. But theſe arrears did not exceed one-third of the ſums expended by Henry on his military operations; and Francis being in no condition to diſcharge them; Boulogne (a chargeable pledge) was left in the hands of the Engliſh as a ſecurity for the debt.

126 arles obed to nclude a dvantaus peace h the ks and teſtants.

In conſequence of the emperor's reſolution to humble the Proteſtant princes, he concluded a diſhonourable peace with the Porte, ſtipulating that his brother Ferdinand ſhould pay tribute for that part of Hungary which he ſtill poſſeſſed; while the ſultan enjoyed the imperial and undiſturbed poſſeſſion of all the reſt. At the ſame time he entered into a leage with pope Paul III. for the extirpation of hereſy; but in reality with a view to oppreſs the liberties of Germany. Here, however, his ambition met with a ſevere check; for though he was ſucceſsful at firſt, he was obliged, in 1552, to conclude a peace with the Proteſtants on their own terms; as has been related under the article Reformation, n° 26—32.

127 Attempts to recover ſome of his provinces.

By the peace concluded on this occaſion the emperor loſt Metz, Toul, and Verdun, which had formed the barrier of the empire on that quarter; and therefore ſoon after put himſelf at the head of an army, in order to recover theſe three biſhoprics. In order to conceal the deſtination of his army, he gave out, that he intended to lead it into Hungary, to ſecond Maurice in his operations againſt the Infidels; and as that pretext failed him, when he began to advance towards the Rhine, he propagated a report that he was marching firſt to chaſtiſe Albert of Brandenburgh, who had refuſed to be included in the treaty of Paſſau, and whoſe cruel exactions in that part of Germany called loudly for redreſs.

128 Is obliged to raiſe the ſiege of Metz.

The French, however, were not deceived by theſe arts. Henry immediately gueſſed the true object of Charles's armament, and reſolved to defend his conqueſts with vigour. The defence of Metz, againſt which it was foreſeen the whole weight of the war would be turned, was committed to Francis of Lorrain, duke of Guiſe, who poſſeſſed in an eminent degree all the qualities that render men great in military command. He repaired with joy to the dangerous ſtation; and many of the French nobility, and even princes of the blood, eager to diſtinguiſh themſelves under ſuch a leader, entered Metz as volunteers. The city was of great extent, ill fortified, and the ſuburbs large. For all theſe defects the duke endeavoured to provide a remedy. He repaired the old fortifications with all poſſible expedition, labouring with his own hands; the officers imitated his example; and the ſoldiers, thus encouraged, cheerfully ſubmitted to the moſt ſevere toils; he erected new works, and he levelled the ſuburbs with the ground. At the ſame time he filled the magazines with proviſions and military ſtores, compelled all uſeleſs perſons to leave the place, and laid waſte the neighbouring country; yet ſuch were his popular talents, as well as his arts of acquiring an aſcendent over the minds of men, that the citizens not only refrained from murmuring, but ſeconded him with no leſs ardour than the ſoldiers in all his operations—in the ruin of their eſtates, and in the havoc of their public and private buildings.

Meanwhile the emperor continued his march towards Lorrain, at the head of 60,000 men. On his approach, Albert of Brandenburgh, whoſe army did not exceed 20,000, withdrew into that principality, as if he intended to join the French king; and Charles, notwithſtanding the advanced ſeaſon, it being towards the end of October, laid ſiege to Metz, contrary to the advice of his moſt experienced officers.

The attention of both the beſiegers and the beſieged was turned for ſome time towards the motions of Albert, who ſtill hovered in the neighbourhood, undetermined which ſide to take, though reſolved to ſell his ſervice. Charles at laſt came up to his price, and he joined the imperial army. The emperor now flattered himſelf that nothing could reſiſt his force; but he found himſelf deceived. After a ſiege of almoſt 60 days, during which he had attempted all that was thought poſſible for art or valour to effect, and had loſt upwards of 30,000 men by the inclemency of the weather, diſeaſes, or the ſword of the enemy, he was obliged to abandon the enterpriſe.

129 Miſerable condition of his army.

When the French ſallied out to attack the enemy's rear, the imperial camp was filled with the ſick and wounded, with the dead and the dying. All the roads by which the army retired were ſtrewed with the ſame miſerable objects; who, having made an effort beyond their ſtrength to eſcape, and not being able to proceed, were left to periſh without aſſiſtance. Happily that, and all the kind offices which their friends had not the power to perform, they received from their enemies. The duke of Guiſe ordered them all to be taken care of, and ſupplied with every neceſſary; he appointed phyſicians to attend, and direct what treatment was proper for the ſick and wounded, and what refreſhments for the feeble; and ſuch as recovered he ſent home, under an eſcort of ſoldiers, and with money to bear their charges. By theſe acts of humanity, leſs common in that age, the duke of Guiſe completed that heroic character which he had juſtly acquired by his brave and ſucceſsful defence of Metz.

130 His further misfortunes

The emperor's misfortunes were not confined to Germany. During his reſidence at Villach, he had been obliged to borrow 200,000 crowns of Coſmo de Medici; and ſo low was his credit, that he was obliged to put Coſmo in poſſeſſion of the principality of Piombino as a ſecurity for that inconſiderable ſum; by which means he loſt the footing he had hitherto maintained in Tuſcany. Much about the ſame time he loſt Siena. The citizens, who had long enjoyed a republican government, roſe againſt the Spaniſh garriſon, which they had admitted as a check upon the tyranny of the nobility, but which they found was meant to enſlave them; forgetting their domeſtic animoſities, they recalled the exiled nobles; they demoliſhed the citadel, and put themſelves under the protection of France.

To theſe unfortunate events one ſtill more fatal had almoſt ſucceeded. The ſevere adminiſtration of the viceroy of Naples had filled that kingdom with murmuring and diſſatisfaction. The prince of Salerno, the head of the malcontents, fled to the court of France. The French monarch, after the example of his father, applied to the grand ſeignior; and Solyman, at that time highly incenſed againſt the houſe of Auſtria on account of the proceedings in Hungary, ſent a powerful fleet into the Mediterranean, under the command of the corſair Dragut, an officer trained up under Barbaroſſa, and ſcarce inferior to his maſter in courage, talents, or in good fortune. Dragut appeared on the coaſt of Calabria at the time appointed; but not being joined by the French fleet according to concert, he returned to Conſtantinople, after plundering and burning ſeveral places, and filling Naples with conſternation.

131 Is ſucceſsful in the Low Countries.

Highly mortified by ſo many diſaſters, Charles retired into the Low Countries, breathing vengeance againſt France: and here the war was carried on with conſiderable vigour. Impatient to efface the ſtain which his military reputation had received before Metz, Charles laid ſiege to Terouane; and the fortifications being in diſrepair, that important place was carried by aſſault. Heſdin alſo was inveſted, and carried in the ſame manner. The king of France was too late in aſſembling his forces, to afford relief to either of theſe places; and the emperor afterwards cautiouſly avoided an engagement.

132 But not ſo in other places.

The imperial arms were leſs ſucceſsful in Italy. The viceroy of Naples failed in an attempt to recover Siena; and the French not only eſtabliſhed themſelves more firmly in Tuſcany, but conquered part of the iſland of Corſica. Nor did the affairs of the houſe of Auſtria go on better in Hungary during the courſe of this year. Iſabella and her ſon appeared once more in Tranſylvania, at a time when the people were ready for revolt, in order to revenge the death of Martinuzzi, whoſe loſs they had ſeverely felt. Some noblemen of eminence declared in favour of the young king; and the baſhaw of Belgrade, by Solyman's order, eſpouſing his cauſe, in oppoſition to Ferdinand, Caſtaldo, the Auſtrian general, was obliged to abandon Tranſylvania to Iſabella and the Turks.

133 Marriage between Philip of Spain and Mary of England.

In order to counterbalance theſe and other loſſes, the emperor, in 1554, concerted a marriage between his ſon Philip and Mary of England, in hopes of adding that kingdom to his other dominions. Meanwhile the war between Henry and Charles was carried on with various ſucceſs in the Low Countries, and in Italy much to the diſadvantage of France. The French, under the command of Strozzi, were defeated in the battle of Merciano; Siena was reduced by Medicino, the Florentine general, after a ſiege of ten months; and the gallant Sieneſe were ſubjected to the Spaniſh yoke. Much about the ſame time a plot was formed by the Franciſcans, but happily diſcovered before it could be carried into execution, to betray Metz to the Imperialiſts. The father-guardian, and twenty other monks, received ſentence of death on account of this conſpiracy; but the guardian, before the time appointed for his execution, was murdered by his incenſed accomplices, whom he had ſeduced; and ſix of the youngeſt were pardoned.

134 Charles reſigns his dominions to his ſon Philip.

While war thus raged in Italy and the Low Countries, Germany enjoyed ſuch profound tranquillity, as afforded the diet full leiſure to confirm and perfect the plan of religious pacification agreed upon at Paſſau, and referred to the conſideration of the next meeting of the Germanic body. During the negociation of this treaty, an event happened which aſtoniſhed all Europe, and confounded the reaſonings of the wiſeſt politicians. The emperor Charles V. though no more than 56, an age when objects of ambition operate with full force on the mind, and are generally purſued with the greateſt ardour, had for ſome time formed the reſolution of reſigning his hereditary dominions to to his ſon Philip. He now determined to put it in execution. Various have been the opinions of hiſtorians concerning a reſolution ſo ſingular and unexpected; but the moſt probable ſeem to be, the diſappointments which Charles had met with in his ambitious hopes, and the daily decline of his health. He had early in life been attacked with the gout; and the fits were now become ſo frequent and ſevere, that not only the vigour of his conſtitution was broken, but the faculties

Spain.

culties of his mind were ſenſibly impaired. He therefore judged it more decent to conceal his infirmities in ſome ſolitude, than to expoſe them any longer to the public eye; and as he was unwilling to forfeit the fame, or loſe the acquiſitions of his better years, by attempting to guide the reins of government when he was no longer able to hold them with ſteadineſs, he prudently determined to ſeek in the tranquillity of retirement, that happineſs which he had in vain purſued amid the tumults of war and the intrigues of ſtate.

In conſequence of this reſolution, Charles, who had already ceded to his ſon Philip the kingdom of Naples and the duchy of Milan, aſſembled the ſtates of the Low Countries at Bruſſels; and ſeating himſelf for the laſt time in the chair of ſtate, he explained to his ſubjects the reaſons of his reſignation, and ſolemnly devolved his authority upon Philip. He recounted with dignity, but without oſtentation, all the great things which he had undertaken and performed ſince the commencement of his adminiſtration. "I have dedicated," obſerved he, "from the 17th year of my age, all my thoughts and attention to public objects, reſerving no portion of my time for the indulgence of eaſe, and very little for the enjoyment of private pleaſure. Either in a pacific or hoſtile manner, I have viſited Germany nine times, Spain ſix times, France four times, Italy ſeven times, the Low Countries ten times, England twice, Africa as often; and while my health permitted me to diſcharge the duty of a ſovereign, and the vigour of my conſtitution was equal in any degree to the arduous office of governing ſuch extenſive dominions, I never ſhunned labour, nor repined under fatigue; but now, when my health is broken, and my vigour exhauſted by the rage of an incurable diſtemper, my growing infirmities admoniſh me to retire; nor am I ſo fond of reigning, as to retain the ſceptre in an impotent hand, which is no longer able to protect my ſubjects. Inſtead of a ſovereign worn out with diſeaſes," continued he, "and ſcarce half alive, I give you one in the prime of life, already accuſtomed to govern, and who adds to the vigour of youth all the attention and ſagacity of maturer years." Then turning towards Philip, who fell on his knees, and kiſſed his father's hand, "It is in your power," ſaid Charles, "by a wiſe and virtuous adminiſtration, to juſtify the extraordinary proof which I give this day of my paternal affection, and to demonſtrate that you are worthy of the extraordinary confidence which I repoſe in you. Preſerve," added he, "an inviolable regard for religion; maintain the catholic faith in its purity; let the laws of your country be ſacred in your eyes; encroach not on the rights of your people; and if the time ſhould ever come when you ſhall wiſh to enjoy the tranquillity of private life, may you have a ſon to whom you can reſign your ſceptre with as much ſatisfaction as I give up mine to you." A few weeks after, he reſigned to Philip the ſovereignty of Spain and America; reſerving nothing to himſelf out of all theſe vaſt poſſeſſions but an annual penſion of 100,000 crowns.

Charles was now impatient to embark for Spain, where he had fixed on a place of retreat; but by the advice of his phyſicians, he put off his voyage for ſome months, on account of the ſeverity of the ſeaſon; and, by yielding to their judgment, he had the ſatiſfaction, before he left the Low Countries, of taking a conſiderable ſtep towards a peace with France. This he ardently longed for; not only on his ſon's account, whoſe adminiſtration he wiſhed to commence in quietneſs, but that he might have the glory, when quitting the world, of reſtoring to Europe that tranquillity which his ambition had baniſhed out of it, almoſt from the time that he aſſumed the reins of government.

Spain.

The great bar to ſuch a pacification, on the part of France, was the treaty which Henry had concluded with the Pope; and the emperor's claims were too numerous to hope for adjuſting them ſuddenly. A truce of five years was therefore propoſed by Charles; during which term, without diſcuſſing their reſpective pretenſions, each ſhould retain what was in his poſſeſſion; and Henry, through the perſuaſion of the conſtable Montmorency, who repreſented the imprudence of ſacrificing the true intereſts of his kingdom to the raſh engagements that he had come under with Paul, authoriſed his ambaſſadors to ſign at Vaucelles a treaty, which would inſure to him, for ſo conſiderable a period, the important conqueſt which he had made on the German frontier, together with the greater part of the duke of Savoy's dominions.

135
A truce of five years concluded with France

The Pope, when informed of this tranſaction, was no leſs filled with terror and aſtoniſhment than rage and indignation. But he took equal care to conceal his fear and his anger. He affected to approve highly of the truce; and he offered his mediation, as the common father of Chriſtendom, in order to bring about a definitive peace. Under this pretext, he appointed cardinal Rebibo his nuncio to the court of Bruſſels, and his nephew cardinal Caraffa to that of Paris. The public inſtructions of both were the ſame; but Caraffa, beſides theſe, received a private commiſſion, to ſpare neither intreaties, promiſes, nor bribes, in order to induce the French monarch to renounce the truce and renew his engagements with the holy ſee. He flattered Henry with the conqueſt of Naples; he gained by his addreſs the Guiſes, the queen, and even the famous Diana of Poictiers, ducheſs of Valentinois, the king's miſtreſs; and they eaſily ſwayed the king himſelf, who already leaned to that ſide towards which they wiſhed to incline him. All Montmorency's prudent remonſtrances were diſregarded; the nuncio (by powers from Rome) abſolved Henry from his oath of truce; and that weak prince ſigned a new treaty with the Pope; which rekindled with freſh violence the flames of war, both in Italy and the Low Countries.

136
Quarrel betwixt the pope and king Philip.

No ſooner was Paul made acquainted with the ſucceſs of this negociation, than he proceeded to the moſt indecent extremities againſt Philip. He ordered the Spaniſh ambaſſador to be impriſoned; he excommunicated the Colonnas, becauſe of their attachment to the imperial houſe; and he conſidered Philip as guilty of high treaſon, and to have forfeited his right to the kingdom of Naples, which he was ſuppoſed to hold of the holy ſee, for afterward affording them a retreat in his dominions.

Alarmed at a quarrel with the pope, whom he had been taught to regard with the moſt ſuperſtitious veneration, as the vicegerent of Chriſt and the common father of Chriſtendom, Philip tried every gentle method before he made uſe of force. He even conſulted ſome Spaniſh divines on the lawfulneſs of taking arms againſt a perſon ſo ſacred. They decided in his favour; and Paul continuing inexorable, the duke of Alva, to whom the negociations as well as the war had been committed, entered the eccleſiaſtical ſtate at the head of 10,000 veterans, and carried terror to the gates of Rome.

The haughty pontiff, though ſtill inflexible and undaunted in himſelf, was forced to give way to the fears of the cardinals, and a truce was concluded for 40 days. Meantime the duke of Guiſe arriving with a ſupply of 20,000 French troops, Paul became more arrogant than ever, and baniſhed all thoughts from his mind but thoſe of war and revenge. The duke of Guiſe, however, who had precipitated his country into this war, chiefly from a deſire of gaining a field where he might diſplay his own talenes, was able to perform nothing in Italy worthy of his former fame. He was obliged to abandon the ſiege of Civetella; he could not bring the duke of Alva to a general engagement; his army periſhed by diſeaſes and the Pope neglected to furniſh the neceſſary reinforcements. He begged to be recalled; and France ſtood in need of his abilities.

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Philip was now ſenſible that he had loſt an opportunity which could never be recalled, of diſtreſſing his enemy, and contented himſelf with reducing Horn and Catelet; which petty towns, together with St Quintin, were the ſole fruits of one of the moſt deciſive victories gained in the 16th century. The Catholic king, however, continued in high exultation on account of his ſucceſs; and as all his paſſions were tinged with ſuperſtition, he vowed to build a church, a monaſtery, and a palace, in honour of St Laurence, on the day ſacred to whoſe memory the battle of St Quintin had been fought. He accordingly laid the foundation of an edifice, in which all theſe were included, and which he continued to forward at vaſt expence, for 22 years. The ſame principle which dictated the vow directed the building. It was ſo formed as to reſemble a gridiron—on which culinary inſtrument, according to the legendary tale, St Laurence had ſuffered martyrdom. Such is the origin of the famous eſcurial near Madrid, the royal reſidence of the kings of Spain.

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Conſequences of the war in Italy.

But though this war, which at its commencement threatened mighty revolutions, was terminated without occaſioning any alteration in thoſe ſtates which were its immediate object, it produced effects of conſiderable conſequence in other parts of Italy. In order to detach Octavio Farneſe, duke of Parma, from the French intereſt, Philip reſtored to him the city of Placentia and its territory, which had been ſeized by Charles V. and he granted to Coſmo de Medici the in-

inveſtiture of Sienna, as an equivalent for the ſums due to him. By theſe treaties, the balance of power among the Italian ſtates was poiſed with more equality, and rendered leſs variable than it had been ſince it received the firſt violent ſhock from the invaſion of Charles VIII. and Italy henceforth ceaſed to be the theatre on which the monarchs of Spain, France, and Germany, contended for fame and dominion. Their hoſtilities, excited by new objects, ſtained other regions of Europe with blood, and made other ſtates feel, in their turn, the miſeries of war.

140 The French unſucceſsful in the Low Countries.

The duke of Guiſe, who left Rome the ſame day that his adverſary the duke of Alva made his humiliating ſubmiſſion to the pope, was received in France as the guardian-angel of the kingdom. He was appointed lieutenant-general in chief, with a juriſdiction almoſt unlimited; and, eager to juſtify the extraordinary confidence which the king had repoſed in him, as well as to perform ſomething ſuitable to the high expectations of his countrymen, he undertook, in winter, the ſiege of Calais. Having taken that place, he next inveſted Thionville in the duchy of Luxembourg, one of the ſtrongeſt towns on the frontiers of the Netherlands; and forced it to capitulate, after a ſiege of three weeks. But the advantages on this quarter were more than balanced by an event which happened in another part of the Low Countries. The mareſchal de Termes governor of Calais, who had penetrated into Flanders and taken Dunkirk, was totally routed near Gravelines, and taken priſoner by count Egmont. This diſaſter obliged the duke of Guiſe to relinquiſh all his other ſchemes, and haſten towards the frontiers of Picardy, that he might there oppoſe the progreſs of the enemy.

The eyes of all France were now turned towards the duke of Guiſe, as the only general on whoſe arms victory always attended, and in whoſe conduct as well as good fortune they could confide in every danger. His ſtrength was nearly equal to the duke of Savoy's, each commanding about 40,000 men. They encamped at the diſtance of a few leagues from one another; and the French and Spaniſh monarchs having joined their reſpective armies, it was expected that, after the viciſſitudes of war, a deciſive battle would at laſt determine which of the rivals ſhould take the aſcendant for the future in the affairs of Europe. But both monarchs, as if by agreement, ſtood on the defenſive; neither of them diſcovering any inclination, though each had it in his power, to reſt the deciſion of a point of ſuch importance on the iſſue of a ſingle battle.

141 Peace concluded between Henry and Philip.

During this ſtate of inaction, peace began to be mentioned in each camp, and both Henry and Philip diſcovered an equal diſpoſition to liſten to any overture that tended to re-eſtabliſh it. The private inclinations of both kings concurred with their political intereſts and the wiſhes of their people. Philip languiſhed to return to Spain, the place of his nativity; and peace only could enable him, either with decency or ſafety, to quit the Low Countries. Henry was now deſirous of being freed from the avocations of war, that he might have leiſure to turn the whole force of his government towards ſuppreſſing the opinions of the reformers, which were ſpreading with ſuch rapidity in Paris and the other great towns, that they began to grow formidable to the eſtabliſhed church. Court-intrigues conſpired with theſe public and avowed motives to haſten the negociation, and the abbey of Cercamp was fixed on as the place of congreſs.

142 Death of Charles V.

While Philip and Henry were making theſe advances towards a treaty which reſtored tranquillity to Europe, Charles V. whoſe ambition had ſo long diſturbed it, but who had been for ſome time dead to the world, ended his days in the monaſtery of St Juſtus in Eſtremadura, which he had choſen as the place of his retreat, as is particularly related under the article Charles V.

143 Revolt of the United Provinces.

After the death of Charles, the kingdom of Spain ſoon loſt great part of its conſequence. Though Charles had uſed all his intereſt to get his ſon Philip elected emperor of Germany, he had been totally diſappointed; and thus the grandeur of Philip II. never equalled that of his father. His dominions were alſo conſiderably abridged by his tyrannical behaviour in the Netherlands. In conſequence of this, the United Provinces revolted; and after a long and bloody war obtained their liberty *. In this quarrel Elizabeth of England took part againſt Philip, which brought on a war with Spain. The great loſſes he ſuſtained in theſe wars exhauſted the kingdom both of men and money, notwithſtanding the great ſums imported from America. Indeed, the diſcovery and conqueſt of that country hath much impoveriſhed, inſtead of enriching, Spain; for thus the inhabitants have been rendered lazy and averſe from every kind of manufacture or traffic, which only can be a durable ſource of riches and ſtrength to any nation.

144 Expulſion of the Moors, and its bad conſequences to Spain.

The ruin of the kingdom in this reſpect, however, was completed by Philip III. who, at the inſtigation of the inquiſition, and by the advice of his prime miniſter the duke of Lerma, expelled from the kingdom all the Moreſcoes or Moors, deſcendents of the ancient conquerors of Spain. Thirty days only were allowed them to prepare for their departure, and it was death to remain beyond that time. The reaſon for this barbarous decree was, that theſe people were ſtill Mahometans in their hearts, though they conformed externally to the rites of Chriſtianity, and thus might corrupt the true faith. The Moreſcoes, however, choſe themſelves a king, and attempted to oppoſe the royal mandate; but, being almoſt entirely unprovided with arms, they were ſoon obliged to ſubmit, and all baniſhed the kingdom. By this violent and impolitic meaſure, Spain loſt almoſt a million of induſtrious inhabitants; and as the kingdom was already depopulated by bloody wars, by repeated emigrations to America, and enervated by luxury, it now ſunk into a ſtate of languor from whence it has never recovered.

145 Revolt of Portugal, &c.

In conſequence of this languor and the mal-adminiſtration of the Spaniſh governors, Portugal, which had been reduced by Philip II. revolted, and has ever ſince been an independent kingdom †. However, the memory of what Spain once was, remained for a conſiderable time, and the power of that kingdom long continued to be feared after it had ceaſed to be powerful. In the time of queen Anne, a Britiſh army was ſeen for the firſt time in Spain, in order to ſupport Charles of Auſtria againſt Philip the grandſon of Louis XIV. The ill ſucceſs of that attempt is related under the article Britain nº 353—359; and thus the crown of Spain fell to a branch of the houſe of Bourbon, in conſequence of which

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* See *United Provinces.*

† See *Portugal*, nº 18. *et ſeq.*

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Conſequences of the war in Italy.

But though this war, which at its commencement threatened mighty revolutions, was terminated without occaſioning any alteration in thoſe ſtates which were its immediate object, it produced effects of conſiderable conſequence in other parts of Italy. In order to detach Octavio Farneſe, duke of Parma, from the French intereſt, Philip reſtored to him the city of Placentia and its territory, which had been ſeized by Charles V. and he granted to Coſmo de Medici the in-

inveſtiture of Sienna, as an equivalent for the ſums due to him. By theſe treaties, the balance of power among the Italian ſtates was poiſed with more equality, and rendered leſs variable than it had been ſince it received the firſt violent ſhock from the invaſion of Charles VIII. and Italy henceforth ceaſed to be the theatre on which the monarchs of Spain, France, and Germany, contended for fame and dominion. Their hoſtilities, excited by new objects, ſtained other regions of Europe with blood, and made other ſtates feel, in their turn, the miſeries of war.

140 The French unſucceſsful in the Low Countries.

The duke of Guiſe, who left Rome the ſame day that his adverſary the duke of Alva made his humiliating ſubmiſſion to the pope, was received in France as the guardian-angel of the kingdom. He was appointed lieutenant-general in chief, with a juriſdiction almoſt unlimited; and, eager to juſtify the extraordinary confidence which the king had repoſed in him, as well as to perform ſomething ſuitable to the high expectations of his countrymen, he undertook, in winter, the ſiege of Calais. Having taken that place, he next inveſted Thionville in the duchy of Luxembourg, one of the ſtrongeſt towns on the frontiers of the Netherlands; and forced it to capitulate, after a ſiege of three weeks. But the advantages on this quarter were more than balanced by an event which happened in another part of the Low Countries. The mareſchal de Termes governor of Calais, who had penetrated into Flanders and taken Dunkirk, was totally routed near Gravelines, and taken priſoner by count Egmont. This diſaſter obliged the duke of Guiſe to relinquiſh all his other ſchemes, and haſten towards the frontiers of Picardy, that he might there oppoſe the progreſs of the enemy.

The eyes of all France were now turned towards the duke of Guiſe, as the only general on whoſe arms victory always attended, and in whoſe conduct as well as good fortune they could confide in every danger. His ſtrength was nearly equal to the duke of Savoy's, each commanding about 40,000 men. They encamped at the diſtance of a few leagues from one another; and the French and Spaniſh monarchs having joined their reſpective armies, it was expected that, after the viciſſitudes of war, a deciſive battle would at laſt determine which of the rivals ſhould take the aſcendant for the future in the affairs of Europe. But both monarchs, as if by agreement, ſtood on the defenſive; neither of them diſcovering any inclination, though each had it in his power, to reſt the deciſion of a point of ſuch importance on the iſſue of a ſingle battle.

141 Peace concluded between Henry and Philip.

During this ſtate of inaction, peace began to be mentioned in each camp, and both Henry and Philip diſcovered an equal diſpoſition to liſten to any overture that tended to re-eſtabliſh it. The private inclinations of both kings concurred with their political intereſts and the wiſhes of their people. Philip languiſhed to return to Spain, the place of his nativity; and peace only could enable him, either with decency or ſafety, to quit the Low Countries. Henry was now deſirous of being freed from the avocations of war, that he might have leiſure to turn the whole force of his government towards ſuppreſſing the opinions of the reformers, which were ſpreading with ſuch rapidity in Paris and the other great towns, that they began to grow formidable to the eſtabliſhed church. Court-intrigues conſpired with theſe public and avowed motives to haſten the negociation, and the abbey of Cercamp was fixed on as the place of congreſs.

142 Death of Charles V.

While Philip and Henry were making theſe advances towards a treaty which reſtored tranquillity to Europe, Charles V. whoſe ambition had ſo long diſturbed it, but who had been for ſome time dead to the world, ended his days in the monaſtery of St Juſtus in Eſtremadura, which he had choſen as the place of his retreat, as is particularly related under the article Charles V.

143 Revolt of the United Provinces.

After the death of Charles, the kingdom of Spain ſoon loſt great part of its conſequence. Though Charles had uſed all his intereſt to get his ſon Philip elected emperor of Germany, he had been totally diſappointed; and thus the grandeur of Philip II. never equalled that of his father. His dominions were alſo conſiderably abridged by his tyrannical behaviour in the Netherlands. In conſequence of this, the United Provinces revolted; and after a long and bloody war obtained their liberty *. In this quarrel Elizabeth of England took part againſt Philip, which brought on a war with Spain. The great loſſes he ſuſtained in theſe wars exhauſted the kingdom both of men and money, nowithſtanding the great ſums imported from America. Indeed, the diſcovery and conqueſt of that country hath much impoveriſhed, inſtead of enriching, Spain; for thus the inhabitants have been rendered lazy and averſe from every kind of manufacture or traffic, which only can be a durable ſource of riches and ſtrength to any nation.

144 Expulſion of the Moors, and its bad conſequences to Spain.

The ruin of the kingdom in this reſpect, however, was completed by Philip III. who, at the inſtigation of the inquiſition, and by the advice of his prime miniſter the duke of Lerma, expelled from the kingdom all the Moreſcoes or Moors, deſcendents of the ancient conquerors of Spain. Thirty days only were allowed them to prepare for their departure, and it was death to remain beyond that time. The reaſon for this barbarous decree was, that theſe people were ſtill Mahometans in their hearts, though they conformed externally to the rites of Chriſtianity, and thus might corrupt the true faith. The Moreſcoes, however, choſe themſelves a king, and attempted to oppoſe the royal mandate; but, being almoſt entirely unprovided with arms, they were ſoon obliged to ſubmit, and all baniſhed the kingdom. By this violent and impolitic meaſure, Spain loſt almoſt a million of induſtrious inhabitants; and as the kingdom was already depopulated by bloody wars, by repeated emigrations to America, and enervated by luxury, it now ſunk into a ſtate of languor from whence it has never recovered.

145 Revolt of Portugal, &c.

In conſequence of this languor and the mal-adminiſtration of the Spaniſh governors, Portugal, which had been reduced by Philip II. revolted, and has ever ſince been an independent kingdom †. However, the memory of what Spain once was, remained for a conſiderable time, and the power of that kingdom long continued to be feared after it had ceaſed to be powerful. In the time of queen Anne, a Britiſh army was ſeen for the firſt time in Spain, in order to ſupport Charles of Auſtria againſt Philip the grandſon of Louis XIV. The ill ſucceſs of that attempt is related under the article Britain nº 353—359; and thus the crown of Spain fell to a branch of the houſe of Bourbon, in conſequence of

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* See *United Provinces*.

† See *Portugal*, nº 18. *et ſeq.*

which the courts of France and Spain have ever ſince acted in concert. Their wars with Britain are related under that article, n° 398. *et ſeq;* and theſe, with a late unſucceſsful attempt on Algiers, conſtitute the moſt important part of the Spaniſh hiſtory to the preſent time.

146
Air and climate of Spain.

The air of Spain, during the months of June, July, and Auguſt, is exceſſively hot in the day-time; but the reſt of the year it is pleaſant and temperate. Even during the above months it is very cool in the ſhade; and ſo cold in the night, that it makes a traveller ſhiver; and in the day-time the violent heat continues only for about four or five hours. In the north, on the mountains, and near the ſea-coaſt, the air is much leſs ſultry in ſummer than in the ſouth, eſpecially in the lower parts of the country, and at a diſtance from the ſea. It ſeldom rains here, except about the equinoxes: the froſts are very gentle towards the ſouth but on the mountains in the north and north-eaſt, the air is very ſharp in winter.

147
Soil and produce.

Though there are ſome ſandy barren deſarts in the ſouth, and many barren mountains in the north, yet in the greater part of the country, particularly in the valleys and plains, the ſoil is good, producing a great variety of rich wines, oil, and fruits; ſuch as oranges, lemons, prunes, citrons, almonds, raiſins, dates, figs, cheſnuts, pomegranates, capers, pears, and peaches; but not a ſufficiency of grain, which is chiefly owing to the neglect of tillage. Wheat and barley are the moſt common grain; the former of which is ſaid by ſome to be the beſt in Europe. There is not much flax, hemp, oats, or hay, in Spain: but there is plenty of honey, ſalt, fine wool, ſilk, and cotton; and, in ſome places, of rice and ſugar-canes. Here alſo are abundance of mules, and, in ſome provinces, of horſes, together with deer, wild-fowl, and other game, chamois and other goats, but few horned cattle. Wolves are almoſt the only wild beaſts in the country. The herb kali, which is uſed in making ſalt, ſoap, and glaſs, grows in great plenty on the ſea-ſhore. The wild bulls, uſed in their bull-fights, are bred in Andeluſia. The ſeas about Spain are well ſtored with fiſh; among which is the anchovy, in the Mediterranean. We may gueſs at the number of ſheep here by that of the ſhepherds, which is ſaid to be about forty thouſand. The ſheep that bear the fine wool move regularly, every ſummer, from ſouth to north, along the mountains, which yield a great variety of ſweet-herbs and plants, and return again towards winter. During this progreſs, large quantities of ſalt are diſtributed among them, and all poſſible care is taken both of their health and fleeces.

148
Mountains, minerals, &c.

The chief mountains are the Pyrenees, which ſtretch from the Mediterranean to the Atlantic Ocean, but not in a direct line, for near 200 miles: their breadth is, in ſome places, not leſs than 80. That called the *Pic de Midi* is of a prodigious height. Over theſe mountains there are only about five paſſages out of Spain into France, and theſe alſo narrow; even the valleys between the mountains are covered with thick and lofty woods. The other chains in Spain are the Sierra d'Occa, Sierra Molino, Sierra Moreno, and Sierra Novada or the ſnowy mountains. Near Gibraltar, oppoſite to Mount Abyla in Africa, ſtands the celebrated Mount Calpe: theſe were anciently called *Hercules's pillars*. The mountains yield great quantities of timber for ſhipping, which are conveyed by the Ebro and other rivers to the Mediterranean. According to the ancient and modern writers, they abound alſo with gold, ſilver, iron, lead, tin, cinnabar, quickſilver, alum, vitriol, copperas, lapis calaminaris, &c. beſides gems, and mineral waters both hot and cold. The gold and ſilver mines are not worked at preſent, but thoſe of iron are. The neglect of the former is owing partly to the indolence of the Spaniards, and partly to the gold and ſilver imported from America. Beſides the rivers Minho, Douro, Tagus, Monda, Lima, and Guadiana, mentioned in Portugal, but which have their ſources in Spain, the moſt conſiderable are the Ebro, Olim Iberus, Guadalavier or Turio, Guadalquiver, Olim Perea Bœtis and Tarteſſus, Segura, and Zucar.

149
Religion.

The Spaniards are jealous Romaniſts. Nowhere is there more pomp, farce, and parade, in what regards religion; and no where leſs true Chriſtianity. Their zeal and their ſuperſtition exceed that of any other Roman-Catholic country, unleſs perhaps we ſhould except Portugal. Nowhere did the inquiſition reign with greater terror; there being no ſubject who was not liable to be proſecuted by the *holy office*, as it is called; however, the powers of that tribunal are now greatly diminiſhed even in Spain. There are eight archbiſhops in Spain, ſeven in America, and one in Aſia, at Manilla; each of which has his ſuffragan biſhops. The archbiſhop of Toledo is primate, chancellor of Caſtile, and, by virtue of his office, privy-counſellor. He is ſaid to have a revenue of 100,000 l. Sterling *per annum*, or more. The king nominates all archbiſhops and biſhops; and, ſince 1753, all ſmall benefices are alſo in his gift. He has alſo lately obtained a power to tax eccleſiaſtical poſſeſſions, according to his pleaſure and the exigency of affairs. Though the reſt of the nation is poor, the clergy are immenſely rich, and their revenues of all kinds amazingly great. Moſt of the towns and eſtates belong to them, and are exempt from all public burdens; yet their avarice is inſatiable, eſpecially that of the Mendicant friars, though they profeſs poverty. Their commerce, which is free from all duties and impoſts, is alſo a rich fund to them. Though the Spaniards are naturally men of wit and an elevated genius, yet little progreſs in the ſciences is to be expected from them, while the clergy uſe their utmoſt efforts to keep them in ignorance, branding all literary reſearches with the name of hereſy, and inveighing againſt the ſeats of the muſes, as the ſchools of hell, where the devil teaches ſorcery. There are 22 univerſities, and ſeveral academies, in Spain; but ſo conſtituted, and under ſuch reſtrictions, that they can never attain to any meaſure of true learning. There are few printing-houſes in Spain, and moſt of the books in that language are publiſhed in other countries.

150
Trade and manufactures.

In regard to trade and manufactures, the Spaniards are far from making ſuch a figure as might be expected. Moſt of the laborious work in their huſbandry, manufactures, and handicrafts, is performed by the French, eſpecially in the two Caſtiles and the midland provinces, the natives being either too lazy or too proud to ſtoop to ſuch employments. By theſe means, the French uſually return with large fortunes to their own

Spain.

own country. The chief manufactures of Spain are thoſe of ſilk, wool, iron, copper, and other hardwares; but theſe fall far ſhort of the flouriſhing condition they might be brought to: hence a great part of the treaſures of America go to the foreign merchants, who ſupply them with goods for that part of the world. However, it is certain, that Spain, ſince it hath had princes of the houſe of Bourbon upon the throne, hath improved its revenues, increaſed its forces by ſea and land, and applied itſelf more than it did before to manufactures and huſbandry; having ſhaken off, in ſome meaſure, that idle indolent diſpoſition which rendered it ſo contemptible in the eyes of other nations; but it will be a long time before they will be able to ſupply the wants of their own country, and thoſe of America, in any great degree. Spain is extremely well ſituated for trade: but moſt of its produce is exported by foreigners, except what is carried to the Indies; and even with regard to that trade, they are little better than factors to the Engliſh, French, Dutch, and Italians. Smuggling, which was formerly carried to a great height, is now in a great meaſure ſuppreſſed. Since the year 1750, the exportation of ſilver hath been allowed on the payment of 3 *per cent.* From 1735 almoſt to 1756, the flotas and galleons were diſcontinued, and the trade to America carried on in regiſter-ſhips, which any merchant might ſend, on permiſſion obtained from the council of the Indies: but then the flotas and galleons were reſtored. The Aſſogue ſhips are two veſſels which carry quickſilver on the king's account to Vera Cruz. There is a company which has an excluſive grant for trading to the Caraccas; and another for trading to Porto Rico, the Bay of Honduras, the province of Guatimala and Hiſpaniola; but the Spaniſh part of the laſt, it is ſaid, hath been lately ceded to the French. One ſhip, and ſometimes two, ſails annually from Manilla, in the iſland of Luçonia, one of the Philippines, for Acapulco, in Mexico: her cargo, which belongs to the convents, conſiſts of the principal commodities of that part of the world; but the return from Acapulco is, for the moſt part, made in money, and amounts to a vaſt ſum, as appeared from the treaſure found on board the Acapulco ſhip taken by Lord Anſon. In return for the manufactures ſent to America, the Spaniards receive gold, ſilver, cochineal, indigo, the cocoa or chocolate nut, logwood and other dyeing woods, ſugar, tobacco, ſnuff, and other productions of that part of the world; ſupplying moſt part of Europe and Aſia with the ſilver they bring from thence in their galleons. In the time of the Moors and Goths, this kingdom was exceedingly populous. It is ſaid to have then contained between twenty and thirty millions; whereas now it does not contain above ſeven or eight: and this, among other cauſes, is owing to the pride and lazineſs of the inhabitants, want of manufactures and good regulations, neglect of the mines and agriculture, the expulſion of the Moors, the peopling of America, heavy taxes, the great number of convents, exceſſive venery, and the conſequent infecundity of both ſexes. Their debauchery and ſterility are partly occaſioned by their way of living; for they make great uſe of ſpices, and drink a great deal of chocolate, and ſtrong wine mixed with brandy. The cauſes aſſigned for the want of people in Spain will account, in ſome meaſure, for its poverty; notwithſtanding it is computed that it receives one year with another, ſetting aſide other ſums, above twenty-ſix millions of pieces of eight, in regiſtered gold and ſilver. As moſt of the manufactures that are ſent to America are furniſhed by Britain, France, Italy, and Holland, ſo a great part of the treaſure brought home by the galleons is paid to the merchants of thoſe nations.

151
Conſtitution and government.

The conſtitution of Spain is at preſent an abſolute hereditary monarchy, where the females inherit in default of the males. The king, in his title, enumerates moſt of the provinces and particular parts of the dominions he has been or is poſſeſſed of. In ſpeaking of him, he is commonly called his *Catholic Majeſty*, or the *Catholic King*. The hereditary prince is commonly ſtyled *Prince of Aſturias*, and the other royal children *Infants*. The kings of Spain are never crowned; they ſeem to have a power to diſpoſe of the crown to what branch of the royal family they pleaſe. For the adminiſtration of the government and of juſtice, here are ſeveral councils and tribunals; as the junto or cabinet-council, the privy-council, the council of war, the council of Caſtile, the council of the inquiſition, the council of the Indies, the ſeven courts of royal audiences, &c. Since the beginning of the 17th century, and the reign of Philip III. the cortes, or parliaments of this kingdom, have been diſcontinued. The higher nobility here conſiſt of counts, marquiſſes, and dukes. The grandees, who have precedence of all others, next the king and princes of the blood, are named out of theſe. They have the privilege of being covered in the king's preſence, who ſtyles them in his letters *Illuſtrious*; and in ſpeaking to them or of them, *their Eminences*: but there are others beſide the grandees who are covered in the king's preſence; as cardinals, nuncios, archbiſhops, the grand prior of Caſtile and the grand prior of Malta, the generals of the orders of St Dominic and St Francis, ambaſſadors of crowned heads, the knights of the golden-fleece, and of the three military orders of St James, Calatrava, and Alcantara, when the king aſſiſts at their reſpective chapters in quality of grandmaſter. No grandee can be apprehended for any crime but by the expreſs order of the king; and they have many other privileges beſides theſe. The inferior nobility ſtyle themſelves *Cavalleros* and *Hidalgos*.

152
Orders of knighthood

Of the orders in Spain, that of the golden fleece is the principal; which was inſtituted in 1430 by Philip the Good duke of Burgundy, and is common now to the kings of Spain and the houſe of Auſtria. The order of St Jago de Compoſtella was inſtituted in the year 1175 by Ferdinand II. king of Leon. The order of Calatrava was founded by Sancho III. of Caſtile. The order of Alcantara owes its inſtitution to Ferdinand II. king of Leon. The three laſt orders have large commanderies or eſtates annexed to them. The maſters of them were once ſo powerful, that they diſputed the king's authority over them; whereupon the king procured thoſe maſterſhips to be conferred on himſelf by the Pope, that they might no longer aſſume an independency of the ſtate. The knights of theſe three orders are eſteemed noblemen.

153
Revenues.

In the laſt century, the revenues of Spain amounted to 32 or 33 millions of livres; but afterwards they were ſo reduced, that they did not exceed ſeven or eight millions. At preſent, the revenues of the crown ariſing in Spain are computed at five millions Sterling *per annum*, beſides what ariſes from America. The ſilver mines there are inexhauſtible; and of the produce of theſe a fifth belongs to the king. The taxes in Spain are numerous and heavy. The land-forces, in time of peace, are computed at about 80,000; and in time of war, muſt be much more numerous. Their navy at preſent cannot be aſcertained.

154 Language. The language of this country, eſpecially that ſpoken in Caſtile, which is by far the pureſt, approaches the neareſt to the Latin of any language in Europe, mixed with Arabic words and terminations introduced by the Moors. In ſome provinces, the vulgar tongue is a dialect of the old French, or rather Gaſcon, which is little underſtood in the others. In Biſcay, the language is ſaid to be a dialect of the Gothic or Celtic, and to have ſome analogy with the Welch and Iriſh. As to what regards the character of the Spaniards, they do not want either an inclination or capacity for the ſciences; but have hardly an opportunity of acquiring any true learning or knowledge, at leaſt in their ſchools and univerſities. They are admired for their ſecrecy, conſtancy, gravity, patience in adverſity, and loyalty. They are alſo ſaid to be true to their word, great enemies to lying, and ſo nice and jealous in point of honour, that they will ſtick at nothing to wipe off any ſtain that is caſt upon it. Among their vices and defects are reckoned their pride and contempt of foreigners, their indolence, lazineſs, luſt, bigotry, and credulity in believing the feigned miracles and legends of their monks. They are alſo ſaid to be extremely paſſionate, jealous, and vindictive; and are noted, above any other European nation, for their contempt of and averſion to agriculture, arts, and manufactures.

New Spain. See Mexico.

SPAN, a meaſure taken from the ſpace between the thumb and the tip of the little finger when both are ſtretched out. The ſpan is eſtimated at three hand's breadths or nine inches.

SPANHEIM (Ezekiel), a moſt learned writer in the 17th century, was born at Geneva in 1629; and in 1642 went to Leyden to ſtudy. Here he diſtinguiſhed himſelf to great advantage; and, his reputation ſpreading, Charles Lewis elector palatine ſent for him to be tutor to his only ſon. This taſk our author diſcharged to the entire ſatisfaction of the elector; by whom he was alſo employed in divers negociations at foreign courts. He afterward entered into the ſervice of the elector of Brandenbourg, who, in 1680, ſent him envoy-extraordinary to the court of France, and ſoon after made him a miniſter of ſtate. After the peace of Ryſwic, he was again ſent on an embaſſy to France, where he continued from the year 1697 to 1702. The elector of Brandenbourg having during that interval aſſumed the title of *king of Pruſſia*, conferred on him the title and dignity of a baron. In 1702, he left France; and went ambaſſador to England, where he had been ſeveral times. Here he died in 1710, aged 81 years. It is ſurpriſing, that in diſcharging the duties of a public miniſter with ſo much exactneſs, and amidſt ſo many different journeys, he could find time enough to write the ſeveral books publiſhed by him. It may be ſaid of him, that he acquitted himſelf in his negociations like a perſon who had nothing elſe in his thoughts; and that he wrote like a man who had ſpent his whole time in his ſtudy. The principal of his works are, 1. *De præſtantia et uſu numiſmatum antiquorum;* the beſt edition of which is in two volumes folio. 2. Several letters or diſſertations on ſcarce and curious medals. 3. A preface and notes to the edition of the Emperor Julian's works, printed at Leipſic in 1696, folio.

SPANIEL, in zoology. See Canis.

SPAR, in natural hiſtory, a claſs of foſſils not inflammable nor ſoluble in water: when pure, it is pellucid, and colourleſs; emulating the appearance of cryſtal, but wanting its diſtinguiſhing characteriſtics; compoſed of plane and equable plates; not flexile nor elaſtic; not giving fire with ſteel; readily calcining in a ſmall fire; fermenting violently with acids, and totally ſoluble in them.—The ſpars in general are found in the fiſſures of ſtones, and about mines. Vaſt quantities are found in the German mines, and in thoſe of Derbyſhire in England.

SPARROW, in ornithology. See Fringilla.

Sparrow-hawk, in ornithology. See Falco.

SPARTA, or Lacedæmon, the capital of the country of Laconia in Greece, an ancient and moſt renowned ſtate, the inhabitants of which have been in all ages celebrated for their military and other virtues.—The hiſtory of Sparta for many ages is entirely fabulous; and the authentic accounts commence only with the celebrated lawgiver Lycurgus, who flouriſhed about 870 B. C. See the article Lycurgus. 1 The hiſtory of Sparta moſtly fabulous till the time of Lycurgus.

After his death, the firſt material tranſaction which we find mentioned in the Spartan hiſtory is the Meſſenian war, which commenced in the year 752 B. C. and ended in the total reduction of the Meſſenian territory, as related under the article Messenia. During this period, according to ſome authors, a great change took place in the government of Sparta. This was the creation of the ephori, which is aſcribed to one of the kings named *Theopompus*. This man perceiving that there was a neceſſity for leaving magiſtrates to execute the laws, when the kings were obliged to be in the field, appointed the magiſtrates above-mentioned, who afterwards made ſo great a figure in the ſtate. See Ephori. One great privilege of the ephori was, that they did not riſe up at the preſence of the kings, as all other magiſtrates did: another was, that if the kings offended againſt the laws, the ephori took cogniſance of the offence, and inflicted a ſuitable puniſhment. From the firſt election of the ephori, the year was denominated, as at Athens, from the firſt of the archons.

The conqueſt of Meſſenia gave Sparta the ſuperiority over the reſt of the ſtates, excepting only that of Athens, which for a long time continued to be a very troubleſome rival; but the conteſts between theſe two rival ſtates have been ſo fully related under the article Attica, that nothing more is requiſite to be added in this place.—In the time of the Perſian war, Leonidas the Spartan king diſtinguiſhed himſelf in ſuch a manner, as to become the admiration not only of that but of every ſucceeding age. It being reſolved in a general council to defend the ſtraits of Thermopylæ againſt the Perſians, 6000 foot were put under the com-

2 Leonidas undertakes to defend the ſtraights of Thermopylæ againſt the Perſians.

command of Leonidas; of whom, however, only 300 were Spartans. Leonidas did not think it practicable to defend the paſs againſt ſuch multitudes as the Perſian king commanded; and therefore privately told his friends, that his deſign was to devote himſelf to death for his country.

Xerxes advancing near the ſtraights was ſtrangely ſurpriſed to find that the Greeks were reſolved to diſpute his paſſage; for he had always flattered himſelf that on his approach they would betake themſelves to flight, and not attempt to oppoſe his innumerable forces. However, Xerxes, entertaining ſtill ſome hopes of their flight, waited four days without undertaking any thing, on purpoſe to give them time to retreat. During this time, he uſed his utmoſt endeavours to gain and corrupt Leonidas, promiſing to make him maſter of all Greece if he would come over to his intereſt. His offers being rejected with contempt and indignation, the king ordered him by an herald to deliver up his arms. Leonidas, in a ſtyle and with a ſpirit truly laconical, anſwered, "Come thyſelf, and take them." Xerxes, at this reply, tranſported with rage, commanded the Medes and Ciſſians to march againſt them, take them all alive, and bring them to him in fetters. The Medes, not able to ſtand the ſhock of the Greeks, ſoon betook themſelves to flight; and in their room Hydarnes was ordered to advance with that body which was called *Immortal*, and conſiſted of 10,000 choſen men: but when theſe came to cloſe with the Greeks, they ſucceeded no better than the Medes and Ciſſians, being obliged to retire with great ſlaughter. The next day the Perſians, reflecting on the ſmall number of their enemies, and ſuppoſing ſo many of them to be wounded that they could not poſſibly maintain a ſecond fight, reſolved to make another attempt; but could not by any efforts make the Greeks give way: on the contrary, they were themſelves put to a ſhameful flight. The valour of the Greeks exerted itſelf on this occaſion in a manner ſo extraordinary, that Xerxes is ſaid to have three times leaped from his throne, apprehending the entire deſtruction of his army.

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Xerxes having loſt all hopes of forcing his way thro' troops that were determined to conquer or die, was extremely perplexed and doubtful what meaſures he ſhould take in this poſture of affairs; when one Epialtes, in expectation of a great reward, came to him, and diſcovered a ſecret paſſage to the top of the hill which overlooked and commanded the Spartan forces. The king immediately ordered Hydarnes thither with his ſelect body of 10,000 Perſians; who marching all night, arrived at break of day, and poſſeſſed themſelves of that advantageous poſt. The Phocæans, who defended this paſs, being overpowered by the enemy's numbers, retired with precipitation to the very top of the mountain, prepared to die gallantly. But Hydarnes neglecting to purſue them, marched down the mountain with all poſſible expedition, in order to attack thoſe who defended the ſtraights in the rear. Leonidas being now appriſed that it was impoſſible to bear up againſt the enemy, obliged the reſt of his allies to retire: but he ſtaid himſelf, with the Theſpians, Thebans, and 300 Lacedæmonians, all reſolved to die with their leader; who being told by the oracle, that either Sparta ſhould be deſtroyed or the king loſe his life, determined without the leaſt heſitation to ſacrifice himſelf for his country. The Thebans indeed remained againſt their inclination, being detained by Leonidas as hoſtages; for they were ſuſpected to favour the Perſians. The Theſpians, with their leader Demophilus, could not by any means be prevailed upon to abandon Leonidas and the Spartans. The augur Megiſtias, who had foretold the event of this enterpriſe, being preſſed by Leonidas to retire, ſent home his only ſon; but remained himſelf, and died by Leonidas. Thoſe who ſtaid did not feed themſelves with any hopes of conquering or eſcaping, but looked upon Thermopylæ as their graves; and when Leonidas, exhorting them to take ſome nouriſhment, ſaid, that they ſhould all ſup together with Pluto, with one accord they ſet up a ſhout of joy, as if they had been invited to a banquet.

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all his men.

Xerxes, after pouring out a libation at the riſing of the ſun, began to move with the whole body of his army, as he had been adviſed by Epialtes. Upon their approach, Leonidas advanced to the broadeſt part of the paſſage, and fell upon the enemy with ſuch undaunted courage and reſolution, that the Perſian officers were obliged to ſtand behind the diviſions they commanded, in order to prevent the flight of their men. Great numbers of the enemy falling into the ſea, were drowned; others were trampled under foot by their own men, and a great many killed by the Greeks; who, knowing they could not avoid death upon the arrival of thoſe who were advancing to fall upon their rear, exerted their utmoſt efforts. In this action fell the brave Leonidas; which Abrocomes and Hyperanthes, two of the brothers of Xerxes, obſerving, advanced with great reſolution to ſeize his body, and carry it in triumph to Xerxes. But the Lacedæmonians, more eager to defend it than their own lives, repulſed the enemy four times, killed both the brothers of Xerxes, with many other commanders of diſtinction, and reſcued the body of their beloved general out of the enemy's hands. But in the mean time, the army that was led by the treacherous Epialtes, advancing to attack their rear, they retired to the narroweſt place of the paſſage, and drawing all together except the Thebans, poſted themſelves on a riſing ground. In this place they made head againſt the Perſians, who poured in upon them on all ſides, till at length, not vanquiſhed, but oppreſſed and overwhelmed by numbers, they all fell, except one who eſcaped to Sparta, where he was treated as a coward and traitor to his country; but afterwards made a glorious reparation in the battle of Platæa, where he diſtinguiſhed himſelf in an extraordinary manner. Some time after, a magnificent monument was erected at Thermopylæ, in honour of thoſe brave defenders of Greece, with two inſcriptions; the one general, and relating to all thoſe who died on this occaſion, importing, that the Greeks of Peloponneſus, to the number only of 4000, made head againſt the Perſian army, conſiſting of 3,000,000. The other related to the Spartans in particular, and was compoſed by the poet Simonides, to this purport: "Go, paſſenger, and acquaint the Spartans that we died here in obedience to their juſt commands." At thoſe tombs a funeral oration was yearly pronounced in honour of the dead heroes, and public games performed with great ſolemnity, wherein none but the Lacedæmonians and

Theſpians had any ſhare, to ſhow that they alone were concerned in the glorious defence of Thermopylæ.

6 A dreadful earthquake in Sparta.

At the end of the 77th Olympiad, a moſt dreadful earthquake happened at Sparta, in which, according to Diodorus, 20,000 perſons loſt their lives; and Plutarch tells us, that only five houſes were left ſtanding in the whole city. On this occaſion the Helotes or ſlaves, whom the Spartans had all along treated with the utmoſt cruelty, attempted to revenge themſelves by taking up arms, and marching directly to the ruins of the city, in hopes of cutting off at once thoſe who had eſcaped from the earthquake. But in this they were prevented by the prudence of the Spartan king Archidamus; for he, obſerving that the citizens were more deſirous of preſerving their effects than taking care of their own lives, cauſed an alarm to be ſounded, as if he had known that an enemy was at hand. On this the citizens armed themſelves in haſte with ſuch weapons as they could come at; and having marched a little way from the city, met the Helotes, whom they ſoon compelled to retire. The latter, however, knowing that they had now no mercy to expect from thoſe who had already treated them with ſuch cruelty, reſolved to defend themſelves to the laſt. Having therefore ſeized a ſea-port town in Meſſenia, they from thence made ſuch incurſions into the Spartan territories, that they compelled thoſe imperious maſters to aſk aſſiſtance from the Athenians. This was immediately granted; but when the Spartans ſaw that the ſkill of the Athenians in beſieging towns was much greater than their own, they became jealous, and diſmiſſed their allies, telling them, that they had now no farther occaſion for their ſervices. On this the Athenians left them in diſguſt; and as the Helotes and Meſſenians did not chooſe to come to an engagement with a Spartan hrmy in the field, but took ſhelter in their fortified places, the war was protracted to ten years and upwards. At laſt the Helotes were reduced to their former miſery; and the Meſſenians were obliged to leave Peloponneſus, on pain of being made ſlaves alſo. Theſe poor people were then received by the Athenians, who granted them Naupactus for their reſidence, and afterwards brought them back to a part of their own country, from whence in the courſe of the Peloponneſian war they had driven the Spartans.

7 War with the Helotes.

8 With the Athenians and Perſians.

In the year 431 B. C. the Peloponneſian war commenced; of which a full account has been given under the article ATTICA, n° 108—165. It ended moſt unfortunately for the Athenians; their city being taken and diſmantled, as related in the article above mentioned. Thus were the Spartans raiſed to the higheſt pitch of glory; and, in the reign of Ageſilaus, they ſeemed to be on the point of ſubverting the Perſian empire, as related under the article PERSIA, n° 30. But here their good fortune and their views of empire were ſuddenly checked. Ageſilaus had carried on the war in Aſia with the greateſt ſucceſs; and as he would hearken to no terms of accommodation, a Perſian governor named *Tithrauſtes*, having firſt attempted in vain to bribe the king, diſpatched Timocrates the Rhodian with 50 talents into Greece, in order to try whether he could there meet with any perſons leſs incorruptible than the Spartan monarch. This agent found many who inclined to accept his offers; particularly in Thebes, Corinth, and Argos. By diſtributing the money in a proper manner, he inflamed the inhabitants of theſe three cities againſt the Spartans; and of all others the Thebans came into his terms with the greateſt readineſs. They ſaw that their antagoniſts would not of their own accord break with any of the ſtates of Greece, and did not chooſe to begin the war themſelves, becauſe the chiefs of the Perſian faction were unwilling to be accountable for the event. For this reaſon they perſuaded the Locrians to invade a ſmall diſtrict which lay in diſpute betwixt the Phocians and themſelves. On this the Phocians invaded Locris; the Locrians applied to the Thebans, and the Phocians to the Spartans. The latter were glad of an opportunity of breaking with the Thebans; but met with a much warmer reception than they expected. Their old general Lyſander, who had reduced Athens, was defeated and killed, with the loſs of 1000 men: on which diſaſter Ageſilaus was recalled, and obliged to relinquiſh all hopes of conquering the Perſians. His return changed the fortune of the war ſo much, that all the ſtates began to grow weary of a conteſt from which nobody derived any advantage except the king of Perſia. In a ſhort time a treaty was concluded, known in hiſtory by the name of the *peace of Antaleidas*. The terms of this treaty were highly diſadvantageous and diſhonourable to the Greeks †; for even the Spartans, though ſucceſsful in Greece, had loſt a great battle at ſea with the Perſian fleet under Conon the Athenian, which entirely broke their power in Aſia.

9 A general combina- tion again Sparta.

10 Peace of Antaleidas.

By the peace of Antaleidas, the government of Bœotia was taken from the Thebans, which they had for a long time enjoyed; and by this they were ſo much provoked, that at firſt they abſolutely refuſed to accede to the treaty; but as Ageſilaus made great preparations to invade them, they thought proper at laſt to comply. However, it was not long before a new war commenced, which threatened the total ſubverſion of the Spartan ſtate. As, by the peace of Antaleidas, the king of Perſia had in a manner guaranteed the ſovereignty of Greece to Sparta, this republic very ſoon began to exerciſe its power to the utmoſt extent. The Mantineans were the firſt who felt the weight of their reſentment, although they had been their allies and confederates. In order to have a pretence for making war againſt them, they commanded them to quit their city, and to retire into five old villages which, they ſaid, had ſerved their forefathers, and where they would live in peace themſelves, and give no umbrage to their neighbours. This being refuſed, an army was ſent againſt them to beſiege their city. The ſiege was continued through the ſummer with very little ſucceſs on the part of the Spartans; but having during the winter ſeaſon dammed up the river on which the city ſtood, the water roſe to ſuch an height, as either to overflow or throw down the houſes; which compelled the Mantineans to ſubmit to the terms preſcribed to them, and to retire into the old villages. The Spartan vengeance fell next on the Phliaſians and Olynthians, whom they forced to come into ſuch meaſures as they thought proper. After this they fell on the Thebans; and, by attempting to ſeize on the Piræum, drew the Athenians alſo into the quarrel. But here their carreer was ſtopped: the Thebans had been taught the art of war by Chabrias the Athenian; ſo that even Age-

11 Hoſtilities recommen- ced.

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† See *Perſia*, n° 23.

12 power Sparta irely ken.

Ageſilaus himſelf took the command of the Spartan army in vain. At ſea they were defeated by Timotheus the ſon of Conon; and by land the battle of Leuctra put an end to the ſuperiority which Sparta had held over Greece for near 500 years. See Leucera.

After this dreadful defeat, the Spartans had occaſion to exert all their courage and reſolution. The women, and neareſt relations of thoſe who were killed in battle, inſtead of ſpending their time in lamentations, ſhook each other by the hand, while the relations of thoſe who had eſcaped from the battle hid themſelves among the women; or if they were obliged to go abroad, they appeared in tattered cloaths, with their arms folded, and their eyes fixed on the ground. It was a law among the Spartans, that ſuch as fled from battle ſhould be degraded from their honours, ſhould be conſtrained to appear in garments patched with divers colours, to wear their beards half-ſhaved, and to ſuffer any to beat them who pleaſed, without reſiſtance. At preſent, however, this law was diſpenſed with; and Ageſilaus by his prudent conduct kept up the ſpirits of the people, at the ſame time that by his ſkill in military affairs he checked the progreſs of the enemy. Yet, during the lifetime of Epaminondas the Theban general, the war went on greatly to the diſadvantage of the Spartans; but he being killed at the battle of Mantinæa, all parties became quickly deſirous of peace. Ageſilaus did not long ſurvive; and with him, we may ſay, periſhed the glory of Sparta. Soon after this all the ſtates of Greece fell under the power of Alexander the Great; and the Spartans, as well as the reſt, having become corrupt, and loſt their martial ſpirit, became a prey to domeſtic tyrants, and to foreign invaders. They maintained their ground, however, with great reſolution againſt the celebrated Pyrrhus king of Epirus; whom they repulſed for three days ſucceſſively, though not without aſſiſtance from one of the captains of Antigonus. Soon after this one of the kings of Sparta named *Agis*, perceiving the univerſal degeneracy that had taken place, made an attempt to reſtore the laws and diſcipline of Lycurgus, by which he ſuppoſed the ſtate would be reſtored to its former glory. But though at firſt he met with ſome appearance of ſucceſs, he was in a ſhort time tried and condemned by the ephori as a traitor to his country.—Cleomenes, however, who aſcended the throne in 216 B. C. accompliſhed the reformation which Agis had attempted in vain. He ſuppreſſed the ephori; cancelled all debts; divided the lands equally, as they had been in the time of Lycurgus; and put an end to the luxury which prevailed among the citizens. But at laſt he was overborne by the number of enemies which ſurrounded him; and being defeated in battle by Antigonus, he fled to Egypt, where he put an end to his own life. With him periſhed every hope of retrieving the affairs of Sparta: the city for the preſent fell into the hands of Antigonus; after which a ſucceſſion of tyrants took place; till at laſt all diſturbances were ended by the Romans, who reduced Macedon and Greece to provinces of their empire, as has been related under theſe articles.

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It remains now only to ſay ſomething concerning the character, manners, and cuſtoms of the Spartans, which, as they were founded on the laws of Lycurgus, may beſt be learned from a view of theſe laws.

15 His laws concerning religion.

The inſtitutions of Lycurgus were divided into 12 twelve tables.—The firſt comprehended ſuch of the Spartan laws as regarded religion. The ſtatues of all the gods and goddeſſes were repreſented in armour, even to Venus herſelf; the reaſon of which was, that the people might conceive a military life the moſt noble and honourable, and not attribute, as other nations did, ſloth and luxury to the gods. As to ſacrifices, they conſiſted of things of very ſmall value; for which Lycurgus himſelf gave this reaſon, That want might never hinder them from worſhipping the gods. They were forbidden to make long or raſh prayers to the heavenly powers, and were enjoined to aſk no more than that they might live honeſtly and diſcharge their duty. Graves were permitted to be made within the bounds of the city, contrary to the cuſtom of moſt of the Greek nations; nay, they buried cloſe by their temples, that all degrees of people might be made familiar with death, and not conceive it ſuch a dreadful thing as it was generally eſteemed elſewhere: on the ſame account the touching of dead bodies, or aſſiſting at funerals, made none unclean, but were held to be as innocent and honourable duties as any other. There was nothing thrown into the grave with the dead body; magnificent ſepulchres were forbidden; neither was there ſo much as an inſcription, however plain or modeſt, permitted. Tears, ſighs, outcries, were not allowed in public, becauſe they were thought diſhonourable in Spartans, whom their lawgiver would have to bear all things with equanimity. Mournings were ſtinted to 11 days; on the 12th the mourner ſacrificed to Ceres, and threw aſide his or her weeds. In favour of ſuch as were ſlain in the wars, however, and of women who devoted themſelves to a religious life, there was an exception allowed as to the rules beforementioned; for ſuch had a ſhort and decent inſcription on their tombs. When a number of Spartans fell in battle, at a diſtance from their country, many of them were buried together under one common tomb; but if they fell on the frontiers of their own ſtate, then their bodies were carefully carried back to Sparta, and interred in their family-ſepulchres.

16 Concerning the diviſion of land.

II. Lycurgus divided all the country of Laconia into 30,000 equal ſhares: the city of Sparta he divided into 9,000, as ſome ſay; into 6000, as others ſay; and, as a third party will have it, into 4500. The intent of the legiſlator was, that property ſhould be equally divided amongſt his citizens, ſo that none might be powerful enough to oppreſs his fellows, or any be in ſuch neceſſity, as to be therefrom in danger of corruption. With the ſame view he forbad the buying or ſelling theſe poſſeſſions. If a ſtranger acquired a right to any of theſe ſhares, he might quietly enjoy it, provided he ſubmitted to the laws of the republic. The city of Sparta was unwalled; Lycurgus truſting it rather to the virtue of its citizens than to the art of maſons. As to the houſes, they were very plain; for their cielings could only be wrought by the ax, and their gates and doors only by the ſaw; and their utenſils were to be of a like ſtamp, that luxury might have no inſtruments among them.

17 Of the citizens, children, &c.

III. The citizens were to be neither more nor leſs than the number of city-lots; and if at any time there happened to be more, they were to be led out in colonies. As to children, their laws were equally harſh and unreaſonable; for a father was directed to carry his new-born infant to a certain place, where the graveſt men of his tribe looked upon the infant; and if they perceived its limbs ſtraight, and thought it had a wholeſome look, then they returned it to its parents to be educated; otherwiſe it was thrown into a deep cavern at the foot of the mountain Taygetus. This law ſeems to have had one very good effect, viz. making women very careful, when they were with child, of either eating, drinking, or exerciſing, to exceſs: it made them alſo excellent nurſes; for which they were in mighty requeſt throughout Greece. Strangers were not allowed to reſide long in the city, that they might not corrupt the Spartans by teaching them new cuſtoms. Citizens were alſo forbid to travel for the ſame reaſon, unleſs the good of the ſtate required it. Such as were not bred up in their youth according to the law, were not allowed the liberty of the city, becauſe they held it unreaſonable, that one who had not ſubmitted to the laws in his youth ſhould receive the benefit of them when a man. They never preferred any ſtranger to a public office; but if at any time they had occaſion for a perſon not born a Spartan, they firſt made him a citizen, and then preferred him.

18 Of celibacy and marriage.

IV. Celibacy in men was infamous, and puniſhed in a moſt extraordinary manner; for the old batchelor was conſtrained to walk naked, in the depth of winter, through the market-place: while he did this, he was obliged to ſing a ſong in diſparagement of himſelf; and he had none of the honours paid him which otherwiſe belonged to old age, it being held unreaſonable, that the youth ſhould venerate him who was reſolved to leave none of his progeny behind him, to revere them when they grew old in their turns. The time of marriage was alſo fixed; and if a man did not marry when he was of full age, he was liable to an action; as were ſuch alſo as married above or below themſelves. Such as had three children had great immunities; ſuch as had four were free from all taxes whatſoever. Virgins were married without portions; becauſe neither want ſhould hinder a man, nor riches induce him, to marry contrary to his inclinations. When a marriage was agreed on, the huſband committed a kind of rape upon his bride. Huſbands went, for a long time, ſecretly and by ſtealth, to the beds of their wives, that their love might not be quickly and eaſily extinguiſhed. Huſbands were allowed to lend their wives; but the kings, however, were forbid to take this liberty. Some other laws of the like nature there were, which as they were evidently againſt modeſty, ſo they were far from producing the ends for which Lycurgus deſigned them; ſince, though the men of Sparta were generally remarkable for their virtue, the Spartan women were as generally decried for their boldneſs and contempt of decency.

19 Education of their children.

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and unreaſonable; for a father was directed to carry his new-born infant to a certain place, where the graveſt men of his tribe looked upon the infant; and if they perceived its limbs ſtraight, and thought it had a wholeſome look, then they returned it to its parents to be educated; otherwiſe it was thrown into a deep cavern at the foot of the mountain Taygetus. This law ſeems to have had one very good effect, viz. making women very careful, when they were with child, of either eating, drinking, or exerciſing, to exceſs: it made them alſo excellent nurſes; for which they were in mighty requeſt throughout Greece. Strangers were not allowed to reſide long in the city, that they might not corrupt the Spartans by teaching them new cuſtoms. Citizens were alſo forbid to travel for the ſame reaſon, unleſs the good of the ſtate required it. Such as were not bred up in their youth according to the law, were not allowed the liberty of the city, becauſe they held it unreaſonable, that one who had not ſubmitted to the laws in his youth ſhould receive the benefit of them when a man. They never preferred any ſtranger to a public office; but if at any time they had occaſion for a perſon not born a Spartan, they firſt made him a citizen, and then preferred him.

18 Of celibacy and marriage.

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Sparta. loved, as thoſe that were to build up and continue the future glory of the ſtate, yet in Sparta it was a virtuous and modeſt affection, untinged with that ſenſuality which was ſo ſcandalous at Athens. The good effects of this part of Lycurgus's inſtitutions were ſeen in the union that reigned among his citizens; and which was ſo extraordinary, that even in caſes of competition, it was hardly known that rivals bore ill-will to each other; but, on the contrary, their love to the ſame perſon begat a ſecondary friendſhip among themſelves, and united them in all things which might be for the benefit of the perſon beloved.

Some authors have accuſed this great lawgiver of encouraging theft in his inſtitutions; which, they ſay, was not held ſcandalous among the Spartans, if it were ſo dexterouſly managed as that the perſon was not detected in it. But this is certain, and ſeems to be a ſtrong contradiction of the heinous charge, that when a theft was diſcovered, it was puniſhed with the utmoſt ſeverity: a perſon even ſuſpected of it would endure the heavieſt puniſhments rather than acknowledge it, and be branded with ſo baſe a crime.

22 Exercises. IX. The exerciſes inſtituted by law fall under the ninth table. In theſe all the Greeks were extremely careful; but the Lacedæmonians in a degree beyond the reſt: for if a youth, by his corpulence, or any other means, became unfit for theſe exerciſes, he underwent public contempt at leaſt, if not baniſhment. Hunting was the uſual diverſion of their children; nay, it was made a part of their education, becauſe it had a tendency to ſtrengthen their limbs, and to render thoſe who practiſed it ſupple and fleet: they likewiſe bred up dogs for hunting with great care. They had a kind of public dances, in which they exceedingly delighted, and which were common alike to virgins and young men: indeed, in all their ſports, girls were allowed to divert themſelves with the youths; inſomuch that, at darting, throwing the quoit, pitching the bar, and ſuch-like robuſt diverſions, the women were as dexterous as the men. For the manifeſt oddity of this proceeding, Lycurgus aſſigned no other reaſon, than that he ſought to render women, as well as men, ſtrong and healthy, that the children they brought forth might be ſo too. Violent exerciſes, and a laborious kind of life, were only enjoined the youth; for when they were grown up to mens eſtate, that is, were upwards of 30 years old, they were exempted from all kinds of labour, and employed themſelves wholly either in affairs of ſtate or in war. They had a method of whipping, at a certain time, young lads in the temple of Diana, and about her altar; which, however palliated, was certainly unnatural and cruel. It was eſteemed a great honour for lads to ſuſtain theſe flagellations without weeping, groaning, or ſhowing any ſenſe of pain; and the thirſt of glory was ſo ſtrong in theſe young minds, that they very frequently ſuffered death without ſhedding a tear or breathing a ſigh. A deſire of overcoming all the weakneſſes of human nature, and thereby rendering his Spartans not only ſuperior to their neighbours, but to their ſpecies, runs through many of the inſtitutions of Lycurgus; which principle, if well attended to, thoroughly explains them, and without attending to which it is impoſſible to give any account of them at all.

23 Money, &c. X. Gold and ſilver were, by the conſtitutions of Lycurgus, made of no value in Sparta. He was ſo well appriſed of the danger of riches, that he made the very poſſeſſion of them venal; but as there was no living without ſome ſort of money, that is, ſome common meaſure or ſtandard of the worth of things, he directed an iron coinage, whereby the Spartans were ſupplied with the uſeful money, and at the ſame time had no temptation to covetouſneſs afforded them; for a very ſmall ſum was ſufficient to load a couple of horſes, and a great one muſt have been kept in a barn or warehouſe. The coming in of all foreign money was alſo prohibited, that corruption might not enter under the name of commerce. The moſt ancient method of dealing, viz. by barter, or exchange of one commodity for another, was preſerved by law in Sparta long after it had been out of date every where elſe. Intereſt was a thing forbid in the Spartan commonwealth; where they had alſo a law againſt alienation of lands, accepting preſents from foreigners, even without the limits of their own country, and when their authority and character might well ſeem to excuſe them.

24 Courts of juſtice. XI. Such of the laws of Sparta as related to courts of juſtice may be brought under the 11th table. Thirty years muſt have paſſed over the head of him who had a right to concern himſelf in juridical proceedings. Young men were thought unfit for them; and it was even held indecent, and of ill report, for a man to have any fondneſs for law-ſuits, or to be buſying himſelf at the tribunals, when he had no affairs there of his own. By theſe rules Lycurgus thought to ſhut out litigiouſneſs, and to prevent that multiplicity of ſuits which is always ſcandalous in a ſtate. As young people were not permitted to inquire about the laws of other countries, and as they were hindered from hearing judicial proceedings in their courts, ſo they were likewiſe forbidden to aſk any queſtions about, or to endeavour to diſcover, the reaſons of the laws by which themſelves were governed. Obedience was their duty; and to that alone they would have them kept. Men of abandoned characters, or who were notoriouſly of ill fame, loſt all right of giving their votes in reſpect of public affairs, or of ſpeaking in public aſſemblies; for they would not believe that an ill man in private life could mean his country better than he did his neighbour.

25 Military ſervice. XII. Till a man was 30 years old, he was not capable of ſerving in the army, as the beſt authors agree; though ſome think that the military age is not well aſcertained by ancient writers. They were forbidden to march at any time before the full-moon; the reaſon of which law is very hard to be diſcovered, if indeed it had any reaſon at all, or was not rather founded on ſome ſuperſtitious opinion, that this was a more lucky conjuncture than any other. They were likewiſe forbidden to fight often againſt the ſame enemy; which was one of the wiſeſt maxims in the political ſyſtem of Lycurgus: and Ageſilaus, by offending againſt it, deſtroyed the power of his country, and loſt her that authority which for many ages ſhe maintained over the reſt of Greece; for, by continually warring againſt the Thebans, to whom he had an inveterate hatred, he at laſt beat them into the knowledge of the art of war, and enabled them, under the command of Epaminondas, to maintain for a time the

principality of Greece. Maritime affairs they were forbidden to meddle with; though the neceſſity of things compelled them, in proceſs of time, to tranſgreſs this inſtitution, and by degrees to transfer to themſelves as well the dominion at ſea as land: but, after the Peloponneſian war they again neglected naval affairs, from a perſuaſion that ſailors and ſtrangers corrupted thoſe with whom they converſed. As they never fortified Sparta, they were not ready to undertake ſieges: fighting in the field was their proper province, and, while they could overcome their enemies there, they rightly conceived, that nothing could hurt them at home. In time of war, they relaxed ſomewhat of their ſtrict manner of living, in which they were ſingular. The true reaſon for this was, in all probability, that war might be leſs burdenſome to them; for, as we have more than once obſerved, a ſtrong deſire to render them bold and warlike was the reigning paſſion of their legiſlator. They were forbidden to remain long encamped in the ſame place, as well to hinder their being ſurpriſed, as that they might be more troubleſome to their enemies, by waſting every corner of their country. They ſlept all night in their armour; but their outguards were not allowed their ſhields, that, being unprovided of defence, they might not dare to ſleep. In all expeditions they were careful in the performance of religious rites; and, after their evening-meal was over, the ſoldiers ſung together hymns to their gods. When they were about to engage, the king ſacrificed to the muſes, that, by their aſſiſtance, they might be enabled to perform deeds worthy of being recorded to lateſt times. Then the army advanced in order to the ſound of flutes, which played the hymn of Caſtor. The king himſelf ſung the pæan, which was the ſignal to charge. This was done with all the ſolemnity imaginable; and the ſoldiers were ſure either to die or conquer: indeed they had no other choice; for if they fled they were infamous, and in danger of being ſlain, even by their own mothers, for diſgracing their families. In this conſiſted all the excellency of the Spartan women, who, if poſſible, exceeded in bravery the men, never lamenting over huſbands or ſons, if they died honourably in the field; but deploring the ſhame brought on their houſe, if either the one or the other eſcaped by flight. The throwing away a ſhield alſo induced infamy; and, with reſpect to this, mothers, when they embraced their departing ſons, were wont to caution them, that they ſhould either return armed as they were, or be brought back ſo when they were dead; for, as we have obſerved, ſuch as were ſlain in battle were nevertheleſs buried in their own country. When they made their enemies fly, they purſued no longer than till victory was certain; becauſe they would ſeem to fight rather for the honour of conquering, than of putting their enemies to death. According to their ancient rules of war, they were bound not to ſpoil the dead bodies of their enemies; but in proceſs of time, this, and indeed many other of their moſt excellent regulations, fell into deſuetude. He who overcame by ſtratagem, offered up an ox to Mars; whereas he who conquered by force, offered up only a cock; the former being eſteemed more manly than the latter. After 40 years ſervice, a man was, by law, no longer required to go into the field; and conſequently if the military age was 30, the Spartans were not held invalids till they were 70.

SPARTIANUS (Ælius), a Latin hiſtorian, who wrote the lives of Adrian, Caracalla, and four other Roman emperors. He lived under the reign of Diocleſian, about the year 290.

SPARTIUM, BROOM; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are 10 ſpecies, all of them of ſhrubby growth. Of theſe one is the common broom, which grows naturally in this country; the reſt are exotics, chiefly from Spain, Portugal, Italy, and other ſouthern parts of Europe, and the Levant. Three of theſe, viz. the ſcoparium, or common broom; the junceum, or yellow Spaniſh broom; and the radiatum, or ſtarry Italian broom, are hardy: but all the reſt require the ſhelter of a green-houſe in ſevere winters.—They are all propagated by ſeeds.—The young flowers of the common broom are ſometimes preſerved as pickles; and the plant when burnt affords a tolerably pure alkaline ſalt. Dr Mead relates, that a dropſical patient, who had taken the uſual remedies, and been tapped three times without effect, was cured by taking half a pint of the decoction of green broom tops, with a ſpoonful of whole muſtard-ſeed every morning and evening. "An infuſion of the ſeeds drank freely (ſays Mr Withering) has been known to produce ſimilar happy effects; but whoever expects theſe effects to follow in every dropſical caſe, will be greatly deceived. I knew them ſucceed in one caſe that was truly deplorable; but out of a great number of caſes in which the medicine had a fair trial, this proved a ſingle inſtance. The branches or ſtalks of common broom being dried in the ſun, and treated like hemp, produce threads which may be ſpun, and worked into a coarſe linen-cloth. The wood of a Weſt Indian ſpecies of broom, called by Millar the *ſpartium arboreſcens*, and frequently known by the name of *American ebony*, is of a fine greeniſh brown colour, hard, durable, and takes an exceeding fine poliſh.

SPARUS, the GILTHEAD; a genus of fiſhes belonging to the order of thoracici. The fore-teeth and dog-teeth are very ſtrong; the grinders are obtuſe and thick ſet; the lips are folded over; there are five rays in the gill membrane; and the opercula are ſcaly: the body is compreſſed; the lateral line is crooked behind; and the pectoral fins are roundiſh.

There are 26 ſpecies, three of which are natives of the Britiſh ſeas. The lunulated gilthead grows to the weight of ten pounds, and takes its name from the predominant colour; that of the fore-head and ſides being as if gilt; but the latter are tinged with brown. It is one of the *piſces ſaxatiles*, or fiſh that haunts deep waters on bold rocky ſhores. They feed chiefly on ſhell-fiſh, which they comminute with their teeth before they ſwallow; the teeth of this genus in particular being adapted for that purpoſe: the grinders are flat and ſtrong, like thoſe of certain quadrupeds; beſides which, there are certain bones in the lower part of the mouth that aſſiſt in grinding their food. They are but a coarſe fiſh: they were known to the Romans, who did not eſteem them unleſs they were fed with Lucrine oyſters, as Martial informs us,

Non omnis laudem pretiumque AURATA *meretur*
Sed cui ſolus erit concha Lucrina cibus. Lib. xiii. Ep. 90.

In the account of captain Cook's voyage publiſhed by Mr Forſter, we are informed, that the giltheads are ſometimes poiſonous, owing to their feeding on certain ſpecies of the raja, which have an extremely acrid and ſtimulating property.

SPASM, a convulſion. See MEDICINE, n° 135, 191.

SPATHA, in botany, a ſheath; a ſpecies of calix which burſts lengthwiſe, and protrudes a ſtalk ſupporting one or more flowers, which commonly have no perianthium or flower-cup.

SPATHACEÆ, (from *ſpatha*, a "ſheath"), the name of the ninth order in Linnæus's Fragments of a Natural Method, conſiſting of plants whoſe flowers are protruded from a ſpatha or ſheath. See BOTANY, p. 1306.

SPAWN, in natural hiſtory, the eggs of fiſhes or frogs. See FISH, and RANA.

SPAVIN, in the manege, a diſeaſe in horſes, being a ſwelling or ſtiffneſs, uſually in the ham, occaſioning a lameneſs. See FARRIERY, § xxvii. and xxxii. 2, 3.

SPAYING, or SPADING, the operation of caſtrating the females of ſeveral kinds of animals, as ſows, bitches, &c. to prevent any further conception, and promote their fattening. It is performed by cutting them in the mid flank, on the left ſide, with a ſharp knife or lancet, taking out the uterus and cutting it off, and ſo ſtitching up the wound, anointing the part with tar, and keeping the animal warm for two or three days. The uſual way is to make the inciſion aſlope, two inches and a half long; that the fore-finger may be put in towards the back, to feel for the ovaries, which are two kernels as big as acorns on both ſides of the uterus, one of which is drawn to the wound, and thus both taken out.

SPEAKER *of the Houſe of Commons*, a member of the houſe elected by a majority of votes thereof to act as chairman or preſident in putting queſtions, reading briefs, or bills, keeping order, reprimanding the refractory, adjourning the houſe, &c. See PARLIAMENT.

SPEAKING, the art or act of expreſſing one's thoughts in articulate ſounds or words. See GRAMMAR, LANGUAGE, READING, n° vi. vii. and ORATORY, part iv.

SPEAKING-*Trumpet*. See ACOUSTICS, n° 26.

SPECIAL, ſomething that is particular, or has a particular deſignation; from the Latin *ſpecies*, in oppoſition to the *general*, from *genus*.

SPECIES, in logic, a relative term expreſſing an idea which is compriſed under ſome general one called a *genus*. See LOGIC, n° 18. &c.

SPECIES, in commerce, are the ſeveral pieces of gold, ſilver, copper, &c. which having paſſed their full preparation and coinage, are current in public. See MONEY.

SPECIFIC, in philoſophy, that which is peculiar to any thing, and diſtinguiſhes it from all others.

SPECIFICS, in medicine. By ſpecifics is not meant ſuch as infallibly and in all patients produce ſalutary effects. Such medicines are not to be expected, becauſe the operations and effects of remedies are not formally inherent in them, but depend upon the mutual action and reaction of the body and medicine upon each other; hence the various effects of the ſame medicine in the ſame kind of diſorders in different patients, and in the ſame patient at different times. By ſpecific medicines we underſtand ſuch medicines as are more infallible than any other in any particular diſorder.

SPECTACLES, in dioptrics, a machine conſiſting of two lenſes ſet in ſilver, horn, &c. to aſſiſt the defects of the organ of ſight. Old people, and others who have flat eyes, uſe convex ſpectacles, which cauſe the rays of light converge ſo as to fall upon the retina: whereas myopes, or ſhort-ſighted people, uſe concave lenſes for ſpectacles, which cauſes the rays to diverge, and prevent their meeting ere they reach the retina. See OPTICS, n° 66.

SPECULARIS LAPIS, in natural hiſtory, a genus of talcs, compoſed of large plates viſibly ſeparate, and of extreme thinneſs; and each fiſſile again ſeparated into a number of plates ſtill finer. See TALC. Of this genus there are three ſpecies: 1. The white ſhining ſpecularis, with large and broad leaves, commonly called *iſinglaſs and Muſcovy-glaſs*: its lamellæ, or leaves, are extremely thin, elaſtic, and tranſparant; it makes not the leaſt effervеſcence with aqua-fortis, and is not eaſily calcined in the fire. It is imported in great quantities; the miniature-painters cover their pictures with it; the lantern-makers ſometimes uſe it inſtead of horn; and minute objects are uſually preſerved between two plates of it, for examination by the microſcope. 2. The bright brown ſpecularis, with broad leaves; a very valuable ſpecies, though inferior to the former. 3. The purple bright ſpecularis, with braod leaves; which is the moſt elegant of all the talcs, and not leſs beautifully tranſparent than the firſt kind.

SPECULATIVE, ſomething relating to the theory of ſome art or ſcience, in contradiſtinction to practical.

SPECULUM, a LOOKING-GLASS, or *Mirrour*, capable of reflecting the rays of the ſun, &c. See OPTICS, n° 160, 161. p. 5575. 5576.

SPECULUM, in ſurgery, an inſtrument for dilating a wound, or the like, in order to examine it attentively. See SURGERY.

SPECULUMS, for reflecting teleſcopes. See OPTICS, p. 5603, 5619.

SPEECH, in general, the art or act of expreſſing a perſon's thoughts by means of articulate ſounds, which we call words. See LANGUAGE, GRAMMAR, READING, n° vi. vii. and ORATORY, part iv.

SPEED (John), an eminent Engliſh hiſtorian, was born at Farington, in Cheſhire, in 1552. He was by profeſſion a taylor, and free of the company of merchant-taylors in the city of London. In 1606, he publiſhed his Theatre of Great Britain, which was afterwards reprinted in folio, under the title of the *Theatre of the Empire of Great Britaine*. His Genealogies of Scripture were firſt bound up with the Bible in 1611, which was the firſt edition of the preſent tranſlation. In 1614, appeared his *Hiſtory of Great Britaine*, which has been tranſlated into Latin; and in 1616 he publiſhed his *Cloud of Witneſſes*, in octavo. He lived in marriage 57 years with his wife, by whom he had twelve ſons and ſix daughters; and died in 1629. He was interred in the church of St Giles's, Cripplegate, London, where a monument was erected to his memory.

SPEEDWELL, in botany. See VERONICA.

SPELL, in general, denotes the ſame with CHARM or ANULET.

SPELLING, in grammar, that part of orthograghy which teaches the true manner of reſolving words into their ſyllables.

All words are either ſimple or compound, as *uſe, diſuſe; done, undone;* and the rules for dividing each, muſt be ſuch as are derived from the analogy of language in general, or from the eſtabliſhed cuſtom of ſpeaking; which, for the Engliſh language, are reduced to the following rules: 1. A conſonant between two vowels muſt be joined with the latter in ſpelling, as *na-ture, ve-ri-ly, ge-ne-rous:* except, however, the letter *x*, which is joined to the firſt, as in *flax-en, ox-en*, &c. and compound words, as in *up-on, un-uſed*, &c. 2. A double conſonant muſt be divided, as in *let-ter, man ner*, &c. 3. Thoſe conſonants which can begin a word, muſt not be parted in ſpelling, as in *de-fraud, re-prove, di-ſtinct:* however, this rule is found ſometimes to fail; for though *gn* begins a word, as *gnaw gnat*, &c. yet it muſt be divided in ſpelling, as in *cog-ni-zance, ma-lig-ni-ty*, &c. 4. Thoſe conſonants which cannot begin a word muſt be divided, as *ld* in *ſel-dom*, *lt* in *mul-ti tude*, *mp* in *tem-per*, *rd* in *ar-dent;* but in final ſyllables there are exceptions, as *tl* in *ti-tle*, *dl* in *han-dle*, &c. 5. When two vowels come together, and are both of them diſtinctly ſounded, they muſt be ſeparated in ſpelling, as in *co-e val, mu-tu-al*, &c. 6. The grammatical terminations or endings, muſt be ſeparated in ſpelling, as in *ed* in *wing-ed*, *edſt* in *de-li-ver-edſt*, *ing* in *hear-ing*, *ance* in *de-li-ver-ance*, &c. 7. Compound words muſt be reſolved into their ſimple or componant words, as *up-on, in-to, never-the-leſs, not-with-ſtand-ing*, &c.

SPELMAN, (Sir Henry) an eminent Engliſh antiquarian, was deſcended from an ancient family, and born at Cengham, near Lynn in Norfolk, about the year 1561. He was knighted by king James I. who had a particular eſteem for him on account of his known capacity for buſineſs; and he employed him ſeveral times in Ireland on public affairs. When he was about 50 years of age, he went to reſide in London; where falling into a ſtudy to which his own genius had always inclined him, he collected all ſuch books and Mſs. as concerned the ſubject af antiquities, either foreign or domeſtic. In 1626, he publiſhed the firſt part of his well-known Gloſſary, which he never carried beyond the letter L; becauſe, as ſome have ſuggeſted, he had ſaid things under "Magna charta," and "Maximum conſilium," that could not then have appeared without giving offence. Upon his death all his papers came into the hands of his ſon Sir John Spelman, a gentleman who had abilities to have completed his father's deſign, if death had not prevented him. The ſecond part was afterwards publiſhed by Sir William Dugdale; but with all the marks of a ſcanty unfiniſhed performance. The next work he entered upon, was an edition of the Engliſh Councils, of which he publiſhed the firſt volume about two years before his death; leaving the ſecond volume, as well of this as of his Gloſſary, to be publiſhed by Sir William Dugdale. Sir Henry wrote ſeveral other things, all relating to ancient laws and cuſtoms; and died in 1641. His Poſthumous Works were publiſhed in folio, 1698, under the inſpection of Mr Gibſon, afterwards biſhop of London.

SPELTER, in metallurgy, the ſame with ZINC.

SPENSER (Edmund), was born in London, in the year 1553, and deſcended from an ancient family of the Spenſers in Northamptonſhire. All we know concerning his education is, that he was admitted a ſizer of Pembroke-hall in Cambridge, and matriculated in 1569. At this time began his intimacy with Mr Gabriel Harvey, a man of genius and a poet. In 1576, having completed his degrees in arts, he left the univerſity, as it is conjectured, for want of ſubſiſtence, and retired to the north of England. Here he had the misfortune to become enamoured of his Roſalind, who, after flattering his paſſion for a time, at length preferred his happier rival. Spenſer continued in the country till the year 1578, when, at the perſuaſion of his friend Mr Harvey, he removed to London, where that gentleman introduced him to Mr Sidney, (afterward Sir Philip). Concerning his firſt introduction to Sir Philip, there is indeed a different ſtory, which was firſt told by the writer of his life, prefixed to his works in 1679, and tranſcribed by Hughes, Cibber, and ſeveral others; which, nevertheleſs, is certainly not true. The purport of it is, that Spenſer, being unknown to this Mecænas of the age, went to Leiceſter houſe, and ſent in the 9th canto of the firſt book of the Fairy Queen; that, on reading part of it, Sir Philip ordered his ſteward to give the bearer 50 l.; on reading a little farther, 50l. more; then 200 l. bidding him to make haſte and pay the money, leſt he ſhould give the poet his whole eſtate. The ſtory tells prettily enough; but it is very certain, that the Fairy Queen was begun long after his acquaintance with Sir Philip. By this univerſal patron of genius, however, he was preſented to queen Elizabeth, who honoured him with the place of poet-laureat. About this time he finiſhed his Shepherd's Calendar, which was firſt printed in 1579; and in the following year, being recommended by his patron to the earl of Leiceſter, he went to Ireland as ſecretary to the lord Grey of Wilton, then appointed lord lieutenant of that kingdom. Lord Grey was recalled in 1582, and with him Spenſer returned to London, where he continued till after the death of Sir Philip Sidney in 1586; a loſs which he bewailed to the end of his life. The following year, our poet, having obtained a royal grant of 3000 acres of forfeited lands in the county of Cork in Ireland, ſet out for that kingdom, took poſſeſſion of his eſtate, and fixed his reſidence in the caſtle of Kilcolman, which had belonged to the earl of Deſmond. In this retirement he reſumed his great work of the Fairy Queen, and continued in Ireland till, being viſited by his old friend Sir Walter Raleigh in 1589, he came over with him to England; but returned to Ireland the year following, where he fell in love with a country-girl, and married her. Soon after his marriage, he paid another viſit to his native country, where we alſo find him in 1596. In the following year he returned once more to Kilcolman; but on the rebellion of Lord Tyrone, who ravaged the whole county of Cork, he was obliged to fly for ſafety with his family to England, where, in the year 1599, he died in extreme poverty. He was buried in Weſtminſter Abbey, according to his requeſt, near Chaucer. A monument was erected to his memory by Ann counteſs of Dorſet. We know but little of his character as a man; as a poet, conſidering the age in which he lived, he deſerves our utmoſt veneration. He wrote various pieces beſides thoſe above-mentioned. His whole works, with his life by Hughes, were publiſhed in ſix volumes 12mo, in 1715 and 1750.

SPENSER (Dr John), a very ingenious and learned Engliſh divine, born in Kent in 1630; who became maſter of Corpus Chriſti College, Cambridge, and afterwards dean of Ely. He publiſhed a Diſcourſe on Prodigies, which is a truly philoſophical and learned work; and another famous work *De legibus Hebræorum ritualibus, et eorum rationibus*: and after a life ſpent in the cloſeſt application to his ſtudies, died in 1695.

SPERGULA, SPURREY; a genus of the pentagynia order, belonging to the decandria claſs of plants. There are five ſpecies; of which the moſt remarkable is the arvenſis, or corn-ſpurrey, which grows in this country in gravelly ſoil and corn-fields. In Holland it is cultivated as food for cattle, and has the advantage of growing on the very pooreſt ſoils; but does not afford a great deal of food. Poultry are fond of the ſeeds; and the inhabitants of Finland and Norway make bread of them when their crops of corn fail. Horſes, ſheep, goats, and ſwine, eat it. Cows refuſe it.

SPERM, the ſeed whereof an animal is formed. See SEMEN.

SPERMACETI, a white flaky ſubſtance, prepared from the brain of a ſpecies of whale called *phyſeter microps*. See PHYSETER.

One of theſe fiſhes affords ſome tuns of brains; which are firſt groſsly freed from the oil by draining and preſſing, and afterwards more perfectly purified by ſteeping them in a ley of alkaline ſalt and quicklime, which diſſolves the remains of the oily matter into a ſaponaceous liquid. The brains being then waſhed with water, appear of a ſilver whiteneſs; and nothing more is required to complete the preparation than to cut them in ſhivers with wooden knives, and ſpreading them abroad to dry. Such is the ſimple proceſs by which this profitable commodity is prepared. It has been ſaid that ſpermaceti is a natural concrete, found floating on the ſurface of the northern ſeas; but this is plainly a falſe report, perhaps calculated to prevent inquiry into the manner of its preparation. Good ſpermaceti is in fine white flakes, gloſſy and ſemitranſparent, ſoft and unctuous to the touch, yet dry and eaſily friable; in taſte ſomewhat like butter; of a faint ſmell like that of tallow. It is apt, in keeping, if not carefully ſecured from the air, to grow yellowiſh, and contract a rancid fiſhy ſmell. The more perfectly it has been purified at firſt, the leſs ſuſceptible it is of theſe alterations; and after it has been changed, it may be rendered white and ſweet again, by ſteeping it afreſh in a ley of alkaline ſalt and quick-lime. It melts in a ſmall degree of heat, and congeals again as it cools. Laid on burning coals, it emits a fetid ſmell like that of the ſnuff of a candle. The contact of flame does not ſet it on fire, but with a wick it burns equally with common tallow-candles. In diſtillation it totally ariſes, leaving no coal or *caput mortuum* behind. From four ounces were obtained three ounces and a half of oil, and a dram and a half of phlegm; the other two drams and a half having been waſted or diſſipated in the proceſs. The oil is not a brown or black fetid empyreumatic one, like thoſe of other animal ſubſtances, but clear, yellowiſh, of a butyraceous conſiſtence, in ſmell like oil of wax, like which alſo it coagulates in the cold. Rectified ſpirit of wine, digeſted and boiled with ſpermaceti, takes up about half a dram out of half an ounce: greateſt part ſettles to the bottom, and the finer particles float in the liquor, in appearance like flowers of benzoine. Water long digeſted or boiled with it extracts nothing. By grinding it with ſugar or almonds, it becomes miſcible with water, but not near ſo perfectly as the vegetable reſins do by the ſame treatment: on ſtanding for a little time, the ſpermaceti ſeparates and floats on the ſurface. Yolks of eggs unite it more thoroughly with watery liquors; but when diſſolved by theſe alſo, it ſoon ſeparates and falls to the bottom. Even cauſtic alkaline ley does not diſſolve nor unite with it into ſoap, as it does with all other fats; and hence the uſe of this ley in its preparation and purification. It mingles ſufficiently with oils, fats, balſams, reſins, butter, wax, &c.

SPERMATIC, in anatomy, ſomething belonging to the ſperm or ſeed.

SPEY, a river of Scotland, riſing from a lake of the ſame name in Badenoch, and, after a ſerpentine courſe of 76 miles, paſſes by Rothes caſtle, and falls into the German ſea at Garnoch near Elgin. Mr Pennant tells us, that the Spey is a dangerous neighbour to Caſtle Gordon, overflowing frequently in a dreadful manner, as appears by its ravages far beyond its banks. The bed of the river is wide and full of gravel, and the channel very ſhifting. In 1746 the duke of Cumberland paſſed this river at Belly church, near Caſtle Gordon, when the channel was ſo deep as to take an officer, from whom Mr Pennant had the account, and who was ſix feet four inches high, up to the breaſt. The banks are here very high and ſteep; ſo that had not the rebels been infatuated in ſuch a manner as to neglect oppoſition, the paſſage muſt have been attended with conſiderable loſs. On this river there is a great ſalmon-fiſhery; about 1700 barrels full are caught in the ſeaſon, and the ſhore is rented for about 1200 l. *per annum*.

SPHACELUS, in ſurgery and medicine, an abſolute and perfect corruption or death of the parts.

SPHAGNUM, BOG-MOSS; a genus of the order of muſci belonging to the cryptogamia claſs of plants. There are three ſpecies; the moſt remarkable of which is the paluſtra, or common bog-moſs, which grows on our bogs in wide patches, ſo that it frequently covers a large portion of their ſurface. The ſtalks are from two inches to two feet long, irregularly ſurrounded with numerous, conical, pendant branches, and terminated with a roſaceous cluſter of erect ſhort ones. It is generally believed, that the roots and decayed ſtalks of this moſs conſtitute a principal part of that uſeful bituminous ſubſtance called *peat*, which is the chief fuel of the northern regions.—The Lapland matrons are well acquainted with this moſs. They dry and lay it in their cradle, to ſupply the place of bed, bolſter, and every covering; and, being changed night and morning, it keeps the infant remarkably clean, dry, and warm. It is ſufficiently ſoft of itſelf; but the tender mother, not ſatisfied with this, frequently covers the moſs with the downy hairs of the rein-deer; and by that means makes a moſt delicate neſt for the young babe.

Os SPHENOIDES, the ſeventh bone of the cranium or ſkull. See ANATOMY, n° 15.

SPHERE, is a ſolid contained under one uniform round ſurface, ſuch as would be formed by the revorution of a circle about one of its own diameters as an axis. See GEOMETRY.

Projection of the SPHERE. See PROJECTION.

SPHERE, in aſtronomy, that concave orb or expanſe which inveſts our globe, and in which the heavenly bodies appear to be fixed, and at an equal diſtance from the eye.

The better to determine the places of the heavenly bodies in the ſphere, ſeveral circles are ſuppoſed to be deſcribed on the ſurface thereof, hence called the *circles of the ſphere*: of theſe ſome are called *great circles*, as the equinoctial, ecliptic, meridian, &c. and others *ſmall circles*, as the tropics, parallels, &c. See GEOGRAPHY and ASTRONOMY, *paſſim*.

Armillary SPHERE. See GEOGRAPHY, ſect. ii.

SPHERE *of Activity of a Body*, is that determinate ſpace or extent to which, and no farther, the effluvia continually emitted from that body reach; and where they operate according to their nature.

SPHERES, in optics, the ſame with metalline mirrors for teleſcopes or other purpoſes. See OPTICS, p. 5613, 5619.

SPHEROID, in geometry, a ſolid approaching to the figure of a ſphere. It is generated by the entire revolution of a ſemi-ellipſis about its axis.

SPHINCTER, in anatomy, a term applied to a kind of circular muſcles, or muſcles in form of rings, which ſerve to cloſe and draw up ſeveral orifices of the body, and prevent the excretion of the contents.

SPHINX, in ſculpture, &c. a figure or repreſentation of a monſter of that name, famed among the ancients, now moſtly uſed as an ornament in gardens, terraces, &c. It is repreſented with the head and breaſts of a woman, the wings of a bird, the claws of a lion, and the reſt of the body like a dog. It is ſuppoſed to have been engendered by Typhon, and ſent by Juno to be revenged on the Thebans. Its office, they ſay, was to propoſe dark enigmatical queſtions to all paſſers-by; and if they did not give the explication thereof, to devour them. It made horrible ravages, as the ſtory goes, on a mountain near Thebes; and could not by any means be deſtroyed, till after Oedipus had ſolved the following riddle, "What animal is it that in the morning walks on four legs, at noon on two, and at night on three?" The anſwer was "Man."

Among the Egyptians, the ſphinx was the ſymbol of religion, by reaſon of the obſcurity of its myſteries: and on the ſame account the Romans placed a ſphinx in the porch of their temples.

SPICE, any kind of aromatic drug that has hot and pungent qualities: ſuch are pepper, nutmeg, ginger, cinnamon, cloves, &c.

SPICE-*Iſlands*, in the Eaſt Indies. See BANDA, MOLUCCA *Iſlands*, and CEYLON.

SPIDER, in zoology. See ARANEA.

SPIDERWORT, in botany. See PHALANGIUM.

SPIKE, or *Oil of* SPIKE, a name given to an eſſential oil diſtilled from lavender, and much uſed by the varniſh-makers and the painters in enamel.

SPIKENARD, in botany. See NARDUS.

SPINA VENTOSA, in ſurgery, that ſpecies of corruption of the bones which takes its riſe in the internal parts, and by degrees enlarges the bone, and raiſes it into a tumour. See SURGERY.

SPINACHIA, SPINACH; a genus of the pentandria order, belonging to the dioecia claſs of plants. There are two ſpecies. The common ſpecies intended for winter uſe ſhould be ſown on an open ſpot of ground in the latter end of July; obſerving to do it if poſſible when the weather is rainy. When the young plants are come up, the weeds muſt be deſtroyed, and the plants left at about five inches aſunder. The ground being kept clear of weeds, the ſpinach will be fit for uſe in October. The way of gathering it to advantage is only to take off the longeſt leaves, leaving thoſe in the centre to grow bigger; and at this rate a bed of ſpinach will furniſh the table for a whole winter, till the ſpinach ſown in ſpring is become fit for uſe, which is common in April.

SPINAGE, or SPINACH. See SPINACHIA.

SPINÆ, in botany, thorns, rigid prickles: a ſpecies of *arma*, growing on various parts of certain plants for their defence; *ſpinæ ramorum arcent pecora.* On the branches we find examples in the pyrus, prunus, citrus, hippophaes, gmelina, rhamnus, lycium, &c.; on the leaves in the aloe, agave, yucca, ilex, hippomane, theophraſta, carlina, &c.; on the calyx, in the carduus, cnicus, centauria, moluccella, galeopſis, &c.; on the fruit, in the trapa, tribulus, murex, ſpinacia, agremonia, datura, &c.

SPINAL MARROW. See ANATOMY, n° 5. 396—399.

SPINALIS, in anatomy, the name of ſeveral muſcles, &c. of the ſpine.

SPINE, SPINA DORSI. See ANATOMY, n° 29.

SPINE, in botany. See SPINÆ.

SPINELLO, a Tuſcan painter, of great repute in his time. He painted a picture of the fallen angels, in which he drew ſo horrid a picture of Lucifer, that it frightened him ſo much as to affect his ſenſes ever after. He flouriſhed about the year 1380.

SPINET, or SPINNET, a muſical inſtrument ranked in the ſecond or third place among harmonious inſtruments. It conſiſts of a cheſt or belly made of the moſt porous and reſinous wood to be found, and a table of fir glued on ſlips of wood called *ſummers*, which bear on the ſides. On the table is raiſed two little prominences or bridges, wherein are placed ſo many pins as there are chords or ſtrings to the inſtrument. It is played on by two ranges of continued keys, the former range being the order of the diatonic ſcale, and that behind the order of the artificial notes or ſemi-tones. The keys are ſo many flat pieces of wood, which, touched and preſſed down at the end, make the other raiſe a jack which ſtrike and ſound the ſtrings by means of the end of a crow's quill, wherewith it is armed. The 30 firſt ſtrings are of braſs, the other more delicate ones of ſteel or iron-wire; they are all ſtretched over the two bridges already mentioned. The figure of the ſpinet is a long ſquare or parallelogram; ſome call it an *harp-couched*, and the harp an *inverted ſpinet*. See the article HARP.

This inſtrument is generally tuned by the ear, which method of the practical muſicians is founded on a ſuppoſition that the ear is a perfect judge of an octave and a fifth. The general rule is to begin at a certain note, as C, taken towards the middle of the inſtrument, and tuning all the octaves up and down, and alſo the fifths, reckoning ſeven ſemi-tones to each fifth, by which means the whole is tuned. Sometimes to the common or fundamental play of the ſpinet is added another ſimilar one in uniſon, and a third in octave to the firſt, to make the harmony the fuller; they are either played ſeparately or together by means of a ſtop; theſe are called *double* or *triple ſpinets;* ſometimes a play of violins is added, by means of a bow, or a few wheels parallel to the keys, which preſs the ſtrings and make the ſound laſt as long as the muſician pleaſes, and heighten and ſoften them more or leſs, as they are more or leſs preſſed. The harpſichord is a kind of ſpinet, only with another diſpoſition of the keys. See the article HARPSICHORD. The inſtrument takes its name from the ſmall quill ends which touch the ſtrings, reſembling *ſpinæ*, or thorns.

SPINNING, in commerce, the act or art of reducing ſilk, flax, hemp, wool, hair, or other matters, into thread. Spinning is either performed on the wheel with a diſtaff and ſpindle, or with other machines proper for the ſeveral kinds of working. Hemp, flax, nettle-thread, and the like vegetable matters, are to be wetted in ſpinning; ſilks, wools, &c. are to be ſpun dry, and do not need water; but there is a way of ſpinning ſilk as it comes off the caſes or balls, where hot and even boiling water is to be uſed. See the articles SILK, THREAD, &c.

SPINOSUS CAULIS, in botany; a ſtem covered with ſtrong woody prickles, whoſe roots are not ſuperficial, but proceeding from the body of the ſtem. When applied to a leaf, *ſpinoſum folium*, it indicates the margin running out into rigid points or prickles, *quod margine exit in acumina duriora, rigida, pungentia.*

SPINOUS, in botany. See SPINOSUS.

SPINOUS *Fiſhes*, ſuch as have ſome of the rays of the back-fins running out into thorns or prickles, as the perch, &c.

SPINOZA (Benedict de), the ſon of a Portugueſe Jew ſettled at Amſterdam, where he was born in 1633. He commenced philoſopher early in life; publicly embraced Chriſtianity, for which the Jews attempted to aſſaſſinate him; and in the end made a great noiſe in the world by his atheiſtical principles and writings. He was probably the firſt who reduced Atheiſm to a ſyſtem; but in other reſpects his doctrine was the ſame with that of ſeveral philoſophers both ancient and modern. He retired into the country that he might not be interrupted in his ſpeculations, and was ſometimes three months without going out of his lodgings. This retired life did not hinder his name from ſpreading. The free-thinkers came to him from all parts. The palatine count offered him the place of profeſſor of philoſophy at Heidelberg; but he refuſed it. He died at the Hague in 1677, aged about 44 years. He is ſaid to have been honeſt, obliging, and very regular in his morals; which we need not be more ſurpriſed at than to ſee people live an irregular life tho' fully perſuaded of the truths of the Goſpel.

SPINOZISM, or SPINOSISM, the doctrine of Spinoza, or Atheiſm and Pantheiſm propoſed after the manner of Spinoza. See SPINOZA.

The great principle of Spinoziſm is, That there is nothing properly and abſolutely exiſting beſides matter and the modifications of matter; among which are even comprehended thought, abſtract and general ideas, compariſons, relations, combinations of relations, &c.

The chief articles in Spinoza's ſyſtem are reducible to theſe. That there is but one ſubſtance in nature, and that this only ſubſtance is endued with an infinite number of attributes, among which are extenſion and cogitation: that all the bodies in the univerſe are modifications of this ſubſtance conſidered as it is extended; and that all the ſouls of men are modifications of the ſame ſubſtance conſidered as cogitative: that God is a neceſſary and infinitely perfect being, and is the cauſe of all things that exiſt, but not a different being from them: that there is but one being and one nature, and that this nature produces within itſelf, by an immanent act, all thoſe which we call *creatures;* and that this being is at the ſame time both agent and patient, efficient cauſe and ſubject; but that he produces nothing but modifications of himſelf.

SPIRÆA, in botany, a genus of the pentagynia order, belonging to the icoſandria claſs of plants.—There are 12 ſpecies; of which the moſt remarkable are, 1. The ſalicifolia, or common ſpiræa frutex, riſes with ſeveral ſhrubby ſtalks, to the height of ſix or eight feet. The branches are terminated by ſpikes of pale-red flowers, the lower parts of the ſpikes are branched out into ſmall ſpikes, but the upper parts are cloſe and obtuſe. When the flowers are paſt, the germen changes to pointed capſules; but they ſeldom come to perfection. 2. The filipendula, or common drop-wort, grows in mountainous paſtures in ſeveral parts of England and Scotland. It riſes about a foot and an half high, with an erect ſtalk, and but few leaves upon it; terminated with a looſe umbel of white flowers often tinged with red. 3. The ulmaria, or meadow-ſweet; grows naturally on the ſides of waters, and in low moiſt meadows, in moſt of the northern counties of Europe. The ſtalks are angular, red, and riſe three or four feet high; garniſhed with winged leaves, and terminated by large looſe bunches of white flowers.—The firſt ſpecies is propagated by ſuckers, which are ſent forth in plenty from the roots of the old ſtems, or by laying down the tender branches. The ſecond and third ſpecies are not cultivated. However, the tuberous pea-like roots of the ſecond, dried and reduced to powder, make a kind of bread which in times of ſcarcity is not to be deſpiſed. Hogs are very fond of theſe roots. Cows, goats, ſheep, and ſwine, eat the plant; but horſes refuſe it. The flowers of the ulmaria have a fragrant ſcent, which riſes in diſtillation. The whole plant indeed is extremely fragrant, ſo that the common people of Sweden ſtrew their floors with it on holidays. It has alſo an aſtringent quality, and thus has been found uſeful in dyſenteries, ruptures, and in tanning of leather. Goats are extremely fond of it; cows and horſes refuſe it.

SPIRAL, in geometry, a curve line of the circular kind, which in its progreſs recedes from its centre.

SPIRE, in architecture, was uſed by the ancients for the baſe of a column, and ſometimes for the aſtragal or tore; but among the moderns it denotes a ſteeple that continually diminiſhes as it aſcends, whether conically or pyramidally.

SPIRIT, in metaphyſics, an incorporeal being or intelligence; in which ſenſe God is ſaid to be a ſpirit, as are angels and the human ſoul. See METAPHYSICS, n° 5, 106, 109.

SPIRIT, in chemiſtry and pharmacy, a name applied to every volatile liquid which is not inſipid like phlegm or water; and hence the diſtinction into acid, alkaline, and vinous ſpirits. See (*Index* to) PHARMACY.

SPIRIT *of Wine*. See DISTILLATION; and PHARMACY, n° 446, 682.

SPIRITS, or ANIMAL SPIRITS, in phyſiology. See ANATOMY, n° 400.

Acid SPIRITS. See PHARMACY, p. 6078.

Alkaline SPIRITS, ſolutions of volatile alkaline ſalt in water, ſometimes with a portion of empyreumatic oil; in which caſe they receive different appellations, as *ſpirit of hartſhorn, of urine*, &c. If the volatile alkali contained in theſe ſolutions be united with a conſiderable quantity of fixed air, the ſpirit efferveſces with an acid, and is called a *mild ſpirit*; but if the alkali is deprived of its fixed air, the ſpirit is ſaid to be *cauſtic*, and raiſes no efferveſcence. The mild ſpirits, though to the ſmell they appear much weaker than the cauſtic, are in reality ſtronger, as containing a larger proportion of alkali than the latter commonly do. However, there is no alkaline ſpirit perfectly mild, or it would be entirely neutraliſed by the fixed air, ſo that no alkaline ſmell or taſte could be perceived. All mild ſpirits therefore are partly cauſtic, to which they owe that degree of ſmell and pungent taſte which they retain. However, being already partly neutralized, they are much leſs apt to imbibe fixed air than ſuch as have none at all; the ſolution of the neutral ſalt compoſed of volatile alkali and fixed air alſo is much more apt to retain the alkaline air or cauſtic ſalt than pure water; and hence the mild alkaline ſpirits preſerve a much more equable degree of ſtrength than the cauſtic ones, which partly by the attraction of fixed air, and partly by evaporation, unleſs very firmly ſecured, very ſoon become ſenſibly weaker both in taſte and ſmell than when originally made.

SPIRITUAL, in general, ſomething belonging to or partaking of the nature of ſpirit. See SPIRIT.

SPIRITUALITIES *of a* BISHOP, are the profits he receives as a biſhop, and not as a baron of parliament; ſuch are the duties of his viſitation, preſentation-money, what ariſes from the inſtitution and ordination of prieſts, the income of his juriſdiction, &c.

SPITHEAD, a road between Portſmouth and the Iſle of Wight, where the royal navy of Great Britain frequently rendezvous.

SPITTLE, in phyſiology. See SALIVA.

SPITZBERGEN. See GROENLAND.

SPLEEN, in anatomy. See there, n° 360.

SPLEEN-*Wort*. See ASPLENIUM.

SPLENETIC, a perſon afflicted with an obſtruction of the ſpleen.

SPLENT, or SPLINT, among farriers, a callous inſenſible excreſcence, breeding on the ſhank-bone of horſes. See FARRIERY, § xxix.

SPLICING, in the ſea-language, is the untwiſting the ends of two cables or ropes, and working the ſeveral ſtrands into one another by a fidd, ſo that they become as ſtrong as if they were but one rope.

SPOILS, whatever is taken from the enemy in time of war. Among the ancient Greeks, the ſpoils were divided among the whole army; only the general's ſhare was largeſt: but, among the Romans, the ſpoils belonged to the republic.

SPOLETO, a duchy of Italy, bounded on the north by the Marche of Ancona and duchy of Urbino, on the eaſt by Farther Abruzzo, on the ſouth by Sabina and the patrimony of St Peter, and on the weſt by Orvietano and Perrugino. It is about 55 miles in length and 40 in breadth. It was anciently a part of Umbria, and now belongs to the Pope.—The name of the capital city is alſo *Spoleto*. It was formerly a large place, but in 1703 was ruined by an earthquake; from whence it has never recovered itſelf.

SPOLIATION, in eccleſiaſtical law, is an injury done by one clerk or incumbent to another, in taking the fruits of his benefice without any right thereunto, but under a pretended title. It is remedied by a decree to account for the profits ſo taken. This injury, when the *jus patronatus*, or right of advowſon, doth not come in debate, is cognizable in the ſpiritual court: as if a patron firſt preſents A to a benefice, who is inſtituted and inducted thereto; and then, upon pretence of a vacancy, the ſame patron preſents B to the ſame living, and he alſo obtains inſtitution and induction. Now if A diſputes the fact of the vacancy, then that clerk who is kept out of the profits of the living, whichever it be, may ſue the other in the ſpiritual court for ſpoliation, or taking the profits of his benefice. And it ſhall there be tried, whether the living were or were not vacant; upon which the validity of the ſecond clerk's pretenſions muſt depend. But if the right of patronage comes at all into diſpute, as if one patron preſented A, and another patron preſented B, there the eccleſiaſtical court hath no cognizance, provided the tithes ſued for amount to a fourth part of the value of the living, but may be prohibited at the inſtance of the patron by the king's writ of *indicavit*. So alſo if a clerk, without any colour of title, ejects another from his parſonage, this injury muſt be redreſſed in the temporal courts: for it depends upon no queſtion determinable by the ſpiritual law, (as plurality of benefices or no plurality, vacancy or no vacancy), but is merely a civil injury.

SPON (James), was the ſon of Charles Spon, an eminent French phyſician, and born at Lyons in 1647. After an education of great care, he was admitted a doctor of phyſic at Montpelier in 1667, and a member of the college of phyſicians at Lyons in 1669. Mr Vailant, the king's antiquary, paſſing through Lyons to Italy in queſt of medals and other antiquities, Mr Spon accompanied him. He afterward, in the years 1675 and 1676, made a voyage to Dalmatia, Greece, and the Levant, in company with Sir George Wheeler an Engliſh gentleman: but whether his conſtitution was naturally weak, or he had hurt himſelf in this tour, does not appear, but he never after enjoyed his health. Being of the reformed religion, he was forced to leave France on the revocation of the edict of Nantz; and died at Vevay, a town on the lake Leman, in 1686. He was the author of many valuable works which were printed at Lyons; the principal of which are, 1. His travels into Italy, Dalmatia, Greece, and the Levant. 2. An anſwer to M. Guillet's Criticiſms on his Travels. 3. Curious antiquities, in quarto. 4. A hiſtory of Geneva; all the above are in French. 5. *Miſcellanea eruditæ antiquatis*, folio, &c.

SPONDANUS (Henricus), or *Henry de* Sponde, was born in 1568, and educated at Ortez, where the reformed had a college, and where he diſtinguiſhed himſelf early by his facility in acquiring the Latin and Greek languages. He applied himſelf to the ſtudy of the civil and canon law; and in the mean time read the controverſial works of Bellarmine and Perron with ſuch eagerneſs, that, after the example of his brother John, he forſook the Proteſtant religion. He made his abjuration at Paris in 1595, took prieſts orders at Rome in 1606, and was made biſhop of Pamiers by Lewis XIII. in 1626. His intimacy with Baronius while he was in Italy, ſuggeſted to him the deſign of abridging his *Annales eccleſiaſtici;* which he executed with the author's conſent, and continued them from the year 1197, where Baronius left off, to the year 1640. He publiſhed alſo, in folio, *Annales ſacri à mundi creatione ad ejuſdem redemptionem;* with ſome ſmaller works; and died in 1643.

SPONDEE, in ancient poetry, a foot conſiſting of two long ſyllables, as *omnes*.

SPONDIAS, the Jamaica Plum; a genus of the pentagynia order, belonging to the decandria claſs of plants. There are two ſpecies: 1. The purpurea, or purple myrabolin plum, is a native of the Weſt Indies, where it riſes to the height of 12 or 14 feet, but in this country is ſeldom found more than half that height. The flowers terminate the branches in a racemus, and are of a whitiſh yellow colour. Some of them are ſucceeded by oblong fleſhy berries of a pale yellow colour, covered with a mealy farina; the fleſh of which is thin, but of a ſweet luſcious taſte. The incloſed nut appears as if compoſed of many ligneous fibres. 2. The lutea, with neat leaves and yellow fruit, is a native of the warmeſt parts in America, where it riſes to the height of 30 feet, ſending out many irregular branches, which are deſtitute of leaves for ſome months. The flowers come out before the leaves appear, and are ſucceeded by yellow plums an inch and an half long. Both theſe ſpecies are propagated by fruit or by cuttings. The fruit is much eſteemed, but the plums yield little meat; however, the wild hogs are very fond of them, and they are their principal food during the ſeaſon of their ripening.

SPONGIA, Spunge; a genus belonging to the order of vermes zoophyta. The whole texture is a congeries of bibulous cells. There are ſix ſpecies, all found in the bottom of the ſea, and on ſubmarine rocks. Spunges are much uſed by ſurgeons and others for ſucking up ſuperfluous moiſture, which they eaſily part with by preſſure.

SPONSORS, among Chriſtians, are thoſe perſons who, in the office of baptiſm, anſwer or are ſureties for the perſons baptized.

SPONTANEOUS, a term applied to ſuch motions of the body and operations of the mind as we perform of ourſelves without any conſtraint.

SPOON-bill, in ornithology. See Platæa.

SPOONING, in the ſea-language, is ſaid of a ſhip, which being under ſail in a ſtorm at ſea, is unable to bear it, and conſequently forced to go right before the wind.

SPORADES, among ancient aſtronomers, a name given to ſuch ſtars as were not included in any conſtellation.

SPORADIC diseases, among phyſicians, are ſuch as ſeize particular perſons at any time or ſeaſon, and in any place; in which ſenſe they are diſtinguiſhed from epidemical and endemical diſeaſes.

SPOTS, in aſtronomy, certain places of the ſun's or moon's diſk, obſerved to be either more bright or dark than the reſt; and accordingly called *peculæ* or *maculæ*. See Astronomy, n° 33—39.

SPOTSWOOD (John), archbiſhop of St Andrew's in Scotland, was deſcended from the lairds of Spotſwood in the Merſe, and was born in the year 1565. He was educated in the univerſity of Glaſgow, and ſucceeded his father in the parſonage of Calder when but 18 years of age. In 1601 he attended Lodowick duke of Lenox as his chaplain, in an embaſſy to the court of France for confirming the ancient amity between the two nations, and returned in the ambaſſador's retinue through England. When he entered into the archbiſhopric of Glaſgow, he found there was not 100 l. Sterling of yearly revenue left; yet ſuch was his care for his ſucceſſors, that he greatly improved it, and much to the ſatisfaction of his dioceſe. After having filled this ſee eleven years, he was raiſed to that of St Andrew's in 1615, and made primate and metropolitan of all Scotland. He preſided in ſeveral aſſemblies for reſtoring the ancient diſcipline, and bringing the church of Scotland to ſome ſort of uniformity with that of England. He continued in high eſteem with king James I. nor was he leſs valued by king Charles I. who was crowned by him in 1633, in the abbey-church of Holyroodhouſe. In 1635, upon the death of the earl of Kinnoul chancellor of Scotland, our abbot was advanced to that poſt; but had ſcarcely held it four years, when the confuſions beginning in Scotland, he was obliged to retire into England; and being broken with age, grief, and ſickneſs, died at London in 1639, and was interred in Weſtminſter-abbey. He wrote a hiſtory of the church of Scotland, from the year 203 to the reign of king James VI. in folio.

SPOUT, or *Water*-Spout. See Water-*Spout*.

SPRANGHER (Bartholomew), a German painter, born at Antwerp in 1546. He was brought up under a variety of maſters, and then went to Rome, where cardinal Farneſe took him into his ſervice, and afterwards recommended him to Pope Pius V. He was employed at Belvidere, and worked two years and ten months in drawing the picture of the Laſt Judgment; this piece, which contained 500 heads, was ſo highly valued, that, after the death of Pius, it was placed over his monument as its principal ornament. From Rome he entered into the ſervice of the emperors Maximilian and Rudolphus II. by whom he was exceedingly careſſed and honoured: the latter in 1588 ennobled him and his deſcendents, and in the preſence of his whole court placed a chain of gold of three rows round the neck of the artiſt, and ordered him to wear it as long as he lived. He died in 1623;

and as he worked moſtly for princes and nobles, his works are not frequently to be bought.

SPRAT (Dr Thomas), biſhop of Rocheſter, was born in 1636. He had his education at Oxford, and after the Reſtoration entered into holy orders. He became fellow of the Royal Society, chaplain to George duke of Buckingham, and chaplain in ordinary to king Charles II. In 1667, he publiſhed the Hiſtory of the Royal Society, and a Life of Mr Cowley; who, by his laſt will, left to his care his printed works and MSS. which were accordingly publiſhed by him. In 1668, he was inſtalled prebendary of Weſtminſter; in 1683, was appointed canon of Windſor, and dean of Weſtminſter; and in 1684, conſecrated to the biſhopric of Rocheſter. He was clerk of the cloſet to king James II.; in 1685, was made dean of the chapel royal; and the year following, was appointed one of the commiſſioners for eccleſiaſtical affairs. In 1692, his lordſhip, with ſeveral other perſons, was charged with treaſon by two men, who forged an aſſociation under their hands, of which the biſhop publiſhed an account. He died of an apoplexy in 1713. His writings are greatly admired for elegance of ſtyle.

Sprat, in ichthyology. See Clupea.

SPRAY, the ſprinkling of the ſea, which is driven from the top of a wave in ſtormy weather. It differs from ſpoon-drift, as being only blown occaſionally from the broken ſurface of a high wave; whereas the latter continues to fly horizontally along the ſea, without intermiſſion, during the exceſs of a tempeſt or hurricane.

SPRING, in natural hiſtory, a fountain or ſource of water riſing out of the ground.

Many have been the conjectures of philoſophers concerning the origin of fountains, and great pains have been taken both by the members of the Royal Society and thoſe of the Academy of Sciences at Paris, in order to aſcertain the true cauſe of it. It was Ariſtotle's opinion, and held by moſt of the ancient philoſophers after him, that the air contained in the caverns of the earth, being condenſed by cold near its ſurface, was thereby changed into water; and that it made its way through, where it could find a paſſage. But we have no experience of any ſuch tranſmutation of air into water.

Thoſe who imagine that fountains owe their origin to waters brought from the ſea by ſubterraneous ducts, give a tolerable account how they loſe their ſaltneſs by percolation as they paſs through the earth: but they find great difficulty in explaining by what power the water riſes above the level of the ſea to near the tops of mountains, where ſprings generally abound; it being contrary to the laws of hydroſtatics, that a fluid ſhould riſe in a tube above the level of its ſource. However, they have found two ways whereby they endeavour to extricate themſelves from this difficulty. The one is that of Des Cartes, who imagines, that after the water is become freſh by percolation, it is raiſed out of the caverns of the earth in vapour towards its ſurface; where meeting with rocks near the tops of mountains in the form of arches or vaults, it ſticks to them, and runs down their ſides, (like water in an Alembic), till it meets with proper receptacles, from which it ſupplies the fountains. Now this is a mere hypotheſis, without foundation or probability: for, in the firſt place, we know of no internal heat of the earth to cauſe ſuch evaporation; or if that were allowed, yet it is quite incredible, that there ſhould be any caverns ſo ſmooth and void of protuberances, as to anſwer the ends of an alembic, in collecting and condenſing the vapours together in every place where fountains ariſe. There are others (as Varenius, &c.) who ſuppoſe that the water may riſe through the pores of the earth, as through capillary tubes by attraction. But hereby they ſhow, that they are quite unacquainted with what relates to the motion of a fluid through ſuch tubes: for when a capillary tube opens into a cavity at its upper end, or grows larger and larger, ſo as to ceaſe to be capillary at that end, the water will not aſcend through that tube into the cavity, or beyond where the tube is capillary; becauſe that part of the periphery of the cavity, which is partly above the ſurface of the water and partly below it, is not of the capillary kind. Nay, if the cavity is continually ſupplied with water, it will be attracted into the capillary tube, and run down it as through a funnel, if the lower end is emerged in the ſame fluid, as in this caſe it is ſuppoſed to be.

It has been a generally received opinion, and much eſpouſed by Mariotte, (a diligent obſerver of nature), that the riſe of ſprings is owing to the rains and melted ſnow. According to him, the rain-water which falls upon the hills and mountains, penetrating the ſurface, meets with clay or rocks contiguous to each other; along which it runs, without being able to penetrate them, till, being got to the bottom of the mountain, or to a conſiderable diſtance from the top, it breaks out of the ground, and forms ſprings.

In order to examine this opinion, Mr Perrault, De la Hire, and D. Sideleau, endeavoured to make an eſtimate of the quantity of rain and ſnow that falls in the ſpace of a year, to ſee whether it would be ſufficient to afford a quantity of water equal to that which is annually diſcharged into the ſea by the rivers. The reſult of their inquiries was, that the quantity of rain and ſnow which fell in a year into a cylindrical veſſel, would fill it (if ſecured from evaporating) to the height of about nineteen inches. Which quantity D. Sideleau ſhowed, was not ſufficient to ſupply the rivers; for that thoſe of England, Ireland, and Spain, diſcharge a greater quantity of water annually, than the rain, according to that experiment, is able to ſupply. Beſides which, another obſervation was made by them at the ſame time, viz. that the quantity of water raiſed in vapour, one year with another, amounted to about thirty-two inches, which is thirteen more than falls in rain: a plain indication that the water of fountains is not ſupplied by rain and melted ſnow.

Thus the true cauſe of the origin of fountains remained undiſcovered, till Dr Halley, in making his celeſtial obſervations upon the tops of the mountains at St Helena, about 800 yards above the level of the ſea, found, that the quantity of vapour which fell there (even when the ſky was clear) was ſo great, that it very much impeded his obſervations, by covering his glaſſes with water every half quarter of an hour: and upon that he attempted to determine by experiment the quantity of vapour exhaled from the ſurface of the ſea,

ſea, as far as it riſes from heat; in order to try whether that might be a ſufficient ſupply for the water continually diſcharged by fountains. The proceſs of his experiment was as follows: He took a veſſel of water ſalted to the ſame degree with that of ſea-water, in which he placed a thermometer; and by means of a pan of coals, brought the water to the ſame degree of heat, which is obſerved to be that of the air in our hotteſt ſummer; this done, he fixed the veſſel of water with the thermometer in it, to one end of a pair of ſcales, and exactly counterpoiſed it with weights on the other: then, at the end of two hours, he found, by the alteration made in the weight of the veſſel, that about a ſixtieth part of an inch of the depth of the water was gone off in vapour; and therefore, in twelve hours, one-tenth of an inch would have gone off. Now this accurate obſerver allows the Mediterranean Sea to be forty degrees long, and four broad, (the broader parts compenſating for the narrower, ſo that its whole ſurface is 160 ſquare degrees); which, according to the experiment, muſt yield at leaſt 5,280,000,000 tons of water: In which account no regard is had to the wind and the agitation of the ſurface of the ſea; both which undoubtedly promote the evaporation.

It remained now to compare this quantity of water with that which is daily conveyed into the ſame ſea by the rivers. The only way to do which, was to compare them with ſome known river; and accordingly he takes his computation from the river Thames; and, to avoid all objections, makes allowances, probably greater than what were abſolutely neceſſary.

The Mediterranean receives the following conſiderable rivers, viz. the Iberus, the Rhone, the Tyber, the Po, the Danube, the Nieſter, the Boryſthenes, the Tanais, and the Nile. Each of theſe he ſuppoſes to bring down ten times as much water as the Thames; whereby he allows for ſmaller rivers which fall into the ſame ſea. The Thames, then, he finds by menſuration to diſcharge about 20,300,000 tuns of water a-day. If therefore the above-ſaid nine rivers yield ten times as much water as the Thames doth, it will follow, that all of them together yield but 1827 millions of tuns in a day; which is but little more than one-third of what is proved to be raiſed in vapour out of the Mediterronean in the ſame time. We have therefore from hence a ſource abundantly ſufficient for the ſupply of fountains.

Now having found, that the vapour exhaled from the ſea is a ſufficient ſupply for the fountains, he proceeds in the next place to conſider the manner in which they are raiſed; and how they are condenſed into water again, and conveyed to the ſources of ſprings.

In order to this he conſiders, that if an atom of water was expanded into a ſhell of bubble, ſo as to be ten times as big in diameter as when it was water, that atom would become ſpecifically lighter than air; and therefore would riſe ſo long as the warmth which firſt ſeparated it from the ſurface of the water ſhould continue to diſtend it to the ſame degree; and conſequently, that vapours may be raiſed from the ſurface of the ſea in that manner, till they arrive at a certain height in the atmoſphere, at which they find air of equal ſpecific gravity with themſelves. Here they will float, till being condenſed by cold, they become ſpecifically heavier than the air, and fall down in dew; or being driven by the winds againſt the ſides of mountains, (many of which far ſurpaſs the uſual height to which the vapours would of themſelves aſcend), are compelled by the ſtream of the air to mount up with it to the tops of them; where being condenſed into water, they preſently precipitate, and gleeting down by the crannies of the ſtones, part of them enters into the caverns of the hills; which being once filled, all the overplus of water that comes thither, runs over by the loweſt place, and breaking out by the ſides of the hills, forms ſingle ſprings. Many of theſe running down by the valleys between the ridges of the hills, and coming to unite, form little rivulets or brooks: many of theſe again meeting in one common valley, and gaining the plain ground, being grown leſs rapid, become a river; and many of theſe being united in one common channel, make ſuch ſtreams as the Rhine and the Danube; which latter, he obſerves, one would hardly think to be a collection of water condenſed out of vapour, unleſs we conſider how vaſt a tract of ground that river drains, and that it is the ſum of all thoſe ſprings which break out on the ſouth ſide of the Carpathian mountains, and on the north ſide of the immenſe ridge of the Alps, which is one continued chain of mountains from Switzerland to the Black Sea.

Thus one part of the vapours which are blown on the land is returned by the rivers into the ſea from whence it came. Another part falls into the ſea before it reaches the land; and this is the reaſon why the rivers do not return ſo much water into the Mediterranean as is raiſed in vapour. A third part falls on the low-lands, and is the pabulum of plants: where yet it does not reſt; but is again exhaled in vapour by the action of the ſun, and is either carried by the winds to the ſea to fall in rain or dew there, or elſe to the mountains to become the ſources of ſprings.

However, it is not to be ſuppoſed, that all fountains are owing to one and the ſame cauſe; but that ſome proceed from rain and melted ſnow, which ſubſiding through the ſurface of the earth, makes its way into certain cavities, and thence iſſues out in the form of ſprings; becauſe the waters of ſeveral are found to increaſe and diminiſh in proportion to the rain which falls: that others again, eſpecially ſuch as are ſalt, and ſpring near the ſea-ſhore, owe their origin to ſea-water percolated through the earth; and ſome to both theſe cauſes: though, without doubt, moſt of them, and eſpecially ſuch as ſpring near the tops of high mountains, receive their waters from vapours, as before explained.

This reaſoning of Dr Halley's is confirmed by more recent obſervations and diſcoveries. It is now found, that though water is a tolerable conductor of the electric fluid, dry earth is an electric *per ſe*; conſequently the dry land muſt always be in an electrified ſtate compared with the ocean, unleſs in ſuch particular caſes as are mentioned under the article EARTHQUAKE, n° 39. It is alſo well known, that ſuch bodies as are in an electrified ſtate, whether *plus* or *minus*, will attract vapour, or other light ſubſtances that come near them. Hence the vapours that are raiſed from the ocean muſt neceſſarily have a tendency to approach the land in great quantity, even without the aſſiſtance of the wind; though this laſt muſt undoubtedly contribute greatly towards the ſame purpoſe, as Dr Halley juſtly obſerves. In like manner, the higher grounds are always in a more electrified ſtate than the lower ones: and hence the vapours having once left the ocean and approached the ſhore, are attracted by the high mountains; of which Mr Pennant gives an inſtance in Snowdon. Hence we may ſee the reaſon why ſprings are ſo common in the neighbourhood of mountains, they being ſo advantageouſly formed in every reſpect for collecting and condenſing the vapours into water.

There is a certain ſpecies of ſprings which ebb and flow alternately, and ſome that ceaſe to flow for a time, which from thence are called *reciprocating* or *intermitting ſprings*. Their reciprocations are accounted for under HYDROSTATICS, n° 21.

SPRING, in mechanics, denotes a thin piece of tempered ſteel, or other elaſtic ſubſtance, which being wound up, ſerves to put ſeveral machines in motion by its elaſticity, or endeavour to unbend itſelf: ſuch is the ſpring of a watch, clock, or the like.

SPRING, *Ver*, in coſmography, denotes one of the ſeaſons of the year; commencing, in the northen parts of the world, on the day the ſun enters the firſt degree of Aries, which is about the 10th day of March, and ending when the ſun leaves Gemini: Or, more ſtrictly and generally, the ſpring begins on the day when the diſtance of the ſun's meridian altitude from the zenith, being on the increaſing hand, is at a medium between the greateſt and leaſt. The end of the ſpring coincides with the beginning of ſummer. See SUMMER.

SPRING-*Tide*. See ASTRONOMY, n° 164.

Burning SPRINGS. See BURNING *Springs*.

SPRIT, a ſmall boom or pole which croſſes the ſail of a boat diagonally, from the maſt to the upper hindmoſt corner of the ſail, which it is uſed to extend and elevate: the lower end of the ſprit reſts in a ſort of wreath or collar called the *ſnotter*, which encircles the maſt in that place. Theſe ſort of ſails are accordingly called *ſprit-ſails*.

SPRITSAIL, a ſail attached to a yard which hangs under the bowſprit, as repreſented in fig. 2. *y*, Plate CCLX. It is furniſhed with a large hole in each of its lower corners, to evacuate the water with which the cavity or belly of it is frequently filled by the ſurge of the ſea when the ſhip pitches.

SPRITSAIL-*Topſail*, a ſail extended above the former, by a yard which hangs acroſs the jib-boom. The lower corners of this ſail are hauled home to the ſpritſail-yard-arms; after which the ſail is drawn out towards the extremity of the boom, in light winds, as any other topſail-yard is hoiſted upon its maſt.

Formerly the ſpritſail-topſails were ſet on a maſt which was erected perpendicularly on the end of the bowſprit: but this method has of late been juſtly rejected as inconvenient and dangerous to the bowſprit, although ſerviceable in light breezes.

SPRUCE-TREE *of New Zealand*, a very beautiful tree, conſpicuous on account of its pendant branches, which are loaded with numerous long thread-like leaves, of a vivid green. It frequently grows to the height of 50 or 60, or even of 100 feet, and above ten in circumference. This tree proved very uſeful to captain Cook's people while on the iſland of New Zealand, who found that a wholeſome and palatable liquor might be brewed from it as a ſubſtitute for ſpruce-beer. With the addition of ſome inſpiſſated wort and moloſſes, they brewed a very good ſort of beer; which they afterwards improved conſiderably, by correcting the too great aſtringency of the ſpruce with an equal quantity of the new tea-tree *. Its taſte was pleaſant, and ſomething bitter; its only fault was, that, when taken on an empty ſtomach, it cauſed a nauſea or ſickneſs. Mr Forſter regrets that New Zealand was viſited at ſuch unfavourable ſeaſons that he could never find the ſpruce-tree either in flower or in fruit, ſo that he could not give a botanical deſcription of it.

SPUNGE, or SPONGE. See SPONGIA.

SPUNGING, in gunnery, the cleaning a gun's inſide with a ſpunge, in order to prevent any ſparks of fire from remaining in her, which would endanger the life of him that ſhould load her again.

SPUN YARN, among ſailors, is a kind of line made from rope yarn, and uſed for ſeizing or faſtening things together.

SPUNK, in botany. See BOLETUS.

SPUR, a piece of metal conſiſting of two branches encompaſſing a horſeman's heel, and a rowel in form of a ſtar, advancing out behind to prick the horſe.

SPURGE, in botany. See EUPHORBIA.

SPURGE-*Laurel*. See DAPHNE.

SPY, a perſon hired to watch the actions, motions, &c. of another; particularly what paſſes in a camp. When a ſpy is diſcovered, he is hanged immediately.

SQUADRON, in military affairs, denotes a body of horſe whoſe number of men is not fixed; but is uſually from 100 to 200.

SQUADRON *of Ships*, either implies a detachment of ſhips employed on any particular expedition, or the third part of a naval armament.

SQUADS, in a military ſenſe, are certain diviſions of a company into ſo many ſquads, generally into three or four. The uſe of forming companies into as many ſquads of inſpection as it has ſerjeants and corporals, is proved by thoſe regiments who have practiſed that method; as by it the irregularity of the ſoldiers is conſiderably reſtrained, their dreſs improved, and the diſcipline of the regiment in general moſt remarkably forwarded. Every officer ſhould have a roll of his company by ſquads.

SQUALL, a ſudden and violent blaſt of wind, uſually occaſioned by the interruption and reverberation of the wind from high mountains. Theſe are very frequent in the Mediterranean, particularly that part of it which is known by the name of the *Levant*, as produced by the repulſion and new direction which the wind meets with in its paſſage between the various iſlands of the Archipelago.

SQUALUS, the SHARK-KIND; a genus belonging to the order of amphibia nantes. There are five ſpiracula, one on each ſide of the neck, the body is ſomewhat oblong and cylindrical; and the mouth is ſituated in the anterior part of the head. There are 15 ſpecies, all inhabitants of the ocean. The moſt remarkable are,

1. The ſquatina, or angel-fiſh, has a large head; teeth broad at their baſe, but ſlender and very ſharp

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* See *Tea-tree of New Zealand*.

above, and diſpoſed in five rows all round the jaws. Like thoſe of all ſharks, they are capable of being raiſed or depreſſed by means of muſcles uniting them to the jaws, not being lodged in ſockets as the teeth of cetaceous fiſh are. The back is of a pale aſh-colour, and very rough; along the middle is a prickly tuberculated line: the belly is white and ſmooth. The pectoral fins are very large, and extend horizontally from the body to a great diſtance; they have ſome reſemblance to wings, whence its name. The ventral fins are placed in the ſame manner, and the double penis is placed in them; which forms another character of the males in this genus.

This is the fiſh which connects the genus of rays and ſharks, partaking ſomething of the character of both; yet is an exception to each in the ſituation of the mouth, which is placed at the extremity of the head. It is a fiſh not unfrequent on moſt of our coaſts, where it prowls about for prey like others of the kind. It is extremely voracious; and, like the ray, feeds on flounders and flat fiſh, which keep at the bottom of the water. It is extremely fierce, and dangerous to be approached. Mr Pennant mentions a fiſherman whoſe leg was terribly tore by a large one of this ſpecies, which lay within his nets in ſhallow water, and which he went to lay hold of incautiouſly. The aſpect of theſe, as well as the reſt of the genus, have much malignity in them: their eyes are oblong, and placed lengthwiſe in their head, ſunk in it, and overhung by the ſkin, and ſeem fuller of malevolence than fire. Their ſkin is very rough; the ancients made uſe of it to poliſh wood and ivory, as we do at preſent that of the greater dog-fiſh. The fleſh is now but little eſteemed on account of its coarſeneſs and rankneſs; yet Archeſtratus, (as quoted by Athenæus, p. 319.), ſpeaking of the fiſh of Miletus, gives this firſt the place, in reſpect to its delicacy, of the whole cartilaginous tribe. They grow to a great ſize; being ſometimes near an hundred weight.

2. The ſpinax, or picked dog-fiſh, takes its name from a ſtrong and ſharp ſpine placed juſt before each of the back-fins, diſtinguiſhing it at once from the reſt of the Britiſh ſharks. The noſe is long, and extends greatly beyond the mouth, but is blunt at the end. The teeth are diſpoſed in two rows, are ſmall and ſharp, and bend from the middle of each jaw towards the corners of the mouth. The back is of a browniſh aſh-colour; the belly white.—It grows to the weight of about 20 pounds.

This ſpecies ſwarms on the coaſts of Scotland, where it is taken, ſplit, and dried; and is a food among the common people. It forms a ſort of internal commerce, being carried on womens backs 14 or 16 miles up the country, and ſold or exchanged for neceſſaries.

3. The maximus, baſking ſhark, or the ſun-fiſh of the Iriſh. This ſpecies has been long known to the inhabitants of the ſouth and weſt of Ireland and Scotland, and thoſe of Caernarvonſhire and Angleſea; but having never been conſidered in any other than a commercial view, is deſcribed by no Engliſh writer except Mr Pennant; and, what is worſe, miſtaken for and confounded with the luna of Rondeletius, the ſame that our Engliſh writers call the *ſun-fiſh*. The Iriſh and Welſh give it the ſame name, from its lying as if to ſun itſelf on the ſurface of the water; and for the ſame reaſon Mr Pennant calls it the *baſking ſhark*. It was long taken for a ſpecies of whale, till Mr Pennant pointed out the branchial orifices on the ſides, and the perpendicular ſite of the tail.—Theſe are migratory fiſh, or at leaſt it is but in a certain number of years that they are ſeen in multitudes on the Welſh ſeas, though in moſt ſummers a ſingle, and perhaps ſtrayed, fiſh, appears. They inhabit the northern ſeas, even as high as the arctic circle. They viſited the bays of Caernarvonſhire and Angleſea in vaſt ſhoals in the ſummers of 1756 and a few ſucceeding years, continuing there only the hot months; for they quitted the coaſt about Michaelmas, as if cold weather was diſagreeable to them. Some old people ſay they recollect the ſame ſort of fiſh viſiting theſe ſeas in vaſt numbers about 40 years ago. They appear in the Frith of Clyde, and among the Hebrides, in the month of June, in ſmall droves of ſeven or eight, but oftener in pairs. They continue in thoſe ſeas till the latter end of July, when they diſappear.

They have nothing of the fierce and voracious nature of the ſhark kind, and are ſo tame as to ſuffer themſelves to be ſtroked: they generally lie motionleſs on the ſurface, commonly on their bellies, but ſometimes, like tired ſwimmers, on their backs. Their food ſeemed to conſiſt entirely of ſea-plants, no remains of fiſh being ever diſcovered in the ſtomachs of numbers that were cut up, except ſome green ſtuff, the half-digeſted parts of algæ, and the like. Linnæus ſays it feeds on meduſæ.

At certain times, they are ſeen ſporting on the waves, and leaping with vaſt agility ſeveral feet out of the water. They ſwim very deliberately, with the dorſal fins above water. Their length is from three to twelve yards, and ſometimes even longer. Their form is rather ſlender, like others of the ſhark kind. The upper jaw is much longer than the lower, and blunt at the end. The tail is very large, and the upper part remarkably longer than the lower. The colour of the upper part of the body is a deep leaden; the belly white. The ſkin is rough like ſhagreen, but leſs ſo on the belly than the back. Within-ſide the mouth, towards the throat, is a very ſhort ſort of whalebone. The liver is of a great ſize, but that of the female is the largeſt; ſome weighs above 1000 pounds, and yield a great quantity of pure and ſweet oil, fit for lamps, and alſo much uſed to cure bruiſes, burns, and rheumatic complaints. A large fiſh has afforded to the captors a profit of 20l. They are viviparous; a young one about a foot in length being found in the belly of a fiſh of this kind. The meaſurements of one found dead on the ſhore of Loch Ranza in the iſle of Arran were as follow: The whole length, 27 feet 4 inches: firſt dorſal fin, 3 feet; ſecond, 1 foot: pectoral fin, 4 feet; ventral, 2 feet: the upper lobe of the tail, 5 feet; the lower, 3.

They will permit a boat to follow them, without accelerating their motion till it comes almoſt within contact; when a harponeer ſtrikes his weapon into them, as near to the gills as poſſible. But they are often ſo inſenſible as not to move till the united ſtrength of two men have forced in the harpoon deeper. As ſoon as they perceive themſelves wounded, they fling up their tail and plunge headlong to the bottom; and frequently coil the rope round them in their agonies, attempting to diſengage the harpoon from them by rolling on the ground, for it is often found greatly bent. As ſoon as they diſcover that their efforts are in vain, they ſwim away with amazing rapidity, and with ſuch violence, that there has been an inſtance of a veſſel of 70 tons having been towed away againſt a freſh gale. They ſometimes run off with 200 fathoms of line, and with two harpoons in them; and will employ the fiſhers for 12, and ſometimes for 24, hours before they are ſubdued. When killed, they are either hauled on ſhore, or, if at a diſtance from land, to the veſſel's ſide. The liver (the only uſeful part) is taken out, and melted into oil in kettles provided for that purpoſe. A large fiſh will yield eight barrels of oil, and two of worthleſs ſediment.

4. The carcharias, or white ſhark, grows to a very great bulk, Gillius ſays to the weight of 4000 pounds: and that in the belly of one was found a human corpſe entire; which is far from incredible, conſidering their their vaſt greedineſs after human fleſh. The mouth of this fiſh is furniſhed with (ſometimes) a ſixfold row of teeth, flat, triangular, exceedingly ſharp at their edges, and finely ſerrated. Mr Pennant has one that is rather more than an inch and a half long. Grew ſays, that thoſe in the jaws of a ſhark two yards in length are not half an inch; ſo that the fiſh to which this tooth belonged muſt have been ſix yards long, provided the teeth and body keep pace in their growth.

This dreadful apparatus, when the fiſh is in a ſtate of repoſe, lie quite flat in the mouth; but when he ſeizes his prey, he has power of erecting them by the help of a ſet of muſcles that join them to the jaw. The mouth is placed far beneath; for which reaſon theſe, as well as the reſt of the kind, are ſaid to be obliged to turn on their backs to ſeize their prey; which is an obſervation as ancient as the days of Pliny. The eyes are large; the back broad, flat, and ſhorter than that of other ſharks. The tail is of a ſemilunar form, but the upper part is longer than the lower. It has vaſt ſtrength in the tail, and can ſtrike with great force; ſo that the ſailors inſtantly cut it off with an axe as ſoon as they draw one on board. The pectoral fins are very large, which enables it to ſwim with great ſwiftneſs. The colour of the whole body and fins is a light aſh. The ancients were acquainted with this fiſh; and Oppian gives a long and entertaining account of its capture. Their fleſh is ſometimes eaten, but is eſteemed coarſe and rank.—They are the dread of the ſailors in all hot climates, where they conſtantly attend the ſhips in expectation of what may drop overboard: a man that has that misfortune periſhes without redemption; they have been ſeen to dart at him like gudgeons to a worm. A maſter of a Guinea ſhip informed Mr Pennant, that a rage of ſuicide prevailed among his new-bought ſlaves, from a notion the unhappy creatures had, that after death they ſhould be reſtored again to their families, friends, and country. To convince them at leaſt that they ſhould not reanimate their bodies, he ordered one of their corpſes to be tied by the heels to a rope and lowered into the ſea; and though it was drawn up again as faſt as the united force of the crew could be exerted, yet in that ſhort ſpace the ſharks had devoured every part but the feet, which were ſecured at the end of the cord. Swimmers very often periſh by them; ſometimes they loſe an arm or leg, and ſometimes are bit quite aſunder, ſerving but for two morſels for this ravenous animal: a melancholy tale of this kind is related in a Weſt-India ballad, preſerved in Dr Percy's Relics of ancient Engliſh Poetry.

5. The glaucus, or blue ſhark, is of an oblong form: the noſe extends far beyond the mouth: it wants the orifices behind the eyes, which are uſual in this genus: the noſtrils are long, and placed tranſverſely. Artedi remarks a triangular dent in the lower part of the back. The ſkin is ſmoother than that of other ſharks: the back is of a fine blue colour; the belly of a ſilvery white. Linnæus ſays, that its teeth are granulated. Rondeletius ſays he was an eye-witneſs to its fondneſs for human fleſh: that theſe fiſh are leſs deſtructive in our ſeas, is owing to the coolneſs of the climate, which is well known to abate the fierceneſs of ſome, as well as the venom of other animals.

6. The long-tailed ſhark, or ſea-fox, is moſt remarkable for the great length of the tail: the whole meaſure of one examined by Mr Pennant being 13 feet, of which the tail alone was more than ſix, the upper lobe extending greatly beyond the lower, almoſt in a ſtraight line. The body was round and ſhort: the noſe ſhort, but ſharp-pointed: the eyes large, and placed immediately over the corners of the mouth, which was ſmall, and not very diſtant from the end of the noſe. The teeth triangular, ſmall for the ſize of the fiſh, and placed in three rows. The back aſh-colour; the belly white; the ſkin univerſally ſmooth.

The ancients ſtyled this fiſh ἀλωπηξ, and *vulpes*, from its ſuppoſed cunning. They believed, that when it had the misfortune to have taken a bait, it ſwallowed the hook till it got at the cord, which it bit off, and ſo eſcaped. They are ſometimes taken in our ſeas, and have been imagined to be the fiſh called the *threſher*, from its attacking and beating the grampus with its long tail, whenever that ſpecies of whale riſes to the ſurface to breathe.

7. The canicula, or ſpotted ſhark.—The weight of one examined by Mr Pennant was ſix pounds three ounces, and yet it meaſured three feet eight inches in length; ſo light are the cartilaginous fiſh in reſpect to their ſize. The noſe was ſhort and very blunt, not extending above an inch and an half beyond the mouth. The noſtrils were large, placed near the mouth, and covered with a large angular flap: the head very flat. The eyes were oblong, behind each a large orifice opening to the inſide of the mouth. The teeth ſmall, ſharp, ſmooth at their ſides, ſtraight, and diſpoſed in four rows. The tail was finned, and below extended into a ſharp angle. The colour of the whole upper part of the body and the fins was brown, marked with numbers of large diſtinct black ſpots: ſome parts of the ſkin were tinged with red; the belly was white. The whole was remarkably round, and had a ſtrong ſmell. The tendrils that iſſue from each end of the purſe of this fiſh are much more delicate and ſlender than thoſe of any other; are as fine as Indian graſs, and very much reſemble it. The female of this ſpecies, and we believe of other ſharks, is greatly ſuperior in ſize to the male; ſo that in this reſpect there is an agreement between the fiſh and the birds of prey. They bring about 19 young at a time: the fiſhermen

believe that they breed at all times of the year, as they ſcarce ever take any but what are with young.

8. The catulus, or leſſer ſpotted ſhark.—The weight of one that was brought to Mr Pennant by a fiſherman was only one pound twelve ounces; the length two feet two inches: it is of a ſlender make in all parts. The head was flat; the noſtrils covered with a long flap; the noſe blunt, and marked beneath with numerous ſmall punctures; behind each eye was a ſmall orifice; the back-fins, like thoſe of the former, placed far behind. The ventral fins are united, forming as if it were but one, which is a ſure mark of this ſpecies. The tail finned like that of the greater dog-fiſh. The colour is cinereous, ſtreaked in ſome parts with red, and generally marked with numbers of ſmall black ſpots; but in ſome they are very faint and obſcure. The belly is white. This ſpecies breeds from 9 to 13 young at a time; is very numerous on ſome of our coaſts, and very injurious to the fiſheries.

SQUAMARIA, in botany. See Lathræa.

SQUAMOUS, in anatomy, a name given to the ſpurious or falſe ſutures of the ſkull, becauſe compoſed of ſquamæ, or ſcales like thoſe of fiſhes.

SQUARE, in geometry, a quadrilateral figure both equilateral and equiangular. See Geometry.

Square-*Root*. See Algebra, n° 8. and Arithmetic, n° 33.

Hollow Square, in the military art, a body of foot drawn up with an empty ſpace in the middle, for the colours, drums, and baggage, faced and covered by the pikes every way, to keep off the horſe.

Square, among mechanics, an inſtrument conſiſting of two rules or branches, faſtened perpendicularly at one end of their extremities, ſo as to form a right angle. It is of great uſe in the deſcription and menſuration of right angles, and laying down perpendiculars.

Square-*Rigged*, an epithet applied to a ſhip whoſe yards are very long. It is alſo uſed in contradiſtinction to all veſſels whoſe ſails are extended by ſtays or lateen-yards, or by booms and gaffs; the uſual ſituation of which is nearly in the plane of the keel; and hence,

Square-*Sail*, is a ſail extended to a yard which hangs parallel to the horizon, as diſtinguiſhed from the other ſails which are extended by booms and ſtays placed obliquely. This ſail is only uſed in fair winds, or to ſcud under in a tempeſt. In the former caſe, it is furniſhed with a large additional part called the *bonnet*, which is then attached to its bottom, and removed when it is neceſſary to scud. See that article.

SQUATINA. See Squalus.

SQUILL, in botany. See Scilla.

SQUILLA, the name of a ſpecies of cancer. See Cancer, n° 5, 6.

SQUINTING. See Medicine, n° 476.

SQUIRREL, in zoology. See Sciurus.

STABBING, in law. The offence of mortally ſtabbing another, though done upon ſudden provocation, is puniſhed as murder; the benefit of clergy being taken away from it by ſtatute. (See Murder). For by Ja. I. c. 8. when one thruſts or ſtabs another, not then having a weapon drawn, or who hath not then firſt ſtricken the party ſtabbing, ſo that he dies thereof within ſix months after, the offender ſhall not have the benefit of clergy, though he did it not of malice aforethought. This ſtatute was made on account of the frequent quarrels and ſtabbings with ſhort daggers between the Scotch and the Engliſh at the acceſſion of James I.; and being therefore of a temporary nature, ought to have expired with the miſchief which it meant to remedy. For, in point of ſolid and ſubſtantial juſtice, it cannot be ſaid that the mode of killing, whether by ſtabbing, ſtrangling, or ſhooting, can either extenuate or enhance the guilt; unleſs where, as in the caſe of poiſoning, it carries with it an internal evidence of cool and deliberate malice. But the benignity of the law hath conſtrued the ſtatute ſo favourably in behalf of the ſubject, and ſo ſtrictly when againſt him, that the offence of ſtabbing now ſtands almoſt upon the ſame footing as it did at the common law. Thus, (not to repeat the caſes mentioned under Manslaughter, of ſtabbing an adultereſs, &c. which are barely manſlaughter, as at common law), in the conſtruction of this ſtatute it hath been doubted, whether, if the deceaſed had ſtruck at all before the mortal blow given, this does not take it out of the ſtatute, though in the preceding quarrel the ſtabber had given the firſt blow; and it ſeems to be the better opinion, that this is not within the ſtatute. Alſo it hath been reſolved, that the killing a man, by throwing a hammer or other weapon, is not within the ſtatute; and whether a ſhot with a piſtol be ſo or not, is doubted. But if the party ſlain had a cudgel in his hand, or had thrown a pot or a bottle, or diſcharged a piſtol at the party ſtabbing, this is a ſufficient reaſon for having a weapon drawn on his ſide within the words of the ſtatute.

STADIUM, an ancient Greek long meaſure, containing 125 geometrical paces, or 625 Roman feet, correſponding to our furlong.

The word is formed from the Greek ϛασις, ſtation; and it is ſaid, on this occaſion, that Hercules, after running ſo far at one breath, ſtood ſtill. The Greeks meaſured all their diſtances by ſtadia, which they call ϛαδιαζιν.—Stadium was alſo the courſe or career wherein the Greeks ran their races.

STADTHOLDER, the principal magiſtrate or governor of the United provinces. The Stadtholder ſeems to be empowered, either directly, or by his influence, to change both the deputies, magiſtrates, and officers in every province and city. He is preſident in the ſtates of every province, though he has not ſo much as a ſtate or vote in the ſtates-general; but as he influences the ſtates of each province to ſend what deputies he pleaſes to the aſſembly, he has in fact the appointing of the perſons that conſtitute it, and may be deemed ſovereign of the United Provinces. The ſtadtholders had once a very great power; ſo that we find one of them appointing what towns ſhould ſend deputies to the aſſembly of the ſtates of Holland: but the ſtadtholderſhip was never hereditary till the year 1747, when it was made ſo in the family of Orange.

It is obſerved, that the States paſſed by the ſtadtholder's eldeſt ſon, and appointed his younger ſon prince Maurice of Orange their ſtadtholder. At other times they have ſuppreſſed the ſtadtholderſhip entirely. The ſtadtholder always in the council, where there happens to be an equality of votes, has a deciſive voice.

STAFF, an inſtrument ordinarily uſed to reſt on in walking.

Staff, Staffa.

walking. The ſtaff is alſo frequently uſed as a kind of natural weapon both of offence and defence; and for ſeveral other purpoſes.

Staff, a light pole erected in different parts of a ſhip, whereon to hoiſt and diſplay the colours.

The principal of theſe is reared immediately over the ſtern, to diſplay the enſign; another is fixed on the bowſprit, to extend the jack; three more are erected at the three maſt-heads, or formed by their upper ends, to ſhow the flag or pendant of the reſpective ſquadron or diviſion to which the ſhip is appropriated. See Ensign, Mast, Jack, and Pendant.

Staff, in military matters, conſiſts of a quarter-maſter-general, adjutant-general, and majors of brigade. The ſtaff properly exiſts only in time of war. See Quarter-*Maſter General*, &c.

Regimental Staff, conſiſts in the adjutant, quarter-maſter, chaplain, ſurgeon, &c.

Staff, in muſic, five lines, on which, with the intermediate ſpaces, the notes of a ſong or piece of muſic are marked.

STAFFA, one of the Hebrides, or Weſtern Iſlands of Scotland, remarkable for its baſaltic pillars. It was lately viſited by Mr Joſeph Banks, who communicated the following account of it to Mr Pennant.

" The little iſland of Staffa lies on the weſt coaſt of Mull, about three leagues N. E. from Jona, or the Columb Kill: its greateſt length is about an Engliſh mile, and its breadth about half a one. On the weſt ſide of the iſland is a ſmall bay where boats generally land; a little to the ſouthward of which, the firſt appearance of pillars are to be obſerved: they are ſmall; and inſtead of being placed upright, lie down on their ſides, each forming a ſegment of a circle. From thence you paſs a ſmall cave, above which the pillars, now grown a little larger, are inclining in all directions: in one place in particular, a ſmall maſs of them very much reſemble the ribs of a ſhip. From hence having paſſed the cave, which, if it is not low water, you muſt do in a boat, you come to the firſt ranges of pillars, which are ſtill not above half as large as thoſe a little beyond. Over-againſt this place is a ſmall iſland, called in Erſe *Boo-ſha-la*, ſeparated from the main by a channel not many fathoms wide. This whole iſland is compoſed of pillars without any ſtratum above them; they are ſtill ſmall, but by much the neateſt formed of any about the place.

" The firſt diviſion of the iſland, for at high water it is divided into two, makes a kind of a cone, the pillars converging together towards the centre: on the other they are in general laid down flat; and in the front next to the main, you ſee how beautifully they are packed together, their ends coming out ſquare with the bank which they form. All theſe have their tranſverſe ſections exact, and their ſurfaces ſmooth; which is by no means the caſe with the large ones, which are cracked in all directions. I much queſtion, however, if any one of this whole iſland of Boo-ſha-la is two feet in diameter.

" The main iſland oppoſite to Boo-ſha-la, and farther towards the N. W. is ſupported by ranges of pillars pretty erect, and, though not tall, (as they are not uncovered to the baſe), of large diameters; and at their feet is an irregular pavement, made by the upper ſides of ſuch as have been broken off, which extends as far under water as the eye can reach. Here the forms of the pillars are apparent: theſe are of three, four, five, ſix, and ſeven ſides; but the number of five and ſix are by much the moſt prevalent. The largeſt I meaſured was of ſeven; it was four feet five inches in diameter.

Staffa.

" The ſurfaces of theſe large pillars, in general, are rough and uneven, full of cracks in all directions; the tranſverſe figures in the upright ones never fail to run in their true directions. The ſurfaces upon which we walked were often flat, having neither concavity nor convexity; the larger number, however, were concave, though ſome were very evidently convex. In ſome places, the interſtices within the perpendicular figures were filled up with a yellow ſpar: in one place, a vein paſſed in among the maſs of pillars, carrying here and there ſmall threads of ſpar. Though they were broken and cracked through and through in all directions, yet their perpendicular figures might eaſily be traced: from whence it is eaſy to infer, that whatever the accident might have been that cauſed the diſlocation, it happened after the formation of the pillars.

" From hence proceeding along ſhore, you arrive at Fingal's cave. Its dimenſions I have given in the form of a table:

	Feet.	In.
Length of the cave from the rock without,	371	6
From the pitch of the arch, -	250	0
Breadth of ditto at the mouth, -	53	7
At the farther end, - -	20	0
Height of the arch at the mouth, -	117	6
At the end, - -	70	0
Height of an outſide pillar, -	39	6
Of one at the N. W. corner, -	54	0
Depth of water at the mouth, -	18	0
At the bottom, - -	9	0

" The cave runs into the rock in the direction of N. E. by E. by the compaſs.

" Proceeding farther to the north-weſt, you meet with the higheſt ranges of pillars; the magnificent appearance of which is paſt all deſcription. Here they are bare to their very baſis, and the ſtratum below them is alſo viſible: in a ſhort time, it riſes many feet above the water, and gives an opportunity of examining its quality. Its ſurface is rough, and has often large lumps of ſtone ſticking in it as if half immerſed: itſelf, when broken, is compoſed of a thouſand heterogeneous parts, which together have very much the appearance of a lava; and the more ſo, as many of the lumps appear to be of the very ſame ſtone of which the pillars are formed. This whole ſtratum lies in an inclined poſition, dipping gradually towards the ſouth-eaſt. As hereabouts is the ſituation of the higheſt pillars, I ſhall mention my meaſurements of them and the different ſtrata in this place, premiſing, that the meaſurements were made with a line, held in the hand of a perſon who ſtood at the top of the cliff, and reaching to the bottom; to the lower end of which was tied a white mark, which was obſerved by one who ſtaid below for the purpoſe: when this mark was ſet off from the water, the perſon below noted it down, and made ſignal to him above, who made then a mark in his rope: whenever this mark paſſed a notable place, the ſame ſignal was made, and the name of the place noted down as before: the line being all hauled up, and the diſtances between the marks meaſured and noted down, gave, when compared with the book kept below, the diſtances, as for inſtance in the cave:

"N° 1. in the book below, was called from the water to the foot of the firſt pillar in the book above; n° 1. gave 36 feet 8 inches, the higheſt of that aſcent, which was compoſed of broken pillars.

"N° 1. Pillar at the weſt corner of Fingal's cave.

	Feet.	In.
1 From the water to the foot of the pillar,	12	10
2 Height of the pillar, - -	37	3
3 Stratum above the pillar, -	66	9

"N° 2. Fingal's cave.

1 From the water to the foot of the pillar,	36	8
2 Height of the pillar, - -	39	6
3 From the top of the pillar to the top of the arch, - -	31	4
4 Thickneſs of the ſtratum above, -	34	4
By adding together the three firſt meaſurements, we got the height of the arch from the water, - -	117	6

"N° 3. Corner pillar to the weſtward of Fingal's cave.

Stratum below the pillar of lava-like matter,	11	0
Length of pillar, - -	54	0
Stratum above the pillar, -	61	6

"N° 4. Another pillar to the weſtward.

Stratum below the pillar, - -	17	1
Height of the pillar, - -	50	0
Stratum above, - -	51	1

"N° 5. Another pillar farther to the weſtward.

Stratum below the pillar, - -	19	8
Height of the pillar, - -	55	1
Stratum above, - -	54	7

"The ſtratum above the pillars, which is here mentioned, is uniformly the ſame, conſiſting of nnmberleſs ſmall pillars, bending and inclining in all directions, ſometimes ſo irregularly that the ſtones can only be ſaid to have an inclination to aſſume a columnar form; in others more regular, but never breaking into or diſturbing the ſtratum of large pillars, whoſe tops every where keep an uniform and regular line.

"Proceeding now along the ſhore round the north end of the iſland, you arrive at *Oua na ſcarve*, or the Corvorant's Cave. Here the ſtratum under the pillars is lifted up very high; the pillars above it are conſiderably leſs than thoſe at the north-weſt end of the iſland, but ſtill very conſiderable. Beyond is a bay, which cuts deep into the iſland, rendering it in that place not more than a quarter of a mile over. On the ſides of this bay, eſpecially beyond a little valley, which almoſt cuts the iſland into two, are two ſtages of pillars, but ſmall; however, having a ſtratum between them exactly the ſame as that above them, formed of innumerable little pillars, ſhaken out of their places, and leaning in all directions.

"Having paſſed this bay, the pillars totally ceaſe; the rock is of a dark-brown ſtone, and no ſigns of regularity occur till you have paſſed round the ſouth-eaſt end of the iſland (a ſpace almoſt as large as that occupied by the pillars), which you meet again on the weſt ſide, beginning to form themſelves irregularly, as if the ſtratum had an inclination to that form, and ſoon arrive at the bending pillars where I began.

"The ſtone of which the pillars are formed, is a coarſe kind of baſaltes, very much reſembling the Giant's Cauſeway in Ireland, though none of them are near ſo neat as the ſpecimens of the latter which I have ſeen at the Britiſh Muſeum; owing chiefly to the colour, which in ours is a dirty brown, in the Iriſh a fine black: indeed the whole production ſeems very much to reſemble the Giant's Cauſeway."

STAFFORD, the capital of a county of England of the ſame name, in W. Long. 2. 6. N. Lat. 52. 20. It ſtands on the river Sow, over which it has a ſtone-bridge. It is well built and paved, and had formerly a caſtle and walls. It has a flouriſhing cloth-manufacture, and gives the title of *earl* to a Popiſh branch of the family of Howard.

STAFFORDSHIRE, a county of England, bounded on the ſouth by Worceſterſhire, by Cheſhire and Derbyſhire on the north, by Warwickſhire and Derbyſhire on the eaſt, and Shropſhire and Cheſhire on the weſt. The length is reckoned at 40 miles, the breadth at 26, and the circumference at 141. It contains 5 hundreds, 150 pariſhes, 810,000 acres, 1 city, and 18 market-towns. The air, except in thoſe parts that are called the Moorlands and Woodlands, and about the mines, is good, eſpecially upon the hills, where it is accounted very fine: but the ſoil in the northern mountainous part is not ſo fertile. In the middle, where it is watered by the Trent, the third river in England, it is both fruitful and pleaſant, being a mixture of arable and meadow grounds. In the ſouth, it abounds not only with corn, but with mines of iron and pits of coal. The other rivers of this country, beſides the Trent, which runs almoſt through the middle of it, and abounds with ſalmon, are the Dove and Tame, both which are well ſtored with fiſh. In this county are alſo a great many lakes, or meres and pools, as they are called; which, having ſtreams either running into them or from them, cannot be ſuppoſed to be of any great prejudice to the air, and yield plenty of fiſh. In divers parts of the county are medicinal waters, impregnated with different ſorts of minerals, and conſequently of different qualities and virtues; as thoſe at Hynts and Breſsford-houſe, which are mixed with bitumen; thoſe at Ingeſtre, Codſalwood, and Willough-bridge park, which are ſulphureous. Of the ſaline kind are the Brine-pits at Chertley, Epſon, Penſnet-cloſe, of which very good ſalt is made. There is a well at Newcaſtle Under-Line that is ſaid to cure the king's-evil; another called *Elder-well* near Blemhill, ſaid to be good for ſore eyes; and a third called the *Spa*, near Wolverhampton.

Great flocks of ſheep are bred in this county, eſpecially in the moor-lands, or mountains of the northern part of it; but the wool is ſaid to be ſomewhat coarſer than that of many other counties. Of this wool, however, they make a variety of manufactures, particularly felts. In the low grounds along the rivers, are rich paſtures for black cattle; and vaſt quantities of butter and cheeſe are made there. In the middle and ſouthern parts not only grain of all kinds, but a great deal of hemp and flax, are raiſed. This county produces alſo lead, copper, iron; marble, alabaſter, mill-ſtones, limeſtone; coal, ſalt, and marles of ſeveral ſorts and colours; brick-earth, fullers-earth, and potters-clay, particularly a ſort uſed in the glaſs-manufacture at

Amblecot, and ſold at ſeven-pence a buſhel; tobacco-pipe-clay; a ſort of reddiſh earth called *ſlip*, uſed in painting divers veſſels; red and yellow okers; fire-ſtones for hearths of iron furnaces, ovens, &c.; iron-ſtones of ſeveral ſorts; blood-ſtones, or hæmatites, found in the brook Tent, which, when wet a little, will draw red lines like ruddle; quarry-ſtones, and grind-ſtones. For fuel the county is well ſupplied with turf, peat, and coal of ſeveral ſorts, as cannel-coal, peacock-coal, and pit-coal. The peacock-coal is ſo called, becauſe, when turned to the light, it diſplays all the colours of the peacock's tail; but it is fitter for the forge than the kitchen. Of the pit-coal there is an inexhauſtible ſtore: its burns into white aſhes, and leaves no ſuch cinder as that of the Newcaſtle coal. It is not uſed for malting till it is charred, and in that ſtate it makes admirable winter-fuel for a chamber.

This county is in the dioceſe of Litchfield and Coventry, and the Oxford circuit. It ſends eight members to parliament; namely, two for the county, two for the city of Litchfield, two for Stafford, and two for Newcaſtle-Under-Line.

STAG, in zoology. See Cervus.

STAGE, in the modern drama, the place of action and repreſentation, included between the pit and the ſcenes, and anſwering to the proſcenium or pulpitum of the ancients.

STAGGERS. See Farriery, § ix.

STAHL (George Erneſt), an eminent German chemiſt, born in Franconia in the year 1660. He wrote upon almoſt all parts of chemiſtry; and his works, ſome of which are in German, and ſome in Latin, are highly eſteemed.

STAINING *of* Bone, Ivory, Marble, Paper, Wood, &c. See theſe articles.

STAIRCASE, in architecture, an aſcent incloſed between walls, or a balluſtrade conſiſting of ſtairs or ſteps, with landing places and rails, ſerving to make a communication between the ſeveral ſtories of a houſe. See Architecture, n° 94, &c.

STALACTITÆ, in natural hiſtory, cryſtalline ſpars formed into oblong, conical, round, or irregular bodies, compoſed of various cruſts, and uſually found hanging in form of icicles from the roofs of grottos, &c.

STALE, among ſportſmen, a living fowl put in a place to allure and bring others where they may be taken. For want of theſe, a bird ſhot, his entrails taken out, and dried in an oven in his feathers, with a ſtick thruſt through to keep it in a convenient poſture, may ſerve as well as a live one.

Stale is alſo a name for the urine of cattle.

STALLION, or Stone-horse, in the manege, an ungelt horſe, deſigned for the covering of mares, in order to propagate the ſpecies. See Equus.

STAMFORD, an ancient town of Lincolnſhire in England; ſeated on the river Walland, on the edge of Northamptonſhire. It is a large handſome place, containing ſix pariſh-churches, ſeveral good ſtreets, and fine buildings. It had formerly a college, the ſtudents of which removed to Brazen-Noſe college in Oxford. It has no conſiderable manufactories, but deals chiefly in malt. W. Long. 0. 27. N. Lat. 52. 39.

STAMINA, in botany, are thoſe upright filaments which, on opening a flower, we find within the corolla ſurrounding the piſtillum. According to Linnæus, they are the male organs of generation, whoſe office it is to prepare the pollen. Each ſtamen conſiſts of two diſtinct parts, viz. the Filamentum and the Anthera.

Stamina, in the animal body, are defined to be thoſe ſimple original parts which exiſted firſt in the embryo, or even in the ſeed; and by whoſe diſtinction, augmentation, and accretion, by additional juices, the animal body, at its utmoſt bulk, is ſuppoſed to be formed.

STAMP-duties, a branch of the perpetual revenue. See Revenue.

There is a tax impoſed upon all parchment and paper whereon any legal proceedings, or private inſtruments of almoſt any nature whatſoever, are written; and alſo upon licences for retailing wines, of all denominations; upon all almanacks, newſpapers, advertiſements, cards, dice, &c. Theſe impoſts are very various, according to the nature of the things ſtamped, riſing gradually from a penny to ten pounds. This is alſo a tax which, though in ſome inſtances it may be heavily felt, by greatly increaſing the expence of all mercantile as well as legal proceedings, yet (if moderately impoſed) is of ſervice to the public in general, by authenticating inſtruments, and rendering it much more difficult than formerly to forge deeds of any ſtanding; ſince, as the officers of this branch of the revenue vary their ſtamps frequently, by marks perceptible to none but themſelves, a man that would forge a deed of king William's time, muſt know and be able to counterfeit the ſtamp of that date alſo. In France and ſome other countries the duty is laid on the contract itſelf, not on the inſtrument in which it is contained; as, with us too in England, (beſides the ſtamps on the indentures), a tax is laid, by ſtatute 8 Ann. c. 9. on every apprentice-fee; of 6d. in the pound if it be 50l. or under, and 1s. in the pound if a greater ſum: but this tends to draw the ſubject into a thouſand nice diſquiſitions and diſputes concerning the nature of his contract, and whether taxable or not; in which the farmers of the revenue are ſure to have the advantage. Our general method anſwers the purpoſes of the ſtate as well, and conſults the eaſe of the ſubject much better. The firſt inſtitution of the ſtamp-duties was by ſtatute 5 and 6 W. and M. c. 21. and they have ſince, in many inſtances, been increaſed to five times their original amount.

STANCHION, or Stanchions, a ſort of ſmall pillars of wood or iron uſed for various purpoſes in a ſhip; as to ſupport the decks, the quarter-rails, the nettings, the awnings, &c. The firſt of theſe are two ranges of ſmall columns fixed under the beams, throughout the ſhip's length between decks; one range being on the ſtarboard and the other on the larboard ſide of the hatchways. They are chiefly intended to ſupport the weight of the artillery.

STAND, in commerce, a weight from two hundred and an half to three hundred of pitch.

STANDARD, in war, a ſort of banner or flag, borne as a ſignal for the joining together of the ſeveral troops belonging to the ſame body.

Standard, in commerce, the original of a weight, meaſure, or coin, committed to the keeping of a magiſtrate, or depoſited in ſome public place, to regulate, adjuſt, and try the weights uſed by particular perſons in traffic. See MONEY.

STANHOPE (Philip Dormer, earl of Cheſterfield), was born in 1695, and educated in Trinity-hall, Cambridge; which place he left in 1714, when, by his own account, he was an abſolute pedant. In this character he went abroad, where a familiarity with good company ſoon convinced him he was totally miſtaken in almoſt all his notions: and an attentive ſtudy of the air, manner, and addreſs of people of faſhion, ſoon poliſhed a man whoſe predominant deſire was to pleaſe; and who, as it afterward appeared, valued exterior accompliſhents beyond any other human acquirement. While lord Stanhope, he got an early ſeat in parliament; and in 1722, ſucceeded to his father's eſtate and titles. In 1728, and in 1745, he was appointed ambaſſador extraordinary and plenipotentiary to Holland, which high character he ſupported with the greateſt dignity; ſerving his own country, and gaining the eſteem of the ſtates-general. Upon his return from Holland, he was ſent lord-lieutenant of Ireland; and during his adminiſtration there, gave general ſatisfaction to all parties. He left Dublin in 1746, and in October ſucceeded the earl of Harrington as ſecretary of ſtate, in which poſt he officiated until Feb. 6th 1748. Being ſeized with a deafneſs in 1752 that incapacitated him for the pleaſures of ſociety, he from that time led a private and retired life, amuſing himſelf with books and his pen; in particular, he engaged largely as a volunteer in a periodical miſcellaneous paper called *The World*, in which his contributions have a diſtinguiſhed degree of excellence. He died in 1773, leaving a character for wit and abilities that had few equals. He diſtinguiſhed himſelf by his eloquence in parliament on many important occaſions; of which we have a characteriſtic inſtance, of his own relating. He was an active promoter of the bill for altering the ſtyle; on which occaſion, as he himſelf writes in one of his letters to his ſon, he made ſo eloquent a ſpeech in the houſe, that every one was pleaſed, and ſaid he had made the whole very clear to them; "when (ſays he), God knows, I had not even attempted it. "I could juſt as ſoon have talked Celtic or Sclavonian to them, as aſtronomy; and they would have underſtood me full as well." Lord Macclesfield, one of the greateſt mathematicians in Europe, and who had a principal hand in framing the bill, ſpoke afterward, with all the clearneſs that thorough knowledge of the ſubject could dictate; but not having a flow of words equal to lord Cheſterfield, the latter gained the applauſe from the former, to the equal credit of the ſpeaker and the auditors. The high character lord Cheſterfield ſupported during life, received no ſmall injury ſoon after his death, from a fuller diſplay of it by his own hand. He left no iſſue by his lady, but had a natural ſon, Philip Stanhope, Eſq; whoſe education was for many years a cloſe object of his attention, and who was afterward envoy extraordinary at the court of Dreſden, but died before him. When lord Cheſterfield died, Mr Stanhope's widow publiſhed a courſe of letters, written by the father to the ſon, filled with inſtructions ſuitable to the different gradations of the young man's life to whom they were addreſſed. Theſe letters contain many fine obſervations on mankind, and rules of conduct: but it is obſervable that he lays a greater ſtreſs on exterior accompliſhments and addreſs, than on intellectual qualifications and ſincerity; and allows greater latitude to faſhionable pleaſures than good morals will juſtify, eſpecially in paternal inſtructions. Hence it is that a celebrated writer †, of manners ſomewhat different from thoſe of the polite earl of Cheſterfield, is ſaid to have obſerved of theſe Letters, that "they inculcate only the morals of a whore, with the manners of a dancing-maſter."

STANISLAUS I. king of Poland and elector of Saxony, a moſt unfortunate but virtuous prince. He was driven from his dominions by his competitor, who was ſupported by the czar Peter the Great, in oppoſition to Charles XII. king of Sweden. He was obliged, by a treaty of peace in 1736, to content himſelf with the empty title of *king*, and the duchies of Lorraine and Bar, in which he led a retired life; diſtinguiſhing himſelf, however, in this obſcure ſituation, by public and private acts of humanity and benevolence; particularly by ſupplying a fund, under the direction of the magiſtrates of Bar, for purchaſing corn, to be ſold at a cheap price to the poor, whenever it becomes dear. At the age of 90 he came to a fatal end, having ſet fire to his night-gown in ſmoking his pipe: he was burnt almoſt to death before he could get aſſiſtance; and died ſoon after, in 1766. He wrote ſeveral philoſophical, political, and moral tracts, which were publiſhed under the title of *The Works of the Beneficent Philoſopher*, in 4 vols 8vo. Paris, 1673.

STANLEY (Thomas), a very learned Engliſh writer in the 17th century, was the ſon of Sir Thomas Stanley of Cumberlow-Green in Herefordſhire, knight. He was born at Cumberlow, and educated in his father's houſe, whence he removed to the univerſity of Cambridge. He afterwards travelled; and, upon his return to England, proſecuted his ſtudies in the Middle Temple. He married, when young, Dorothy, the eldeſt daughter of Sir John Enyon of Flowne, in Northamptonſhire, baronet. He wrote, 1. A volume of Poems. 2. Hiſtory of Philoſophy, and Lives of the Philoſophers. 3. A Tranſlation of and Commentary on Eſchylus; and ſeveral other works. He died in 1678.

STANNARIES, the mines and works where tin is dug and purified; as in Cornwall, Devonſhire, &c.

STANNARY COURTS, in Devonſhire and Cornwall, for the adminiſtration of juſtice among the tinners therein. They are held before the lord-warden and his ſubſtitutes, in virtue of a privilege granted to the workers in the tin-mines there, to ſue and be ſued only in their own courts, that they may not be drawn from their buſineſs, which is highly profitable to the public, by attending their law-ſuits in other courts. The privileges of the tinners are confirmed by a charter, 33 Edw. I. and fully expounded by a private ſtatute, 50 Edw. III. which has ſince been explained by a public act, 16 Car. I. c. 15. What relates to our preſent purpoſe is only this: That all tinners and labourers in and about the ſtannaries ſhall, during the time of their working therein, *bona fide*, be privileged from ſuits of other courts, and be only pleaded in the ſtannary court in all matters, excepting pleas of land, life, and member. No writ of error lies from hence to any court in Weſtminſter-hall; as was agreed by all the judges, in 4 Jac. I. But an appeal lies from the ſteward

† *Dr Joh ſon.*

ſteward of the court to the under-warden; and from him to the lord-warden; and thence to the privy-council of the prince of Wales, as duke of Cornwall, when he hath had livery or inveſtiture of the ſame. And from thence the appeal lies to the king himſelf, in the laſt reſort.

STANNUM, tin. See Chemistry, n° 150, 203, 246, 285, 406.

STANZA, in poetry, a certain ſtated number of verſes, generally containing a perfect ſenſe, that ought to end with ſome lively and ingenious thought, or juſt and pertinent reflection.

STAPLE, primarily ſignifies a public place or market, whither merchants, &c. are obliged to bring their goods to be bought by the people; as the Greve, or the places along the Seine, for ſale of wines and corn, at Paris, whither the merchants of other parts are obliged to bring thoſe commodities.

Formerly, the merchants of England were obliged to carry their wool, cloth, lead, and other like ſtaple commodities of this realm, in order to utter the ſame by wholeſale; and theſe ſtaples were appointed to be conſtantly kept at York, Lincoln, Newcaſtle upon Tyne, Norwich, Weſtminſter, Canterbury, Chicheſter, Wincheſter, Exeter, and Briſtol; in each whereof a public mart was appointed to be kept, and each of them had a court of the mayor of the ſtaple, for deciding differences, held according to the law-merchant, in a ſummary way.

STAR, in aſtronomy, a general name for all the heavenly bodies, which, like ſo many brilliant ſtuds, are diſperſed throughout the whole heavens.

The ſtars are diſtinguiſhed, from the phænomena of their motion, &c. into fixed, and erratic or wandering ſtars: theſe laſt are again diſtinguiſhed into the greater luminaries, viz. the ſun and moon; the planets, or wandering ſtars, properly ſo called; and the comets; which have been all fully conſidered and explained under the article Astronomy.

As to the fixed ſtars, or ſimply ſtars, they are ſo called, becauſe they ſeem to be fixed, or perfectly at reſt, and conſequently appear always at the ſame diſtance from each other.

Falling Stars, in meteorology, fiery meteors which dart through the ſky in form of a ſtar. See Electricity, n° 39. and Meteor.

Twinkling of the Stars. See Optics, n° 20. *et ſeq.*

Star, is alſo a badge of honour, worn by the knights of the garter, bath, thiſtle. See Garter.

Star *of Bethlehem*, in botany. See Ornithogalum.

Court of Star-chamber, (*camera ſtellata*), a famous, or rather infamous, Engliſh tribunal, ſaid to have been ſo called either from a Saxon word ſignifying to *ſteer* or govern; or from its puniſhing the *crimen ſtellionatus*, or coſenage; or becauſe the room wherein it ſat, the old council-chamber of the palace of Weſtminſter, (Lamb. 148.) which is now converted into the lottery-office, and forms the eaſtern ſide of new palace-yard, was full of windows; or, (to which Sir Edward Coke, 4 Inſt. 66. accedes), becauſe *haply* the roof thereof was at the firſt garniſhed with gilded *ſtars*. As all theſe are merely conjectures, (for no ſtars are now in the roof, nor are any ſaid to have remained there ſo late as the reign of queen Elizabeth), it may be allowable to propoſe another conjectural etymology, as plauſible perhaps as any of them. It is well known, that, before the baniſhment of the Jews under Edward I. their contracts and obligations were denominated in our ancient records *ſtarra* or *ſtarrs*, from a corruption of the Hebrew word, *ſhetar*, a covenant. (Tovey's *Angl. Judaic.* 32. Selden. tit. of hon. ii. 34. *Uxor Ebraic.* i. 14.) Theſe ſtarrs, by an ordinance of Richard the firſt, preſerved by Hoveden, were commanded to be enrolled and depoſited in cheſts under three keys in certain places; one, and the moſt conſiderable, of which was in the king's exchequer at Weſtminſter: and no ſtarr was allowed to be valid, unleſs it were found in ſome of the ſaid repoſitories. (*Memorand, in Scac' P. 6 Edw. I.* prefixed to Maynard's year-book of Edw. II. fol. 8. Madox hiſt. exch. c. vii. § 4, 5, 6.) The room at the exchequer, where the cheſts containing theſe ſtarrs were kept, was probably called the *ſtar-chamber*; and, when the Jews were expelled the kingdom, was applied to the uſe of the king's council, ſitting in their judicial capacity. To confirm this, the firſt time the ſtar-chamber is mentioned in any record, it is ſaid to have been ſituated near the receipt of the exchequer at Weſtminſter: (the king's council, his chancellor, treaſurer, juſtices, and other ſages, were aſſembled *en la chaumbre des eſteilles pres la reſceipt al Weſtminſter. Clauſ.* 41 *Edw. III. m.* 13.) For in proceſs of time, when the meaning of the Jewiſh *ſtarrs* were forgotten, the word *ſtar-chamber* was naturally rendered in law-French, *la chambre des eſteilles*, and in law-Latin *camera ſtellata*; which continued to be the ſtyle in Latin till the diſſolution of that court.

This was a court of very ancient original; but new-modelled by ſtatutes 3 Hen. VII. c. 1. and 21 Hen. VIII. c. 20, conſiſting of divers lords ſpiritual and temporal, being privy counſellors, together with two judges of the courts of common-law, without the intervention of any jury. Their juriſdiction extended legally over riots, perjury, miſbehaviour of ſheriffs and other notorious miſdemeanors, contrary to the laws of the land. Yet this was afterwards (as lord Clarendon informs us) ſtretched "to the aſſerting of all proclamations and orders of ſtate; to the vindicating of illegal commiſſions, and grants of monopolies; holding for honourable that which pleaſed, and for juſt that which profited; and becoming both a court of law to determine civil rights, and a court of revenue to enrich the treaſury: the council-table by proclamations enjoining to the people that which was not enjoined by the laws, and prohibiting that which was not prohibited; and the ſtar-chamber, which conſiſted of the ſame perſons in different rooms, cenſuring the breach and diſobedience to thoſe proclamations by very great fines, impriſonments, and corporal ſeverities: ſo that any diſreſpect to any acts of ſtate, or to the perſons of ſtateſmen, was in no time more penal, and the foundations of right never more in danger to be deſtroyed." For which reaſons, it was finally aboliſhed by ſtatute 16 Car. I. c. 10. to the general joy of the whole nation. See King's *Bench*. There is in the Britiſh Muſeum (Harl. MSS. Vol. I. n° 1226.) a very full, methodical, and accurate account of the conſtitution and courſe of this court, compiled by William Hudſon of Gray's Inn, an eminent practitioner therein; a ſhort account of the ſame, with copies of all its proceſs, may alſo be found in 18 Rym. Foed. 192, &c.

STAR-*Board*, the right ſide of the ſhip when the eye of the ſpectator is directed forward.

STAR-*Fiſh*. See ASTERIAS.

STAR-*Shot*, a gelatinous ſubſtance frequently found in fields, and ſuppoſed by the vulgar to have been produced from the meteor called a *falling-ſtar*: but, in reality, is the half-digeſted food of herons, ſea-mews, and the like birds; for theſe birds, when ſhot, have been found, when dying, to diſgorge a ſubſtance of the ſame kind.

STAR-*Stone*, in natural hiſtory, a name given to certain extraneous foſſile ſtones, in form of ſhort, and commonly ſomewhat crooked, columns, compoſed of ſeveral joints, each reſembling the figure of a radiated ſtar, with a greater or ſmaller number of rays in the different ſpecies: they are uſually found of about an inch in length, and of the thickneſs of a gooſe-quill. Some of them have five angles or rays, and others only four; and in ſome the angles are equi-diſtant, while in others they are irregularly ſo: in ſome alſo they are ſhort and blunt, while in others they are long, narrow, and pointed; and ſome have their angles very ſhort and obtuſe. The ſeveral joints in the ſame ſpecimen are uſually all of the ſame thickneſs; this, however, is not always the caſe; but in ſome they are larger at one end, and in others at the middle, than in any other part of the body; and ſome ſpecies have one of the rays bifid, ſo as to emulate the appearance of a ſix-rayed kind.

STARCH, a fecula or ſediment, found at the bottom of veſſels wherein wheat has been ſteeped in water, of which fecula, after ſeparating the bran from it, by paſſing it through ſieves, they form a kind of loaves, which being dried in the ſun or an oven, is afterwards cut into little pieces, and ſo ſold. The beſt ſtarch is white, ſoft, and friable, and eaſily broken into powder. Such as require fine ſtarch, do do not content themſelves, like the ſtarchmen, with refuſe wheat, but uſe the fineſt grain. The proceſs is as follows: The grain being well cleaned, is put to ferment in veſſels full of water, which they expoſe to the ſun while in its greateſt heat; changing the water twice a-day, for the ſpace of eight or twelve days, according to the ſeaſon, When the grain burſts eaſily under the finger, they judge it ſufficiently fermented. The fermentation perfected, and the grain thus ſoftened, it is put, handful by handful, into a canvas-bag, to ſeparate the flour from the huſks; which is done by rubbing and beating it on a plank laid acroſs the mouth of an empty veſſel that is to receive the flour.

As the veſſels are filled with this liquid flour, there is ſeen ſwimming at top a reddiſh water, which is to be carefully ſcummed off from time to time, and clean water is to be put in its place, which, after ſtirring the whole together, is alſo to be ſtrained through a cloth or ſieve, and what is left behind put into the veſſel with new water, and expoſed to the ſun for ſome time. As the ſediment thickens at the bottom, they drain off the water four or five times, by inclining the veſſel, but without paſſing it through the ſieve. What remains at bottom is the ſtarch, which they cut in pieces to get out, and leave it to dry in the ſun. When dry, it is laid up for uſe.

STARE, or STARLING. See STURNUS.

STATE *of a* CONTROVERSY. See ORATORY, nº 20, &c.

STATES, or ESTATES, a term applied to ſeveral orders or claſſes of people aſſembled to conſult of matters for the public good.

Thus ſtates-general is the name of an aſſembly conſiſting of the deputies of the ſeven United Provinces. Theſe are uſually 30 in number, ſome provinces ſending two, others more; and whatever reſolution the ſtates-general take, muſt be confirmed by every province, and by every city and republic in that province, before it has the force of a law. The deputies of each province, of what number ſoever they be, have only one voice, and are eſteemed as but one perſon, the votes being given by provinces. Each province preſides in the aſſembly in its turn, according to the order ſettled among them. Guelderland preſides firſt, then Holland, &c.

States of Holland are the deputies of eighteen cities, and one repreſentative of the nobility, conſtituting the ſtates of the province of Holland: the other provinces have likewiſe their ſtates, repreſenting their ſovereignty; deputies from which make what they call the ſtates-general. In an aſſembly of the ſtates of a particular province, one diſſenting voice prevents their coming to any reſolution.

STATIUS, (Publius Papinius), a celebrated Latin poet of the firſt century, was born at Naples, and was the ſon of Statius, a native of Epirus, who went to Rome to teach poetry and eloquence, and had Domitian for his ſcholar. Statius the poet alſo obtained the favour and friendſhip of that prince; and dedicated to him his Thebais and Achilleis; the firſt in twelve books, and the laſt in two. He died at Naples about the year 100. Beſides the above poems, there are alſo ſtill extant his *Sylvæ*, in five books; the ſtyle of which is purer, more agreeable, and more natural, than that of his Thebais and Achilleis.

STATUARY, a branch of ſculpture, employed in the making of ſtatues. See SCULPTURE and the next article.

Statuary is one of thoſe arts wherein the ancients ſurpaſſed the moderns; and indeed it was much more popular, and more cultivated, among the former than the latter. It is diſputed between ſtatuary and painting, which of the two is the moſt difficult and the moſt artful.

Statuary is alſo uſed for the artificer who makes ſtatues. Phidias was the greateſt ſtatuary among the ancients, and Michael Angelo among the moderns.

STATUE, is defined to be a piece of ſculpture in full relievo, repreſenting a human figure. Daviler more ſcientifically defines ſtatue a repreſentation, in high relievo and inſulate, of ſome perſon diſtinguiſhed by his birth, merit, or great actions, placed as an ornament in a fine building, or expoſed in a public place, to preſerve the memory of his worth. In ſtrictneſs, the term ſtatue is only applied to figures on foot, the word being formed from *ſtatura*, the ſize of the body.

Statues are formed with the chiſel, of ſeveral matters, as ſtone, marble, plaſter, &c. They are alſo caſt of various kinds of metal, particularly gold, ſilver, braſs, and lead. For the method of caſting ſtatues, ſee the article FOUNDERY *of Statues*.

Statues are uſually diſtinguiſhed into four general kinds. The firſt are thoſe leſs than the life; of which kind we have ſeveral ſtatues of great men, of kings, and of gods themſelves. The ſecond are thoſe equal to the life; in which manner it was that the ancients, at the public expence, uſed to make ſtatues of perſons eminent for virtue, learning, or the ſervices they had done. The third are thoſe that exceed the life; among which thoſe that ſurpaſſed the life once and a half were for kings and emperors; and thoſe double the life, for heroes. The fourth kind were thoſe that exceeded the life twice, thrice, and even more, and were called *coloſſuſes*. See COLOSSUS.

Every ſtatue reſembling the perſon it is intended to repreſent, is called *ſtatua iconica*. Statues acquire various other denominations. 1. Thus, allegorical ſtatue is that which, under a human figure, or other ſymbol, repreſents ſomething of another kind; as a part of the earth, a ſeaſon, age, element, temperament, hour, &c. 2. Curule ſtatues, are thoſe which are repreſented in chariots drawn by bigæ or quadrigæ, that is, by two or four horſes; of which kind there were ſeveral in the circuſes, hippodromes, &c. or in cars, as we ſee ſome, with triumphal arches on antique medals. 3. Equeſtrian ſtatue, that which repreſents ſome illuſtrious perſon on horſeback, as that famous one of Marcus Aurelius at Rome; that of king Charles I. at Charing-croſs; King George II. in Leiceſter-Square, &c. 4. Greek ſtatue, denotes a figure that is naked and antique; it being in this manner the Greeks repreſented their deities, athletæ of the olympic games, and heroes: the ſtatues of heroes were particularly called *Achillean ſtatues*, by reaſon of the great number of figures of Achilles in moſt of the cities of Greece. 5. Hydraulic ſtatue, is any figure placed as an ornament of a fountain or grotto, or that does the office of a *jet d'eau*, a cock, ſpout, or the like, by any of its parts, or by any attribute it holds: the like is to be underſtood of any animal ſerving for the ſame uſe. 6. Pedeſtrian ſtatue, a ſtatue ſtanding on foot; as that of king Charles II. in the Royal-Exchange, and of king James II. in the Privy-Gardens. 7. Roman ſtatue, is an appellation given to ſuch as are clothed, and which receive various names from their various dreſſes. Thoſe of emperors, with long gowns over their armour, were called *ſtatuæ paludatæ*: thoſe of captains and cavaliers, with coats of arms, *thoracatæ*; thoſe of ſoldiers with cuiraſſes, *loricatæ*; thoſe of ſenators and augurs, *trabeatæ*; thoſe of magiſtrates with long robes, *togatæ*; thoſe of the people with a plain tunica, *tunicatæ*; and, laſtly, thoſe of women with long trains, *ſtolatæ*.

In repairing a ſtatue caſt in a mould, they touch it up with a chiſel, graver, or other inſtrument, to finiſh the places which have not come well off: they alſo clear off the barb, and what is redundant in the joints and projectures.

STATUTE, in its general ſenſe, ſignifies a law, ordinance, decree, &c. See LAW, &c.

STATUTE, in our laws and cuſtoms, more immediately ſignifies an act of parliament made by the three eſtates of the realm; and ſuch ſtatutes are either general, of which the courts at Weſtminſter muſt take notice without pleading them; or they are ſpecial and private, which laſt muſt be pleaded.

STAY, a large ſtrong rope employed to ſupport the maſt on the fore-part, by extending from its upper end towards the fore-part of the ſhip, as the ſhrouds are extended to the right and left, and behind it. See MAST, RIGGING, and SHROUD.

The ſtay of the fore-maſt *a*, fig. 3. Plate CCLXXVI. which is called the *fore-ſtay*, reaches from the maſt-head towards the bowſprit-end: the main-ſtay *b* extends over the forecaſtle to the ſhip's ſtem; and the mizen-ſtay *c* is ſtretched down to that part of the main-maſt which lies immediately above the quarter-deck: the fore-top-maſt ſtay *d* comes alſo to the end of the bowſprit, a little beyond the fore-ſtay: the main-top-maſt ſtay *e* is attached to the head or hounds of the fore-maſt; and the mizen-top-maſt ſtay comes alſo to the hounds of the main-maſt: the fore-top-gallant ſtay comes to the outer end of the jib-boom; and the main-top-gallant ſtay is extended to the head of the fore-top-maſt.

STAY-*Sail*, a ſort of triangular ſail extended upon a ſtay. See SAIL.

STEAM, the ſmoke ariſing from water, or any other liquid, when conſiderably heated.

STEAM-*Engine*, an engine for raiſing water by means of fire.

History.

The earlieſt account to be met with of the invention of this engine is in a book publiſhed by the marquis of Worceſter in the year 1663, where he propoſed the raiſing of great quantities of water by the force of fire, or by turning water into ſteam; and mentions an engine of that kind of his own contrivance which could raiſe a continual ſtream like a fountain 40 feet high, by the means of two cocks which were alternately and ſucceſſively turned by a man to admit the ſteam, and to re-fill the veſſel with cold water, the fire being continually kept up: for which reaſon this nobleman is generally looked upon as the firſt inventor of this engine; and though his method of applying the force of ſteam was certainly much different from the preſent, yet the water was raiſed by the ſame original power, which is the expanſion of water into ſteam by fire. However, this invention not meeting with encouragement, probably owing to the confuſed ſtate in which the public affairs were about that time, it was neglected, and lay dormant ſeveral years until one captain Savery having read the marquis of Worceſter's books, ſeveral years afterwards, tried many experiments upon the force and power of ſteam; and at laſt luckily hit upon a method of applying it to raiſe water. This he had no ſooner done, than he bought up and deſtroyed all the marquis's books that could be got, and then claimed the honour of this invention to himſelf, and obtained a patent for it, pretending to have diſcovered this ſecret of nature by ſuch an accident as by experiment was found could not give him any ſuch idea. He contrived an engine which, after many experiments, he brought to ſome degree of perfection, ſo as to raiſe water in ſmall quantities: but he could not ſucceed in raiſing water a great height and in large quantities for the draining of mines; to effect which by his method, the ſteam required to be boiled to ſuch a ſtrength as would have burſt all his veſſels; ſo that he was obliged to be content with raiſing water a ſmall height or in ſmall quantities. The largeſt engine that he ever erected, was for the York-buildings company in London, for the ſupplying the inhabitants of the Strand and that neighbourhood with water. A draught and deſcription of one of theſe engines is in Harris's Lexicon Technicum.

At the ſame time that captain Savery was employed in perfecting his engine, Dr Papinus of Marburg was contriving one on the ſame principles, which he deſcribes in a ſmall book publiſhed in 1707, intitled *Ars nova ad aquam ignis adminiculo efficaciſſime elevandum.* Captain Savery's engine, however, was much completer than that propoſed by Dr Papinus.

About the ſame time alſo one Monſieur Amontons of Paris was engaged in the ſame purſuit: but his method of applying the force of ſteam was different from thoſe before-mentioned; for he intended it to drive or turn a wheel, which he called a *fire-mill,* which was to work pumps for raiſing water: but he never brought it to perfection. Each of theſe three gentlemen claimed the originality of the invention; but it is more than probable they all took the hint from the book publiſhed by the marquis of Worceſter many years before.

In this imperfect ſtate it continued without farther improvements until the year 1705, when Mr Newcommon and Mr Calley of Dartmouth in Southamptonſhire made ſeveral experiments to bring it to work with a piſton and beam, as now uſed; in which, after much pains taken, they ſucceeded, and obtained a patent for the ſole uſe of this invention, for 14 years. The firſt propoſal they made for draining of mines by this engine was in the year 1711; but they were very coldly received by many perſons in the ſouth of England, who did not underſtand the nature of it. In 1712, they came to an agreement with the owners of a colliery at Griff in Warwickſhire, where they erected an engine with a cylinder of 22 inches diameter. At firſt they were under great difficulties in many things; but by the aſſiſtance of ſome good workmen they got all the parts put together in ſuch a manner as to anſwer their intention tolerably well: and this was the firſt engine of the kind erected in England. There was at firſt one man to attend the ſteam-cock, and another to attend the injection-cock; but they afterwards contrived a method of opening and ſhutting them by ſome ſmall machinery connected with the working-beam. The next engine erected by theſe patentees was at a colliery in the county of Durham, about the year 1718, where one Mr Beighton was concerned; who, not approving of the intricate manner of opening and ſhutting the cocks by ſtrings and catches as in the former engine, ſubſtituted the hanging-beam for that purpoſe as at preſent uſed, and likewiſe made ſome improvement in the pipes, valves, and ſome other parts of the engine.

In a few years afterwards theſe engines came to be better underſtood than they had been; and their advantages, eſpecially in draining of mines, became more apparent: and from the great number of them erected, they received additional improvements from different hands, until they arrived at their preſent degree of perfection.

This engine, as now improved, is the moſt curious and compound machine of all thoſe inventions which have been owing to modern philoſophy; and is not only applicable to the raiſing of large quantities of water out of mines, and for the ſupplying of towns, &c. but to many other of the moſt neceſſary purpoſes for mankind.

The principles on which it acts are truly philoſophical; and when all the parts of the machine are proportioned to each other agreeable to theſe principles, it never fails anſwering the intention of the engineer.

1. It has been proved in Pneumatics, that the preſſure of the atmoſphere upon a ſquare inch at the earth's ſurface, is about 14.8 pounds avoirdupoiſe at a mean. And,

Theory.

2. If a vacuum is made by any means in a cylinder, which has a moveable piſton ſuſpended at one end of a lever equally divided, the air will endeavour to ruſh in, and will preſs down the piſton, with a force proportionable to the area of the ſurface, and will raiſe an equal weight at the other end of the lever.

3. Water may be rarefied near 14,000 times by being reduced into ſteam, the particles whereof are ſo ſtrongly repellent, as to drive away air of the common denſity, only by a heat ſufficient to keep the water in a boiling ſtate: by increaſing the heat, the ſteam may be rendered much ſtronger; but this requires great ſtrength in the veſſels to ſupport it. This ſteam may again be condenſed into its former ſtate by a jet of cold water diſperſed among it; ſo that 14,000 cubic inches of ſteam admitted into a cylinder, may be reduced into the ſpace of one cubic inch of water only, by which means a vacuum is partly obtained.

4. Though the preſſure of the atmoſphere be about 14$\frac{8}{10}$ pounds upon every ſquare inch, yet on account of the friction of the ſeveral parts, the reſiſtance from ſome air which is unavoidably admitted with the jet of cold water, and from ſome remainder of ſteam in the cylinder, the vacuum is very imperfect, and the piſton does not deſcend with a force exceeding eight or nine pounds upon every ſquare inch of its ſurface.

5. The gallon of water of 282 cubic inches weighs 10.2 pounds averdupoiſe, or a cubic foot 62.5 pounds. The piſton being preſſed by the atmoſphere with a force proportionable to its area in inches, multiplied by about eight or nine pounds, depreſſeth that end of the lever, and raiſeth a column of water in the pumps of equal weight at the other end, by means of the pump-rods ſuſpended to it. When the ſteam is again admitted, the piſton riſes and the pump-rods ſink; and when that ſteam is condenſed, the pump-rods again lift; and ſo alternately as long as the engine works.

It has been obſerved above, that the piſton does not deſcend with a force exceeding eight or nine pounds upon every ſquare inch of its ſurface; but by reaſon of accidental frictions and alterations in the denſity of the air, it will be the ſafeſt method, in calculating the power of the cylinder, to allow ſomething leſs than eight pounds for the preſſure of the atmoſphere upon every ſquare inch, viz. ſeven pounds ten ounces; and it being allowed that the gallon of water of 282 cubic inches weighs 10.2 pounds averdupoiſe, from theſe premiſſes the dimenſions of the cylinder, pumps, &c. for any fire-engine, may be deduced as follows:

Suppoſe c=the cylinder's diameter in inches.
p=the pump's ditto.
f=the depth of the pit in fathoms.
g=the gallons drawn by a ſtroke of ſix feet or one fathom.
h=the hogſheads drawn per hour.
s=the number of ſtrokes per minute.

Then $c^2 \times .7854$=area of the cylinder, which multiplied by 7.64 pound, the air's preſſure on a ſquare inch, we have $6c^2$ for the power of any cylinder in pounds averdupoiſe.

And, $\frac{p^2 \times .7854 \times 72}{282} = g$, the gallons contained in one fathom of any pump$=.2005p^2$; which multiplied by f fathoms, we have $.2005p^2f$ for the gallons contained in any number of fathoms of any pump.

Alſo, $.2005p^2f \times 10.2$ pound, the weight of one gallon, we have $2.0451p^2f$=the weight in pounds of the column of water which is to be raiſed by the power of the cylinder.

But as a ſufficient allowance was made in the power of the cylinder, by eſtimating it at 7.64 pound only, inſtead of 8 pound, the fraction of .0451 in the weight of the column of water may be ſafely omitted; whence we ſhall have $6c^2 = 2p^2f$ by the latter equation; and by the ſame mode $.2p^2 = \frac{p^2}{5} = g$ by the former.

Or if, inſtead of ſix pounds for the preſſure of the air on each circular inch of the cylinder, it be ſuppoſed a pound, we ſhall then have $ac^2 = 2p^2f$; and ſubſtituting $5g$ in the place of p^2, it will be, $ac^2 = 10gf$. And farther, $\frac{63h}{60s} = g$; whence $\frac{1.05h}{s} = \frac{p^2}{5}$.

From a compariſon of theſe equations, the following theorems are derived, which will determine the ſize of the cylinder and pumps of any ſteam-engine capable of drawing a certain quantity of water from any aſſigned depth, with the preſſure of the atmoſphere on each circular inch of the cylinder's area.

A TABLE of THEOREMS for the readier computing of the Powers of a Fire-engine.

1	$c=$	$\sqrt{\frac{p^2f}{3}}=$	$\sqrt{\frac{5gf}{3}}=$	$\sqrt{\frac{2p^2f}{a}}=$	$\sqrt{\frac{1.75hf}{s}}$
2	$p=$	$\sqrt{\frac{3c^2}{f}}=$	$\sqrt{5g}=$	$\sqrt{\frac{ac^2}{2f}}=$	$\sqrt{\frac{5.25h}{s}}$
3	$f=$	$\frac{3c^2}{p^2}=$	$\frac{3c^2}{5g}=$	$\frac{c^2a}{10g}=$	$\frac{c^2s}{1.75h}$
4	$g=$	$\frac{p^2}{5}=$	$\frac{3c^2}{5f}=$	$\frac{c^2a}{10f}=$	$\frac{1.05h}{s}$
5	$a=$	$\frac{2p^2f}{c^2}=$	$\frac{10gf}{c^2}=$	$\frac{5gf}{.5c^2}=$	$\frac{10.5hf}{sc^2}$
6	$h=$	$\frac{sp^2}{5.25}=$	$\frac{gs}{1.05}=$	$\frac{c^2s}{1.75f}=$	$\frac{ac^2s}{10.5f}$
7	$s=$	$\frac{1.75hf}{c^2}=$	$\frac{5.25}{p^2}=$	$\frac{1.05h}{g}=$	$\frac{10.5hf}{ac^2}$

In this Table there are four particular values of each letter, which render it more extenſively uſeful than it would have been upon a leſs ſcale, becauſe ſometimes one value is more convenient for finding the unknown letter or quantity than another; as will be ſeen in the following examples, in which, to avoid repetitions, it is ſuppoſed that the preſſure of the atmoſphere is ſix pounds upon a circular inch of the piſton, and that the engine goes at the rate of 12 ſtrokes, 6 feet long each, in a minute.

EXAMPLES of the uſe of the TABLE.

1. Required the ſize of the cylinder to work a pump of 12 inches diameter, 30 fathoms deep. *Per* theorem 1. $c=\sqrt{\frac{p^2f}{3}}$; therefore $\sqrt{\frac{12 \times 12 \times 30}{3}} = c = 38$ inches.

2. Required the ſize of the pump that a cylinder of 38 inches diameter can work at 30 fathoms deep. *Per* theorem 2. $p=\sqrt{\frac{3c^2}{f}}$; therefore $\sqrt{\frac{38 \times 38 \times 3}{30}} = p = 12$ inches.

3. Required the depth that a 36-inch cylinder will work a pump of 10 inches diameter. *Per* theorem 3. $f=\frac{3c^2}{p^2}$; therefore $\frac{36 \times 36 \times 3}{10 \times 10} = f = 39$ fathoms.

4. Required the number of gallons drawn at a ſix-feet ſtroke *per* laſt-mentioned cylinder and pumps. *Per* theorem 4. $g=\frac{p^2}{5}$; therefore $\frac{10 \times 10}{5} = 20$ gal. $=g$.

5. Required the preſſure of the atmoſphere on a cylinder of 36 inches, which works a pump 10 inches diameter, 39 fathoms deep. *Per* theorem 5. $a=\frac{2p^2f}{c^2}$; therefore $\frac{10 \times 10 \times 39 \times 2}{36 \times 36} = a = 6$ pounds.

6. Required the hogſheads delivered *per* hour by a pump of 16 inches diameter, at 12 ſtrokes *per* minute. *Per* theorem 6. $h=\frac{sp^2}{5.25}$; therefore $\frac{16 \times 16 \times 12}{5.25} = h = 585$ hogſheads.

7. Required the number of ſtrokes *per* minute an engine muſt make to raiſe 585 hogſheads *per* hour by a 16-inch pump. *Per* theorem 7. $s=\frac{5.25h}{p^2}$; therefore $\frac{585 \times 5.25}{16 \times 16} = s = 12$ ſtrokes.

By theſe examples it is evident that the quantity ſought is diſcoverable (by the help of the theorems) by one operation only, which without them might have taken ſeveral. But it often happens in practice, that an engine has to draw ſeveral pumps of different diameters from different depths; in which caſe the operations will be ſomewhat different from thoſe above, as will be ſeen in the following example.

8. Let it be required to find the diameters of the cylinder and pumps to draw 520 hogſheads *per* hour from 30 fathoms deep, 450 hogſheads *per* hour from 20 fathoms deep, and 80 hogſheads *per* hour for the jackhead from 10 fathoms deep, allowing the engine to make 12 ſix-feet ſtrokes *per* minute, and the air's preſſure 6 pounds upon each circular inch of the piſton.

Per theor 2. $p=\sqrt{\frac{5.25h}{s}}$, therefore $\sqrt{\frac{520\times5.25}{12}}=15$, the firſt pump$=x$.

Per ditto, $\sqrt{\frac{450\times5.25}{12}}=14$, the 2d pump$=y$.

Per ditto, $\sqrt{\frac{80\times5.25}{12}}=6$, the 3d pump$=z$.

Then, *per* theor. 1. $c=\sqrt{\frac{p^2f}{3}}$, if the water was to be raiſed in one column from a certain depth; but it being in three columns of various dimenſions, it is evident from the queſtion, that the power of the cylinder muſt be a counterpoiſe to the weight of all theſe columns; and putting x, y, z, for the three pumps, inſtead of p, the equation will be $c=\sqrt{\frac{x^2f\times y^2f\times z^2f}{3}}$, which is $\sqrt{\frac{11030}{3}}=60.6$ inches, the cylinder's diameter. If there had been a greater number of pumps, the ſize of the cylinder might have been found in the ſame manner, by ſubſtituting the ſum of their ſquares inſtead of p^2 in the theorem.

It is the practice of ſome engineers to allow a longer ſtroke than ſix feet; and, although the advantages of it are rather problematical, if that be ſuppoſed, for inſtance, a z feet ſtroke; then, inſtead of $p=\sqrt{5g}$, and $g=\frac{p^2}{5}$ in the table of theorems, we ſhall have

$$p=\sqrt{\frac{5g\times6}{z}}, \text{ and } g=\frac{p^2z}{5\times6}.$$

On the following page is given a Table, calculated from the foregoing theorems, of the powers of cylinders from 30 to 70 inches diameter; and the diameter and lengths of pumps which thoſe cylinders are capable of working, from a ſix-inch bore to that of 20 inches, together with the quantity of water drawn *per* ſtroke and *per* hour, allowing the engine to make 12 ſtrokes of 6 feet *per* minute.

Explanation of the Table.

The firſt column on the left is the diameter of the cylinders from 30 inches to 70. The firſt line of numbers at the top is the diameters of pumps from 6 to 20 inches; and the numbers in the common angle of meeting are the fathoms in depth which the cylinder is capable of working with any of theſe pumps. The right-hand column gives the power of the cylinder in pounds, to which it ſtands oppoſite, likewiſe the weight of the columns of water in the ſame line. Thus the firſt ſum, 5400 pounds, is the power of a 30-inch cylinder; it is alſo the weight of water contained in 75 fathoms of 6-inch pumps, 55 fathoms of 7 inches diameter, 42 fathoms of 8 inches, 33 fathoms of 9 inches, &c.

The quantity in gallons drawn by a ſix-feet ſtroke, or the quantity contained in one fathom of any of the pumps, is expreſſed in the loweſt line but one; any quantity in this line multiplied by 10.2 will give the weight in pounds of one fathom, if wanted. The loweſt line of figures is the number of hogſheads drawn in an hour by each pump reſpectively, when the engine goes 12 ſtrokes *per* minute.

Examples of the Uſe of the Table.

1. Required the ſize of the cylinder to work a pump of 12 inches diameter 30 fathom deep.

Under 12 inches, the diameter of the pump, find the fathoms 30, (or the neareſt number to it); and on the ſame line in the firſt column is 38 inches, the diameter of the cylinder.

2. Required the ſize of the pump that a cylinder of 38 inches diameter can work at 30 fathoms deep.

Find 38, the cylinder's diameter in the firſt column; then in the line from it look for 30 fathoms, or the neareſt number to it; and where that is found, the diameter of the pump will be found above: thus 30 fathoms has 12 inches for the pump's diameter.

3. Required the depth that a 36-inch cylinder will work a pump of 10 inches diameter.

Find 36 in the ſide-column, and 10 in the upper line; and in the common angle of meeting is 39, the fathoms required.

4. Required the number of gallons drawn *per* ſtroke by the laſt-mentioned cylinder and pumps.

Under the diameter 10 of the pump, and in the loweſt line but one, is 20, the number of gallons drawn *per* ſtroke.

5. Required the hogſheads delivered *per* hour by a 12-inch pump.

Under 12, the pump's diameter, in the loweſt line of figures, is 328, the hogſheads delivered *per* hour.

6. Required the diameter of the cylinder and pumps to draw 520 hogſheads *per* hour from 30 fathoms deep, 450 hogſheads *per* hour from 20 fathoms deep, and 80 hogſheads *per* hour from 10 fathoms deep.

In this queſtion take the neareſt numbers in the Table: thus 513 hogſheads *per* hour is the neareſt to 520, and above it find the fathoms 29, which is neareſt to 30; then at the head of that column is 15 inches for the ſize of the largeſt pump, and in the right-hand column, oppoſite 29, is 12,696 lb. the weight of that water; viz.

Pump, 15 inches,		Weight,	12,696
In the ſame manner find pump 14 inch.			7776
Alſo pump 6 inch.			800
The ſum is the weight of the whole,			21272

Then, by looking in the laſt column amongſt the powers of cylinders, the neareſt number to 21,272 is 21,600; and oppoſite to it, in the firſt column, is 60 inches, the diameter of a cylinder capable of working thoſe three pumps.

TABLE

TABLE of the Power and Effects of Steam-Engines, allowing 12 ſtrokes of 6 feet long each *per* minute, and the Preſſure of the Air 7lb. 10oz. *per* ſquare Inch.

	The Diameters of the Pumps in Inches.															
The Diameters of the Cylinders in Inches.	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Power of the cylinders, and weight of water in pounds.
30	75	55	42	33	27	22	19	16	14	12	10	—	—	—	—	5400
31	80	58	45	35	29	24	20	17	15	13	11	10	—	—	—	5766
32	83	61	47	37	30	25	21	18	16	13.	12	10.	—	—	—	6144
33	90	67	51	40	33	27	22	19	17	14	13	11	10	—	—	6534
34	94	70	53	42	34	28	23	20	18	15	14	12	10.	—	—	6936
35	102	75	57	45	37	30	26	22	19	16	14.	13	11	—	—	7350
36	—	79	61	48	39	32	27	23	20	17	15	14	12	10	—	7776
37	—	84	64	51	41	34	29	24	21	18	16	14.	12.	11	10	8214
38	—	88	68	53	43	35	30	26	22	19	17	15	13	12	10.	8664
39	—	93	71	56	45	37	32	27	23	20	18	16	14	12.	11	9126
40	—	98	75	59	48	39	34	28	24	21	19	17	15	13	12	9600
42	—	108	83	65	53	43	38	31	27	23	21	18	16	14.	13	10584
44	—	—	90	71	58	48	41	34	30	26	23	20	18	16	14.	11616
46	—	—	99	78	63	52	45	37	33	29	25	21.	19.	17.	16	12696
48	—	—	—	85	69	57	49	41	35	31	27	24	21	19	17	13824
50	—	—	—	92	75	62	53	44	38	34	29	26	23	21	19	15000
52	—	—	—	100	81	67	57	48	41	36	31	28.	25	22.	20	16224
54	—	—	—	—	87	72	61	52	44	38	34	30	27	24	22	17496
56	—	—	—	—	94	78	66	56	48	42	37	32	29	26	23.	18816
58	—	—	—	—	101	83	70	59	54	44	39	34	31	28	25	20184
60	—	—	—	—	—	89	75	63	55	48	42	37	33	30	27	21600
62	—	—	—	—	—	95	80	68	58	51	45	39	35	32	28	23064
64	—	—	—	—	—	—	85	72	62	54	48	42	38	34	30	24546
66	—	—	—	—	—	—	90	77	66	57	51	45	40	36	32	26676
68	—	—	—	—	—	—	96	82	70	61	54	48	42	38	34	27744
70	—	—	—	—	—	—	—	86	75	64	57	50	45	40	36	29400
Quantity drawn at one ſtroke in gallons.	7.2	10	13	16.2	20	24.2	28.8	33.8	392	45	51.2	57.8	64.8	72.2	80	
Quantity drawn in one hour in hogſheads.	82	114	148	184	228	276	328	385	447	513	583	659	738	823	912	
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Steam-Engine. Practice.

Steam-Engine.

We ſhall now deſcribe the ſeveral parts of an engine, and exemplify the application of the foregoing principles in the conſtruction of one of the completeſt of the modern engines. See Plate CCLXXIII. fig. 1.

A, Repreſents the fire-place under the boiler, for the boiling of the water, and the aſh-hole below it.

B, The boiler, filled with water about three feet above the bottom, made of iron plates.

C, The ſteam-pipe through which the ſteam paſſes from the boiler into the receiver.

D, The receiver, a cloſe iron veſſel, in which is the regulator or ſteam-cock, which opens and ſhuts the hole of communication each ſtroke.

E, The communication-pipe betwixt the receiver and the cylinder; it riſes 5 or 6 inches up, in the inſide of the cylinder bottom, to prevent the injected water from deſcending into the receiver.

F, The cylinder, of caſt iron, about 10 feet long, bored ſmooth in the inſide; it has a broad flanch in the middle on the outſide, by which it is ſupported when hung in the cylinder-beams.

G, The piſton, made to fit the cylinder exactly: it has a flanch riſing 4 or 5 inches upon its upper ſurface, betwixt which and the ſide of the cylinder a quantity of junk or oakham is ſtuffed, and kept down by weights, to prevent the entrance of air or water and the eſcaping of ſteam.

H, The chain and piſton ſhank by which it is connected to the working-beam.

II, The working-beam or lever: it is made of two or more large logs of timber, bent together at each end, and kept at the diſtance of 8 or 9 inches from each other in the middle by the gudgeon, as repreſented in the Plate. The arch-heads, II, at the ends, are for giving a perpendicular direction to the chains of the piſton and pump-rods.

K, The pump-rod which works in the ſucking-pump L, and draws the water from the bottom of the pit to the ſurface.

M, A ciſtern, into which the water drawn out of the pit is conducted by a trough, ſo as to keep it always full; and the ſuperfluous water is carried off by another trough.

N, The jack-head pump, which is a ſucking-pump wrought by a ſmall lever or working-beam, by means of a chain connected to the great beam or lever near the arch *g* at the inner end, and the pump-rod at the outer end. This pump commonly ſtands near the corner of the front of the houſe, and raiſes the column of water up to the ciſtern O, into which it is conducted by a trough.

O, The jack-head ciſtern for ſupplying the injection, which is always kept full by the pump N: it is fixed ſo high as to give the jet a ſufficient velocity into the cylinder when the cock is opened. This ciſtern has a pipe on the oppoſite ſide for conveying away the ſuperfluous water.

PP, The injection-pipe, of 3 or 4 inches diameter, which turns up in a curve at the lower end, and enters the cylinder bottom: it has a thin plate of iron upon the end *a*, with 3 or 4 adjutage holes in it, to permit the jet of cold water from the jack-head ciſtern to fly up againſt the piſton and condenſe the ſteam each ſtroke, when the injection-cock is open. *e*, A valve upon the upper end of the injection-pipe within the ciſtern, which is ſhut when the engine is not working, to prevent any waſte of the water. *f*, A ſmall pipe which branches off from the injection-pipe, and has a ſmall cock to ſupply the piſton with a little water to keep it air-tight.

Q, The working plug, ſuſpended by a chain to the arch *g* of the working-beam. It is uſually a heavy piece of timber, with a ſlit vertically down its middle, and holes bored horizontally through it, to receive pins for the purpoſe of opening and ſhutting the injection and ſteam cocks as it aſcends and deſcends by the motion of the working-beam.

h, The handle of the ſteam-cock or regulator. It is fixed to the regulator by a ſpindle which comes up through the top of the receiver. The regulator is a circular plate of braſs or caſt iron, which is moved horizontally by the handle *h*, and opens or ſhuts the communication at the lower end of the pipe E within the receiver. It is repreſented in the Plate by a circular dotted line.

i i, The ſpanner, which is a long rod or plate of iron for communicating motion to the handle of the regulator; to which it is fixed by means of a ſlit in the latter, and ſome pins put through to faſten it.

k l, The vibrating lever, called the *Y*, having the weight *k* at one end and two legs at the other end. It is fixed to an horizontal axis, moveable about its centre-pins or pivots *m n*, by means of the two ſhanks *o p* fixed to the ſame axis, which are alternately thrown backwards and forwards by means of two pins in the working plug; one pin on the outſide depreſſing the ſhank *o*, throws the loaded end *k* of the Y from the cylinder into the poſition repreſented in the plate, and cauſes the leg *l* to ſtrike againſt the end of the ſpanner; which forcing back the handle of the regulator or ſteam-cock, opens the communication, and permits the ſteam to fly into the cylinder. The piſton immediately riſing by the admiſſion of the ſteam, the working-beam II riſes; which alſo raiſes the working-plug, and another pin which goes through the ſlit raiſes the ſhank *p*, which throws the end *k* of the Z towards the cylinder, and, ſtriking the end of the ſpanner, forces it forward, and ſhuts the regulator or ſteam-cock.

q r, The lever for opening and ſhutting the injection-cock, called the F. It has two toes from its centre, which take betwixt them the key of the injection-cock. When the working-plug has aſcended nearly to its greateſt height, and ſhut the regulator, a pin catches the end *q* of the F and raiſes it up, which opens the injection-cock, admits a jet of cold water to fly into the cylinder, and, condenſing the ſteam, makes a vacuum; then the preſſure of the atmoſphere bringing down the piſton in the cylinder, and alſo the plug-frame, another pin fixed therein catches the end of the lever in its deſcent, and, by preſſing it down, ſhuts the injection-cock, at the ſame time the regulator is opened to admit ſteam, and ſo on alternately; when the regulator is ſhut the injection is open, and when the former is open the latter is ſhut.

R, The hot well. A ſmall ciſtern made of planks, which receives all the waſte water from the cylinder.

S, The ſink-pit, to convey away the water which is injected into the cylinder each ſtroke. Its upper end is even with the inſide of the cylinder bottom, its lower end has a lid or cover moveable on a hinge, which ſerves as a valve to let out the injected water, and ſhuts cloſe each ſtroke of the engine, to prevent the water being forced up again when the vacuum is made.

T, The feeding pipe, to ſupply the boiler with water from the hot well. It has a cock to let in a large or ſmall quantity of water as occaſion requires, to make up for what is evaporated; it goes nearly down to the boiler bottom.

U, Two gage-cocks, the one larger than the other, to try when a proper quantity of water is in the boiler: upon opening the cocks, if one give ſteam and the other water, it is right; if they both give ſteam, there is too little water in the boiler; and if they both give water, there is too much.

W, A plate which is ſcrewed on to a hole in the ſide of the boiler, to allow a paſſage into the boiler for the convenience of cleaning or repairing it.

X, The ſteam-clack or puppet-valve, which is a braſs valve on the top of a pipe opening into the boiler, to let off the ſteam when it is too ſtrong. It is loaded with lead, at the rate of one pound to an inch ſquare; and when the ſteam is nearly ſtrong enough to keep it open, it will do for the working of the engine.

ſ, The ſnifting valve, by which the air is diſcharged from the cylinder each ſtroke which was admitted with the injection, and would otherwiſe obſtruct the due operation of the engine.

tt, The cylinder-beams; which are ſtrong joiſts going through the houſe for ſupporting the cylinder.

v, The cylinder-cap of lead, ſoldered on the top of the cylinder, to prevent the water upon the piſton from flaſhing over when it riſes too high.

w, The waſte-pipe which conducts the ſuperfluous water from the top of the cylinder to the hot-well.

xx, Iron bars, called the *catch-pins*, fixed horizontally through each arch-head, to prevent the beam deſcending too low in caſe the chain ſhould break.

yy, Two ſtrong wooden ſgrings to weaken the blow given by the catch-pins when the ſtroke is too long.

zz, Two friction-wheels, on which the gudgeon or centre of the great beam is hung; they are the third or fourth part of a circle, and move a little each way as the beam vibrates. Their uſe is to diminiſh the friction of the axis, which, in ſo heavy a lever, would otherwiſe be very great.

When this engine is to be ſet to work, the boiler muſt be filled about three or four feet deep with water, and a large fire made under it; and when the ſteam is found to be of a ſufficient ſtrength by the puppet-clack, then by thruſting back the ſpanner, which opens the regulator or ſteam-cock, the ſteam is admitted into the cylinder, which raiſes the piſton to the top of the cylinder, and forces out all the air at the ſnifting valve; then by turning the key of the injection-cock, a jet of cold water is admitted into the cylinder, which condenſes the ſteam and makes a vacuum; and the atmoſphere then preſſing upon the piſton, forces it down to the lower part of the cylinder, and makes a ſtroke by raiſing the column of water at the other end of the beam. After two or three ſtrokes are made in this manner, by a man opening and ſhutting the cocks to try if they be right, then the pins may be put into the pin-holes in the working plug, and the engine left to turn the cocks of itſelf; which it will do with greater exactneſs than any man can pretend to do.

There are in ſome engines different methods of ſhutting and opening the cocks than in the one above deſcribed, but perhaps none better adapted to the purpoſe; and as the principles on which they all act are originally the ſame, any difference in the mechanical conſtruction of the ſmall machinery will have no influence of conſequence upon the total effect of the grand machine.

The furnace or fire-place ſhould not have the bars ſo cloſe as to prevent the free admiſſion of freſh air to the fire, nor ſo open as to permit the coals to fall through them; for which purpoſe two inches or thereabouts is ſufficient for the diſtance betwixt the bars. The ſize of the furnace depends upon the ſize of the boiler; but in every caſe the aſh-hole ought to be capacious to admit the air, and the greater its height the better. If the flame is conducted in a flue or chimney round the outſide of the boiler, or in a pipe round the inſide of it, it ought to be gradually diminiſhed from the entrance at the furnace to its egreſs at the chimney; and the ſection of the chimney at that place ſhould not exceed the ſection of the flue or pipe, and ſhould alſo be ſomewhat leſs at the chimney-top.

The boiler or veſſel in which the water is rarefied by the force of fire, may be made of iron-plates, caſt iron, or ſuch other materials as can withſtand the effects of the fire, and the elaſtic force of the ſteam. It may be conſidered as conſiſting of two parts; the upper part which is expoſed to the ſteam, and the under part which is expoſed to the fire. The form of the latter ſhould be ſuch as to receive the full force of the fire in the moſt advantageous manner, ſo that a certain quantity of fuel may have the greateſt poſſible effect in heating and evaporating the water; which is beſt done by making the ſides cylindrical, and the bottom a little concave, and then conducting the flame by an iron flue or pipe round the inſide of the boiler beneath the ſurface of the water, before it reach the chimney. For, by this means, after the fire in the furnace has heated the water by its effect on the bottom, the flame heats it again by the pipe being wholly included in the water, and having every part of its ſurface in contact with it; which is preferable to carrying it in a flue or chimney round the outſide of the boiler, as a third or a half of the ſurface of the flame only could be in contact with the boiler, the other being ſpent upon the brick-work. This cylindric lower part may be leſs in its diameter than the upper part, and may contain from four to ſix feet perpendicular height of water in it.

The upper part of the boiler is beſt made hemiſpherical, for reſiſting the elaſticity of the ſteam; yet any other form may do, provided it be of ſufficient ſtrength for the purpoſe. The quick going of the engine depends much on the capaciouſneſs of the boiler-top; for if it be too ſmall, it requires the ſteam to be heated to a great degree, to increaſe its elaſtic force ſo much as to work the engine. If the top is ſo capacious as to contain eight or ten times the quantity of ſteam uſed each ſtroke, it will require no more fire to preſerve its elaſticity than is ſufficient to keep the water in a proper ſtate of boiling; this, therefore, is the beſt ſize for a boiler-top. If the diameter of the cylinder be *c*, and works a ſix-foot ſtroke, and the diameter of the boiler ſuppoſed *b*, then $200c^2=b^3$, or $b=\sqrt[3]{200c^2}$.

The effect of the injection in condenſing the ſteam in the cylinder, depends upon the height of the reſervoir and the diameter of the adjutage. If the engine makes a ſix-feet ſtroke, then the jackhead ciſtern ſhould be twelve feet perpendicular above the bottom of the cylinder or the adjutage. The ſize of the adjutage may be from one to two inches in diameter; or if the cylinder be very large, it is proper to have three or four holes rather than one large one, in order that the jet may be diſperſed the more effectually over the whole area of the cylinder. The injection-pipe, or pipe of conduct, ſhould be ſo large as to ſupply the injection freely with water: if the injection-pipe be called *p*, and the diameter of the adjutage *a*, then $4a^2=p^2$, and $a^2=\frac{p^2}{4}$.

Mr Watt's improved engine.

Mr James Watt of Birmingham having lately obtained a patent for an improvement of the ſteam-engine above-deſcribed, we ſhall give an account of this improvement, and point out in what the advantage of it conſiſts.

The cylinder, or ſteam-veſſel, A, of this engine, (ſee Plate CCLXXIII. fig. 2.) is ſhut at bottom and open at top, as uſual; and is included in an outer cylinder or caſe BB, of wood or metal, covered with materials which tranſmit heat ſlowly. This caſe is at a little diſtance from the cylinder, and is ſhut at both ends; the cover C has a hole in it through which the piſton-rod E ſlides; and near the bottom is another hole F, by which the ſteam from the boiler has always free entrance into this caſe or outer cylinder, and by the interſtice GG between the two cylinders has acceſs to the upper ſide of the piſton HH. To the bottom of the inner cylinder A is joined a pipe I, with a cock or valve K, which is opened and ſhut when neceſſary, and forms a paſſage to another veſſel L called a *condenſer*, made of thin metal. This veſſel is immerſed in a ciſtern M full of cold water, and is contrived in ſuch a manner as to expoſe a very great ſurface externally to the water, and internally to the ſteam. It is alſo made air-tight, and has pumps N wrought by the engine, which keep it always exhauſted of air and water.

Both the cylinders A and BB being filled with ſteam, the paſſage K is opened from the inner one to L the condenſer, into which the ſteam ruſhes with violence by its elaſticity, becauſe that veſſel is exhauſted; but it no ſooner enters it, than coming into contact with the cold matter of the condenſer, it is reduced to water, and the vacuum ſtill remaining, the ſteam continues to ruſh in until the inner cylinder A below the piſton is left empty. The ſteam which is above the piſton ceaſing to be counteracted by that which was below it, acts upon the piſton HH, and forces it to deſcend to the bottom of the cylinder, and ſo raiſes the bucket of the pump by means of the lever. The paſſage K between the inner cylinder and the condenſer is then ſhut, and another paſſage O is opened, which permits the ſteam to paſs from the outer cylinder, or from the boiler into the inner cylinder under the piſton; and then the ſuperior weight of the bucket and pump-rods pulls down the outer end of the lever or great beam, and raiſes the piſton, which is ſuſpended to the inner end of the ſame beam.

The advantages that accrue from this conſtruction are, firſt, that the cylinder being ſurrounded with the ſteam from the boiler, is kept always uniformly as hot as the ſteam itſelf, and is therefore incapable of deſtroying any part of the ſteam which ſhould fill it, as the common engines do. Secondly, the condenſer being kept always as cold as water can be procured, and colder than the point at which it boils *in vacuo*, the ſteam is perfectly condenſed and does not oppoſe the deſcent of the piſton; which is therefore forced down by the full power of the ſteam from the boiler, which is ſomewhat greater than that of the atmoſphere.

In the common fire-engines, when they are loaded to ſeven pounds upon the inch, and are of a middle ſize, the quantity of ſteam which is condenſed in reſtoring to the cylinder the heat which it had been deprived of by the former injection of cold water, is about one full of the cylinder, beſides what really it required to fill that veſſel; ſo that twice the full of the cylinder is employed to make it raiſe a column of water equal to about ſeven pounds for each ſquare inch of the piſton: or, to take it more ſimply, a cubic foot of ſteam raiſes a cubic foot of water about eight feet high, beſides overcoming the friction of the engine, and the reſiſtance of the water to motion.

In the improved engine, about one full and a fourth of the cylinder is required to fill it, becauſe the ſteam is one-fourth more denſe than in the common engine. This engine raiſes a load equal to 12 pounds and a half upon the ſquare inch of the piſton; and each cubic foot of ſteam of the denſity of the atmoſphere, raiſes one cubic foot of water 22 feet high.

STEATITES, in the hiſtory of foſſils, a name given by late authors to a ſubſtance called in Engliſh *ſoap-earth*. Dr Woodward much recommends it as a ſubſtance for making porcelain; and repeated trials of it have been made ſince his time, and ſome of them very lately; in all which it has afforded the fineſt earthen-ware ever was made with us, and promiſes fair, with good management, for the equalling any in the world. It is dug in many parts of Devonſhire and Cornwall, and the neighbouring counties; the cliff of the Lizard-point is almoſt wholly compoſed of it, and the adjacent little iſlands abound with it; and from all theſe places it might be brought, at a ſmall expence, in any quantities. It is known from all other earths by theſe characters: it is compoſed of extremely fine particles; and is of a firm, equal, and regular texture, and a great weight. It is very firm and hard as it lies in the earth; but when it has been ſome time expoſed to the air, it becomes almoſt of a ſtony hardneſs. It is of a perfectly fine, ſmooth, and gloſſy ſurface, ſofter to the touch than any other ſpecies of earth, and does not at all adhere to the tongue, or ſtain the fingers in handling; but, drawn along a rough ſurface, as a piece of cloth, or the like, it marks it with a fine and even white line. In colour it is a clear white, veined and variegated very beautifully with purple of different degrees of deepneſs; and is of ſo fine a ſtructure of parts, that when cut into thin pieces it is in ſome degree tranſparent. It makes no efferveſcence with acids; and burns to a pure white, even in its purple parts. This ſubſtance is found to contain in great quantity the fine white earth called *magneſia alba*.

STEATOMA, a kind of encyſted tumour, conſiſting of a matter like ſuet or lard, ſoft, without pain, and without diſcolouring the ſkin.

STEEL, a very hard and fuſible kind of iron.

Stahl, Cramer, and all good chemiſts, juſtly conſider ſteel as an improved iron, which is poſſeſſed of a larger quantity of inflammable principle, ſo neceſſary to all metals, and which really contains fewer heterogeneous, and more metallic, parts than an equal bulk of iron. We ſhall be convinced of this truth by a deſcription and explanation of the methods of converting iron into ſteel, and by examining the characteriſtic properties of ſteel.

Steel may be made by fuſion or by cementation. The firſt method is uſed to convert iron into ſteel immediately from the ore. All ores of iron are not uſed indifferently for this purpoſe; becauſe ſome of theſe, which are therefore called *ores of ſteel*, are much fitter than others to furniſh good ſteel; and the ſteel extracted from them is called *natural ſteel* (A).

The other method of making ſteel conſiſts in chooſing the beſt forged iron, or that which is moſt malleable, whether it be hot or cold; and impregnating this iron with a larger portion of inflammable principle, by cementation alone, without fuſion.

To underſtand well theſe methods of making ſteel, we muſt attend to two eſſential properties of iron. The firſt is, that of all metals it is the moſt difficultly fuſible; and that therefore, although, in the ſmelting of its ores, its fuſion be much aſſiſted by the ſulphureous parts of the ore itſelf; yet, as theſe parts are always expelled as much as is poſſible, iron never enters into ſo thin and perfect a fuſion as the other metals.

The ſecond property of iron to which we ought to attend is, that the earth of this metal is capable of combining with the inflammable principle, and of being metalliſed without fuſion.

Theſe things being premiſed, it happens, in conſequence of the former property, that, in the firſt fuſion of ores of iron, we obtained only a hard and brittle iron, both from the ſulphureous parts from which this iron is not entirely diſengaged, and from the preſence of a greater or leſs quantity of earthy matters, which are either unmetallic; or which, if they be ferruginous, have not been metalliſed, from want of immediate contact with the phlogiſton of the fuel.

We may eaſily perceive that theſe earthy parts, unmetallic or not metalliſed, cannot be entirely ſeparated from the perfect iron, becauſe the fuſion is not ſufficiently thin for that purpoſe: but in proportion as the iron is deprived of ſulphur, its fuſion becomes more and more difficult, and we are obliged to have recourſe to another expedient than fuſion to diſengage it from its earthy parts, which in the firſt ſmelting remain intercepted betwixt the metallic parts. This expedient is the forge. The impure iron intended to be rendered malleable is to be heated red-hot, and ſtruck by a very heavy hammer.

This percuſſion, that iron ſoftened by heat ſuſtains, preſſes ſtrongly, and ſolders or welds together the metallic parts, which alone are capable of uniting together; and obliges the unmetallic parts, which are incapable of uniting with the metal, to ſeparate. By this operation theſe unmetallic parts are preſſed between the parts of the iron, and driven by degrees to the ſurface of the metal, from which they are detached in form of duſt and ſcales. This treatment, which is a kind of kneading of the iron, is to be repeated till it has acquired the proper degree of purity and ductility.

The operations by which ſteel is to be extracted from its ores are eſſentially the ſame as thoſe employed for iron; but they differ from them in being much more exact; that an iron ſtill purer, more filled with phlogiſton,

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(A) Steel is made ſometimes directly from the ore, but more frequently from crude or caſt iron. Theſe methods of making ſteel are not known in England; but are practiſed in Sweden and other parts of Europe. The proceſs for making ſteel from caſt-iron is thus deſcribed by Swedenborgius, as it is performed in Dalecarlia.

The ore from which the crude iron to be converted into ſteel is obtained is of a good kind. It is black, friable, and compoſed of many ſmall grains; and it produces very tough iron. The converſion into ſteel is made upon a forge-hearth, ſomething ſmaller than common. The ſides and bottom are made of caſt-iron. The tuyere is placed, with very little inclination, on one of the ſide-plates. The breadth of the fire-place is 14 inches; its length is greater The lower part of the tuyere is ſix one-half inches above the bottom. In the interior part of the fire-place, there is an oblong opening for the flowing of the ſuperfluous ſcoria. The workmen firſt put ſcoria on the bottom, then charcoal and powder of charcoal, and upon theſe the caſt-iron run or cut into ſmall pieces. They cover the iron with more charcoal, and excite the fire. When the pieces of iron are of a red-white, and before they begin to melt, they ſtop the bellows, and cary the maſs under a large hammer, where they break it into pieces of three or four pounds each. The pieces are again brought to the hearth, and laid within reach of the workman, who plunges ſome of them into the fire, and covers them with coal. The bellows are made to blow ſlowly till the iron is liquified. Then the fire is increaſed; and when the fuſion has been long enough continued, the ſcoria are allowed to flow out; and at that time the iron hardens. The workman adds more of the pieces of crude iron, which he treats in the ſame manner, and ſo on a third and a fourth time, till he obtains a maſs of ſteel of about a hundred pounds, which is generally done in about four hours. This maſs is raiſed and carried to the hammer, where it is forged, and cut into four pieces, which are further beat into ſquare bars four or five feet long. When the ſteel is thus forged, it is thrown into water, that it may be eaſily broken; for it is yet curde and coarſe-grained. The ſteel is now carried to another hearth ſimilar to the former, and there broken in pieces. Theſe pieces are laid regularly in the fire-place, firſt two parallel, upon which ſeven or eight others are placed acroſs, then a third row acroſs the ſecond, in ſuch a manner that there is ſpace left between thoſe of the ſame row. The whole is then covered with charcoal, and the fire is excited. In about half or three quarters of an hour the pieces are made hot enough, and are then taken from the fire, one by one, to the hammer, to be forged into little bars from half a foot to two feet long, and while hot, are thrown into water to be hardened. Of theſe pieces 16 or 20 are put together ſo as to make a bundle, which is heated and welded, and afterwards forged into bars four inches thick, which are then broken into pieces of convenient length for uſe.

giſton, and better diſengaged from its earthy parts, may be obtained.

To ſucceed in this intention, much ſmaller quantities muſt be fuſed at once than when iron is to be extracted from its ore. Pieces of the firſt fuſion are to be put into crucibles filled and covered with charcoal, and expoſed to a violent heat excited by ſtrong bellows. Theſe pieces are to be well fuſed, and kept in fuſion a longer or ſhorter time, according to the nature of the ore; after which they are to be forged, as iron is; but always in much ſmaller pieces, and till they are become perfectly ductile both when hot and when cold. Nothing then remains but to temper the ſteel, of which we ſhall preſently ſpeak.

In theſe operations, which are to be ſeveral times repeated, the iron that is changed into ſteel muſt evidently be much better purified, and furniſhed with a much greater quantity of inflammable principle, than in the ſmeltings and fuſions of large quantities of iron. As the maſſes of metal are ſmall in theſe operations for the procuring of ſteel, and as they are ſurrounded with a much larger proportion of charcoal, the fuſion is not only more complete, by which the ſeparation of the earthy unmetallic parts is much promoted; but alſo a greater number of ferruginous parts are well metalliſed; and as all theſe parts of iron are in more intimate contact with the charcoal, which is capable of ſupplying them with inflammable principle, they receive the whole quantity of this principle with which they can unite.

The ſame obſervation may be applied to the operation of the forge practiſed upon ſmaller maſſes; for the heterogeneous parts are much more eaſily and copiouſly preſſed out of ſmall maſſes than great.

This exact purification of iron, by which it is converted into ſteel, muſt evidently be attended with conſiderable loſs, or diminution, from the ſeparation of all its heterogeneous parts. This diminution amounts to nearly one half of the weight of the iron. This great loſs does not proceed altogether from the ſeparation of heterogeneous parts; for in all the operations uſed for this ſeparation, ſome part of the metal is always deſtroyed and burnt, although all poſſible precautions are taken to diminiſh this inconvenience, by ſecuring the melted or red-hot metal from the contact of external air as much as is poſſible.

Artificial ſteel is made without fuſion from iron ready forged. The chief point to be attended to in the making of the beſt artificial ſteel, is to chooſe the iron which is moſt perfect and moſt malleable either when it is hot or cold; which quality always ſhows that the iron is well purified. It is firſt to be forged into plates or bars, rather ſmall than large, according to the works for which it is intended; and it is then to be cemented with matters capable of giving to it much inflammable principle. The matters which compoſe this cement vary according to the uſes of different manufacturers. They are all good, provided they contain no ſulphur, or vitriolic acid, which might form ſulphur during the operation; becauſe ſulphur, having much affinity with iron, would certainly unite with this metal, would entirely or partly fuſe it, and would, by reducing it to a mineral or pyritous ſtate, give to it qualities very different from thoſe which good ſteel ought to have.

The matters which enter into the compoſition of the cement for ſteel, are the coals of animal or vegetable ſubſtances, mixed with aſhes, calcined bones, and other matters of this kind. Mr Cramer propoſes theſe two following receipts of cements for ſteel, which appear to be very good.

Take one part of powder of charcoal, half a part of wood-aſhes, and mix them very well together. Or,

Take two parts of charcoal, moderately pulveriſed: one part of bones, horns, hair or ſkins of animals, burnt in cloſe veſſels to blackneſs, and powdered; half a part of wood-aſhes; and mix them well together.

When ſteel is to be made, the bars of iron are to be placed vertically in a cylindrical crucible, which ought to be three inches higher than the bars, and into which a ſtratum of the cement of about the thickneſs of a finger has been previouſly put and preſſed down. The bars ought to be about an inch diſtant from each other, and from the ſides of the crucible. The interſtices and crucible are then to be filled with cement, ſo that the bars ſhall be covered with about the thickneſs of two inches at leaſt. The crucible, previouſly covered with a lid which fits it exactly, and which muſt be carefully luted with clay mixed with ſand, is to be placed in a furnace where an equal fire is to be kept, ſo that the crucible ſhall be red-hot during eight or ten hours: the iron will then be found to be converted into ſteel, which will be ſo much better as the iron employed was of a better quality: it then only requires to be tempered. We may obſerve, that in this operation the iron ſuffers no diminution of weight, and no ſcoria appear upon its ſurface, as Mr Cramer remarks. By the ſole addition, therefore, of a new quantity of phlogiſton, the iron acquires the quality of ſteel. Thus, if this iron contained ſome parts of martial earth which was not metalliſed, by the cementation they are metalliſed, and the iron or ſteel are thereby improved: but if the iron contained ſome earthy unmetallic parts, they are not ſeparated by this operation, becauſe the metal has not been fuſed: and as the beſt forged iron which is uſually ſold, is never ſo well purified from theſe extraneous matters, as that which is converted into ſteel in the great works for procuring ſteel from the ore of iron; hence, in general, artificial ſteel made by cementation is not ſo perfect as that made by fuſion.

We may obſerve, that, in the cementation above deſcribed, the iron combines with a part of the phlogiſton of the cement, without fuſion; which effect proceeds from a peculiar property of the earth of iron, by which it is capable of combining with the inflammable principle, and of being metalliſed without fuſion, which is, nevertheleſs, neceſſary for the reduction of all other metallic earths.

The ſteel which has received only the above-mentioned preparations differs from iron in its colour, which is more dark and brown; in its grain, which is finer and cloſer; in poſſeſſing a greater ductility, flexibility, and ſoftneſs; but the great difference of ſteel from iron, which renders it more valuable for many purpoſes and arts, is the extreme hardneſs it acquires by being tempered.

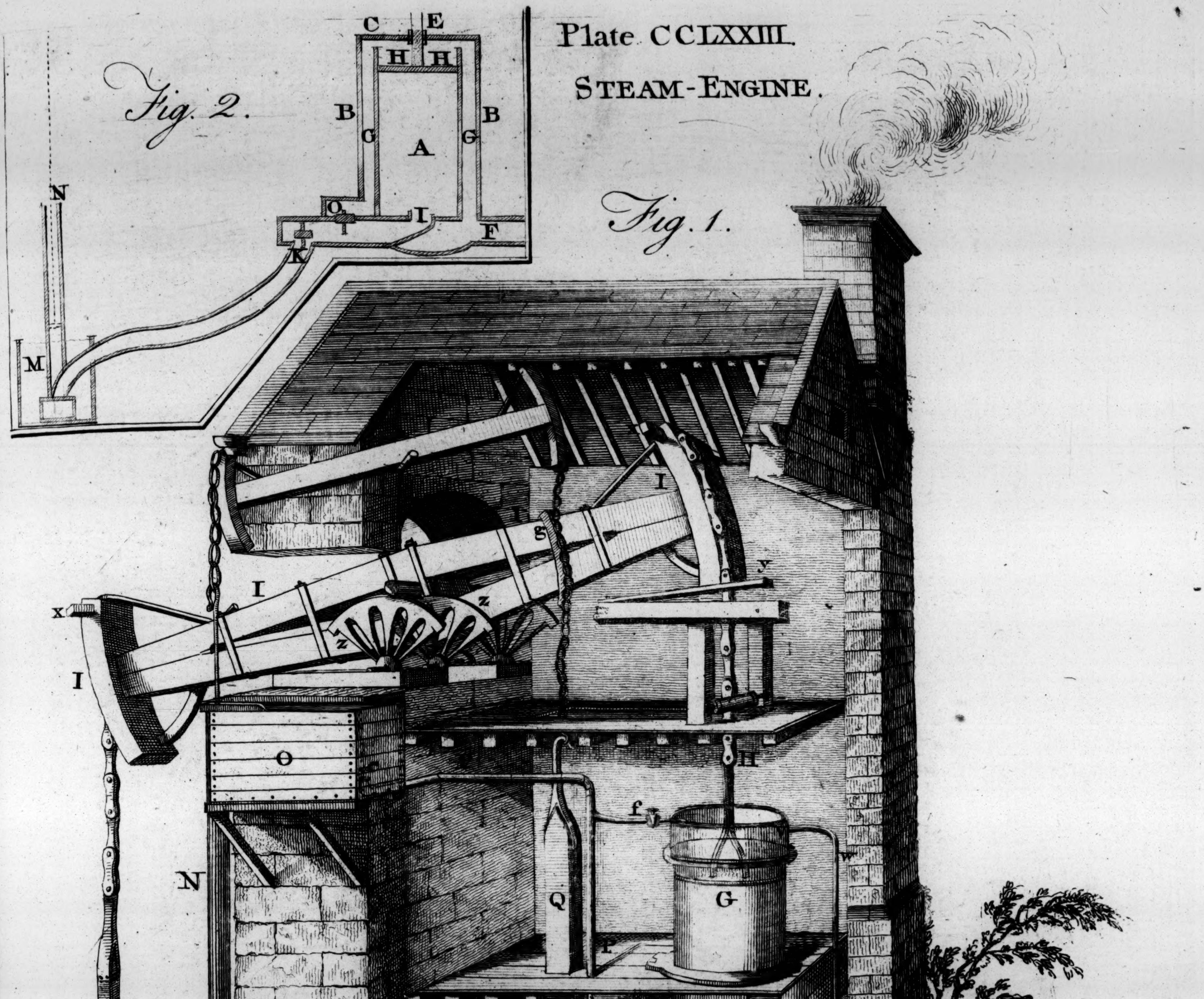
This operation is very ſimple. It conſiſts in making ſteel red-hot, and then in plunging it ſuddenly in cold water. In an inſtant all the qualities of this ſteel are

Plate CCLXXIII.

STEAM-ENGINE.

Fig. 2.

Fig. 1.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A Bell Sculpt

3 MA-53

are changed by this tempering; ſo that from being very ductile and ſoft, it becomes ſo hard and ſo ſtiff, that it is no longer capable of being cut by the file; but is itſelf capable of cutting or piercing very hard bodies: that it does not yield to the hammer; but may be ſooner broken in pieces like a flint, than be extended. It is ſonorous, brittle, very elaſtic, and capable of acquiring the moſt lively and moſt beautiful poliſh, as we ſee in finely-wrought toys of ſteel.

The uſe of this metal is very extenſive for numberleſs convenient and neceſſary utenſils of all ſorts, of which without it we ſhould abſolutely be deprived: but what renders its uſe ſtill more general is, that we can diverſify at pleaſure its hardneſs and ductility, by varying the temper. The hotter the ſteel is when tempered, and the colder the water into which it is plunged, the greater hardneſs it acquires; but, at the ſame time, it becomes ſo much more brittle. This very hard temper is neceſſary for certain tools deſigned to cut very hard bodies. On the contrary, the leſs hot the ſteel is when tempered, and the hotter the water is in which it is tempered, the leſs hard it becomes, and alſo the greater ductility it retains; and hence many tools may be made of it fit for cutting bodies moderately hard, which tools are leſs liable to have their points broken or their edges notched, than if they were made of a harder ſteel.

No other general rule can be given for the tempering of ſteel than that we have mentioned. The proper degree of heat is always relative to the uſe to which the tools to be made of this ſteel are to be applied.

Another very convenient property of ſteel is, that after it has been tempered, it may be again untempered and ſoftened to any degree that we think proper; for which purpoſe we have only to heat it more or leſs, and to let it cool ſlowly. By this method we may ſoften the hardeſt-tempered ſteel.

As the temper is a very eſſential point with regard to ſteel, and that the beſt is in general that which gives the greateſt hardneſs, and deſtroys the leaſt of the ductility of the metal, various ſubſtances are uſed into which ſteel to be tempered is plunged. Such are ſuet, oil, urine; water impregnated with ſoot, with ſal ammoniac, or with other ſalts. Theſe particular methods are the baſes of many ſecrets in different manufactures; their advantages cannot be aſcertained without a very accurate and continued examination. Very intereſting reſearches remain to be made on this ſubject.

Steel is uſually ſold tempered, becauſe, in many manufactures of it, the cuſtom is to temper it as ſoon as it is made, probably that the purchaſers of it may be the better able to judge of its quality. When this ſteel is to be uſed, it muſt be untempered, that it may be extended, filed, and receive the form intended to be given to it; after which each workman tempers it again in his manner. But we alſo find amongſt merchants Engliſh ſteel in ſmall bars, which is not tempered, and which is very good.

Well-poliſhed plates of ſteel, put on a gentle fire of charcoal, acquire different colours on their ſurface, and paſs ſucceſſively through ſeveral ſhades, as they become hotter, in the following order: white, yellow, orange, purple, violet, and laſtly blue, which diſappears and leaves a water-colour, if the ſteel has been heated too much or too long. Theſe different ſhades mark the degree of heat or of annealing applied to different tools or utenſils. The moſt generally uſed ſhade is the blue, ſuch as that given to ſteel-ſprings.

One of the moſt important properties of ſteel is the magnetic quality, which it is capable of acquiring much better than iron. Good mariners compaſſes cannot be made without needles of ſteel.

From what has been ſaid, we may judge that ſteel is much better purified iron than any other, impregnated with a larger quantity of inflammable principle, and hardened by the temper. Some celebrated natural philoſophers, but who were not chemiſts, have advanced, that ſteel was only iron which ſtill retained ſomething of its mineral nature, and that its ſtate was intermediate betwixt that of caſt-iron and ſoft forged iron. But this opinion is manifeſtly erroneous. They have been deceived by the hardneſs and brittleneſs of caſt-iron, which are nearly as great as in ſteel. But theſe qualities proceed from a remaining part of the mineraliſing ſubſtances, which leave it a pyritous character, very different from that of true ſteel; ſince this can only be hardened by the temper, and ſince in the preparation of it all ſulphureous matter muſt be carefully avoided. The miſtake of theſe authors proceeded from their ignorance of the inflammable principle, the properties of which have been ſo well explained by the illuſtrious Stahl, and from their being led into an error by the old chemiſts, who perpetually confounded phlogiſton, or the the pureſt and ſimpleſt inflammable principle of all bodies, with ſulphur, with ſulphureous matters, and with moſt other inflammable compounds.

Steel may be unmade, or reduced to the ſtate of iron, by a management ſimilar to that by which it is made, that is, by cementation. But the cement uſed for this purpoſe muſt be compoſed of ſubſtances entirely free from inflammable matter, and rather capable of abſorbing it, as calcareous earth and quicklime are. By a cementation then with theſe matters, continued during eight or ten hours, ſteel is reduced to the ſtate of iron.

Stahl conſiders it as an undecided queſtion, whether ſteel be more fuſible than iron, and ſays, that the workmen cannot decide it from the violence of fire neceſſary to melt either of them. He believed, with reaſon, that this queſtion might be decided by melting theſe metals in the focus of a burning ſpeculum. Mr Macquer ſays, that by this method he found ſteel much more fuſible than iron. This greater fuſibility of ſteel can be only attributed to the greater quantity of phlogiſton united with it, as phlogiſton is in general the cauſe of the fuſibility of metals.

By converſion of iron into ſteel, this metal acquires a cloſer, more compact, and finer-grained texture, greater hardneſs, elaſticity, tenacity, denſity, ſonorouſneſs, and diſpoſition to receive the magnetic property; and, as ſome ſay, an increaſe of weight. It is alſo rendered leſs liable to ruſt by expoſure to air; and leſs liable to emit ſparkles when heated. The colours or iriſes which ſteel acquires by expoſure to heat, and which are marks by which workmen know when any acquired heat is given, are not peculiar to ſteel and iron, but may alſo be produced by the ſame means on all other calcinable metals. Theſe colours proceed from a calcination gradually advancing on that part of the metals which is expoſed to air. And as the particles of metals in their different degrees of calcination are poſſibly of different ſizes, ſo they muſt acquire (according to Sir Iſaac Newton's theory, which ſhows that the colours of bodies depend on the ſize of their integrant parts) different reflective powers, and exhibit changes of colours.

Steel may be made by fuſion from the ore, or by cementation of forged iron with inflammable matters. Anciently, ſteel is ſaid to have been made by immerſing forged iron during ſome time in melted crude iron. Forged iron may alſo be changed into ſteel, as Wallerius affirms, by immerſing in melted ſcoria; or by fuſion with black flux, glaſs-gall, or borax; or by ſtrewing ſea-ſalt upon heated iron, and extinguiſhing it in dung.

Various opinions are formed concerning the cauſe of the difference between iron and ſteel. The moſt general opinion attributes this difference to the preſence of a larger quantity of phlogiſton in the latter than in the former. Some authors, attending chiefly to the method of converſion by fuſion, conſider that operation only as a purification of the iron from earthy and heterogeneous particles, and ſteel merely as a more pure and perfect iron. Others, obſerving ſome ſimilitude in the texture of ſteel to certain kinds of caſt-iron, and the hardneſs of both theſe, without attending to their eſſential differences, have imagined that the ſtate of ſteel was intermediate betwixt that of caſt and that of forged iron. Laſtly, ſome metallurgiſts maintain, that the converſion of iron into ſteel is effected, not by abſorption of phlogiſton, but by expulſion of ſulphureous or acid particles. To ſupport this opinion, they obſerve, 1. That ſteel is leſs diſpoſed than iron to ruſt; the cauſe of ruſt being, as they think, an acid contained in iron. 2. That ſteel emits fewer ſparkles under the hammer than iron, which ſparkles are found to be moſt frequent in iron abounding with ſulphur, as in red-ſhort iron. 3. That iron may be converted into ſteel by cementation with alkaline ſalts, capable of attracting the acid and ſulphur. 4. That in the preparation of ſteel by fuſion, the metal is rather expoſed to a diſſipation of its inflammable parts and burnt, than further phlogiſticated; and that this operation is accordingly called by workmen *the burning of ſteel*.

In the preparation of ſteel by fuſion, probably much of the earthy matters contained in the iron may be ſeparated, and any contained acid or ſulphur may be burnt or diſſipated. But the converſion of ſteel into iron by cementation with abſorbent earths, in which operation no acid or ſulphur can be abſorbed by the metal, ſhows that the difference between iron and ſteel does not conſiſt in the preſence of an acid or of ſulphur in the iron, but rather in the preſence of ſome ſubſtance in the ſteel, which the inflammable cementing ſubſtance can give to it, and of which abſorbent earths can deprive it. This ſubſtance has been generally believed to be phlogiſton: by the addition of which the metal acquires a new texture, together with the hardneſs, elaſticity, and other peculiar properties of ſteel.

The affinities and medicinal virtues of ſteel are the ſame as thoſe of iron. See IRON.

Salt of STEEL. See CHEMISTRY, nº 146.

STEEL-*Yard*. See BALANCE.

STEELE (Sir Richard), was born about the year 1676 in Ireland; in which kingdom one branch of the family was poſſeſſed of a conſiderable eſtate in the county of Wexford.—His father, a counſellor at law in Dublin, was private ſecretary to James Duke of Ormond: but he was of Engliſh extraction; and his ſon, while very young, being carried to London, he put him to ſchool at the Charter-houſe, whence he was removed to Merton College in Oxford. Our author left the univerſity, which he did without taking any degree, in the full reſolution to enter into the army. This ſtep was highly diſpleaſing to his friends; but the ardour of his paſſion for a military life rendered him deaf to any other propoſal. Not being able to procure a better ſtation, he entered as a private gentleman in the horſe-guards, notwithſtanding he thereby loſt the ſucceſſion to his Iriſh eſtate. However, as he had a flow of good-nature, a generous openneſs and frankneſs of ſpirit, and a ſparkling vivacity of wit, theſe qualities rendered him the delight of the ſoldiery, and procured him an enſign's commiſſion in the guards. In the mean time, as he had made choice of a profeſſion which ſet him free from all the ordinary reſtraints in youth, he ſpared not to indulge his inclinations in the wildeſt exceſſes. Yet his gaieties and revels did not paſs without ſome cool hours of reflection; and in theſe it was that he drew up his little treatiſe intitled *The Chriſtian Hero*, with a deſign, if we may believe himſelf, to be a check upon his paſſions. For this uſe and purpoſe it had lain ſome time by him, when he printed it in 1701, with a dedication to Lord Cutts, who had not only appointed him his private ſecretary, but procured for him a company in Lord Lucas's regiment of Fuſiliers. The above religious piece injuring his reputation among his gay companions, he endeavoured to enliven his character by writing that excellent comedy the Funeral.

This play procured him the regard of King William, who reſolved to give him ſome eſſential marks of his favour; and though, upon that prince's death, his hopes were diſappointed, yet, in the beginning of Queen Anne's reign, he was appointed to the profitable place of Gazetteer. He owed this poſt to the friendſhip of Lord Halifax and the Earl of Sunderland, to whom he had been recommended by his ſchoolfellow Mr Addiſon. That gentleman alſo lent him an helping hand in promoting the comedy called *The Tender Huſband*, which was acted in 1704 with great ſucceſs. But his next play, The Lying Lover, found a very different fate. Upon this rebuff from the ſtage, he turned the ſame humorous current into another channel; and early in the year 1709, he began to publiſh the Tatler; which admirable paper was undertaken in concert with Dr Swift. His reputation was perfectly eſtabliſhed by this work; and, during the courſe of it, he was made a commiſſioner of the ſtamp-duties in 1710. Upon the change of the miniſtry the ſame year, he ſided with the duke of Marlborough, who had ſeveral years entertained a friendſhip for him; and upon his Grace's diſmiſſion from all employments in 1711, Mr Steele addreſſed a letter of thanks to him for the ſervices done to his country. However, as our author ſtill continued to hold his place in the ſtamp-office under the new adminiſtration, he forbore entering with his pen upon political ſubjects; but, adhering more cloſely to Mr Addiſon, he dropt the *Tatler*, and afterwards, by the aſſiſtance chiefly of that ſteady friend, he carried on the ſame plan, under the title of *The Spectator*. The ſucceſs of this paper was equal to that of the former; which encouraged him, before the cloſe of it, to proceed upon the ſame deſign in the character of the *Guardian*. This was opened in the beginning of the year 1713, and was laid down in October the ſame year. But in the courſe of it his thoughts took a ſtronger turn to politics: he engaged with great warmth againſt the miniſtry; and being determined to proſecute his views that way by procuring a ſeat in the houſe of commons, he immediately removed all obſtacles thereto. For that purpoſe, he took care to prevent a forcible diſmiſſion from his poſt in the ſtamp-office, by a timely reſignation of it to the Earl of Oxford; and at the ſame time gave up a penſion, which had been till this time paid him by the queen as a ſervant to the late prince George of Denmark. This done, he wrote the famous Guardian upon the demolition of Dunkirk, which was publiſhed Aug. 7. 1713; and the parliament being diſſolved the next day, the Guardian was ſoon followed by ſeveral other warm political tracts againſt the adminiſtration. Upon the meeting of the new parliament, Mr Steele having been returned a member for the borough of Stockbridge in Dorſetſhire, took his ſeat accordingly in the houſe of commons; but was expelled thence in a few days after, for writing the cloſe of the paper called the *Engliſhman*, and one of his political pieces intitled the *Criſis*. Preſently after his expulſion, he publiſhed propoſals for writing the hiſtory of the duke of Marlborough: at the ſame time he alſo wrote the *Spinſter*; and, in oppoſition to the *Examiner*, he ſet up a paper called the *Reader*, and continued publiſhing ſeveral other things in the ſame ſpirit till the death of the queen. Immediately after which, as a reward for theſe ſervices, he was taken into favour by her ſucceſſor to the throne king George I. He was appointed ſurveyor of the royal ſtables at Hampton-Court, governor of the royal company of comedians, put into the commiſſion of the peace for the county of Middleſex, and in 1715 received the honour of knighthood. In the firſt parliament of that king, he was choſen member for Boroughbridge in Yorkſhire; and, after the ſuppreſſion of the rebellion in the north, was appointed one of the commiſſioners of the forfeited eſtates in Scotland. In 1718, he buried his ſecond wife, who had brought him a handſome fortune and a good eſtate in Wales; but neither that, nor the ample additions lately made to his income, were ſufficient to anſwer his demrnds. The thoughtleſs vivacity of his ſpirit often reduced him to little ſhifts of wit for its ſupport; and the project of the Fiſh-pool this year owed its birth chiefly to the projector's neceſſities. The following year he oppoſed the remarkable peerage bill in the houſe of commons; and, during the courſe of this oppoſition to the court, his licence for acting plays was revoked, and his patent rendered ineffectual, at the inſtance of the lord chamberlain. He did his utmoſt to prevent ſo great a loſs; and finding every direct avenue of approach to his royal maſter effectually barred againſt him by his powerful adverſary, he had recourſe to the method of applying to the public, in hopes that his complaints would reach the ear of his ſovereign, though in an indirect courſe, by that canal. In this ſpirit he formed the plan of a periodical paper, to be publiſhed twice a-week, under the title of the *Theatre*; the firſt number of which came out on the 2d of January 1719-20. In the mean time, the misfortune of being out of favour at court, like other misfortunes, drew after it a train of more. During the courſe of this paper, in which he had aſſumed the feigned name of *Sir John Edgar*, he was outrageouſly attacked by Mr Dennis, the noted critic, in a very abuſive pamphlet, intitled *The Character and Conduct of Sir John Edgar*. To this inſult our author made a proper reply in the Theatre.

While he was ſtruggling with all his might to ſave himſelf from ruin, he found time to turn his pen againſt the miſchievous South-Sea ſcheme, which had nearly brought the nation to ruin in 1720; and the next year he was reſtored to his office and authority in the playhouſe in Drury-Lane. Of this it was not long before he made an additional advantage, by bringing his celebrated comedy called the *Conſcious Lovers* upon that ſtage, where it was acted with prodigious ſucceſs; ſo that the receipt there muſt have been very conſiderable, beſides the profits accruing by the ſale of the copy, and a purſe of 500 l. given to him by the king, to whom he dedicated it. Yet notwithſtanding theſe ample recruits, about the year following, being reduced to the utmoſt extremity, he ſold his ſhare in the play-houſe; and ſoon after commenced a law-ſuit with the managers, which in 1726 was determined to his diſadvantage. Having now again, for the laſt time, brought his fortune, by the moſt heedleſs profuſion, into a deſperate condition, he was rendered altogether incapable of retrieving the loſs, by being ſeized with a paralytic diſorder, which greatly impaired his underſtanding. In theſe unhappy circumſtances, he retired to his ſeat at Languanor near Caermarthen in Wales, where he paid the laſt debt to nature on the 21ſt of September 1729, and was privately interred, according to his own deſire, in the church of Caermarthen. Among his papers were found the manuſcripts of two plays, one called *The Gentlemen*, founded upon the eunuch of Terence, and the other intitled *The School of Action*, both nearly finiſhed.

Sir Richard was a man of undiſſembled and extenſive benevolence, a friend to the friendleſs, and, as far as his circumſtances would permit, the father of every orphan. His works are chaſte and manly. He was a ſtranger to the moſt diſtant appearance of envy or malevolence; never jealous of any man's growing reputation; and ſo far from arrogating any praiſe to himſelf from his conjunction with Mr Addiſon, that he was the firſt who deſired him to diſtinguiſh his papers. His greateſt error was want of œconomy: however, he was certainly the moſt agreeable, and (if we may be allowed the expreſſion) the moſt innocent, rake that ever trod the rounds of indulgence.

STEEPLE, an appendage erected generally on the weſtern end of churches, to hold the bells. Steeples are denominated from their form, either ſpires or towers: the firſt are ſuch as aſcend continually diminiſhing either conically or pyramidally; the latter are mere parallellopipeds, and are covered a-top platform-

Steerage, Steering.

STEERAGE, on board a ſhip, that part of the ſhip next below the quarter-deck, before the bulk-head of the great cabin where the ſteerſman ſtands, in moſt ſhips of war. See STEERING.

STEERING, in navigation, the art of directing the ſhip's way by the movements of the helm; or of applying its efforts to regulate her courſe when ſhe advances.

The perfection of ſteering conſiſts in a vigilant attention to the motion of the ſhip's head, ſo as to check every deviation from the line of her courſe in the firſt inſtant of its motion; and in applying as little of the power of the helm as poſſible. By this ſhe will run more uniformly in a ſtraight path, as declining leſs to the right and left; whereas, if a greater effort of the helm is employed, it will produce a greater declination from the courſe, and not only increaſe the difficulty of ſteering, but alſo make a crooked and irregular tract through the water. See HELM.—The helmſman ſhould diligently watch the movements of the head by the land, clouds, moon, or ſtars; becauſe, although the courſe is in general regulated by the compaſs, yet the vibrations of the needle are not ſo quickly perceived, as the ſallies of the ſhip's head to the right or left, which, if not immediately reſtrained, will acquire additional velocity in every inſtant of their motion, and demand a more powerful impulſe of the helm to reduce them; the application of which will operate to turn her head as far on the contrary ſide of her courſe.—The phraſes uſed in ſteering a ſhip vary according to the relation of the wind to her courſe. Thus, if the wind is fair or large, the phraſes uſed by the pilot or officer who ſuperintends the ſteerage, are *port*, *ſtarboard*, and *ſteddy*. The firſt is intended to direct the ſhip's courſe farther to the right; the ſecond is to guide her farther to the left; and the laſt is deſigned to keep her exactly in the line whereon ſhe advances, according to the courſe preſcribed. The exceſs of the firſt and ſecond movement is called *hard-a-port*, and *hard-a-ſtarboard*; the former of which gives her the greateſt poſſible inclination to the right, and the latter an equal tendency to the left.—If, on the contrary, the wind is foul or ſcant, the phraſes are *luff*, *thus*, and *no nearer*: the firſt of which is the order to keep her cloſe to the wind; the ſecond, to retain her in her preſent ſituation; and the third, to keep her ſails full.

In a ſhip of war, the exerciſe of ſteering the ſhip is uſually divided amongſt a number of the moſt expert ſailors, who attend the helm in their turns; and are accordingly called *timoneers*, from the French term *timonier*, which ſignifies "helmſman." The ſteerage is conſtantly ſuperviſed by the quarter-maſters, who alſo attend the helm by rotation. In merchant-ſhips every ſeaman takes his turn in this ſervice, being directed therein by the mate of the watch, or ſome other officer.—As the ſafety of a ſhip, and all contained therein, depend in a great meaſure on the ſteerage or effects of the helm, the apparatus by which it is managed ſhould often be diligently examined by the proper officers. Indeed, a negligence in this important duty appears almoſt unpardonable, when the fatal effects which may reſult from it are duly conſidered.

Steganium ‖ Stem.

STEGANIUM. See SLATE.

STEGANOGRAPHY, the art of ſecret writing, or of writing in ciphers, known only to the perſons correſponding. See CIPHER.

STELLATE, among botaniſts, expreſſes leaves which grow not leſs than ſix at a joint, and are arranged like the rays of a ſtar.

STELLIONATE, in the civil law, a kind of crime committed by a fradulent bargain, where one of the parties ſells a thing for what it is not; as if I ſell an eſtate for my own which belongs to another, or convey a thing as free and clear which is already engaged to another, or put off copper for gold, &c.

STEM, in botany, that part of a plant ariſing out of the root, and which ſuſtains the leaves, flowers, fruits, &c. By waſhing and rubbing the ſtems of trees their annual increaſe is promoted; for the method of doing which, ſee the article TREE.

STEM *of a Ship*, a circular piece of timber into which the two ſides of a ſhip are united at the fore-end: the lower end of it is ſcarfed to the keel, and the bowſprit reſts upon its upper end. The ſtem is formed of one or two pieces, according to the ſize of the veſſel; and as it terminates the ſhip forward, the ends of the wales and planks of the ſides and bottom are let into a groove or channel, in the middle of its ſurface, from the top to the bottom; which operation is called *rabiting*. The outſide of the ſtem is uſually marked with a ſcale, or diviſion of feet, according to its perpendicular height from the keel. The intention of this is to aſcertain the draught of water at the fore-part, when the ſhip is in preparation for a ſea-voyage, &c. The ſtem at its lower end is of equal breadth and thickneſs with the keel, but it grows proportionally broader and thicker towards its upper extremity. See SHIP-*Building*.

STENOGRAPHY;

Or, SHORT-HAND WRITING.

Plate CCLXXV.

THE moſt eſſential properties of ſhort-hand are expedition and legibility. Any ſcheme which does not poſſeſs a ſufficient degree of the firſt has no title to the name of *Short-hand*; and if the laſt is wanting, let the method in other reſpects be what it will, it is good for nothing. The ſcheme here propoſed has a very conſiderable degree of both, and is alſo more regular and beautiful than any other.

The characters are all ſuppoſed to be written in a ſpace between two parallel lines. Such letters as are perpendicular or diagonal are intended to fill the whole ſpace; but the natural place of horizontal characters is at the top of the ſpace, except when it is otherwiſe directed by the following rules.

Plate CCLXXV.

On Plate CCLXXIV. Nº 1. you have the letters of the alphabet, and words expreſſed by them when they ſtand alone. Thus the firſt *b* ſignifies *be* or *by*; the ſecond, *but* or *put*. Horizontal characters, or ſuch as belong

Plate CCLXXV.

belong to that claſs, as *d*, *m*, *n*, &c. are double; the firſt ſtanding at the top of the ſpace, as *d*, which then ſignifies *do* or *doings;* the other *d* is ſet at the bottom of the ſpace, and ſtands for *would* or *doing*. *m*, *n*, *s*, and *x*, have three places in the ſpace, at the top, in the middle, and at the bottom. Example: *m* at the top is *them*, *me*, *my*, or *am;* the connection will readily diſtinguiſh which of theſe words is meant. The ſecond *k* being a horizontal character, has one place at the top of the ſpace, when it expreſſes *can*, *come*, or *comings;* and another at the bottom, when it is put for *common* or *commonly*. N. B. The firſt column contains all the characters uſed in this ſhort-hand; thoſe in N° 4. being no more than natural and obvious contractions of ſome of them. Where two characters are employed to expreſs one letter, that one is to be choſen occaſionally which will make the moſt eaſy and natural joining. Beginners will be ready to chooſe that character which does not join eaſily; but let not this diſcourage them, for a little practice will remove this difficulty. The firſt *l* muſt always be begun at the bottom; but *r* either at the top or bottom of the ſpace, as occaſion may require.

N° 2. is a liſt of prepoſitions, and N° 3. is a liſt of terminations; of which afterwards. N° 4. contains ſome double and triple conſonants, which are contracted according to the rules afterwards laid down.

All unneceſſary angles muſt be avoided in joining the characters, as in N° 5. The horizontal *k* muſt not follow a character drawn upward, nor *x* one that is drawn downward, as in N° 6. Many of the letters may be contracted as in N° 7. *bn*, *gm*, *gn*, *gr*, *kr*, *mv;* and double letters are wrote as in N° 8. *bb*, *dd*, *kk*, *mm*, *nn*, *ſs*. N. B. No letter is to be conſidered as doubled unleſs a vowel intervenes; as *mammon*, write *mmon;* *babble*, *bbl;* *candid*, *candd*. N° 9. contains another method of doubling letters, by dividing them with a ſmall ſtroke behind; as *ſſ*, *rr*, *tt*, *br*, *bt*, *kſ*, *lt*, *pr*, *chſ*. Conſonants may be alſo doubled by making one of them only half the uſual ſize, as in N° 10. *btr*, *brr*, *ſſl*, *ſlr*, *ſſr*, *ſrr*, *lrr*, *ltr*, *ttl*, *rrb*, *rrt*, *rtt*, *wvr*, *wrr*.

Letters of the ſame organ may be changed, for the ſake of more eaſy joining; as *b* for *p*, *f* for *v*, *k* for *q* or *c* hard, *ks* for *x*, *ch* for *ſh*, *k* for hard *ch;* and alſo *t* for *th*, and *vice verſa*. This is the reaſon why our alphabet has no *c*, becauſe *k* or *s* ſtands for it; and likewiſe why it has no *z*, becauſe *s* will expreſs it. Theſe exchanges are intended only to take place in the middle and end of words, except *q;* for we may write *kalify*, *kite*, for *qualify*, *quite;* but *k* is always uſed for hard *c*, *s* for *c* ſoft, and *s* for *z*. *f* is never wrote for *w*, only for *v*.

N° 11. ſhows the method of joining the letters to one another, and needs no explanation. *h* is always omitted in the middle and end of words; and if a vowel follows, it may be left out even in the beginning, as *Jeova*, or even *Jova*, *umour* or *umor*. *y* is never wrote except in the beginning of words; but *beyond*, *behind*, may be expreſſed as in N° 12. A compound word may be disjoined, as *ſteel yard*. *t* is ſometimes uſed for *th*, as N° 13. *lengthen*. The ſecond *th* is never to be joined to the firſt *l* or *r* when ſtanding by themſelves; but it may be joined to *y* and *q*, as in N° 14 *youth*, *quoth*. At the end of a word *f* or *v* may be joined thus, N° 15. *bv*, *tv*, *dv;* and *wt* *what*, *wn* *when;* which laſt is diſtinguiſhed from *wd*, which is joined at the bottom of the *w*.

Plate CCLXXV.

The ſtroke dividing two letters may ſometimes be ſupplied by the preceding character, as *ſpr*, *kpt*, N° 16. but the dividing ſtroke may frequently be omitted in words of many ſyllables, as *conſtitute;* and the ſame liberty may ſoon be taken with words that are ſhorter; *ſpt* with *r* only half the uſual length, may be *ſpectator*, N° 17. As *t* is ſometimes uſed for *th*, *thr* or *thire* may be wrote as in N° 18. *bthr* as in N° 19. and *btr* or *better*, as in N° 20.

Of Spelling.—The general rule is, "Spell as you pronounce;" for chaiſe, *ſhaiſe;* laugh, *laf;* draught, *draft;* though, *tho;* debt, *det;* phyſic, *fiſik;* ſchiſm, *ſiſm;* foreign, *foren;* writing, *riting;* high, *hi;* honeſt, *oneſt;* pſalm, *ſam;* friendſhip, *frnſhp*. *g* is dropt in ſuch words as *ſtrength*, *t* in *fetch;* *act*, *ect*, *ict*, may be wrote by *k*, and their plurals by *ks*. *t* at the end of a word with *p* before it may be dropt. In general, let the word be as much contracted as poſſible: after a little practice, the learner will find this very eaſy, and farther rules will be neceſſary.

If *p* ends a word, write the ſecond *p;* but if *pf* or *bf*, then uſe the firſt *p;* if *bt* or *pt*, uſe the ſecond *b* as a final character.

Of Vowels.—They are expreſſed by a dot in different ſituations, as in N° 21. where *t*, *m*, *n*, and *s*, have dots placed both before and after them, to ſhow the different vowels. But as the poſition of the dots is fully exemplified in N° 22. it is unneceſſary to give a particular deſcription. When a vowel is to be placed between two conſonants, *a*, *e*, *i*, follow the firſt, *o* and *u* go before the laſt; ſee N° 22.: but advantage may be taken of the place of *i*, ſo that by changing it different words may be expreſſed, as *kite*, *quite*, N° 23. When two perpendicular characters are ſeparated by the dividing ſtroke, *a* and *e* go to the firſt, *i* in the middle, *o* and *u* to the laſt part of the character; as N° 24. *bat*, *bet*, *bit*, *bot*, *but*. Diphthongs are to be expreſſed by the vowel whoſe ſound is moſt prevalent: as *ai*, *au*, by *a;* *oi* by *i;* *ou* by *o;* *oo* by *u*. *w* is never a vowel, for it is always dropt at the end of words.

The following rules ſhow when vowels ought to be expreſſed, and when not.

In general, no more than one vowel ought to be written in any word, excepting in ſuch words as *idea*, *ide*. 1ſt, The initial vowel of a monoſyllable muſt be expreſſed as in *add*, *apt*, *elſ*, *ill*. 2dly, The final vowel (if there is no initial) muſt be wrote in monoſyllables; *few*, *bow*, *pay*, write *fu*, *bo*, *pa*. 3dly, No ſhort vowel is to be expreſſed in any word whatever. 4thly, A long vowel muſt be wrote in a monoſyllable, except in ſuch common words as *both*, *life*, *ſake*. 5thly, A word of more than one ſyllable muſt have its final vowel expreſſed thus, *aptly*, *empty*, *conciſely*, *ptly*, *empy*, *knssly*. 6thly, A word of more than one ſyllable muſt have its long vowel expreſſed (if it has no final), as *ſpuſl* for *eſpouſal*, *dmir* for *admire*. 7thly, A word of two ſyllables, having no final nor long vowel, muſt have its initial vowel wrote, as *akrn* for *acorn*, *img* for *image*. 8thly, If a word have three or more ſyllables without either long or final vowel, write no vowel at all: thus, *mblſh*, *embelliſh*. When the prepoſitions *in*, *im*, are followed by *n*, *m*, the initial vowel muſt be expreſſed, *imdſt*, *immodeſt*, *untrl*, *unnatural*. When the plural or poſſeſſive *s* follows a final vowel, the vowel muſt not be omitted; as *follies*, *rallies*, N° 25. In writing after a ſpeaker, though you ſhould leave out more vowels than the above rules direct, they may be inſerted afterwards when you have more leiſure.

Of Prepositions.—They are always to be wrote ſeparate from the reſt of the word. Such as are horizontal may be placed in the middle or at the bottom of the ſpace, but never at the top. The perpendicular and horizontal are made ſhorter by one-third than their uſual length, and are placed at the bottom of the ſpace. No vowel muſt at any time be joined to a prepoſition, but muſt always be prefixed to the following conſonant; as *connive*, N° 26. If *s* follows a prepoſition, and is uſed as a dividing ſtroke, the prepoſition may be joined to it; as *inſult*, N° 29. Such letters as are not employed as prepoſitions may be made prepoſitions at large; as *gentleman*, *gentlewoman*, *gingerbread*, *landlord*, N° 27. Compound words may be joined or disjoined at pleaſure; as *coachman*. In the liſt of prepoſitions N° 2. the firſt *n* ſignifying *anti*, &c. is placed in the middle of the ſpace; and the other, ſignifying *un*, &c. at the bottom. *s* has three places; when it ſignifies *ſatis*, *ſuper*, it ſtands at the top of the ſpace, and is the only prepoſition which has a place at the top.

Of Terminations.—They may be made the uſual ſize, and may therefore fill the whole ſpace: the termination *ings* is always placed at the top, and *ing* at the bottom. *ſion*, *tion*, in N° 3. has five places, according to the vowel which goes before it; as *ation*, *etion*, &c.: but if a conſonant goes before it, that conſonant is left out, and *ſion*, *tion*, is put in the preceding vowel's place; as for *invention*, we write *invetion*; *tranſaction*, *tranſation*; *diſtinction*, *diſtition*; *adoption*, *adotion*; *preſumption*, *preſution*. Let *ſion*, *tion*, be put in the preceding vowel's place, to horizontal as well as perpendicular characters: example, *aſcenſion*, N° 30. If one termination follows another, the laſt muſt be written at length, as *poſſibility*; with or without the dividing ſtroke, *teſtamentary*, N° 31. If a prepoſition and termination compoſe the whole of a word, one of them muſt be wrote at length, whichſoever the writer pleaſes. *Comical*, *tranſition*, are wrote both ways in N° 32. *N. B.* Prepoſitions and terminations muſt never be uſed in writing monoſyllables.

Plate CCLXXV. N° 33. contains the compound prepoſitions *concom*, *contradis*, *decom*, N° 34. *diſcom* or *diſcon*, *diſin* or *diſinter*, *diſſatis*, *incon* or *incom*, *indis* or *undis*, N° 35. *inſigni*, *impro*, *inſuper* or *unſatis*, *unpro*, *intrans* or *untrans*, N° 36. *incircum* or *uncircum*, *incontro* or *uncontro*, *miſinter* or *miſunder*, *miſcom* or *miſcon*, *miſrepre*. N° 37. *recom* or *recon*, *repre*, *uninter*, *interpre*, *miſinterpre*. The reader will obſerve, that theſe compound prepoſitions are all made up of ſuch as are more ſimple, and are ſuch as any perſon would naturally be led to form for his own uſe; on which account they can be no burden to the memory. *N. B.* In theſe examples, and every where elſe, where two or more words are coupled together by the conjunction *or*, there is but one character to expreſs them in the Plate.

N° 38. contains examples of prepoſitions and terminations in their formation of words, *contradict*, *circumſtance*, *external*, *recompenſe*. N° 39. *ſelfiſhneſs*, *remember*, *blameable*, *repetition*. N° 40. *diſcontentment*, *uncomfortable*, *comical*, *omnipotent*. N° 41. *Antichriſt*, *interpreter*, *undermine*, *contradiſtinction*. N° 42. *competent*, *ſupereminently*, *magnitude*, *property*. N° 43. *tranſferable*, *withſtand*, *diſcompoſe*, *diſintereſted*.

Abbreviating Rules. 1ſt, Such words as are uſually abbreviated in long hand may be abbreviated in ſhort: as *Dr*, *Doctor*; *admnr*, *adminiſtrator*; *e'er*, *ever*; *o'er*, *over*; *e'en*, *even*; *e'entide*, *eventide*; *o'ertake*, *overtake*; *e'ery*, *every*; as in N° 44. Poetic contractions may alſo be uſed: as *morn*, *morning*; *trump*, *trumpet*; *e'en*, *evening*; N° 45. But there are ſome contractions in long-hand, which are not to be imitated in ſhort: we write *he will*, not *he'll*; *will not*, not *won't*; *cannot*, not *can't*. 2d, A dot variouſly applied to a character, ſo as not to interfere with the vowels places, may be made a mark of abbreviation: thus, if it is placed where the character terminates, it may be the mark of a ſubſtantive ſingular or verb; as *t*, *d*, *s*, and *w*, in N° 47. If it is placed at the beginning of the character, it will denote the ſubſtantive-plural; as in N° 48. The adjective has a mark above the character towards the left-hand; and the participle-perfect a ſmall perpendicular ſtroke towards the right-hand of the character: both theſe are exemplified in N° 49. The adverb is a dot towards the left-hand below; as in N° 50. The participle in *ing* is an oblique ſtroke, like the third part of our *r*, placed towards the right-hand below, N° 51. The participle in *ings*, is the ſame ſtroke placed at the top of the ſpace, N° 52. In N° 53. theſe marks of abbreviation are illuſtrated, where *d* with the ſubſtantive-dot denotes *advice* or *adviſe*; with the plural-dot, *advices*; with the participle-perfect dot, *adviſed*; with the adverb-dot, *adviſedly*; with the participle in *ing*, *adviſing*; its plural *adviſings*, and the adjective *adviſable*. N° 54. exemplifies the ſame thing with letter *s*; which, with the ſubſtantive-mark, ſignifies *ſervice* or *ſerve*; and, with the other dots, *ſervices*, *ſerved*, *ſerviceably*, *ſerving*, *ſervings*, *ſerviceable*: and in N° 55. *t* with the ſubſtantive or verb mark expreſſes *triumph*; and, with the other dots, *triumphs*, *triumphed*, *triumphantly*, *triumphing*, *triumphings*, *triumphant*. This uſe of the dot is only intended to abbreviate ſuch words in a ſentence as the connection will readily ſuggeſt by this hint; that is, in ſuch caſes as, if a perſon were writing long-hand, he would contract ſome word in a ſentence by writing only the firſt letter of the word with a daſh after it, as a ſufficient expreſſion for the word: and in every ſubject there are ſome leading words which cannot be miſtaken though they are thus contracted, for the connection will immediately decipher them. In following a ſpeaker, it may be ſufficient to uſe the ſubſtantive mark only; but if time will permit, it is better to uſe them all. In order that theſe marks may be eaſily applied, let it be obſerved, that if a word ends in *s*, the ſubſtantive-plural mark may be uſed. If it ends in *ed*, uſe the participle-perfect mark: if in *ly*, uſe the adverb mark: if in *ing* or *ings*, uſe theſe marks reſpectively; only *ing* and *ings* are not to be uſed in writing monoſyllables. If a word ends in none of theſe, uſe the ſubſtantive or adjective mark at pleaſure. A liſt of words may be formed by the help of this mark, and committed to memory; each individual may adapt the liſt to his own profeſſion, by making choice of ſuch words as frequently occur, and would be

Plate CCLXXV.

be too long if wrote by any other rule. From N° 56. to N° 61. a liſt is given of ſuch words as may ſuit the divine; the lawyer or phyſician may eaſily change theſe for others more ſuited to their reſpective profeſſions. N° 56. contains *bleſs* or *bleſſing*, *believe* or *belief*, *difficulty*, *doctrine*, *advantage*, *divide* or *diviſion*. N° 57. *frequent* or *frequency*, *godlineſs*, *juſtice*, *glory* or *glorify*, *goodneſs*, *humanize* or *humanity*. N° 58. *covet* or *covetouſneſs*, *conſider* or *conſideration*, *conſequence*, *liberality*, *lament* or *lamentation*, *mortality*, *member*. N° 59. *nature*, *engage* or *engagement*, *preſent* or *preſence*, *part*, *qualify* or *qualification*, *repent* or *repentance*, *ſpirit*. N° 60. *ſenſe*, *temper*, *world*, *exemplify* or *example*, *except* or *exception*, *youthfulneſs*, *cheerfulneſs*. N° 61. *change*, *ſhame*, *thank*, *charity*, *cheat*, *grace*, *Chriſtian*, *thoughtfulneſs*. In completing this liſt, that adjective, adverb, &c. ſhould be choſen which bears the greateſt reſemblance to the ſubſtantive in its conſonants. N°s 62. 63. 64. and 65. exemplify the manner of completing the liſt in the word *divide*. N° 62. contains *divide*, *dividing*, *dividings*, *divided*, *diviſible*, *diviſibly*. N° 63. *divider*, *dividend*. No 64. *indiviſible*, *undivided*, *individual*, *individuality*. N° 65. *diviſibility*, *indiviſibility*, *indiviſibleneſs*. Where there is no angle at which the dot may be placed, a ſmall line is drawn through the character at the part where the dot ſhould ſtand, as in *dividend* in N° 63. In theſe examples both prepoſitions and terminations are applied, which makes the method of carrying this liſt to a great extent ſufficiently plain. 3d, Some words may be abbreviated by writing the prepoſition with the following conſonant and mark of contraction; as, *She ruined her comp—— with rouge. He preſents comp——s, and thanks for your favours. They are ſo alike that it is difficult to diſt—— between them*, N° 66. 4th, Other words may be contracted by writing the vowel following the conſonant, inſtead of the mark of contraction. As *competition* or *ſt*, as *circumſtance* in N° 67. But if the word is plural, the plural mark muſt not be omitted. 5th, Words of more than one conſonant may have their termination expreſſed by the mark of contraction; as, *reaſonableneſs*, *hardneſs*, *different*, *fairly*, as in N° 68. If the termination of a plural ſubſtantive is dropt, the plural mark muſt be ſet at the beginning of a word; as *exhortations*, No 69. But the termination muſt never be omitted if a long vowel goes before it, as *employment*. In many caſes the termination is ſo evident, that no expreſſion need be made for it, as in theſe examples: He was very cloſely *engage* in buſineſs; We had *entertain* them very elegantly; They were *walk* in the fields. The terminations of the ſecond and third perſons of verbs may be always omitted; as, *ſpeak* for *ſpeakeſt*, *teach* for *teacheth*.—6th, Many words may be expreſſed by their firſt vowel and conſonant following; as in No 70. *Abroad*, *about*, *after*. No 71. *often*, *action*, *according* or *accordingly*, *occaſion*. No 72. *Almoſt*, *always*, *immediately*, *impoſſible*. No 73. *Into*, *only*, *unto*, *apart*. No 74. *Open*, *acquaint*, *aſide*, *theſe*. No 75. *This*, *thoſe*, *thus*, *utmoſt*. No 76. *Extremely*, *exceſſively*. Obſerve that *theſe* and *this* are wrote in the middle of the ſpace, *thoſe* and *thus* at the bottom. This liſt of words, contained in N.s 70, 71, &c. may be increaſed as the learner improves in the writing; and leading words may be wrote by this rule as well as by the mark of contraction, always taking care that they be ſuch as the connection will readily diſcover. Other words may be expreſſed by their firſt conſonant and vowel following; as in No 77. *Before*, *become*, *hardly*, *likewiſe*. No 78. *Likely*, *many*, *perpetual* or *perpetually*, *peculiar* or *peculiarly*, *real* or *really* or *reality*. No 79. *Every*, *ſomething*, *ſometimes*, *ſince*. Something is wrote in the middle of the ſpace; *ſometimes* and *ſince* are both placed at the bottom.—7th, The beginnings and endings of ſome words will be ſufficient to expreſs them; as in No 80. *Univerſity*, *baniſhment*, *curioſity*, *arbitrary*: And if the firſt character is horizontal, it may be placed at the bottom; as in No 81. *Univerſity*, *civility*. In theſe two laſt numbers *univerſity* is differently expreſſed; that in No 80. may be put for the word *unity*.—8th, The firſt conſonant and termination of a word may often be a ſufficient expreſſion for it; as in No 82. *puniſhment*.—9th, The firſt and laſt conſonant may ſignify a whole word in theſe caſes following. If the characters are both horizontal, place them at the bottom of the ſpace; as, *certain*, *concern*, No 83.: or join them by an angle, as, *doctor*, *maſter*, No 83.: or join them in an unuſual manner; as, *former*, *proper* or *pleaſure*, *character*, *harbour*: or, laſtly, write them ſeparately the one above the other; as, *between*, *return*, *retreat*, in No 85. And words wrote by this 9th rule may have any neceſſary augment joined to them; as, *Returns*, *delivered*, *murdering*, in No 86. Many common words may be abbreviated by writing the firſt and laſt conſonants, the one above the other: thus, *between*, *former*, *neither*, *unleſs*, in No 87.; and *perhaps*, *ſeldom*, *further*, in No 88.—10th, Repetition is to be expreſſed by placing ſo many dots at the bottom of the word, to be repeated as there are repetitions of it; thus, *Holy*, *holy*, *holy*, No 89. Or if a whole ſentence is repeated, draw a line under the whole repetition, and place dots at the end for as many times as it is repeated. *The temple of the Lord*, *the temple of the Lord*, *the temple of the Lord*, No 90.

Plate CCLXXV.

Theſe rules ought to be uſed ſparingly at firſt; as they grow familiar, they may be uſed more extenſively.

No 91. contains characters for figures, diſtinguiſhed from other characters by a ſmall oblique ſtroke placed before them. No 92. is an illuſtration of the joining of ſuch characters, in the various combinations of figures; but if the learner chooſes, he may make uſe of common figures. No 93. ſhows how dots may be placed for the comma, ſemicolon, colon, and period; but proportional ſpaces may be left in the writing inſtead of them. No 94. are marks of reference, which the reader may vary at his pleaſure.

General Specimen, (Plate CCLXXV.) "How frequently is the honeſty and integrity of a man diſpoſed of by a ſmile or a ſhrug?—How many good and generous actions have been ſunk into oblivion by a diſtruſtful look,——or ſtamped with the imputation of proceeding from bad motives, by a myſterious and ſeaſonable whiſper?

"Look into companies of thoſe whoſe gentle natures ſhould diſarm them,—we ſhall find no better account.——How large a portion of chaſtity is ſent out of the world by diſtant hints,——nodded away, and cruelly winked into ſuſpicion by the envy or thoſe who are paſſed all temptation of it themſelves?——How often does the reputation of a helpleſs creature bleed by a report——which the party who is at the pains to propagate it, beholds with much pity and fellow-feeling,——that ſhe is heartily ſorry for it,——hopes in God it is not true? however, as archbiſhop Tillotſon wittily obſerves upon it, is reſolved, in the mean time, to give the report her paſs, that at leaſt it may have fair play to take its fortune in the world——to be believed or not, according to the charity of thoſe into whoſe hands it ſhall happen to fall?

"So fruitful is this vice in variety of expedients, to ſatiate as well as diſguiſe itſelf. But if theſe ſmoother weapons cut ſo ſore——what ſhall we ſay of open and unbluſhing ſcandal——ſubjected to no caution—tied down to no reſtraints? If the one, like an arrow ſhot in the dark, does nevertheleſs ſo much ſecret miſchief——this, like the peſtilence which rageth at noonday, ſweeps all before it, levelling without diſtinction the good and the bad; a thouſand fall beſide it, and ten thouſand on its right hand——they fall——ſo rent and torn in this tender part of them, ſo unmercifully butchered, as ſometimes never to recover either the wounds or the anguiſh of heart——which they have occaſioned.—

"But there is nothing ſo bad which will not admit of ſomething to be ſaid in its defence.

"And here it may be aſked—Whether the inconveniences and ill effects which the world feels—from the licentiouſneſs of this practice—are not ſufficiently counterbalanced by the real influence it has upon mens lives and conduct?—That if there was no evil-ſpeaking in the world, thouſands would be encouraged to do ill, and would ruſh into many indecorums, like a horſe into the battle, were they ſure to eſcape the tongues of men.

"That if we take a general view of the world—we ſhall find, that a great deal of virtue—at leaſt of the outward appearance of it, is not ſo much from any fixed principle, as the terror of what the world will ſay, and the liberty it will take upon the occaſions we ſhall give.

"That if we deſcend to particulars, numbers are every day taking more care to be well ſpoken of, than what would actually enable them to live ſo as to deſerve it.

"That there are many of both ſexes who can ſupport life well enough without honour or chaſtity, who, without reputation (which is but the opinion which the world has of the matter), would hide their heads in ſhame, and ſink down in utter deſpair of happineſs.

"No doubt the tongue is a weapon which does chaſtiſe many indecorums which the laws of men will not reach,—and keeps many in awe, whom conſcience will not; and where the caſe is indiſputably flagrant, the ſpeaking of it in ſuch words as it deſerves, ſcarce comes within the prohibition.—In many caſes it is hard to expreſs ourſelves ſo as to fix a diſtinction betwixt oppoſite characters—and ſometimes it may be as much a debt we owe to virtue, and as great a piece of juſtice, to expoſe a vicious character, and paint it in its proper colours, as it is to ſpeak well of the deſerving, and deſcribe his particular virtues. And indeed, when we inflict this puniſhment upon the bad, merely out of principle, and without indulgences to any private paſſion of our own——'tis a caſe which happens ſo ſeldom, that one might venture to except it.

"However, to thoſe who in this objection are really concerned for the cauſe of virtue, I cannot help recommending what would much more effectually ſerve her intereſt, and be a ſure token of their zeal and attachment to her. And that is—in all ſuch plain inſtances where it ſeems to be duty to fix a diſtinction betwixt the good and the bad—to let their actions ſpeak it inſtead of their words, or at leaſt to let them both ſpeak one language. We all of us talk ſo loud againſt vicious characters, and are ſo unanimous in our cry againſt them—that an unexperienced man, who only truſted his ears, would imagine the whole world was in an uproar about it."

STENTOROPHONIC tube, a ſpeaking-trumpet; thus called from Stentor, a perſon mentioned by Homer. See Acoustics, n° 26.

STEPHANUS (Byzantinus), an able grammarian, who lived in the 5th or 6th century. He wrote a Dictionary, in which he made a great number of obſervations, borrowed from mythology and hiſtory, which ſhowed the origin of cities and colonies, of which we have nothing remaining but a mean abridgment, by Hermolaus the grammarian; but from that work the learned have received great light; and Sigonius, Caſaubon, Scaliger, Salmaſius, &c. have employed themſelves in illuſtrating it.

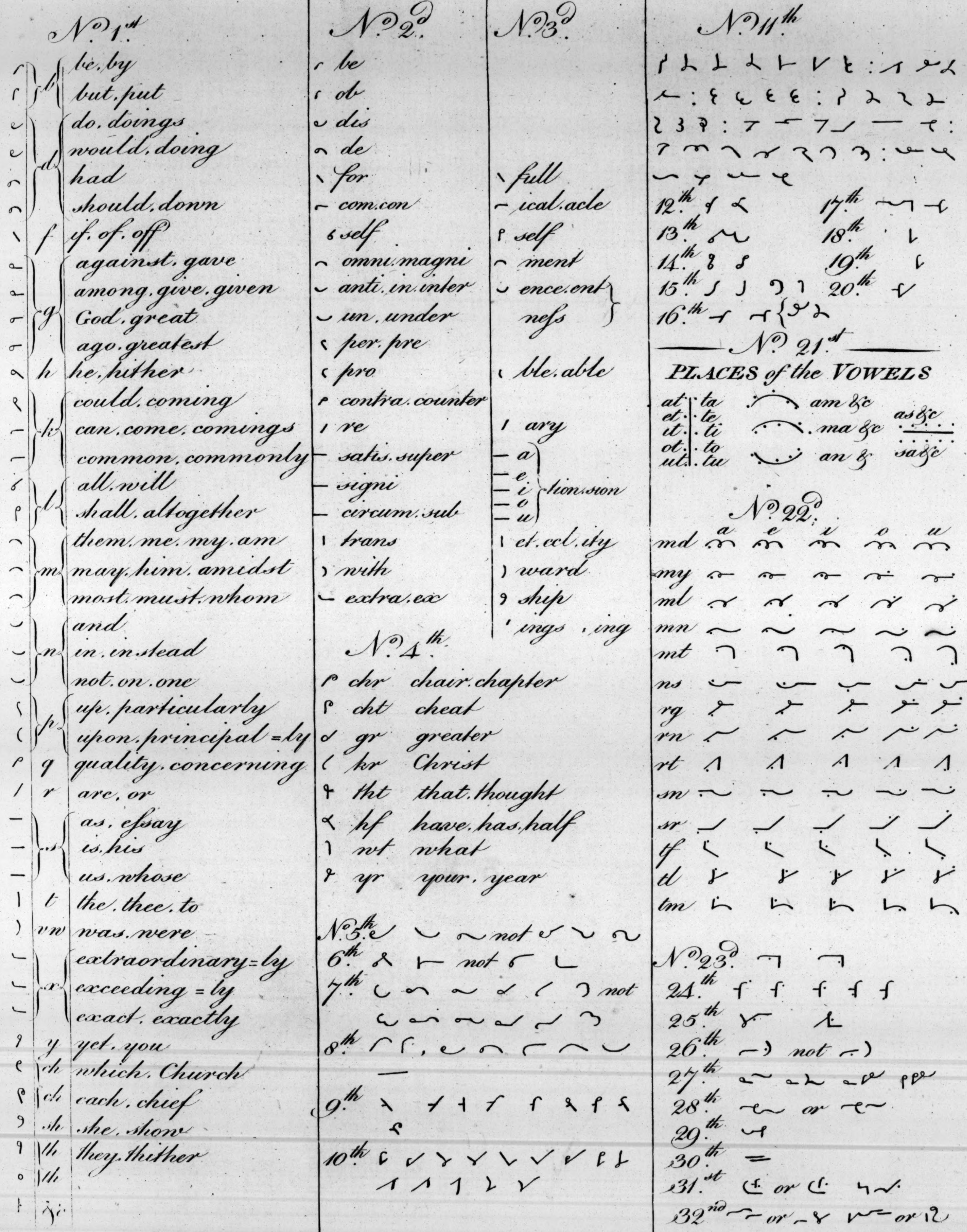
STEPHEN, king of England. See England, n° 107, &c.

Stephen, or *St Stephen's Day*, a feſtival of the Chriſtian church, obſerved on the 26th of December, in memory of the firſt martyr St Stephen.

STEPHENS, the name of a family of printers to whom the world is obliged for the moſt correct and beautiful editions of the beſt claſſic authors, the Greek ones particularly.

Henry *Stephens*, the firſt diſtinguiſhed perſon of his name, was a Frenchman, and one of the beſt printers of his time. He died in 1520.

Robert *Stephens*, his ſecond ſon, was ſtill more eminent in this art than his father. He was born at Paris in 1503; and applied ſo aſſiduouſly to letters in his youth, that he very early acquired a perfect knowledge in the Latin, Greek, and Hebrew tongues. In 1521, the year after his father's death, his mother was married to Simon de Colines, in Latin *Colinæus*; who by this means came into the poſſeſſion of Henry Stephens's printing-houſe, carried on the buſineſs till his death in 1547, and is well known for the neatneſs and beauty of his Italic character. In 1522, when Robert was 19 years of age, he was charged with the management of his father-in-law's preſs: and the ſame year came out, under his inſpection, a New Teſtament in Latin; which gave ſuch offence to the Paris divines, that they threatened to have it burnt and him baniſhed. He appears to have ſet up for himſelf ſoon after, for there are books of his printing ſo early as 1526. He married Perette, the daughter of Baudius, another eminent printer: ſhe was a learned woman, and of great uſe to her huſband in correcting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A. Bell Sculpt.

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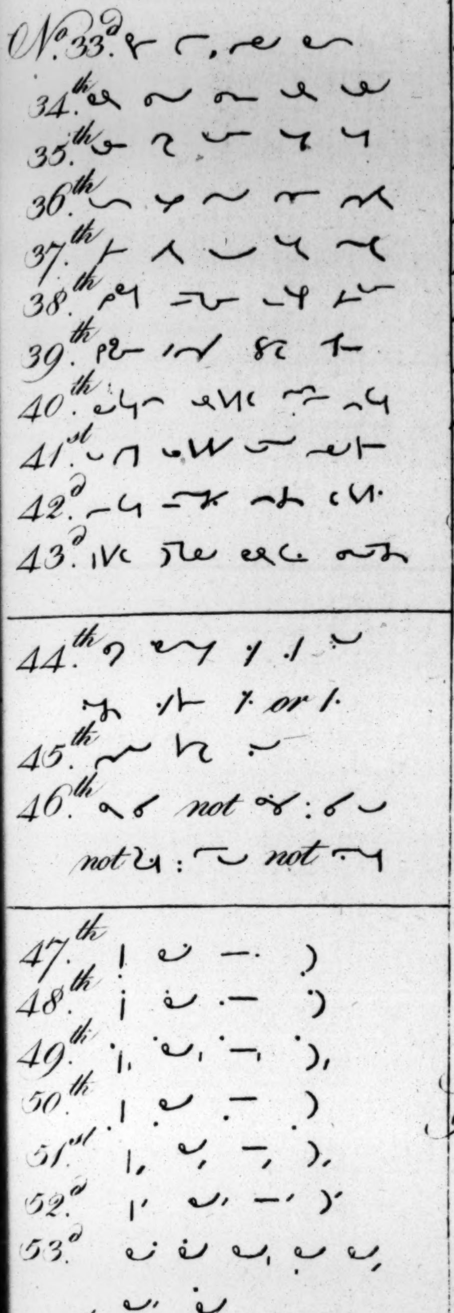
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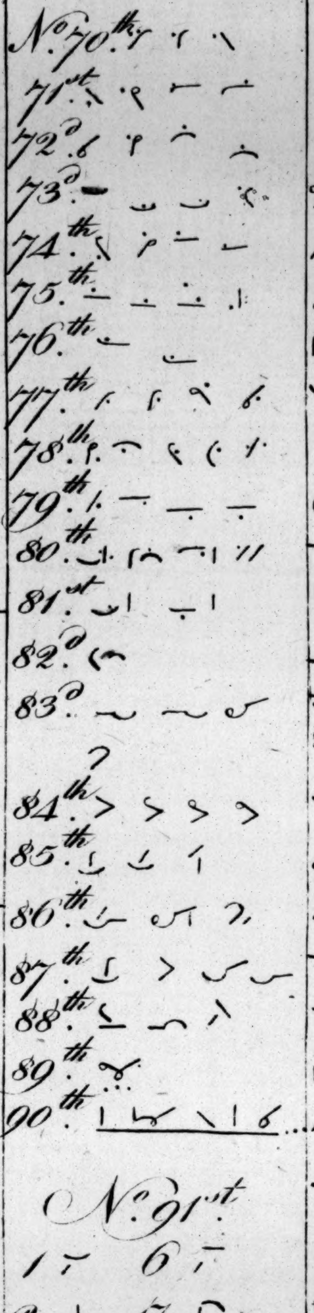
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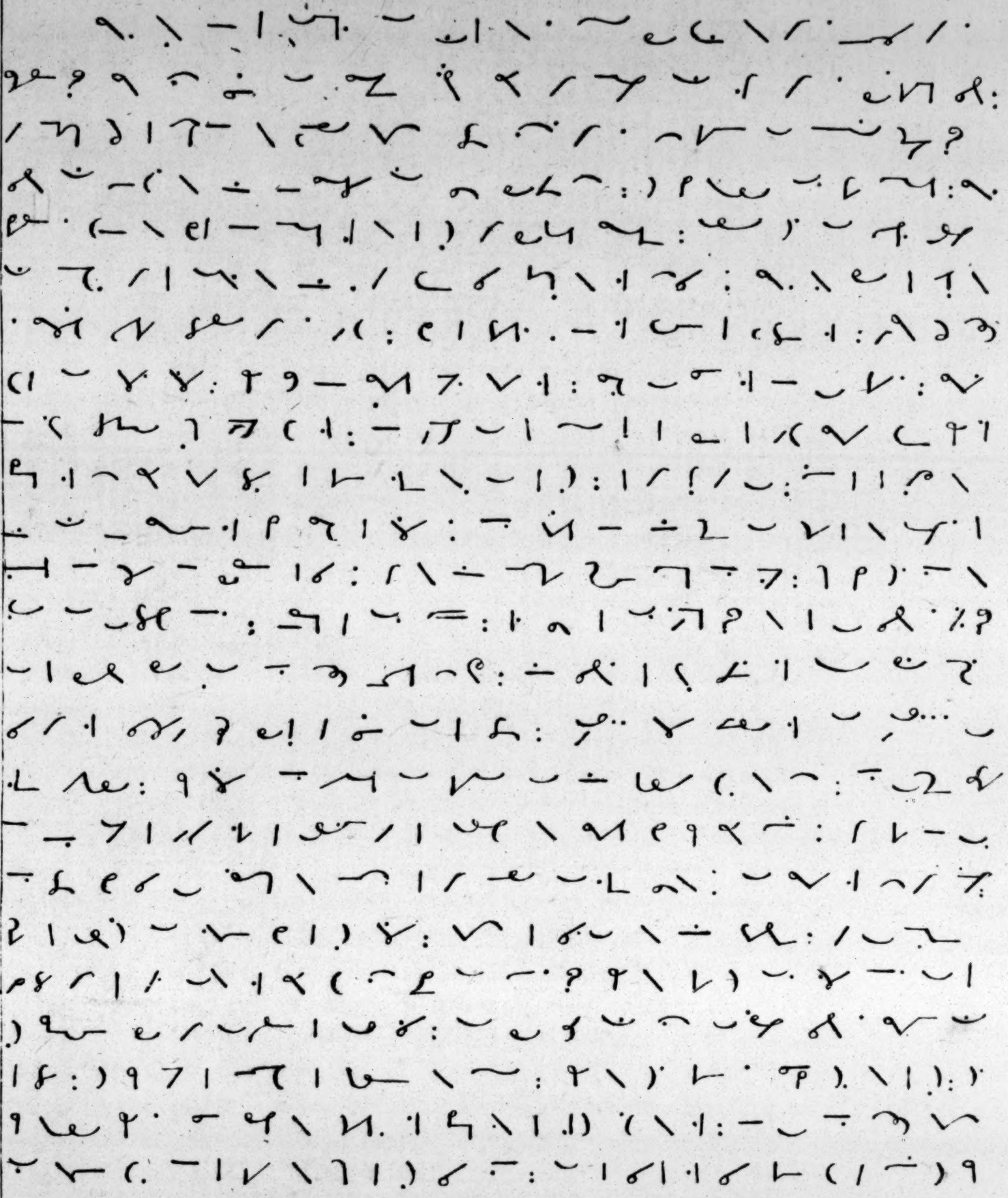
GENERAL SPECIMEN.

From STERNE's Sermons. Vol. 2. Ser. 11.



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ting Latin works. He had, beſides, in his houſe ten or twelve correctors of different nations; and nothing but Latin was ſpoken in his family. In 1539, Francis I. named him his printer; and ordered ancient manuſcripts to be ſought after for him. The averſion which the doctors of the Sorbonne had conceived againſt him on account of the Latin New Teſtament in 1522, revived in 1532, when he printed his great Latin Bible. Francis protected him: but this king dying in 1547, he withdrew to Geneva; where he embraced Calviniſm. Here he lived in intimacy with Calvin, Beza, Rivet, and others, whoſe works he printed; and died in 1559. This eminent artiſt valued himſelf ſo much upon the accuracy of his Latin impreſſions, that he offered a reward to the diſcoverer of any fault in them. Robert, like the reſt of his family, was not only a printer, but alſo a writer: his *Theſaurus Linguæ Latinæ* is a work of immenſe learning, and in high repute.

CHARLES *Stephens*, younger brother of the preceding, wrote and printed many uſeful and valuable works. He was born about the year 1504, and became perfectly ſkilled in Greek and Latin literature. He ſtudied phyſic, and took a doctor's degree at Paris; but this did not hinder him from following the profeſſion of his father, and being printer to the king. He was, however, more eminent as an author than a printer; having written upwards of thirty works upon various ſubjects. He died at Paris in 1564; leaving behind him a very learned daughter.

HENRY *Stephens*, eldeſt ſon of ROBERT, was born at Paris in 1528, and became the moſt learned of all his learned family. He was eſteemed, after the death of Budæus, the beſt Greek ſcholar of his time. It ſeems to have been about the year 1546 when his father took him into buſineſs; yet, before he could think of fixing, he reſolved to travel into foreign countries, to examine libraries, and to connect himſelf with learned men. He went into Italy in 1547, and ſtaid there two years; and returned to Paris in 1549, when he ſubjoined ſome Greek verſes, made in his youth, to a folio edition of the New Teſtament in Greek, which his father had juſt finiſhed. In 1550, he went over to England; and in 1551 to Flanders, where he learned the Spaniſh tongue of the Spaniards, who then poſſeſſed thoſe countries, as he had before learned the Italian in Italy. On his return to Paris, he found his father preparing to leave France: it is not known whether he accompanied him to Geneva; but if he did, it is certain that he returned immediately after to Paris, and ſet up a printing houſe. In 1554, he went to Rome, viſiting his father at Geneva as he went; and the year after, to Naples. He returned to Paris, by the way of Venice, in 1556. This was upon buſineſs, committed to him by the government. Then he ſettled to printing in good earneſt, and gave the world moſt beautiful and correct editions of all the ancient Greek and other valuable writers. He called himſelf at firſt *Printer of Paris*; but, in 1558, took the title of *Printer to Ulric Fugger*, a very rich German, who allowed him a conſiderable penſion. He was at Geneva in 1558, to ſee his father, who died the year after; and he married in 1560. Henry III. of France was very fond of Stephens, ſent him to Switzerland in ſearch of manuſcripts, and gave him a penſion. He took him to court, and made him great promiſes: but the troubles which accompanied the latter part of this king's reign, not only occaſioned Stephens to be diſappointed, but made his ſituation in France ſo dangerous, that he thought it prudent to remove, as his father had done before him, to Geneva. He beſtowed great labour and expence on compiling his *Theſaurus-Linguæ Græcæ*, to the empoveriſhment of his family: for though the work is highly eſteemed to this day by the learned, yet theſe being but few, the demand from them did not reimburſe him; and, to add to his miſfortune, Scapula his ſervant treacherouſly extracted the moſt uſeful parts, and publiſhed an epitome, which deſtroyed the ſale of the *Theſaurus*. He died in 1598; leaving a ſon, Paul, and two daughters, one of whom had eſpouſed the learned Caſaubon in 1586.

PAUL *Stephens*, the ſon of *Henry*, was well ſkilled in the Greek and Latin tongues. He carried on the buſineſs of printing for ſome time at Geneva: but his preſs had greatly degenerated from the beauty of that at Paris; and he afterwards ſold his types to Chouet, another printer. He died at Geneva in 1627, aged 60 years; leaving a ſon,

ANTHONY; who, quitting the religion of his father for that of his anceſtors, quitted alſo Geneva, and returned to Paris the place of their original. Here he was ſome time printer to the king; but managing his affairs ill, he was obliged to give all up, and to have recourſe to an hoſpital, where he died blind in 1674, aged 80.—In him terminated the family of eminent printers, after it had flouriſhed for five generations: and it ſhould be obſerved, that there were other ſons in the three firſt generations, who followed the art, and acquired great, though inferior, reputation.

STEREOGRAPHIC PROJECTION, is the projection of the circles of the ſphere on the plane of ſome one great circle, the eye being placed in the pole of that circle. See PROJECTION.

STERILITY, the quality of a thing that is barren, in oppoſition to fertility. It has been aſſerted by many authors, that all monſters produced by a mixture of different ſpecies of animals, ſuch as mules, are barren; but this does not hold univerſally, even with the mule, which is the inſtance moſt generally adduced. See MULE.

Sterility in women ſometimes happens from a miſcarriage, or violent labour injuring ſome of the genital parts; but one of the moſt frequent cauſes is the ſuppreſſion of the menſtrual flux.—There are other cauſes, ariſing from various diſeaſes incident to thoſe parts; by which the uterus may be unfit to receive or retain the male ſeed;—from the tubæ fallopianæ being too ſhort, or having loſt their erective power; in either of which caſes no conception can take place:—from univerſal debility and relaxation; or a local debility of the genital ſyſtem; by which means, the parts having loſt their tone or contractile power, the ſemen is thrown off immediately *poſt coitum*:—from imperforation of the vagina, the uterus, or the *tubæ*; or from diſeaſed ovas, &c. Hence medical treatment can only avail in caſes ariſing from topical or univerſal debility; in correcting irregularities of the menſtrual flux, or in removing tumours, cicatrices, or conſtrictions of the paſſage, by the art of ſurgery.

STERLING, (*Sterlingum*), was the epithet for ſilver money current within this kingdom, and took name from this: That there was a pure coin ſtamped firſt in England by the Eaſterlings, or merchants of Eaſt Germany, by the command of king John; and Hoveden writes it *Eſterlings*. Inſtead of the pound Sterling, we now ſay ſo many pounds of lawful Engliſh money: but the word is not wholly diſuſed, for though we ordinarily ſay lawful money of England, yet in the mint they call it *Sterling money*; which is meant to denote the certain degree of fineneſs which ought to be retained in the reſpective coins.

STERN, the poſterior face of a ſhip; or that part which is repreſented to the view of a ſpectator, placed on the continuation of the keel behind, as exhibited in Plate CCLXXVII. fig. 1, 2, 3, 4.

The ſtern, fig. 1. is terminated above by the taffarel, and below by the counters: It is limited on the ſides by the quarter-pieces; and the intermediate ſpace comprehends the galleries and windows of the different cabins.

This figure exhibits the ſtern of a 74-gun ſhip.

A, the keel, with *a* the falſe keel beneath it.

A B, the ſtern-poſt.

C, the rail which determines the height of the counters.

D D, the upper and lower quarter-galleries, with their baluſtrades and windows.

E, the quarter-pieces: and P F P, the taffarel.

K G K, the lower counter, with H H, its gun-ports.

G, the rail which ſeparates the lower counter from the ſecond or upper counter; which laſt is included between G and C.

K K, the wing-tranſom.

L L, the deck-tranſom.

M, N, O, firſt, ſecond, and third tranſoms; the 4th, 5th, and 6th tranſoms are placed immediately under theſe: and that which lies between the wing and deck-tranſoms, is called the *filling tranſom*.

O M L K P, the direction of the faſhion-piece, whoſe upper part is expreſſed by the dotted lines K P.

Q, the cove, a ſort of arched canopy, ſerving as a roof to the ſtern-gallery.

R Q R, the ſcreen bulk-head, or partition, containing the cabin-windows.

R S S R, the baluſtrade of the ſtern-gallery, with S S, the foot-pace-rail, which determines the height of its floor, or platform.

S C S, the ward-room windows.

T, the lower finiſhing of the quarter gallery.

Fig. 2. exhibits a ſtern-view of a 60 gun ſhip, with the curve of the frame-timbers on one ſide, and the diſpoſition of all the planks of the bottom on the other ſide.

Fig. 3. repreſents a ſtern view of a French man of war of 70 guns.

Fig. 4. is a ſtern for a firſt or ſecond rate: accordingly it is furniſhed with a middle apartment between the ward-room and the captain's cabin. This apartment is alſo furniſhed with galleries on the ſtern and quarter. The other parts of it are deſcribed in the explanation of fig. 1. See alſo the article QUARTER.

STERN-*Faſt*, a rope uſed to confine the ſtern of a ſhip or boat to any wharf or jetty-head, &c.

STERN-*Poſt*, a long ſtraight piece of timber erected on the extremity of the keel, to ſuſtain the rudder and terminate the ſhip behind.

This piece, which is expreſſed by B in the pieces of the hull, Plate CCLXV. fig. 3. ought to be well ſecured and ſupported; becauſe the ends of all the lower planks of the ſhip's bottom are fixed in a channel, cut on its ſurface; and the whole weight of the rudder is ſuſtained by it.

The dimenſions of the ſtern-poſt, or the proportional breadth and thickneſs in the different parts of its height, are geometrically delineated in the quarter and ſtern of a 74 gun ſhip, Plate CCLIV. fig. 1. and CCLXXVII. fig. 1. being expreſſed in both by AB. It is uſually marked like the ſtern, with a ſcale of feet from the keel upwards, in order to aſcertain the draught of water at that part of the veſſel.

The difficulty of procuring a ſtern-poſt of ſufficient breadth in one piece, has introduced the practice of fixing an additional piece behind it, which is ſtrongly bolted to the former. The hinges, which ſupport the rudder, are accordingly fixed to this latter, which is alſo tenanted into the keel, and denominated the *back of the poſt*. It is half the breadth of the ſtern-poſt at the keel, but diminiſhes gragually towards the upper end, where it is one-third narrower.

The ſtern-poſt is ſtrongly attached to the keel by a knee, G, Plate CCLXV. fig. 3. of which one branch extends along the keel, being ſcarfed and bolted to the dead-wood, and fore-locked under the keel; whilſt the other branch inclines upwards, and correſponds with the inſide, or fore-part of the ſtern-poſt; to which it is alſo bolted in the ſame manner.

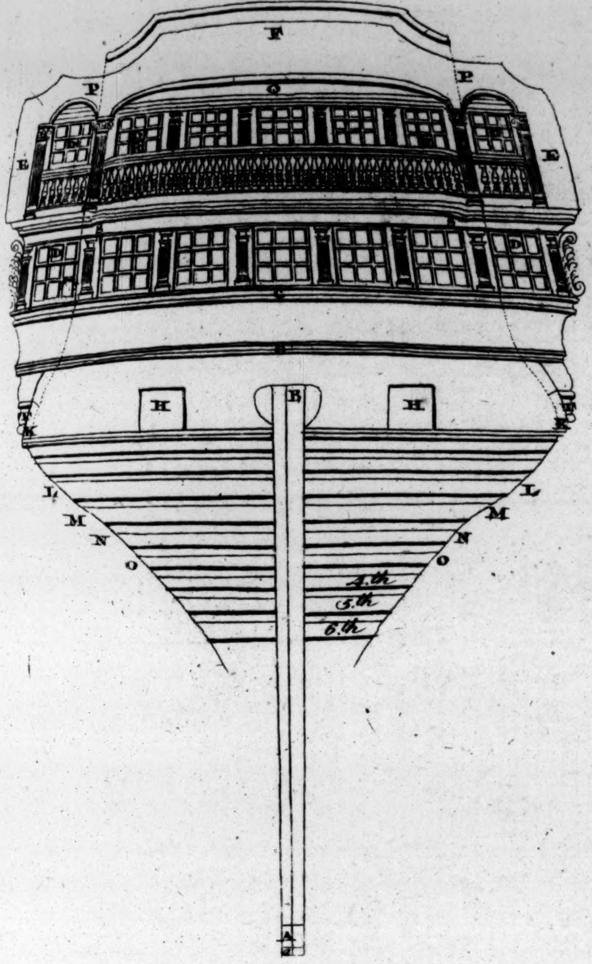
STERN-*Sheets*, that part of a boat which is contained between the ſtern and the aftmoſt, or hindmoſt, ſeat of the rowers. It is generally furniſhed with benches to accommodate the paſſengers. See BOAT.

STERNA, a genus of birds, of the order of anſeres. There are ſeven ſpecies, three of which are Britiſh, viz. 1. The hirundo, or great tern, weighs four ounces one-quarter: the length is fourteen inches; the breadth thirty: the bill and feet are of a fine crimſon; the former tipt with black, ſtraight, ſlender, and ſharp-pointed: the crown, and hind part of the head, black: the throat, and whole underſide of the body, white: the upper part, and the coverts of the wings, a fine pale grey: the tail conſiſts of twelve feathers; the exterior edges of the three outmoſt are grey, the reſt white: the exterior, on each ſide, is two inches longer than the others: in flying, the bird frequently cloſes them together, ſo as to make them appear one ſlender feather. Theſe birds frequent the ſea-ſhores, banks of lakes and rivers: they feed on ſmall fiſh, and water-inſects; hovering over the water, and ſuddenly darting into it, catch up their prey. They breed among ſmall tufts of ruſhes; and lay three or four eggs, of a dull olive colour, ſpotted with black. All the birds of this genus are very clamorous.

2. The leſſer tern, called by Linnæus *larus minuta*, weighs only two ounces five grains; length eight inches and a half; the breadth nineteen and a half. The bill is yellow, tipt with black: the forehead and cheeks white: from the eyes to the bill is a black line: the top of the head and hind part black: the breaſt, and under ſide of the body cloathed with feathers ſo cloſely ſet together, and of ſuch an exquiſite rich gloſs, and ſo fine a white, that

STERN.

Fig. 1.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A

Fig. 2.

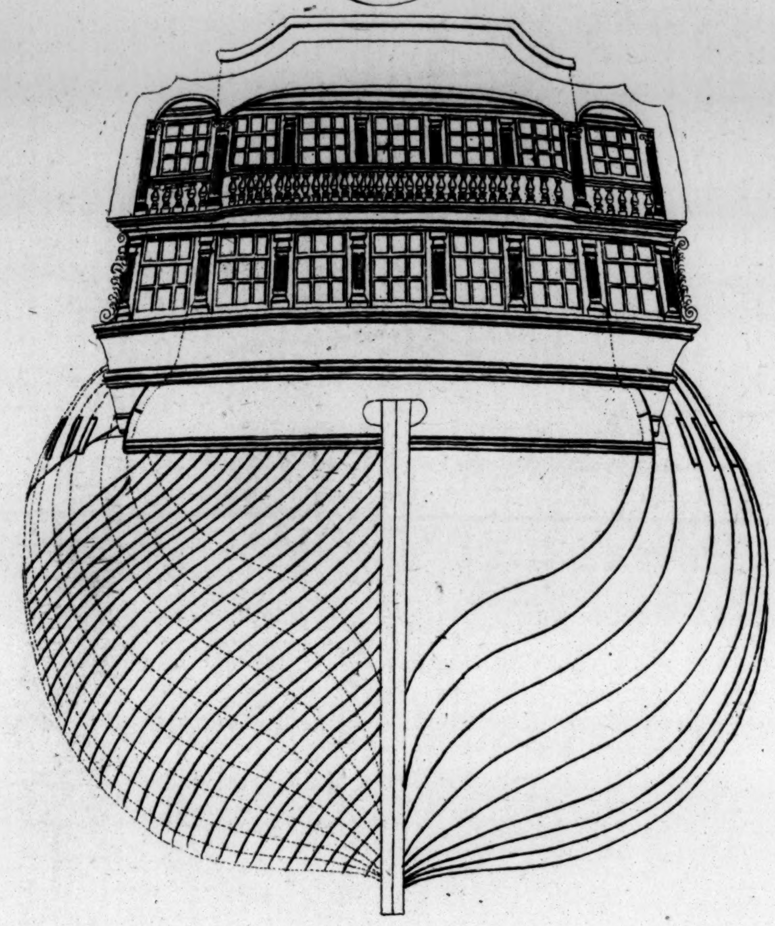


Fig. 3.

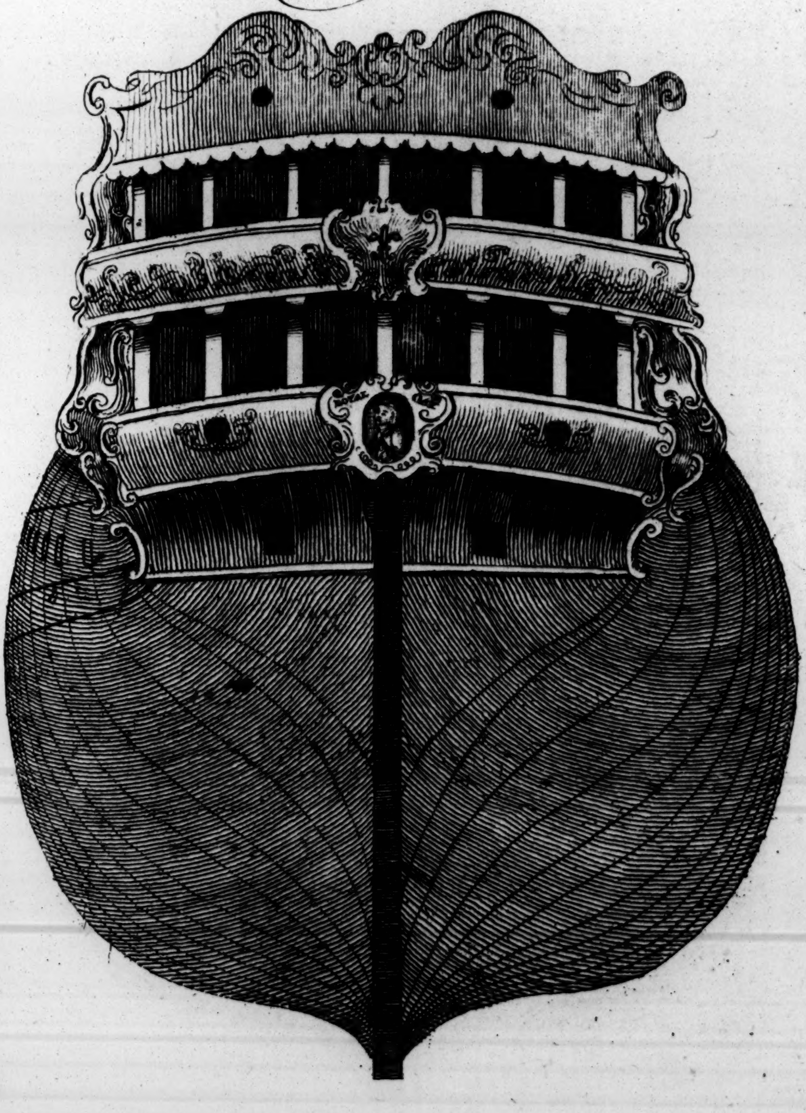
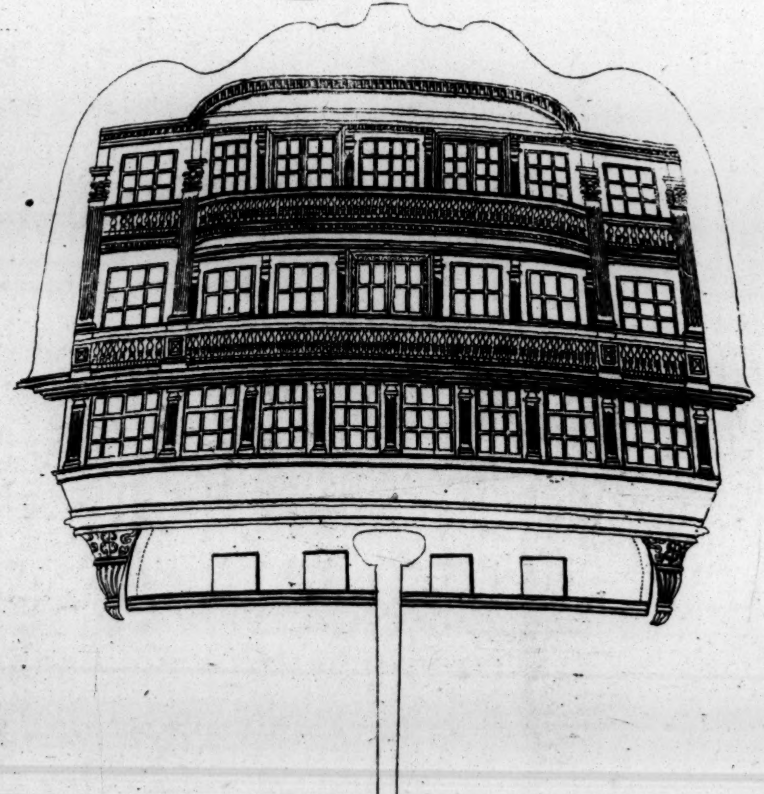


Fig. 4.



A. Bell Sculp.

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that no ſatin can be compared to it: the back and wings of a pale grey: the tail ſhort, leſs forked than that of the former, and white: the legs yellow: the irides duſky.—Theſe two ſpecies are very delicate, and ſeem unable to bear the inclemency of the weather on our ſhores during winter; for we obſerve they quit their breeding-places at the approach of it, and do not return till ſpring. The manners, haunts and food of this are the ſame with thoſe of the former; but theſe are far leſs numerous.

3. The fiſſipes, or black tern, is of a middle ſize between the firſt and ſecond ſpecies. The uſual length is ten inches; the breadth twenty-four; the weight two ounces and a half. The head, neck, breaſt, and belly, as far as the vent, are black; beyond is white: the male has a white ſpot under its chin: the back and wings are of a deep aſh-colour: the tail is ſhort and forked; the exterior feather on each ſide is white; the others aſh-coloured: the legs and feet of a duſky red. Mr Ray calls this a *cloven-footed gull;* as the webs are depreſſed in the middle, and form a creſcent. Theſe birds frequent freſh waters; breed on their banks, and lay three ſmall eggs of a deep olive-colour, much ſpotted with black. They are found during ſpring and ſummer in vaſt numbers in the Fens of Lincolnſhire; make an inceſſant noiſe, and feed as well on flies as water-inſects and ſmall fiſh. Birds of this ſpecies are ſeen very remote from land. Kalm ſaw flocks of hundreds in the Atlantic Ocean, midway between England and America; and a later voyager ſaw one 240 leagues from the Lizard, in the ſame ocean.

STERNO-HYOIDÆUS, in anatomy. See there, *Table of the Muſcles*.

STERNUM, in anatomy. See there, n° 36.

STERNUTATIVE, or STERNUTATORY, a medicine proper to produce ſneezing. Sternutatives are of two kinds, gentle and violent. Of the firſt kind are betony, ſage, marjoram, tobacco, and the whole faſhionable tribe of ſnuffs. Of the latter kind are euphorbium, white hellebore, pellitory, &c. Sternutatives operate by their ſharp pungent parts vellicating the inner membrane of the noſe, which is exceeding ſenſible, and occaſioning the ſerous matter contained in the glands of the noſe, and in ſeveral ſinuſes ſituated in the baſe of the cranium and of the os frontis, to be expelled.

STETIN, or STETTIN, a ſea-port town of Germany, in the circle of Upper Saxony, and capital of Hither Pomerania, with the title of a duchy, and a caſtle. It had long a famous ſchool, which the wars of Germany never diſturbed. The ancient dukes of Pomerania reſided here; and it was taken by the elector of Brandenburgh in 1676, but given to Sweden by the treaty of Nimeguen. In 1713, it ſubmitted to the allies; and then the ſaid elector was put in poſſeſſion again of this important place, which is a bulwark to the Marche of Brandenburg: and the fortifications have been greatly improved. It is now a flouriſhing place, and carries on a conſiderable trade. It is ſeated on the river Oder, 80 miles north of Francfort, and 70 north by eaſt of Berlin. E. Lon. 14. 58. N. Lat. 53. 27. The duchy is 125 miles in length; and borders upon Mecklenburg, and partly upon Brandenburg. The breadth is from 17 to 25 miles, and it is divided by the river Oder into two parts.

STEW, a ſmall kind of fiſh-pond, the peculiar office of which is to maintain fiſh, and keep them in readineſs for the daily uſe of the family, &c.

STEWS, (from the French *eſtuves*, i. e. *thermæ*, *balneum*), are thoſe places which were permitted in England to women of profeſſed incontinency, and that for hire would proſtitute their bodies to all comers; ſo called, becauſe diſſolute perſons are wont to prepare themſelves for venereous acts by bathing; and hot baths were by Homer reckoned among the effeminate ſort of pleaſures. Theſe ſtews were ſuppreſſed by King Henry VIII. about the year 1546.

STEWARD, (*ſeneſcallus*, compounded of the Saxon *ſteda*, i. e. "room;" or *ſtead* and *weard*, "a ward" or "keeper,") an officer appointed in another's ſtead or place, and always taken for a principal officer within his juriſdiction. Of theſe there are various kinds. The greateſt officer under the crown is the lord high-ſteward of England, an office that was anciently the inheritance of the earls of Leiceſter, till forfeited by Simon de Mountfort to king Henry III. But the power of this officer is ſo very great, that it has not been judged ſafe to truſt it any longer in the hands of a ſubject, excepting only *pro hac vice*, occaſionally: as to officiate at a coronation, at the arraignment of a nobleman for high-treaſon, or the like. During his office, the ſteward bears a white ſtaff in his hand; and the trial, &c. ended, he breaks the ſtaff, and with it his commiſſion expires. There is likewiſe a lord-ſteward of the king's houſehold, who is the chief officer of the king's court, has the care of the king's houſe, and authority over all the officers and ſervants of the houſehold, except ſuch as belong to the chapel, chamber, and ſtable.

STEWARD, an officer in a ſhip of war, appointed by the purſer to diſtribute the different ſpecies of proviſions to the officers and crew; for which purpoſe he is furniſhed with a mate and proper aſſiſtants.

Court of the Lord High STEWARD *of Great Britain*, is a court inſtituted for the trial of peers indicted for treaſon or felony, or for miſpriſion of either. The office of this great magiſtrate is very ancient, and was formerly hereditary, or at leaſt held for life, or *dum bene ſe geſſerit:* but now it is uſually, and hath been for many centuries paſt, granted *pro hac vice* only; and it hath been the conſtant practice (and therefore ſeems now to have become neceſſary) to grant it to a lord of parliament, elſe he is incapable to try ſuch delinquent peer. When ſuch an indictment is therefore found by a grand jury of freeholders in the King's-bench, or at the aſſizes before the juſtices of *oyer* and *terminer*, it is to be removed by a writ of *certiorari* into the court of the lord high-ſteward, which has the only power to determine it. A peer may plead a pardon before the court of King's-bench, and the judges have power to allow it, in order to prevent the trouble of appointing an high-ſteward merely for the purpoſe of receiving ſuch plea: but he may not plead in that inferior court any other plea, as guilty or not guilty of the indictment, but only in this court; becauſe, in conſequence of ſuch plea, it is poſſible that judgment of death might be awarded againſt him. The king, therefore, in caſe a peer be indicted of treaſon, felony, or miſpriſion, creates a lord high-ſteward *pro hac vice* by commiſſion under the great ſeal; which recites the indictment ſo found, and gives his Grace power to receive and try it *ſecundum legem et conſuetudinem Angliæ.* Then when the indictment is regularly removed by writ of *certiorari*, commanding the inferior court to certify it up to him, the lord high-ſteward directs a precept to a ſerjeant at arms, to ſummon the lords to attend and try the indicted peer. This precept was formerly iſſued to ſummon only 18 or 20 ſelected from the body of the peers; then the number came to be indefinite; and the cuſtom was for the lord high-ſteward to ſummon as many as he thought proper, (but of late years not leſs than 23), and that thoſe lords only ſhould ſit upon the trial; which threw a monſtrous weight of power into the hands of the crown, and this its great officer, of ſelecting only ſuch peers as the then predominant party ſhould moſt approve of. And accordingly, when the earl of Clarendon fell into diſgrace with Charles II. there was a deſign formed to prorogue the parliament, in order to try him by a ſelect number of peers; it being doubted whether the whole houſe could be induced to fall in with the views of the court. But now, by ſtatute 7 W. III. c. 3. upon all trials of peers for treaſon or miſpriſion, all the peers who have a right to ſit and vote in parliament ſhall be ſummoned at leaſt 20 days before ſuch trial, to appear and vote therein; and every lord appearing ſhall vote in the trial of ſuch peer, firſt taking the oaths of allegiance and ſupremacy, and ſubſcribing the declaration againſt popery.

During the ſeſſion of parliament, the trial of an indicted peer is not properly in the court of the lord high-ſteward, but before the court laſt mentioned of our lord the king in parliament. It is true, a lord high-ſteward is always appointed in that caſe to regulate and add weight to the proceedings: but he is rather in the nature of a ſpeaker *pro tempore*, or chairman of the court, than the judge of it; for the collective body of the peers are therein the judges both of law and fact, and the high-ſteward has a vote with the reſt in right of his peerage. But in the court of the lord high-ſteward, which is held in the receſs of parliament, he is the ſole judge of matters of law, as the lords triors are in matters of fact; and as they may not interfere with him in regulating the proceedings of the court, ſo he has no right to intermix with them in giving any vote upon the trial. Therefore, upon the conviction and attainder of a peer for murder in full parliament, it hath been holden by the judges, that in caſe the day appointed in the judgment for execution ſhould lapſe before execution done, a new time of execution may be appointed by either the high court of parliament during its ſitting, though no high-ſteward be exiſting, or, in the receſs of parliament, by the court of king's-bench, the record being removed into that court.

It has been a point of ſome controverſy, whether the biſhops have now a right to ſit in the court of the lord high-ſteward to try indictments of treaſon and miſpriſion. Some incline to imagine them included under the general words of the ſtatute of king William, "all peers who have a right to ſit and vote in parliament:" but the expreſſion had been much clearer, if it had been "all lords," and not "all peers;" for though biſhops, on account of the baronies annexed to their biſhoprics, are clearly lords of parliament, yet their blood not being ennobled, they are not univerſally allowed to be peers with the temporal nobility: and perhaps this word might be inſerted purpoſely with a view to exclude them. However, there is no inſtance of their ſitting on trials for capital offences, even upon impeachments or indictments in full parliament, much leſs in the court we are now treating of; for indeed they uſually withdraw voluntarily, but enter a proteſt, declaring their right to ſtay. It is obſervable, that, in the 11th chapter of the conſtitutions of Clarendon, made in parliament 11th Hen. II. they are expreſsly excuſed, rather than excluded, from ſitting and voting in trials, when they come to concern life or limb: *epiſcopi, ſicut cæteri barones, debent intereſſe judiciis cum baronibus, quouſque perveniatur ad diminutionem membrorum, vel ad mortem.* And Becket's quarrel with the king hereupon was not on account of the exception, (which was agreeable to the canon law), but of the general rule, that compelled the biſhops to attend at all. And the determination of the houſe of lords in the earl of Danby's caſe, which hath ever ſince been adhered to, is conſonant to theſe conſtitutions; "that the lords ſpiritual have a right to ſtay and ſit in court in capital caſes, till the court proceeds to the vote of guilty or not guilty." It muſt be noted, that this reſolution extends only to trials in full parliament; for to the court of the lord high-ſteward (in which no vote can be given, but merely that of guilty or not guilty) no biſhop, as ſuch, ever was or could be ſummoned: and though the ſtatute of king William regulates the proceedings in that court, as well as in the court of parliament, yet it never intended to new-model or alter its conſtitution; and conſequently does not give the lords ſpiritual any right, in caſes of blood, which they had not before. And what makes their excluſion more reaſonable is, that they have no right to be tried themſelves in the court of the lord high-ſteward, and therefore ſurely ought not to be judges there. For the privilege of being thus tried depends upon nobility of blood rather than a ſeat in the houſe, as appears from the trials of popiſh lords, of lords under age, and (ſince the Union) of the Scots nobility, though not in the number of the ſixteen; and from the trials of females, ſuch as the queen conſort or dowager, and of all peereſſes by birth; and peereſſes by marriage alſo, unleſs they have, when dowagers, diſparaged themſelves by taking a commoner to their ſecond huſband.

STEWART in Scots law. See Law, N° clviii. 5.

STIBIUM, a name for Antimony.

STIGMA, a brand, or impreſſion with a hot iron; a mark of infamy. See Stigmatizing.

Stigma, in botany, the ſummit or top of the ſtyle, accounted by the ſexualiſts the female organ of generation in plants, which receives the fecundating duſt of the tops of the ſtamina, and tranſmits its vapour or effluvia through the ſtyle into the heart of the ſeed-bud, for the purpoſe of impregnating the ſeeds.

STIGMATA, the apertures in different parts of the bodies of inſects, communicating with the tracheæ or air-veſſels, and ſerving for the office of reſpiration.

Stigmata, in antiquity, certain marks impreſſed on the left ſhoulders of the ſoldiers when liſted.

STIGMATIZING, among the ancients, was inflicted upon ſlaves as a puniſhment, but more frequently as a mark to know them by: in which caſe, it was done by applying a red-hot iron marked with certain letters to their foreheads, till a fair impreſſion was made; and then pouring ink into their furrows, that the inſcription might be the more conſpicuous. Stigmatizing, among ſome nations, was, however, looked upon as a diſtinguiſhing mark of honour and nobility.

STILE. See Style.

STILL-bottoms, in the diſtillery, a name given by the traders to what remains in the ſtill after working the waſh into low wines. Theſe bottoms are procured in the greateſt quantity from the malt-waſh, and are of ſo much value to the diſtiller in the fattening of hogs, &c. that he often finds them one of the moſt valuable articles of the buſineſs.

STILLINGFLEET (Edward), biſhop of Worceſter, was the ſon of Samuel Stillingfleet gentleman, and was born at Cranborn in Dorſetſhire in 1635. He was educated at St John's College, Cambridge; and having received holy orders, was, in 1657, preſented to the rectory of Sutton in Nottinghamſhire. By publiſhing his *Origines Sacræ*, and other works, he ſoon acquired ſuch reputation, that he was appointed preacher of the Rolls Chapel; and in January 1665 was preſented to the rectory of St Andrew's, Holborn. He was afterwards choſen lecturer at the Temple, and appointed chaplain in ordinary to king Charles II. In 1668, he took the degree of doctor of divinity; and was ſoon after engaged in a diſpute with thoſe of the Romiſh religion, by publiſhing his diſcourſe concerning the idolatry and fanaticiſm of the church of Rome, which he afterwards defended againſt ſeveral antagoniſts. In 1680 he preached at Guildhall chapel a ſermon on Phil. iii. 16. which he publiſhed under the title of *The Miſchief of Separation*; and this being immediately attacked by ſeveral writers, he in 1683 publiſhed his *Unreaſonableneſs of Separation*. In 1685 appeared his *Origines Britannicæ*, or the Antiquities of the Britiſh Church, in folio. During the reign of king James II. he wrote ſeveral tracts againſt popery, and was prolocutor of the convocation, as he had likewiſe been under king Cha. II. After the Revolution he was advanced to the biſhopric of Worceſter, and was engaged in a diſpute with the Socinians, and alſo with Mr Locke; in which laſt conteſt he is generally thought to have been unſucceſsful. He died at Weſtminſter in 1699, and was interred in the cathedral of Worceſter, where a monument was erected to his memory by his ſon. Dr Stillingfleet wrote other works beſides thoſe here mentioned, which, with the above, have been reprinted in 6 vols. folio.

Stillingfleet (Benjamin), an ingenious naturaliſt, was grandſon of the preceding. His father Edward was fellow of St John's College in Cambridge, F. R. S. M. D. and Greſham profeſſor of phyſic: but marrying in 1692, he loſt his lucrative offices and his father's favour; a misfortune that affected both himſelf and his poſterity. However, going into orders, he obtained, by his father's means, the living of Newington-Butts, which he immediately exchanged for thoſe of Wood-Norton and Swanton in Norfolk. He died in 1708.

Benjamin, his only ſon, was educated at Norwich ſchool; which he left in 1720, with the character of an excellent ſcholar. He then went to Trinity-College in Cambridge, at the requeſt of Dr Bentley, the maſter, who had been private tutor to his father, domeſtic chaplain to his grandfather, and much indebted to the family. Here he was a candidate for a fellowſhip, but was rejected by the maſter's influence. This was a ſevere and unexpected diſappointment, and but little alleviated afterwards by the Doctor's apology, that it was a pity that a gentleman of Mr Stillingfleet's parts ſhould be buried within the walls of a college.

Perhaps, however, this ingratitude of Dr Bentley was not of any real diſſervice to Mr Stillingfleet. By being thrown into the world, he formed many honourable and valuable connections. He dedicated ſome tranſlations of Linnæus to the late lord Lyttelton, partly, he ſays, from motives of private reſpect and honour. The preſent lord Barrington gave him, in a very polite manner, the place of the maſter of the barracks at Kenſington; a favour to which Mr Stillingfleet, in the dedication of his Calendar of Flora to that nobleman, alludes with equal politeneſs, as well as with the warmeſt gratitude. His Calendar of Flora was formed at Stratton in Norfolk in the year 1755, at the hoſpitable ſeat of his very worthy and ingenious friend Mr Marſham, who had made ſeveral obſervations of that kind, and had communicated to the public his curious obſervations on the growth of trees. But it was to Mr Wyndham of Felbrig in Norfolk that he appears to have had the greateſt obligations: he travelled abroad with him, ſpent much of his time at his houſe, and was appointed one of his executors (Mr Garrick was another), with a conſiderable addition to an annuity which that gentleman had ſettled upon him in his lifetime.

Mr Stillingfleet's genius ſeems, if we may judge from his works, to have led him principally to the ſtudy of natural hiſtory; which he proſecuted as an ingenious philoſopher, an uſeful citizen, and a good man. In this walk of learning he mentions, as his friends, Dr Watſon, Mr (now Dr) Solander, Mr Hudſon, Mr Price of Foxley, and ſome others; to whom may be added the ingenious Mr Pennant. Nor can we omit the flattering mention which the late Mr Gray makes of him in one of his letters, dated from London in 1761: "I have lately made an acquaintance with this philoſopher, who lives in a garret here in the winter, that he may ſupport ſome near relations who depend upon him. He is always employed, conſequently (according to my old maxim) always happy, always cheerful, and ſeems to me a very worthy honeſt man. His preſent ſcheme is to ſend ſome perſons, properly qualified, to reſide a year or two in Attica, to make themſelves acquainted with the climate, productions, and natural hiſtory of the country, that we may underſtand Ariſtotle, Theophraſtus, &c. who have been Heathen Greek to us for ſo many ages; and this he has got propoſed to lord Bute, no unlikely perſon to put it in execution, as he is himſelf a botaniſt."

Mr Stillingfleet publiſhed a volume of miſcellaneous tracts, which is in much eſteem, and does great honour to his head and heart. They are chiefly tranſlations of ſome eſſays in the *Amœnitates Academicæ*, publiſhed by Linnæus, interſperſed with ſome obſervations and additions of his own. In this volume he ſhows alſo a taſte for claſſical learning, and entertains us with ſome elegant poetical effuſions of his own. But his Eſſay on Converſation, publiſhed in the firſt volume of Dodſley's Collection of Poems, entitles him to a diſtinguiſhed rank among our Engliſh poets. This poem is addreſſed to Mr Wyndham, with all that warmth of friendſhip which diſtinguiſhes Mr Stillingfleet. As it is chiefly didactic, it does not admit of ſo many ornaments as ſome compoſitions of other kinds. However, it contains much good ſenſe, ſhows a conſiderable knowledge of mankind, and has ſeveral paſſages that in point of harmony and eaſy verſification would not diſgrace the writings of our moſt admired poets. Here more than once Mr Stillingfleet ſhows himſelf ſtill ſore for Dr Bentley's cruel treatment of him; and towards the beautiful and moral cloſe of it (where it is ſuppoſed he gives us a ſketch of himſelf), ſeems to hint at a mortification of a more delicate nature, which he is ſaid to have ſuffered from the other ſex.

To theſe diſappointments it was perhaps owing that Mr Stillingfleet neither married nor went into orders. His London reſidence was at a ſadler's in Piccadilly; where he died in 1771, aged above 70, leaving ſeveral valuable papers behind him. He was buried in St James's church, without the ſlighteſt monument of his having exiſted.

STIMULATING, a property in bodies by which they vellicate, and cauſe vibrations and inflections of the fibres of the nerves, and a greater derivation of nervous fluid into the parts affected. Stimulants produce pain, heat, redneſs, &c.

STIMULI, in botany, a ſpecies of armature or offenſive weapon, with which ſome plants, as nettle, caſſada, acalypha, and tragia, are furniſhed. Their uſe, ſays Linnæus, is by their venomous punctures to keep off naked animals that would approach to hurt them.

STING, an apparatus in the bodies of certain inſects, in form of a little ſpear, ſerving them as a weapon of offence.

STING-*Ray*, in ichthyology. See RAIA.

STINK-POT, an earthen jar or ſhell, charged with powder, grenadoes, and other materials of an offenſive and ſuffocating ſmell. It is frequently uſed by privateers, in the weſtern ocean, in the attack of an enemy whom he deſigns to board; for which purpoſe it is furniſhed with a lighted fuſe, at the opening or touch-hole. See BOARDING.

STIPEND, among the Romans, ſignifies the ſame with tribute; and hence *ſtipendarii* were the ſame with *tributarii*.

STIPEND, in Scots law. See LAW, N° clix. 12, 13.

STIPULA, in botany, one of the fulcra or props of plants, defined by Linnæus to be a ſcale, or ſmall leaf, ſtationed on each ſide the baſe of the foot-ſtalks of the flower and leaves, at their firſt appearance, for the purpoſe of ſupport. Elmgren reſtricts it to the foot-ſtalks of the leaves only.

STIPULATION, in the civil law, the act of ſtipulating, that is, of treating and concluding terms and conditions to be inſerted in a contract. Stipulations were anciently performed at Rome, with abundance of ceremonies; the firſt whereof was, that one party ſhould interrogate, and the other anſwer, to give his conſent, and oblige himſelf. By the ancient Roman law, nobody could ſtipulate but for himſelf; but as the Tabelliones were public ſervants, they were allowed to ſtipulate for their maſters; and the notaries ſucceeding the Tabelliones, have inherited the ſame privilege.

STIRIA, a province of Germany, in the circle of Auſtria, with the title of a duchy. It is bounded on the north by the archduchy of Auſtria, on the eaſt by Hungary, on the ſouth by Carniola, and on the weſt by Carinthia and the archbiſhopric of Saltzburg; being 125 miles in length, and 17 in breadth. It is ſaid to contain 22 cities, 95 towns, 338 caſtles, 15 convents, and 200,000 inhabitants. Though it is a mountainous country, yet there is a great deal of land fit for tillage, and the ſoil is ſo good, that the inhabitants never were in want of corn. It contains mines of very good iron; whence the arms made here are in great eſteem. The women differ greatly from the Auſtrians, and are very plain and downright. They have all ſwellings on their throats, called *bronchoceles*. The men are alſo very ſimple, and are very zealous worſhippers of the Virgin Mary. They delight to ſit at home in the chimney-corner, never troubling their heads about foreign affairs. The chief town is Gratz.

STIRLING, a town of Scotland, ſituated on the river Forth, thirty miles north-weſt of Edinburgh, in W. Long. 3. 50. N. Lat. 56. 12. It is alſo called *Sterling*, and *Striveling*; from the former of which Boethius falſely derives the name *Sterling money*; becauſe, ſays he, Oſbeit, a Saxon prince, after the overthrow of the Scots, eſtabliſhed here a mint. The name of *Striveling* is ſaid to have been derived from the frequency of ſtrifes or conflicts in the neighbourhood. The town contains about 4000 inhabitants. It has a manufacture of tartans and ſhalloons, and employs about 30 looms in that of carpets. The great ſtreet is very broad. In it is the tolbooth, where is kept the ſtandard for the wet meaſures of Scotland. The other ſtreets are narrow and irregular.—Stirling is in miniature a reſemblance of Edinburgh; being built on a rock of the ſame form, with a fortreſs on the ſummit. The origin of the caſtle is unknown. The rock of Stirling was ſtrongly fortified by the Picts, amongſt whom architecture and ſeveral other uſeful arts had made a conſiderable progreſs. As it lay in the extremities of their kingdom, the poſſeſſion of it was the occaſion of frequent conteſts betwixt them and their neighbours the Scots and Northumbrians; each of whoſe dominions did, for ſome time, terminate near it.

When the Scots, under Kenneth II. overthrew the Pictiſh empire near the middle of the ninth century, they endeavoured to obliterate every memorial of that people. They not only gave new names to provinces and towns, but, with all the rage of barbarians, demoliſhed many magnificent and uſeful edifices which had been reared up by them, and this fortreſs among the reſt. It was, however, ſoon rebuilt, though upon an occaſion not very honourable to the Scots.

Upon the death of Kenneth II. in 855, his brother Donald V. mounted the throne of Scotland. In the beginning of his reign the kingdom was invaded by Oſbrecht and Ella, two Northumbrian princes, who, uniting their forces with the Cumbrian Britons, and a number of Picts, who upon their expulſion from their native country had taken refuge in England, advanced to Jedburgh, where Donald encountered them; and, after a fierce and bloody battle, obtained a complete victory: but, having taken up his ſtation in Berwick, in ſupine ſecurity, the Northumbrians, informed of the careleſs poſture in which the Scottiſh army lay, ſurpriſed them by a haſty march, diſperſed them, and made a priſoner of the king. Purſuing the advantage they had gained, they marched northward, and ſubdued all before them to the Frith of Forth and the town of Stirling. But the forlorn ſituation of the Scots, without a king and without an army, obliging them to ſue for peace, they obtained it, upon condition that they ſhould pay a ſum of money for the ranſom of the king, and yield up all their dominions upon the ſouth ſide of the Forth to the conquerors.

The Northumbrians taking poſſeſſion of the territories ceded to them by this treaty, rebuilt the caſtle of Stirling, and planted it with a ſtrong garriſon, in order to preſerve their new conqueſts, upon the frontiers of which it was ſituated. Our authorities alſo inform us, that they erected a ſtone-bridge over the Forth, upon the ſummit of which a croſs was raiſed, with the following inſcription in monkiſh rhyme.

Anglos a Scotis ſeparat crux iſta remotis;
Armis hic ſtant Bruti, Scoti ſtant hic, cruce tuti.

Which is thus tranſlated by Bellenden.

I am free marche, as paſſengeris may ken,
To Scottis, to Britonis, and to Ingliſmen.

None of the ancient Engliſh hiſtorians mention this conqueſt. The whole ſtory, as well as the inſcription, wears much of a monkiſh garb; yet its authenticity is not a little confirmed by the arms of the town of Stirling, upon which is a bridge, with a croſs, and the laſt line of the above Latin diſtich is the motto around it.

We muſt not, however, imagine, that in thoſe times that fortreſs bore any reſemblance to the preſent ſtructure, which is adapted to the uſe of fire-arms. Its ſize and form probably reſembled thoſe caſtles which, under the feudal conſtitution, the Engliſh and Scottiſh barons uſed to erect upon their eſtates for dwelling-houſes; and which, in thoſe barbarous ages, they found neceſſary to fortify for their defence, not only againſt foreign invaders, but often againſt the attacks of their own neighbours. It is directly ſuch a Gothic figure as this which repreſents the *Caſtrum Strivelenſe* upon the arms of Stirling.

This fortreſs, after it had continued in the poſſeſſion of the Northumbrian Saxons about 20 years, was, together with the whole country upon the ſouth ſide of the Forth, reſtored to the Scots, upon condition of their aſſiſting the Saxons againſt their turbulent invaders the Danes. Upon the arms of Stirling are two branches of a tree, to repreſent the *Nemus Strivelenſe*; but the ſituation and boundaries of that foreſt, which was probably a wing of the Caledonian, cannot be aſcertained. Upon the ſouth of Stirling, veſtiges of a foreſt are ſtill diſcernible for ſeveral miles. Banks of natural timber ſtill remain in the caſtle-park, at Murray's wood, and near Nether Bannockburn; and ſtumps of trees, with much bruſhwood, are to be ſeen in all the adjacent fields.

When Kenneth III. received intelligence of the Danes having invaded his dominions, he appointed the caſtle of Stirling to be the place of rendezvous for his army; and he marched from thence to the battle of Loncarty, where he obtained a victory over thoſe rovers, in the end of the 10th century.

In the 12th century, this caſtle is ſpoken of as a place of great importance, and one of the ſtrongeſt fortreſſes in the kingdom. In 1174, a calamity, not unuſual amongſt the Scottiſh monarchs, befel William, who at that time occupied the throne. He was taken priſoner in an unſucceſsful expedition which he made into England; and, after having been detained 12 months in captivity, was releaſed, upon ſtipulating to pay a large ſum of money for his ranſom; and, until payment thereof, delivering into the hands of the Engliſh the four principal fortreſſes in the kingdom, which in thoſe days were Stirling, Edinburgh, Roxburgh, and Berwick. This was the firſt great aſcendant that England obtained over Scotland; and indeed, the moſt important tranſaction which had paſſed between theſe kingdoms ſince the Norman conqueſt.

Though the Scottiſh monarchs, in their frequent perambulations thro' the kingdom, often viſited Stirling, and held their courts for ſome time in the caſtle; yet it did not become a royal reſidence till the family of Stuart mounted the throne, and it was from different princes of this family that it received its preſent form. It was the place of the nativity of James II.; and, when raiſed to the throne, he frequently kept his court in it. It is well known to have been the place where that prince perpetrated an atrocious deed, the murder of William earl of Douglas, whom he ſtabbed with his own hand. The royal apartments were at that time in the north-weſt corner of the caſtle, and are now the reſidence of the major. The room where the murder was committed ſtill goes by the name of *Douglas's room*. See SCOTLAND, n° 304, 305.

James III. contracting a fondneſs for the caſtle on account of its pleaſant ſituation, made it the chief place of his reſidence, and added ſeveral embelliſhments to it. He built within it a magnificent hall, which in thoſe days was deemed a noble ſtructure, and is ſtill entire. It now goes by the name of the *parliament houſe*, having been deſigned for the accommodation of that ſupreme court. It is covered with an oaken roof of exquiſite workmanſhip, which is very little decayed, though it hath ſtood near 300 years. James alſo erected a college of ſecular prieſts in the caſtle, which he called the *chapel-royal*, and which proved one cauſe of his own ruin. As the expences neceſſary for maintaining the numerous officers of ſuch an inſtitution were conſiderable, he annexed to it the revenues of the rich priory of Coldingham in the Merſe, which at that time happened to become vacant. This priory had for a long time been holden by perſons connected with the family of Hume; and that family, conſidering it as belonging to them, ſtrongly oppoſed the annexation. The diſpute ſeems to have laſted ſeveral years; for one parliament had paſſed a vote, annexing the priory to the chapel-royal, and a ſubſequent one enacted a ſtatute prohibiting every attempt that was contrary or prejudicial to that annexation.

James V. was crowned in the caſtle of Stirling; and the palace, which is the chief ornament of it, was the work of that prince. This is a ſtately and commodious ſtructure, all of hewn ſtone, with much ſtatuary work upon it. It is built in form of a ſquare, with a ſmall court in the middle, in which the king's lions are ſaid to have been kept; and hence it ſtill goes by the name of the *lions den*. The palace contains many large and elegant apartments; the ground-ſtory is now converted into barrack-rooms for the ſoldiers of the garriſon; the upper affords a houſe for the governor, with lodgings for ſome of the ſubaltern officers.

Oppoſite to the palace, upon the north, ſtands an elegant chapel, which was built by James VI. for the baptiſm of his ſon prince Henry in 1594. In this chapel is preſerved the hulk of a large boat, which that whimſical monarch cauſed to be built and placed upon carriages, in order to convey into the caſtle the proviſions for that ſolemnity.

A ſtrong battery, with a tier of guns pointing to the bridge over the Forth, was erected during the regency of Mary of Lorraine, mother to queen Mary. It is called the *French battery*, probably becauſe conſtructed by engineers of that nation. The laſt addition was made to the fortifications in the reign of queen Anne. Formerly they reached no farther than the old gate, upon which the flag-ſtaff now ſtands: but in that reign they were conſiderably enlarged upon the ſide towards the town; and barracks, which are bomb-proof, with ſeveral other conveniences for a ſiege, were erected.

Upon the ſouth-weſt of the caſtle lies a large park incloſed with a ſtone-wall, called the *king's park*, where the court uſed to divert themſelves with hunting of the deer which were kept in it. At the eaſt end of the park lay the royal gardens; veſtiges of the walks and parterres, with a few ſtumps of fruit-trees, are ſtill viſible; but by long neglect, and the natural wetneſs of the ſoil, the place is now little better than a marſh. In the gardens is a mount of earth in form of a table, with benches of earth around it, where, according to tradition, the court ſometimes held *fetes champetres*. In the caſtle-hill is an hollow, comprehending about an acre of ground, and having all the appearance of an artificial work, which was uſed for juſtings, tournaments, and other feats of chivalry.

Northward of the caſtle lies the Govan-hill; in the middle of which is a ſmall mount called *Hurly Haaky*, upon which duke Murdoch and his two ſons were executed for treaſonable practices in the reign of James I.

The proſpect from the caſtle is moſt delightful as well as extenſive, being greatly beautified, eſpecially upon the eaſt, by the windings of the Forth; which are ſo many, that though the diſtance by land, from the bridge of Stirling to Alloa, is only four miles, it is ſaid to be 24 by water. As this river generally runs upon plain ground, it rolls its ſtream in ſo ſlow and ſilent a manner, that what Silius Italicus ſaith of the Ticinus is applicable to it, if, inſtead of *lucenti* in that poet, we ſhould for once read *lutoſo*; for the clay-banks, together with the tide, which flows above Stirling, render the Forth perpetually muddy:

Vix credas labi, ripis tam mitis opacis
Somniferam ducit lutoſo gurgite lympham.

The lordſhip and caſtle of Stirling were a part of the uſual dowry of the queens of Scotland, at leaſt after the family of Stuart came to the throne, in which they were inveſted at their marriage.

Robert lord Erſkine was appointed governor of the caſtle by king David II. and the office continued in that family till 1715.

This fortreſs hath been the ſcene of many tranſactions. Being by its ſituation conſidered as a key to the northern parts of the kingdom, the poſſeſſion of it hath been always eſteemed of great importance to thoſe who ſought to be maſters of Scotland. In the ſpace of little more than forty years, the Engliſh were four times in poſſeſſion of it, and as often was it wreſted from them by the Scots. In 1296, Edw. I. enraged at John Baliol's renunciation of his allegiance to him, marched into Scotland with a great army, and carried all before him. Stirling being deſerted by its garriſon, made no defence at all. But the Engliſh dominion in Scotland was never of long duration, being uſually loſt by revolutions as quick as thoſe by which it was acquired. In 1298, the Scots, recovering their ſpirits, drove the invaders out of moſt parts of the kingdom; and laying ſiege to this caſtle, ſoon forced the garriſon to a capitulation. This revolution obliged Edward again to aſſemble an army, and to march into Scotland; and, amongſt his other feats, he inveſted the caſtle of Stirling, and beſieged it with his whole train of artillery. It was commanded by William Oliphant, a brave officer, who held it out three months. So vigorous a defence ſo provoked Edward, that he ordered two pair of gallows to be erected, and proclamation to be made in the audience of the garriſon, that if they did not ſurrender againſt a certain day, every man of them ſhould be hanged without mercy: they ſurrendered before the day prefixed, but rather from want of proviſions than fear of Edward's menaces. They were not, however, ſo far reduced as not to be able to make an honourable capitulation: but the ſouls of conquerors have ſeldom been found to be ſo great as their names; inſtead of punctually obſerving the articles of the capitulation, the Engliſh monarch treated the garriſon with great inhumanity.

After the celebrated victory at Roſling in 1303, the Scots again laid ſiege to this fortreſs. After a ſhort defence, the garriſon was obliged to capitulate for want of proviſions, and the command of it was given to Oliphant its former governor. That ſame year, however, Edward began to beſiege it; but was not able to reduce it till after a ſiege of more than 12 months. This was the moſt memorable ſiege that it ever underwent. Having been unſucceſsful the firſt campaign, Edward was obliged to lead his army into winter-quarters; but during the receſs, he made formidable preparations for reſuming the ſiege early in the ſpring. He ſtripped all the lead from ſeveral roofs in St Andrew's to ſupply his battering machines, which, as ſoon as the ſeaſon of the year was proper for action, he planted againſt the walls, and ſummoned the governor to ſurrender, but without effect. Upon which he collected all his artillery, and furiouſly battered the walls with ſtones, as we are told, of 200 pounds weight, which made wide breaches in them; but the governor ſtill refuſed to yield. His defence was ſo vigorous, that numbers of the beſiegers periſhed by arrows and ſtones ſhot from the engines of the caſtle. So intent was Edward upon the reduction of the place, that he expoſed his own perſon to great danger. An arrow from the caſtle had killed him outright, if he had not been protected by the goodneſs of his armour. Holding up the weapon, he threatened to hang the man who ſhot it, and reſolved upon a general aſſault. By this time, the reiterated attacks of the beſiegers had made great breaches in the walls; and the garriſon was ſo diminiſhed, as to conſiſt of only 28 perſons, and theſe extremely weakened with watching and fatigue: apprehending, therefore, that a general aſſault would overpower them, they offered to capitulate.

Some of the Scottiſh hiſtorians affirm, that a capitulation was ſigned and ſealed; but that Edward, in direct violation thereof, ſent the governor priſoner to England, where he remained ſeveral years in confinement.

In the ſpring of the year 1314, Edward Bruce, brother to king Robert, laid ſiege to it; but on account of the vigorous defence made by Moubray the governor, he found himſelf obliged to abandon the enterpriſe. Only, by a treaty between them, it was agreed, that if no relief came from England before a fixed time, the garriſon ſhould ſurrender to the Scots. The fate of the detachment of cavalry ſent from the Engliſh camp, under the conduct of lord Clifford, to the relief of the garriſon, has been related under the article SCOTLAND, n° 159. After the great victory at Bannockburn, the place ſurrendered to Robert, who treated the garriſon with a humanity of which none of the Edwards had ſet an example.

In 1333, this caſtle yielded to the Baliol party; and, according to ſome accounts, it was at that time diſmantled, probably by orders from the Engliſh king, who had learned, by the experience of his grandfather, how dangerous a weapon it would prove if it ſhould again come into the poſſeſſion of the Scots: but in 1335 it was rebuilt by the orders of that monarch, and planted a-new with a ſtrong garriſon. Soon after the reparation, the Brucean party, recovering ſtrength by ſupplies from France, attempted the reduction of it; but it was relieved by Edward in perſon. Next year the ſiege was renewed and raiſed again by that monarch; but in 1341 the Scots, under Sir William Douglas, conducted the ſiege with ſuch indefatigable induſtry, that the garriſon was forced to capitulate, though upon honourable terms.

The laſt reduction of this fortreſs by ſiege was in 1651. When Cromwell followed king Charles II. into England before the battle of Worceſter, he left General Monk behind to complete the conqueſt of Scotland, which he ſoon accompliſhed. Upon his arrival at Stirling, he planted his batteries in the church-yard, and upon ſome eminences adjoining; and in a ſhort time made himſelf maſter of the caſtle. The impreſſion made by the bullets of the beſiegers are ſtill viſible upon the walls of ſeveral buildings in the caſtle. The marks of thoſe ſhot by the beſieged alſo ſtill remain upon the ſteeple of the church; ſome of the corner-ſtones of which have been broken by them. By this conqueſt Monk became maſter of the principal regiſters of the kingdom; which, upon the ſurrender of the caſtle of Edinburgh the year before, had been carried to Stirling. He ſent them to England by Cromwell's orders, to be lodged in the Tower, where they remained until the reſtoration of Charles in 1660, when, by the orders of that monarch, they were packed up in no leſs than 50 hogſheads, to be carried back to Scotland; but the ſhip in which they were being caſt away in a ſtorm near Berwick, they were all irrecoverably loſt. This calamity, together with that which befel our more ancient records by the malicious policy of Edward I. hath involved the Scottiſh hiſtory in great obſcurity, and obliges us to remain in ignorance and uncertainty with reſpect to many important tranſactions of the nation. In 1746, the caſtle, defended by general Blackney, reſiſted the utmoſt efforts of the rebels.

STIRLINGSHIRE, a county of Scotland, of which Stirling is the capital. It extends 20 miles in length and 12 in breadth; being bounded on the weſt by part of Lennox and Clydeſdale; on the eaſt, by Clackmannanſhire, the river Forth, and part of Lothian; on the ſouth-eaſt, by Lothian; and on the north, by Monteith. The face of the country is open and agreeable, diverſified by hill and dale, well watered with ſtreams and rivers; the principal of which is the Forth, riſing in the neighbourhood of an high mountain called *Ben-Lomond*, and, running eaſtward, forms the frith of Edinburgh. The ſouthern part is hilly, affording plenty of game, and paſturage for ſheep, horſes, and black cattle. The eaſtern part is fertile, producing plentiful harveſts of corn, and great abundance of coal. Lead-ore is found in different parts of the ſhire; and the rivers abound with pike, trout, and ſalmon.

STIRRUP, in the manege, a reſt or ſupport for the horſeman's foot, ſerving to keep him firm in his ſeat, and to enable him to mount.

Stirrups are allowed to be a modern invention: Menage obſerves, that St Jerom is the firſt author who mentions them. Matthiolus relates, that the Turks have a knack of poiſoning their ſtirrups, with ſo ſubtle and penetrating a poiſon, that it makes its way through the boots, and kills the rider. F. le Comte tells us, that the Tartars ride croſs-legged, and with their ſtirrups exceedingly ſhort.

STOBÆUS (John), a laborious Greek writer, who lived at the end of the fourth century, compoſed many works, of which there are only his Collections remaining, and even theſe are not as he compoſed them; many things being inſerted by later authors. This work contains many important ſentiments collected from the ancient writers, poets, and philoſophers.

STOCK, in gardening, &c. the ſtem or trunk of a tree.

STOCK-*Broker*. See BROKER and STOCKS.

STOCK-*Jobbing*, the art or myſtery of trafficking in the public ſtocks or funds. See STOCKS.

STOCKHOLM, the capital of Sweden, is ſituated in the province of Upland. It derives its name from *ſtock*, "wood;" and *holm*, an "iſland;" alluding to the timber uſed in building the city. It is ſituated on a cluſter of ſmall iſlands, and the houſes are founded upon piles. Including the two ſuburbs, one of which ſtands on the peninſula of Toren, and the other in Athundria. The town is as large and populous as Briſtol. Here the king uſually reſides, and here the eſtates always aſſemble. The iſland on which the greateſt part of Stockholm ſtands, is ſurrounded by two branches of a river that runs with great rapidity out of the lake Mæler; and over each of theſe arms there is a wooden bridge: from the city, the eye is regaled with the proſpect of the lake on one ſide, and the ſea on the other. The ſea-water is here potable, the freſhneſs being owing to the great quantity which the lake diſcharges. The caſtle or palace is a ſpacious building, without taſte or magnificence, furniſhing lodging-room not only to the royal-family: but likewiſe to the greater part of the officers belonging to the houſehold. It likewiſe comprehends the national or ſupreme court of juſtice, the colleges of war, chancery, treaſury, and commerce; a chapel, armoury, library, and office for the public records; but the greater number of inferior officers and ſervants belonging to the court, are, with the foot-guards, quartered on the burghers. The caſtle, and all the ſtately edifices in the kingdom, are covered with copper. The palace of the nobility, in which this order ſits during the ſeſſion of the diet, is an elegant building, adorned on the outſide with marble ſtatues and columns, and on the inſide with painting and ſculpture. This and three other palaces ſtand on the banks of the lake, and are built on the ſame model, ſo as to compoſe an uniform piece of architecture. The bank, built at the expence of the city, is a noble edifice, and joins with many ſumptuous houſes belonging to the nobility in exhibiting a ſplendid appearance. The houſes of the burghers are generally built of brick in the city; but in the ſuburbs they are commonly made up of timber, and therefore very ſubject to conflagrations. Theſe houſes are often framed in Finland, according to the plan and dimenſions preſcribed: from thence they are tranſported in pieces to Stocholm by water, and there ſet up by the carpenters. Theſe wooden habitations, if kept in proper repair, will laſt 30 or 40 years, and are deemed warmer, neater, and more healthy, than thoſe of brick or ſtone. To prevent the danger of conflagrations, the city is divided into 12 wards. In each of theſe there is a maſter and four aſſiſtants, who forthwith repair to the place where the fire breaks out; and all porters and labourers are obliged to range themſelves under the maſter of the ward to which they belong. A fire-watch patroles the ſtreets by night, to give warning or aſſiſtance as it may be wanted; and a centinel is maintained in the ſteeple of every church, to toll the bell on the firſt appearance of any ſuch accident. The police of Stockholm is entirely ſubjected to the regulations of the grand governor, aſſiſted by a deputy and bailiff of the caſtle. This city is the ſtaple of Sweden, to which all the commodities of the kingdom are brought for exportation, and where almoſt all the imports from abroad are depoſited. The port or haven formed by the lake Mæler, is large enough to contain 1000 ſail of ſhipping; and furniſhed with a key or wharf about an Engliſh mile in length, to which the veſſels may lie with their broadſides. The greateſt inconveniences attending this ſituation are, the diſtance from the ſea, which is not within leſs than 10 miles of the town; the want of tides; and the winding of the river, which is remarkably crooked. It opens into the Baltic; and the entrance, which is dangerous and rocky, the Swedes have ſecured with two ſmall forts: within, it is perfectly ſafe and commodious. The northern ſuburbs are remarkable for the king's gardens, and for the great number of artiſans who have choſen their habitations in this quarter. In the ſouthern ſuburbs the Muſcovite commodities are ſold; and here is a magnificent exchange where the merchants daily aſſemble. The two warlike monarchs, Guſtavus Adolphus and Charles Guſtavus, are buried in chapels belonging to the church of Redderholm, which formerly belonged to the Cordeliers, and is ſtill known by the name of *Clooſter-kirk*. E. Long. 19. 30. N. Lat. 59. 20.

STOCKING, that part of the clothing of the leg and foot which immediately covers their nudity, and ſcreens them from the cold, &c. Anciently, the only ſtockings in uſe were made of cloth, or of milled ſtuffs ſewed together; but ſince the invention of knitting and weaving ſtockings of ſilk, wool, cotton, thread, &c. the uſe of cloth ſtockings is quite out of faſhion. The modern ſtockings, whether woven or knit, are a kind of plexuſes, formed of an infinite number of little knots called *ſtitches*, *loops*, or *maſhes*, intermingled in one another.—Knit ſtockings are wrought with needles made of poliſhed iron or braſs wire, which interweave the threads, and form the maſhes the ſtocking conſiſts of. This operation is called *knitting;* the invention whereof is commonly attributed to the Scots, on this ground, that the firſt works of this kind came from thence. It is added, that it was on this account that the company of ſtocking-knitters eſtabliſhed at Paris in 1527, took for their patron St Fiacre, who is ſaid to be the ſon of a king of Scotland.—Woven ſhockings are ordinarily very fine; they are manufactured on a frame, or machine of poliſhed iron, the ſtructure and apparatus whereof are exceedingly ingenious. The Engliſh and French have greatly conteſted the honour of the invention of the ſtocking-loom; but we are aſſured, whatever pretenſions the French claim to this invention, that the ſame was certainly deviſed by William Lee, of St John's College, Cambridge, in the year 1589, though it is true, that he firſt made it public in France, after deſpairing of ſucceſs in his own country.

STOCKTON upon Tees, a town of England in the county of Durham, about 16 miles ſouth of the city of Durham. It is now a port of conſiderable trade; though, at the Reſtoration, it was a deſpicable village, the beſt houſe in which could hardly boaſt of any thing better than clay-walls and a thatched roof. About 40 years ago it ſent out in one year 75 veſſels for the port of London; and the trade is much increaſed ſince.

STOCKS, *or* PUBLIC FUNDS *in England*. By the word *ſtock* was originally meant, a particular ſum of money contributed to the eſtabliſhing a fund to enable a company to carry on a certain trade, by means of which the perſon became a partner in that trade, and received a ſhare of the profit made thereby, in proportion to the money employed. But this term has been extended farther, though improperly, to ſignify any ſum of money which has been lent to the government, on condition of receiving a certain intereſt till the money is repaid, and which makes a part of the national debt. As the ſecurity both of the government and of the public companies is eſteemed preferable to that of any private perſon, as the ſtocks are negotiable and may be ſold at any time, and as the intereſt is always punctually paid when due; ſo they are thereby enabled to borrow money on a lower intereſt than what could be obtained from lending it to private perſons, where there muſt be always ſome danger of loſing both principal and intereſt.

But as every capital ſtock or fund of a company is raiſed for a particular purpoſe, and limited by parliament to a certain ſum, it neceſſarily follows, that when that fund is completed, no ſtock can be bought of the company; though ſhares already purchaſed may be transferred from one perſon to another. This being the caſe, there is frequently a great diſproportion between the original value of the ſhares and what is given for them when transferred: for if there are more buyers than ſellers, a perſon who is indifferent about ſelling will not part with his ſhare without a conſiderable profit to himſelf; and, on the contrary, if many are diſpoſed to ſell, and few inclined to buy, the value of ſuch ſhares will naturally fall, in proportion to the impatience of thoſe who want to turn their ſtock into ſpecie.

Theſe obſervations may ſerve to give our readers ſome idea of the nature of that unjuſtifiable and diſhoneſt practice called *ſtock-jobbing*, the myſtery of which conſiſts in nothing more than this. The perſons concerned in that practice, who are denominated *ſtock-jobbers*, make contracts to buy and ſell, at a certain diſtant time, a certain quantity of ſome particular ſtock: againſt which time they endeavour, according as their contract is, either to raiſe or lower ſuch ſtock, by raiſing rumours and ſpreading fictitious ſtories, in order to induce people either to ſell out in a hurry, and conſequently cheap, if they are to deliver ſtock, or to become unwilling to ſell, and conſequently to make it dearer, if they are to receive ſtock.

The perſons who make theſe contracts are not in general poſſeſſed of any real ſtock: and when the time comes that they are to receive or deliver the quantity they have contracted for, they only pay ſuch a ſum of money as makes the difference between the price the ſtock was at when they made the contract, and the price it happens to be at when the contract is fulfilled; and it is no uncommon thing for perſons not worth 100l. to make contracts for the buying or ſelling 100,000l. ſtock. In the language of Exchange Alley, the buyer in this caſe is called the *Bull*, and the ſeller the *Bear*.

Beſides theſe, there are another ſet of men, who, though of a higher rank, may properly enough come under the ſame denomination. Theſe are your great monied men, who are dealers in ſtock, and contracters with the government whenever any new money is to be borrowed. Theſe indeed are not fictitious, but real buyers and ſellers of ſtock; but, by raiſing falſe hopes or creating groundleſs fears, by pretending to buy or ſell large quantities of ſtock on a ſudden, by uſing the fore-mentioned ſet of men as their inſtruments, and other like practices, are enabled to raiſe or lower the ſtocks one or two *per cent.* at pleaſure.

However, the real value of one ſtock above another, on account of its being more profitable to the proprietors, or any thing that will really, or only in imagination, affect the credit of company, or endanger the government, by which that credit is ſecured, muſt naturally have a conſiderable effect on the ſtocks. Thus, with reſpect to the intereſt of the proprietors, a ſhare in the ſtock of a trading company which produces 5 l. or 6l. *per cent. per annum* muſt be more valuable than an annuity with government-ſecurity, that produces no more than 3 l. or 4l. *per cent. per annum*; and conſequently ſuch ſtock muſt ſell at a higher price than ſuch an annuity. Though it muſt be obſerved, that a ſhare in the ſtock of a trading-company producing 5 l. or 6l. *per. cent. per annum*, will not fetch ſo much money at market as a government annuity producing the ſame ſum; becauſe the ſecurity of the company is not reckoned equal to that of the government, and the continuance of their paying ſo much *per annum* is more precarious, as their dividend is, or ought to be, always in proportion to the profits of their trade.

As the prices of the different ſtocks are continually fluctuating above and below par; ſo, when a perſon who is not acquainted with tranſactions of that nature, reads in the papers the prices of ſtocks, where bank-ſtock is marked perhaps 127 l. India ditto 134 a 134¼. South-Sea ditto 97½, &c. he is to underſtand that a 100 l. of thoſe reſpective ſtocks ſell at ſuch a time for thoſe ſeveral ſums.

In comparing the prices of the different ſtocks one with another, it muſt be remembered, that the intereſt due on them from the time of the laſt payment, is taken into the current price; and the ſeller never receives any ſeparate conſideration for it, except in the caſe of India bonds, where the intereſt due is calculated to the day of the ſale, and paid by the purchaſer over and above the premium agreed for. But as the intereſt on the different ſtocks is paid at different times, this, if not rightly underſtood, would lead a perſon, not well acquainted with them, into conſiderable miſtakes in his computation of their value; ſome always having a quarter's intereſt due on them more than others, which makes an appearance of a conſiderable difference in the price, when in reality there is none at all. Thus, for inſtance, old South Sea annuities ſell at preſent for 85½ l. or 85 l. 10 s. while new South-Sea annuities fetch only 84¾ l. or 84 l. 15 s. though each of them produce the ſame annual ſum of l. 3 *per cent.* but the old annuities have a quarter's intereſt more due on them than the new annuities, which amounts to 15 s. the exact difference. There is, however, one or two cauſes that will always make one ſpecies of annuities ſell ſomewhat lower than another, though of the ſame real value; one of which is, the annuities making but a ſmall capital, and there not being for that reaſon ſo many people at all times ready to buy into it as into others, where the quantity is larger; becauſe it is apprehended, that whenever the government pays off the national debt, they will begin with that particular ſpecies of annuity the capital of which is the ſmalleſt.

A ſtock may likewiſe be affected by the court of chancery; for if that court ſhould order the money, which is under their direction, to be laid out in any particular ſtock, that ſtock, by having more purchaſers, will be raiſed to a higher price than any other of the like value.

By what has been ſaid, the reader will perceive how much the credit and intereſt of the nation depends on the ſupport of the public funds. While the annuities and intereſt for money advanced is there regularly paid, and the principal inſured by both prince and people (a ſecurity not to be had in other nations), foreigners will lend us their property, and all Europe be intereſted in our welfare; the paper of the companies will be converted into money and merchandiſe, and Great Britain can never want caſh to carry her ſchemes into execution.

In other nations, credit is founded on the word of the prince, if a monarchy; or that of the people, if a republic: but here, it is eſtabliſhed on the intereſts of both prince and people; which is the ſtrongeſt ſecurity: for however lovely and engaging honeſty may be in other reſpects, intereſt, in money-matters, will always obtain confidence; becauſe many people pay great regard to their intereſt, who have but little veneration for virtue. See the article Funds.

Stocks, a frame erected on the ſhore of a river or harbour, whereon to build ſhipping. It generally conſiſts of a number of wooden blocks, ranged parallel to each other, at convenient diſtances, and with a gradual declivity towards the water.

Stocks, a wooden machine to put the legs of offenders in, for the ſecuring of diſorderly perſons, and by way of puniſhment in divers caſes, ordained by ſtatute, &c.

STOICS, a ſect of ancient philoſophers, the followers of Zeno, thus called from the Greek ſtoa, which ſignifies a "porch or portico," in regard Zeno uſed to teach under a portico or piazza.

To the praiſe of the Stoics in general, it muſt be confeſſed, that, leſs intent than other philoſophers upon frivolous and often dangerous ſpeculations, they devoted their ſtudies to the clearing up of thoſe great principles of morality which were the firmeſt ſupports of ſociety; but the drineſs and ſtiffneſs that prevailed in their writings, as well as in their manners, diſguſted moſt of their readers, and abundantly leſſened their utility. Zeno's chief followers, among the Greeks, were Lucippus, Cleanthes, Chryſippus, Diogenes Babylonius, Antipater, Panætius, Poſſidonius, and Epictetus; among the Romans, Cato, Varro, Cicero, Seneca, the emperor Antoninus, &c. The Stoics cultivated logic, phyſics, metaphyſics, &c. but eſpecially ethics. The principles of their dogmata of the former kinds, are, That there are certain catalepſias or comprehenſions, called *innate ideas* or *principles*, naturally found in the mind; that God is the ſeminal cauſe of the univerſe; and, with the Platoniſts, that the world is an animal, by reaſon of God's inhabiting and informing every part thereof; that nature is an artificial fire tending to generation; and that the world is at laſt to be deſtroyed by a conflagration. As for the morality of the Stoics, it was couched much in paradoxes; as, that a wiſe man is void of all paſſions or perturbation of mind; that pain is no real evil, but that a wiſe man is happy in the midſt of torture, is always the ſame, and is always joyful; that there is none elſe free; that none elſe ought to be eſteemed king, magiſtrate, poet, or philoſopher; that all wiſe men are great men; that they are the only friends or lovers; that nothing can happen to them beyond their expectations; that all virtues are inſenbſibly connected together; that all good things are equal, and equally to be deſired; that goodneſs admits of no increaſe or diminution. They own but one God, whom they however call by various names, as *Fate*, *Jupiter*, &c. by which they did not mean various things, but various powers and relations of the ſame thing. Providence they expreſſed under the name *Fate*, which Chryſippus defines to be a natural ſeries or compoſition of things mutually following each other, by an immutable nexus or tie, fixed from all eternity. They held the immortality of the ſoul.

STOLBERG, a ſmall town of Germany, in the circle of Upper Saxony, and territory of Thuringia, of which it is the capital place. It is ſeated among the mountains, 58 miles north-weſt of Leipſic. E. Long. 11. 12. N. Lat. 51. 46.

STOLE, a ſacerdotal ornament wore by the Romiſh pariſh-prieſts over their ſurplice, as a mark of ſuperiority in their reſpective churches; and by other prieſts over the alb, at celebrating of maſs, in which caſe it goes acroſs the ſtomach; and by deacons, over the left-ſhoulder, ſcarf-wiſe: when the prieſt reads the goſpel for any one, he lays the bottom of his ſtole on his head. The ſtole is a broad ſwath, or ſlip of ſtuff, hanging from the neck to the feet, with three croſſes thereon.

Groom of the **Stole**, the eldeſt gentleman of his Majeſty's bed-chamber, whoſe office and honour it is to preſent and put on his majeſty's firſt garment, or ſhirt, every morning, and to order the things in the chamber.

STOMACH, in anatomy. See Anatomy, n° 352.

STOMACHIC, medicines that ſtrengthen the ſtomach and promote digeſtion, &c.

Stomachic corroboratives are ſuch as ſtrengthen the tone of the ſtomach and inteſtines; among which are carminatives, as the roots of galangals, red gentian, zedoary, pimpinella, calamus aromaticus, and arum. Of barks and rinds, thoſe of canella alba, ſaſſafras, citrons, Seville and China oranges, &c. Of ſpices, pepper, ginger, cloves, cinnamon, cardamums, and mace.

STONEHIVE, or **Stonehaven**, a ſmall town in the county of Merns, in Scotland, 12 computed miles ſouth from Aberdeen. It was built in the time of Charles II. and ſtands at the foot of ſome high cliffs, in a ſmall bay, with a rocky bottom, opening a little in one part, ſo that ſmall veſſels may find admittance but only at high water. A pier laps over this harbour from the north ſide to ſecure them after their entrance. The town contains about 800 inhabitants. The manufactures are ſail-cloths and Oſnaburghs, knit worſted and thread ſtockings.

STONES, in natural hiſtory, are defined to be eſſentially compound foſſils, not inflammable, nor ſoluble in water or oil, nor at all ductile: found in continued ſtrata, or beds, of great extent: formed either of a congeries of ſmall particles, in ſome degree reſembling ſand, and lodged in a ſmoother cementitious matter; or elſe of this cementitious matter, and the gritt or ſand-like particles, running together into one ſmooth maſs; or, finally, of granules cohering by contact, without any cementitious matter among them; or compoſed of cryſtal or ſpar, uſually debaſed by earth, and often mixed with talc and other extraneous particles.

Of this claſs of foſſils there are three orders; and under theſe, eight genera.

The firſt order comprehends all the coarſe, harſh, and rough ſtones, of a lax texture, and compoſed of a viſible gritt, reſembling ſand in form, and uſually immerſed in a cementitious matter, and of little natural brightneſs; ſcarce capable of any poliſh, and naturally mouldering away in form of powder from the tools of the workmen. The genera of this order are two, viz. the ammochiſta and pſaduria; the former of which conſtitute our grey and rough ſlates; and the latter comprehends moſt of the ſtones uſed in building, particularly Portland ſtone.

The ſecond order conſiſts of ſtones moderately fine, of a more compact and even texture, ſcarce diſtinguiſhable conſtruction, and affording no ſand-like particles to the view; of ſome natural brightneſs, capable of a tolerable poliſh, and flying off from the tools of the workmen in form of ſmall chips. Under this order are comprehended the ſympexia and ſtegania.

The third order conſiſts of ſtones of a very fine ſubſtance and elegant ſtructure, naturally of a great brightneſs, and capable of an elegant poliſh; compoſed of granules of various ſhapes and ſizes, but uſually flattiſh, ſometimes more ſometimes leſs diſtinct; and, in ſome ſpecies, running together into uniform maſſes, but never lodged in any cementitious ſubſtance. Of this order are the marbles, alabaſters, porphyries, and granites.

For the Origin and Formation of STONES, M. Tournefort, on his return from the eaſt in the year 1702, propoſed to the Royal Academy a new theory.—On a curious ſurvey of the famous labyrinth of Crete, he obſerved, that ſeveral people had engraven their names in the living rock whereof its walls are formed; and, what was very extraordinary, the letters whereof they conſiſted, inſtead of being hollow, as they muſt have been at firſt (being all cut with knife-points), were prominent, and ſtood out from the ſurface of the rock like ſo many baſſo-relievo's. This is a phenomenon no otherwiſe accountable for than by ſuppoſing the cavities of the letters filled inſenſibly with a matter iſſuing from out of the ſubſtance of the rock, and which even iſſued in greater abundance than was neceſſary for filling the cavity. Thus is the wound made by the knife healed up, much as the fracture of a broken bone is conſolidated by a callus formed of the extravaſated nutritious juice which riſes above the ſurface of the bone; and this reſemblance is the more juſt, as the matter of the letters was found whitiſh, and the rock itſelf greyiſh. Something very like it is obſerved in the barks of trees, wherein letters have been cut with the knife; ſo that the poet had reaſon to ſay, that the characters grew as the trees themſelves grew: *Creſcent illæ, creſcetis amores.*—M. Tournefort ſupports his opinion by ſimilar caluſes apparently formed in ſeveral other ſtones, which had reunited after by accident they had been broken.—From theſe obſervations it follows, that there are ſtones which grow in the quarries, and of conſequence that are fed; that the ſame juice which nouriſhes them ſerves to rejoin their parts when broken, juſt as in the bones of animals and the branches of trees when kept up by bandages; and in a word, that they vegetate.

M. Tournefort examines ſeveral kinds of ſtones, and finds them under the ſame neceſſity of ſeed. The immenſe quantity of flints wherewith the Crau of Arles is covered, he uſes as an argument in behalf of this theory. The country there, for 20 miles round, is full of roundiſh flints, which are ſtill found in equal abundance to whatever depth you dig. M. Peireſc, who firſt propoſed the generation of ſtones by means of ſeeds, (though he took the word *ſeed* in a very different ſenſe from M. Tournefort), firſt brought this extraordinary campagne as a proof thereof. In effect, how could ſo many ſimilar flints be formed? There is no ſaying they are coeval with the world, without aſſerting at the ſame time that all the ſtones in the earth were produced at once; which were to go directly contrary to the obſervations above-mentioned.

Among the ſeeds of ſtones, M. Tournefort obſerves, there are ſome which do not only grow ſoft by the juices of the earth, but even become liquid. Theſe, then, if they penetrate the pores of certain bodies, grow hard, petrify, and aſſume the figure or impreſſion of the body: thus what we call *pectinites, conchites, mytulites, oſtracites, nautilites, echinites,* &c. are real ſtones, the liquid ſeeds whereof have inſinuated into the cavities of the ſhells called *pecten, concha, mytulus, oſtrea, nautilus, echinus.* On the contrary, if thoſe liquid ſeeds fall on flints, on ſhells, ſand, &c. they incloſe thoſe ſeveral bodies, and fixing between them, form a kind of cement, which yet grows like other ſtones. It is highly probable, he thinks, that ſuch rocks as are only an aſſemblage of maſticated flints, have been formed by a number of theſe liquid ſeeds, in like manner as the quarries full of ſhells; unleſs the rocks have enveloped theſe bodies in their growth. He adds, that there are ſeeds of real ſtones incloſed in the ſpawn of certain ſhell-fiſh, as well as that hard ſolid matter deſtined to the forming their ſhells.

There is a particular kind of ſhell-fiſh called *pholas*, which is never found anywhere but in the cavities of flints, which are always found exactly fitted to receive them. Now it is highly improbable the fiſh ſhould come and dig ſuch a nitch to ſpawn in; it is much more likely the ſtones they are found incloſed in were at firſt ſoft, and that the matter they are formed of was originally found in the ſpawn, in like manner as the matter which forms the egg-ſhell is really found in the ſeed thereof. See PHOLAS.

From the whole, he concludes, that the ſeed of ſtones, and even of metals, is a kind of duſt which probably falls from them while they are alive, *i. e.* while they continue to vegetate as above. This duſt may be compared to the ſeeds of ſeveral plants, as thoſe of ferns, moſſes, truffles, &c. which no microſcope ever yet diſcovered, though their exiſtence is not at all to be doubted.

M. Geoffroy accounts for the origin and formation of ſtones in a different manner. He lays it down as a principle, that all ſtones without exception have been fluid; or at leaſt a ſoft paſte, now dried and hardened: witneſs the ſtones wherein are found foreign bodies; witneſs alſo figured ſtones, &c.

On this principle he examines the formation of the different kinds of ſtones; and ſhows, that the earth alone ſuffices for the ſame, independent of all ſalts, ſulphurs, &c. The metallic particles contained in flints give them their colour, but theſe are only accidents; for proof of which, he inſtances the ſapphires and emeralds of Auvergne, which loſe all their colour by a moderate fire conſuming their metallic parts, but without any damage to their tranſparence, they being hereby rendered mere cryſtals. M. Geoffroy conceives two kinds of primitive particles in the earth. Thoſe of the firſt kind are exceedingly fine thin lamellæ, equal to each other, or nearly ſo. Now, when theſe meet together, from any cauſe whatever, in a ſufficient quantity, the regularity and equality of their figures determine them to range themſelves equally and regularly; and thus to form a homogeneous compound, which is very hard from the immediate contact of the parts, and very tranſparent by reaſon of their regular diſpoſition, which leaves a free paſſage to the rays of light every way: and this is cryſtal. The parts of the ſecond kind have all ſorts of irregular figures, and muſt accordingly form aſſemblages that are much opaker and leſs hard. Now cryſtal is formed wholly of parts of the firſt kind, and all other ſtones of a mixture of the two kinds of parts put together; this mixture is abſolutely neceſſary in order to unite and bind together the parts of the ſecond kind, and give them a hardneſs and conſiſtence, without which they would only make a ſand or duſt. Water now appears to be the fitteſt vehicle to carry the parts of the firſt kind. This is ſeen from ſeveral petrifying ſprings, which incruſtate the pipes through which their waters are conveyed, or even ſolid bodies laid in them for ſome time. The water does not diſſolve thoſe earthy parts; it only keeps them in fuſion, as it does the juices wherewith plants are fed. This water, thus charged with earthy particles of the firſt kind, M. Geoffroy calls the *ſtony* or *cryſtalline juice*, whereof thoſe bodies are primarily formed.

Stones are of various kinds, with regard to the places they are produced in: the moſt ordinary are under ground; others in the bodies of men and other animals; others ſeem to be generated by the ſea, as pumice, &c.; and others the effect of a petrifying virtue in certain waters. See Petrifaction, &c.

Artificial Stone. See Stucco.

Stone *in the Bladder*. See Medicine, nº 486. and Surgery.

Stone alſo denotes a certain quantity or weight of ſome commodities. A ſtone of beef at London is 8 pounds; in Hertfordſhire, 12 pounds; and in Scotland, 16 pounds.

Stone-*Chatter*, in ornithology. See Motacilla.

STONEHENGE, a celebrated monument of antiquity in Saliſbury Plain, ſix miles diſtant from that city. The particular ſpot on which it ſtands is in the lordſhip of Weſt or Little Ambreſbury in the poſſeſſion the duke of Queenſberry. The ſoil is chalky, and perfectly hard; ſo that the vaſt numbers of coaches and horſes, which almoſt daily bring viſitors to view this celebrated pile, have not been able to obliterate the track of the banks and ditches. It is ſituated near the ſummit of a hill, to which there is a very gentle aſcent from the lower ground. The whole is incloſed with a circular ditch; which having paſſed, you aſcend 35 yards before you come to the work itſelf; and the diſtance of the verge of the ditch within-ſide quite round to the building, is equal to the diameter of the building itſelf. The whole fabric conſiſted of four circles, or rather ovals, of ſtones, the moſt conſiderable of which had ten uprights, and five architraves or impoſts, making up five trilithons, each trilithon conſiſting of two uprights and one impoſt, which locked them together at the top by tenons and mortiſes. Theſe trilithons are not all of the ſame height, but each of them raiſed its head or impoſt ſomewhat higher as it drew neareſt to that before which the altar is judged to have ſtood, and which appears to have been not only the higheſt, but fineſt, both for the ſmoothneſs and beauty of the ſtones. The height of theſe trilithons, with their architraves or cornices, is computed, at a medium, to be 24 feet, for there is no coming at an exact dimenſion in a work ſo decayed by time and weather; the uprights being between 20 and 21 feet high, and leſſening a little upwards to the top, and the cornice computed about three feet and an half, making up the complement of 24 feet. Theſe impoſts, on the outward face, bore the ſame ſweep with the oval which they compoſed; but on the inſide within a ſtraight line. They ſeem likewiſe to have been ſomewhat broader on the top than at the bottom, ſo that their ſides bear a little ſlant downwards, whether to preſerve them the better from the weather, or to make up the ſhortening which is cauſed by their elevation from the ſight. The gradual aſcent of theſe three orders, as they may be termed, of trilithons, is 13, 14, and 15 druidiſh cubits. The breadth of each trilithon is computed, in a medium, about 10 cubits of the ſame meaſure, and is conſequently the length at leaſt of the impoſt. Each upright is about 3 feet 9 nine inches thick, and twice that, *i. e.* 7 feet and an half in breadth, or 4 cubits and an half druidiſh. Each trilithon which compoſes this ovel cell ſtands at ſuch convenient diſtance from the other, as to yield a beautiful proſpect into it; which is not a little heightened by the ſpace which ſtands between the two uprights, and which widens upwards as theſe leſſen in their breadth, and form an oval from its two centres, whoſe longeſt radius is 15, and ſhorteſt 12, druidiſh cubits; ſo that the ellipſis is formed by a line of 60 cubits, which being joined at the two ends, and turned round the two centres, give a diameter of 30 cubits at the longeſt, and 25 at the ſhorteſt, 5 cubits being the ſuppoſed diſtance between the two centres. Within this grand oval is another, of much leſſer tho' harder and finer ſtones. This circle (together with the long ſtone now broken, which is ſuppoſed to have been the altar, and is of a darkiſh-blue marble, ſuch as is often ſet upon common altar-tombs, and about 16 feet in length) conſiſts of 20 ſtones, the greateſt part of which are broken and mangled; but not ſo much as to hinder a curious obſerver from recovering the order in which they ſtood, though their uſe and deſign is hard to be gueſſed at. Another circle or oval of 40 ſtones ſurrounded the cell or adytum at a proper diſtance. Theſe were likewiſe of a much leſſer ſize; after which one comes out to the greateſt or outer circle, compoſed of 30 ſtones, likewiſe harder, and ſomewhat of a pyramidal form. It ſeems as if the founders had wiſely provided, that their leſſer bulk ſhould be compenſated by their ſolidity. The difference between this outward circle and that of the cell or adytum conſiſted in this, that the architraves of the trilithons of the latter did not touch one another, but preſerved the ſame diſtance with the two uprights on which they were locked; whereas, in the former or outward circle, the ſtanders were joined by a continued cornice. Each ſtander or upright here had two tenons, at equal diſtances on the top, by which the two impoſts were locked by their mortiſes, and ſo continued quite round in the form of a crown or cornice. The whole was ſurrounded by a vallum or deep ditch at a proportionate diſtance, as we have hinted above; and this, with the grand avenue and the gradual aſcent up to the fabric, afforded a noble proſpect, both as you advanced towards it, and much more when you viewed from it all the champaign country round it.

According to the unthinking vulgar, theſe ſtones were brought hither by magic, by the help of demons, or by giants, either of which were readily enough ſuppoſed able to bring them upon their backs from Africa; whilſt the wiſer ſort rather imagined them to be factitious, and caſt from ſome ſuch compoſition as ſand and mortar and the like, and hardened by the weather. This notion, however, has been diſproved, though to the great detriment and disfiguring of the ſtones themſelves, and the endangering of the ſtructure.

Theſe ſtones, rough and battered as they have been by theſe pretended curioſis, as well as by a long ſeries of ages, appear to have been originally ſmoothed by the chiſel, at leaſt as far as they ſtand aboveground; for as to that part which lies buried in the earth, it ſhows itſelf, upon digging round it, to be in its primitive roughneſs; and as it was digged up out of the quarry, or, more probably, as they were found lying on the ſurface of the ground in great numbers and various dimenſions, perhaps ever ſince the creation of the world, and as they are to be ſeen ſtill in vaſt quantities upon Marlborough Downs near Abury, at a place called from thence the *Grey Wethers*, and are of the ſame kind, to wit, a baſtard white marble.

The difficulty is, to conceive how ſtones of that immenſe weight, one of which, though neither the largeſt nor heavieſt, has been computed by proper judges to weigh between 30 and 40 tons, and conſequently would have required about 150 oxen to have drawn it, could be conveyed from their original ſeat to Stonehenge, which is 16 computed miles, and along ſuch uneven grounds and in ſuch quantities as compoſe the fabric. Sure it is, that no carriage can be conceived which would not have been ſunk into the ground by ſuch monſtrous weight, unleſs it be that of rollers: but even this muſt appear a more than Herculean labour; the arduouſneſs of which cannot be extenuated, but by the ſuppoſition that the whole, or at leaſt the greateſt part, of the nation contributed their help towards it in their turns.

The rearing of them afterwards in ſuch form and ſituation was a work of no leſs difficulty; for though we may reaſonably ſuppoſe that they were all pecked and chiſled, had their mortiſes and tenons wrought, and every thing done that could lighten and fit them for the deſign, at the place where they were brought from; yet every man will eaſily perceive what an immenſe labour it muſt have been to rear ſtones of that vaſt bulk and weight, to place them in their proper places, and at ſuch due diſtances, that the architraves or impoſts that locked them to each other at the top ſhould fall ſo exactly every mortiſe upon its own tenon, as we find they actually do to this day: for it is plain to every eye that views them carefully, that each of theſe tenons are ſo exactly fitted to its mortiſe, that if either of the ſtanding ſtones had been ſet ever ſo little out of its place, and perpendicular, they could never have locked one in the other till they were reduced to their due diſtance and poſition; eſpecially conſidering that there were at leaſt 15 in number of this large ſort, ſet up two and two, the whole in a beautiful oval, neareſt to a circle, and exactly locked each to the other by architraves of proportionable bigneſs. Each tenon is a druidiſh cubit, ſomewhat above 20 inches in diameter on the broadeſt ſide; for they are of an oval figure, and the mortiſes exactly anſwerable to it. By this contrivance the impoſts or architraves lie firm locked upon the uprights, and theſe are kept firm to each other. Where the impoſts are heavieſt, the tenons are ſhorteſt; and where thoſe are lighteſt, and conſequently more in danger to be ſhaken, as in thoſe of the outward circle, theſe are made longeſt, and the mortiſes deeper accordingly. If the bottom-face of the impoſt be divided into three ſquares, the two mortiſes will be found in the middle of the two outward ones: draw diagonal lines from corner to corner, and where they interſect is the centre of the mortiſe; which central diſtance from one to the other is ſeven druidiſh cubits, or about eight of ours. Some other particulars ſhow the whole to have been done geometrically, and from ſuch plain and ſimple principles as would beſt anſwer every purpoſe of the grand deſign. And hence we may frame an idea of the curiouſneſs as well as arduouſneſs of the work, which muſt be owned to outvie all that we read of ſingle obeliſks, pillars, and ſtatues, how gigantic ſoever, if we except the pyramids of Egypt and the Rhodian coloſſus.

The firſt account of this ſtructure we meet with is in Geoffroy of Monmouth, who, in the reign of king Stephen, wrote the hiſtory of the Britons in Latin. He tells us, that it was erected by the counſel of Merlin the Britiſh inchanter, at the command of Aurelius Ambroſius the laſt Britiſh king, in memory of 460 Britons who were murdered by Hengiſt the Saxon. The next account is that of Polydore Virgil, who ſays that the Britons erected this as a ſepulchral monument of Aurelius Ambroſius. Others ſuppoſe it to have been a ſepulchral monument of Boadicea the famous Britiſh Queen. Inigo Jones is of opinion that it was a Roman temple; from a ſtone 16 feet long and 4 broad, placed in an exact poſition to the eaſtward, altar-faſhion. However, the opinion of Dr Stukely is the moſt probable, who thinks that it was the chief temple of the Druids in Britain; of which a very ſtrong proof is, that it can be meaſured only by the cubit uſed by the Druids.

STOOL, in medicine, an evacuation or diſcharge of the fæces by the anus.

STOPS. See POINTS *and* PUNCTUATION.

STORAX, or STYRAX, an odoriferous reſinous ſubſtance, exuding, in the warmer climates, from a tree called by C. Bauhine *ſtyrax folio mali cotonei*. It has been cuſtomary to diſtinguiſh three ſorts of ſtorax, though only one is uſually met with in the ſhops.

1. *Styrax calamita*, or ſtorax in the cane, ſo called from its having been formerly brought incloſed in reeds from Pamphylia: it is either in ſmall diſtinct tears, of a whitiſh or reddiſh colour, or in larger maſſes compoſed of ſuch.

2. Storax in the lump, or red ſtorax. This is in maſſes of an uniform texture, and yellowiſh red or browniſh colour, though ſometimes likewiſe interſperſed with a few whitiſh grains. Of this ſort there has been ſome lately to be met with in the ſhops, under the name of *ſtorax in the tear*.

3. The common ſtorax of the ſhops is in large maſſes, conſiderably lighter and leſs compact than the foregoing: it appears upon examination to be compoſed of a fine reſinous juice, mixed with a quantity of ſaw-duſt. For what purpoſe this addition is made we ſhall not here inquire; obſerving only, that it can ſcarce be ſuppoſed to be done with any fraudulent view, ſince the ſaw-duſt appears at ſight. This common ſtorax is much leſs eſteemed than the two firſt ſorts; though, when freed from the woody matter, it proves ſuperior in point of fragrancy to either of them. Rectified ſpirit, the common menſtruum of reſins, diſſolves the ſtorax, leaving the wood behind; nor does this tincture loſe conſiderably of its valuable parts, in being inſpiſſated to a ſolid conſiſtence; whilſt aqueous liquors elevate almoſt all the fragrancy of the ſtorax.

Storax is one of the moſt agreeable of the odoriferous reſins, and may be exhibited to great advantage in langours and debilities of the nervous ſyſtem: it is not, however, much uſed in common practice, unleſs as an ingredient in the traumatic balſam, the compound powder and electuary of ſcordium, the ſtorax pill, *confectio Paulina*, mithridate, and theriaca.

Liquid STORAX. What is moſt commonly met with under this name, is a ſoft reſinous ſubſtance, of a grey colour, a weak ſmell, ſimilar to that of the foregoing ſolid ſtorax: it is ſuppoſed to be compounded of ſolid ſtorax, reſin, wine, and oil, beaten up together into a proper conſiſtence. The genuine liquid ſtorax, according to Petiver's account, (Phil. Tranſact, n° 313), is obtained from a tree growing in the iſland Cobros in the Red Sea. The preparers of this commodity yearly clear off the bark of the trees, and boil it in ſea-water to the conſiſtence of bird-lime: the reſinous matter which floats upon the ſurface is taken off, liquefied again in boiling water, and paſſed through a ſtrainer. The purer part which paſſes through, and the more impure which remains on the ſtrainer, and contains a conſiderable portion of the ſubſtance of the bark, are both ſent to Mocca, from whence they are ſometimes, though very rarely, brought to us. The firſt is of the conſiſtence of honey, tenacious, of a reddiſh or aſh-brown colour, an acrid unctuous taſte, approaching in ſmell to the ſolid ſtorax, but ſo ſtrong as to be diſagreeable; the other is full of woody matter, and much weaker in ſmell. Liquid ſtorax among us is ſcarce ever made uſe of in medicine, and not often found in the ſhops.

STORK, in ornithology. See ARDEA.

STOVES, in gardening, are buildings erected for the preſervation of tender exotic plants, which, without that aſſiſtance, will not bear the cold of our winter, becauſe they require an artificial warmth.

Stoves are of two kinds, diſtinguiſhed by the names of the *dry* and the *bark ſtoves*.

The dry ſtove has the flues, in which the ſmoke is is carried, either laid under the pavement of the floor, or erected in the back-part of the houſe over each other, and returned ſix or eight times all along the ſtove. In theſe ſtoves the plants are placed on ſcaffolds and benches of boards, raiſed above one another; and the plants principally preſerved in theſe, are the aloes, cereuſes, euphorbiums, tithymals, and other ſucculent plants, which are impatient of moiſture in winter; and therefore are not to be kept among trees or herbaceous plants, which perſpire freely.

The bark-ſtoves are made with a large pit, nearly of the length of the houſe, which is three feet deep, and ſix or ſeven feet wide. This pit is to be filled with freſh tanner's bark to make a hot-bed; and in this the pots, containing the tender plants, are to be plunged.

STOVES *for heating Rooms*. The moſt ſimple contrivance of this kind is that deſcribed by Dr Lewis in his *Commercium Philoſophico-technicum*. He there recommends the two crucibles which he makes uſe of for a chemical furnace *, the one inverted over the other, and the joining ſecured by a hoop. Theſe furnaces, ſays he, may be uſed likewiſe as a common ſtove, for keeping a room warm with a little quantity of fuel.—There are three general intentions which have been purſued in contrivances for this purpoſe: 1. Making the fuel take fire by degrees, and conſume ſlowly; 2. conducting its heat, or the air warmed by it, through a number of paſſages or circumvolutions, that the heat, inſtead of being carried up the chimney and thus loſt, may be detained in theſe paſſages, and thence communicated to the air of the room to which they lie expoſed; and, 3. applying to the fire a quantity of ſolid matter, which, being once heated, preſerves its heat long. Some ingenious furnaces, on theſe principles, are deſcribed in the Tranſactions of the Swediſh academy, and in the ſecond edition of Reaumur's Art of hatching Birds. All theſe contrivances are united in the following combination of the two pots and the hoop.

* See *Chemiſtry*, n° 99

The undermoſt pot has the ſmall grate introduced into its lower part, the fire-place door cloſed, and the aſh-pit door or the bottom hole open for admitting air. Being then charged with ſmall pieces of charcoal, and ſome lighted coals thrown above them, its top is covered by the largeſt of the grates; and on this is placed the hoop and dome, filled with balls of baked earth, or with pieces of bricks, ſo diſpoſed as to leave ſmall vacuities between them. If the ſtove is placed in the middle of a room, its injurious burnt air may be carried off by a pipe inſerted laterally into the larger door of the dome, and communicating at the other end, which ſhould be raiſed eight or ten inches, with the chimney of the room; all the other apertures of the dome being cloſed.

The furnace thus charged, will keep up a moderate and nearly equal warmth for many hours, without injury or offence; the charcoal burning down exceedingly ſlowly, and the heated balls or bricks continuing the warmth for a conſiderable time after the fuel is conſumed. Freſh charcoal may be occaſionally ſupplied through the door above the grate: the check which the balls give to the motion of the air through the furnace renders the conſumption of this alſo ſlow; and it may ſtill be made more ſo at pleaſure, by ſtopping a part of the aperture which admits the air, or of the pipe or chimney which carries it off.

STOURBRIDGE, or Sturbich, the name of a field near Cambridge, noted for its famous fair kept annually on the 7th of September, and which continues for a fortnight. The commodities are, horſes, hops, iron, wool, leather, cheeſe, &c. This place is alſo noted for an excellent ſpecies of clay capable of reſiſting an intenſe heat. It is uſed in making pots for glaſshouſes, fire-bricks, &c. and is ſold at an high price.

STOW, the name of a market-town in Gloceſterſhire in England, ſituated in W. Long. 1. 45. N. Lat. 51. 50. It is alſo the name of a fine ſeat of the earl of Temple in Buckinghamſhire. Here are the beſt gardens in England, adorned with buſts, ſtatues, obeliſks, pavilions, and temples. It is two miles from the town of Buckingham.

STOW (John), the induſtrious hiſtorian, ſon of Thomas Stow merchant-taylor of St Michael's, Cornhill, in London, was born about the year 1525. Of the early part of his life we know very little, except that he was bred to his father's buſineſs, which in the year 1560 he relinquiſhed, devoting himſelf entirely to the ſtudy of our ancient hiſtorians, chronicles, annals, charters, regiſters, and records. Of theſe he made a conſiderable collection, travelling for that purpoſe to different parts of the kingdom, and tranſcribing ſuch manuſcripts as he could not purchaſe. But this profeſſion of an antiquary being attended with no preſent emolument, he was obliged for ſubſiſtence to return to his trade. It happened, however, that his talents and neceſſities were made known to Dr Parker archbiſhop of Canterbury; who being himſelf an antiquary, encouraged and enabled Mr Stow to proſecute his darling ſtudy. In theſe times of perſecution, though Elizabeth was then upon the throne, honeſt John Stow did not eſcape danger. His collection of Popiſh records were deemed cauſe of ſuſpicion. His younger brother Thomas preferred no leſs than 140 articles againſt him before the eccleſiaſtical commiſſion; but the proof being inſufficient, he was acquitted. In 1565 he firſt publiſhed his Summary of the Chronicles of England. About the year 1584 he began his Survey of London. In 1585 he was one of the two collectors for a great muſter of Limeſtreet ward: in the ſame year he petitioned the corporation of London to beſtow on him the benefit of two freemen, to enable him to publiſh his ſurvey; and in 1589 he petitioned again for a penſion. Whether he ſucceeded, is not known. He was principally concerned in the ſecond edition of Holinſhed's chronicle, publiſhed in 1587. He alſo corrected, and twice augmented, Chaucer's works, publiſhed in 1561 and in 1597. His ſurvey of London was firſt publiſhed in 1598. To theſe laborious works he would gladly have added his large Chronicle, or Hiſtory of England; but he lived only to publiſh an abſtract of it, under the title of *Flores Hiſtoriarum*. The folio volume, which was printed after his death, with the title of *Stow's Chronicle*, was taken from his papers by Edmund Howes. Having thus ſpent his life and fortune in theſe laborious purſuits, he was at laſt obliged to ſolicit the charitable and well-diſpoſed for relief. For this purpoſe, king James I. granted him, in 1603, a brief, which was renewed in 1604, authoriſing him to collect in churches the benefactions of his fellow-citizens. He died in April 1605, aged 80; and was buried in his pariſh-church of St Andrew's Underſhaft, where his widow erected a decent monument to his memory. John Stow was a moſt indefatigable antiquarian, a faithful hiſtorian, and an honeſt man.

STOWMARKET, a town of Suffolk in England, ſituated in E. Long. 1. 10. N. Lat. 52. 20. It is a large handſome place, ſituated between the branches of the rivers Gyppe and Orwell, and is remarkable for having the beſt cherries in England.

STOWAGE, the general diſpoſition of the ſeveral materials contained in a ſhip's hold, with regard to their figure, magnitude, or ſolidity.

In the ſtowage of different articles, as balaſt, caſks, caſes, bales, and boxes, there are ſeveral general rules to be obſerved, according to the circumſtances or qualities of thoſe materials. The caſks which contain any liquid, are, according to the ſea-phraſe, to be *bung-up* and *bilge-free*, i. e. cloſely wedged up in an horizontal poſition, and reſting on their quarters: ſo that the bilges, where they are thickeſt, being entirely free all round, cannot rub againſt each other by the motion of the veſſel. Dry goods, or ſuch as may be damaged by the water, are to be carefully incloſed in caſks, bales, caſes, or wrappers; and wedged off from the bottom and ſides of the ſhip, as well as from the bow, maſts, and pump-well. Due attention muſt likewiſe be had to their diſpoſition with regard to each other, and to the trim and centre of gravity of the ſhip; ſo that the heavieſt may always be neareſt the keel, and the lighteſt gradually above them.

STRABISMUS, ſquinting. See Medicine, n° 476.

STRABO, a celebrated Greek geographer, philoſopher, and hiſtorian, was born at Amaſia, and was deſcended from a family ſettled at Gnoſſus in Crete. He was the diſciple of Xenarchus, a Peripatetic philoſopher, and at length attached himſelf to the Stoics. He contracted a ſtrict friendſhip with Cornelius Gallus, governor of Egypt; and travelled into ſeveral countries to obſerve the ſituation of places, and the cuſtoms of nations. He flouriſhed under Auguſtus; and died under Tiberius about the year 25, in a very advanced age. He compoſed ſeveral works; all of which are loſt, except his *Geography* in 17 books; which are juſtly eſteemed very precious remains of antiquity. The two firſt books are employed in ſhowing, that the ſtudy of geography is not only worthy of, but even neceſſary to, a philoſopher; the third deſcribes Spain; the fourth, Gaul and the Britannic iſles; the fifth and ſixth, Italy and the adjacent iſles; the ſeventh, which is imperfect at the end, Germany, the countries of the Getæ and Illyrii, Taurica, Cherſoneſus, and Epirus; the eighth, ninth, and tenth, Greece with the neighbouring iſles; the four following, Aſia within Mount Taurus; the fifteenth and ſixteenth, Aſia without Taurus, India, Perſia, Syria, Arabia; and the ſeventeenth, Egypt, Æthiopia, Carthage, and other places of Africa. Strabo's work was publiſhed with a Latin verſion by Xylander, and notes by Iſaac Caſaubon, at Paris, 1620, in folio; but the beſt edition is that of Amſterdam in 1707, in two volumes folio, by the learned Theodore Janſonius ab Almelooveen, with the entire notes of Xylander, Caſaubon, Meurſius, Cluver, Holſtenius, Salmaſius, Bochart, Ez. Spanheim, Cellarius, and others. To this edition is ſubjoined the *Chreſtomathiæ*, or epitome of Strabo; which, according to Mr Dodwell, who has written a very elaborate and learned diſſertation about it, was made by ſome unknown perſon between the years of Chriſt 676 and 996. It has been found of ſome uſe, not only in helping to correct the original, but in ſupplying in ſome meaſure the defect in the ſeventh book. Mr Dodwell's diſſertation is prefixed to this edition.

STRADA (Famianus), a very ingenious and learned Jeſuit, was born at Rome the latter end of the 16th century, and taught rhetoric there, in a public manner, for fifteen years. He wrote ſeveral pieces upon the art of oratory, and publiſhed ſome orations with a view of illuſtrating by example what he had inculcated by precept. But his *Proluſiones Academicæ*, and his *Hiſtoria de Bello Belgico*, are the works which raiſed his reputation, and have preſerved his memory. His hiſtory of the war of Flanders was publiſhed at Rome; the firſt decad in 1640, the ſecond in 1647; the whole extending from the death of Charles V. which happened in 1558, to the year 1590. It is written in good Latin, as all allow; but its merit in other reſpects has been variouſly determined. His *Proluſiones Academicæ* ſhow great ingenuity, and a maſterly ſkill in claſſical literature; that proluſion eſpecially in which he introduces Lucan, Lucretius, Claudian, Ovid, Statius, and Virgil, each of them verſifying according to his own ſtrain. They have been often printed.—We know not the year of Strada's birth or of his death.

STRAIN, in ſurgery, a pain occaſioned by the violent extenſion of ſome membranous or tendinous part. See SURGERY.

STRAIT, a narrow channel, or arm of the ſea, contained between two oppoſite ſhores; as the ſtraits of Gibraltar, the ſtraits of Sunda, the ſtraits of Dover, &c.

STRALSUND, a ſtrong and rich ſea-port town of Germany, in Hither Pomerania, and was formerly an important trading-place. In 1678 it was forced to ſurrender to the elector of Brandenburg, after 1800 houſes had been burnt to aſhes in one night's time. After this the Swedes defended it to the laſt extremity; and Charles XII. in 1714, came hither after his return out of Turkey. But the crown of Sweden not being able to hold out againſt five great powers, it was forced to ſubmit in 1715. In 1720, it was rendered back to Sweden, but in a very poor condition. It is almoſt ſurrounded by the ſea and the lake Francen, and has a harbour ſeparated from the iſle of Rugen by a narrow ſtrait. It is 15 miles north-weſt of Grippſwald, and 32 north-eaſt of Guſtrow. E. Lon. 13. 37. N. Lat. 54. 23.

STRAND (*Saxon*), any ſhore or bank of a ſea or great river. Hence the ſtreet in the weſt ſuburbs of London, which lay next the ſhore or bank of the Thames, was called the *Strand*. An immunity from cuſtom, and all impoſitions upon goods or veſſels by land or water, was uſually expreſſed by *ſtrand* or *ſtream*.

STRANDED (from the Saxon *Strand*), is when a ſhip is by tempeſt, or by ill ſteerage, run on ground, and ſo periſhes. Where a veſſel is ſtranded, juſtices of the peace, &c. ſhall command conſtables near the ſea-coaſts to call aſſiſtance for the preſervation of the ſhip; and officers of men of war are to be aiding and aſſiſting thereto.

STRANGLES, in farriery. See there, § x.

STRANGURY, a ſuppreſſion of urine. See MEDICINE, n° 234.

STRASBURG, an ancient, large, handſome, populous, and ſtrong city of France in Alſace. It contains about 200 ſtreets, part of which are very narrow, and moſt of the houſes are built after the ancient taſte. However, there are a great number of handſome buildings, ſuch as the hotel of the marſhal of France, who is commander of the city; the hotel of the cardinal of Rouen, the biſhop's palace, the Jeſuits college, the royal hoſpital, the hotel of Heſſe-Darmſtadt, the arſenal, the town-houſe, and the cathedral. It has a wooden bridge over the Rhine, which is thought to be one of the fineſt in Europe; as is likewiſe the cathedral church, whoſe tower is the handſomeſt in Germany, and the clock is greatly admired by all travellers. Some look upon it as one of the wonders of the world, and the ſteeple is allowed to be the higheſt in Europe. The clock not only ſhows the hours of the day, but the motion of the ſun, moon, and ſtars. Among other things there is an angel, which turns an hour-glaſs every hour; and the twelve apoſtles proclaim noon, by each of them ſtriking a blow with a hammer on a bell. There is likewiſe a cock, which is a piece of clock-work, that crows every hour. There are 700 ſteps up to the tower or ſteeple, it being 500 feet high. It was a free and imperial city; but the king of France became maſter of it in 1681, and greatly augmented the fortifications, though before it had as many cannon as there are days in the year. The inhabitants were formerly Proteſtants, and carried on a great trade; but moſt of them have been obliged to embrace the Romiſh ſuperſtition, though there is ſtill a ſort of toleration. It is ſeated on the river Ill, 55 miles N. of Baſil, 112 S. W. of Mentz, and 255 E. of Paris. E. Lon. 7. 51. N. Lat. 34. 35.

STRATA, in natural hiſtory, the ſeveral beds or layers of different matters whereof the earth is compoſed.

The ſtrata whereof the earth is compoſed are ſo very different in different countries, that it is impoſſible to ſay any thing concerning them that may be generally applicable: and indeed the depths to which we can penetrate are ſo ſmall, that only a very few can be known to us at any rate; thoſe that lie near the centre, or even a great way from it, being for ever hid. The reaſon why we cannot penetrate to any great depth is, that as we go down, the air becomes foul, loaded with pernicious vapours, inflammable air, fixed air, &c. which deſtroy the miners, and there is no poſſibility of going on. In many places, however, theſe vapours become pernicious much ſooner than others, particularly where ſulphureous minerals abound, as in mines of metal, coal, &c.

But however great differences there may be among the under ſtrata, the upper one is in ſome reſpects the ſame all over the globe, at leaſt in this reſpect, that it is fit for the ſupport of vegetables, which the others are not, without long expoſure to the air. Properly ſpeaking, indeed, the upper ſtratum of the earth all round, is compoſed of the pure vegetable mold, tho' in many places it is mixed with large quantities of other ſtrata, as clay, ſand, gravel, &c.; and hence proceed the differences of ſoils ſo well known to thoſe who practiſe agriculture.

It has been ſuppoſed, by ſome naturaliſts, that the different ſtrata of which the earth is compoſed were originally formed at the creation, and have continued in a manner immutable ever ſince: but this cannot poſſibly have been the caſe, ſince we find that many of the ſtrata are ſtrangely intermixed with each other; the bones of animals both marine and terreſtrial are frequently found at great depths in the earth; beds of oyſter-ſhells are found of immenſe extent in ſeveral countries; and concerning theſe and other ſhell-fiſh, it is remarkable, that they are generally found much farther from the ſurface than the bones or teeth either of marine or terreſtrial animals. Neither are the ſhells or other remains of fiſh found in thoſe countries adjoining to the ſeas where they grow naturally, but in the moſt diſtant regions. Mr Whitehurſt, in his Inquiry into the original ſtate and formation of the earth, has given the following account of many different kinds of animals, whoſe ſhells and other remains or *exuviæ* are found in England; though at preſent the the living animals are not to be found except in the Eaſt and Weſt Indies.

A CATALOGUE *of* EXTRANEOUS FOSSILS, *ſhowing where they were dug up; alſo their native Climates. Moſtly ſelected from the curious Cabinet of Mr* NEILSON, *in* King-Street, Red-Lion Square.

Their Names, and Places where found.	Native Climates.
CHAMBERED NAUTILUS. Sheppy Iſlands; Richmond in Surrey; Sherbone in Dorſetſhire, -	*Chineſe Ocean and other Parts of that great Sea.*
TEETH OF SHARKS. Sheppy Iſland, Oxfordſhire, Middleſex, Surrey, Northamptonſhire, -	*Eaſt and Weſt Indies.*
SEA-TORTOISE, ſeveral kinds; the *Hawkſbill*, *Loggerherd*, and *Green* ſpecies. Sheppy Iſland, -	*Weſt Indies.*
MANGROVE TREE OYSTERS. Sheppy Iſland, - - -	*Weſt Indies.*
COXCOMB TREE OYSTERS. Oxfordſhire, Glouceſterſhire, Dorſetſhire, and Hanover, -	*Coaſt of Guinea.*
VERTRBRÆ *and* PALATES *of the* ORBES. Sheppy Iſlands, and many other parts of England, -	*Eaſt and Weſt Indies.*
CROCODILE. Germany, Derbyſhire, Nottinghamſhire, Oxfordſhire, and Yorkſhire, - -	
ALLIGATOR'S TEETH. Oxfordſhire, Sheppy Iſland, -	*Eaſt and Weſt Indies.*
The BANDED BUCCINUM. Oxfordſhire, and the Alps, -	*Weſt Indies.*
The DIPPING SNAIL, and STAR FISH. Sheppy Iſland, -	*Weſt Indies.*
TAIL BUCCINUM. Sheppy Iſland, Hordel Cliff, Hampſhire, -	*Eaſt Indies.*

Nothing has more perplexed thoſe who undertake to form theories of the earth than theſe appearances. Some have at once boldly aſſerted, from theſe and other phenomena, that the world is eternal. Others have had recourſe to the univerſal deluge. Some, among whom is the Count de Buffon, endeavour to prove that the ocean and dry land are perpetually changing places; that for many ages the higheſt mountains have been covered with water, in conſequence of which the marine animals juſt mentioned were generated in ſuch vaſt quantities, that the waters will again cover theſe mountains, the habitable part of the earth become ſea, and the ſea become dry land as before, &c. Others have imagined that they might be occaſioned by volcanoes, earthquakes, &c. which confound the different ſtrata, and often intermix the productions of the ſea with thoſe of the dry land.

Theſe ſubjects have been diſcuſſed under the article EARTH, to which therefore we refer the reader; and ſhall conclude with ſome account of the ſtrata in thoſe places where they have been moſt particularly obſerved.

Under the article NATURAL HISTORY, Sect. I. it is obſerved, that the upper ſtrata of the earth and mountains generally conſiſt of rag-ſtone, the next of ſlate, the third of marble filled with petrifactions, the fourth again of ſlate; and the next of free-ſtone. But we are far from conſidering this as a rule which holds univerſally. The ſtrata differ exceedingly in a great number of places; ſome inſtances of which we ſhall give from Mr Whitehurſt.—At Alfreton Common in Derbyſhire, the ſtrata are,

A TABLE *of the* STRATA *at* ALFRETON-COMMON.

Numb.		Feet.	Inch.
1	CLAY - - - - - -	7	0
2	RATCHELL, *fragments of ſtone* -	9	0
3	BIND, *indurated clay* - -	13	4
4	STONE *argillaceous, or concreted clay* -	6	0
5	BIND - - - - - -	8	8
6	BIND - - -	25	0
7	STONE, *a black colour* - -	5	0
8	BIND - - - -	2	0
9	STONE - - - - -	2	0
10	BIND - - - -	5	0
11	BIND - - - - -	5	0
12	COAL - - - -	1	6
13	BIND - - - - -	1	6
14	STONE - - - -	23	0
15	STONE - - - - -	14	0
16	BIND - - - - - -	7	0
17	SMUTT, *a black ſubſtance, reſembling a* ſtratum *of coal-duſt* -	3	0
18	BIND - - - -	3	0
19	STONE - - -	20	0
20	BIND - - - - -	16	0
21	COAL - - -	7	4
		184	4

A TABLE *of the* STRATA *at* WEST-HALLAM.

Numb.		Feet.	Inch.
1	CLAY - - -	7	6
2	BIND - - -	48	0
3	SMUTT - - -	1	6
4	CLUNCH, *or indurated clay* -	4	0
	Carried over	61	0

Numb.		Feet.	inch.
	Brought over	61	0
5	BIND	3	0
6	STONE	2	3
7	BIND	1	0
8	STONE	1	0
9	BIND	3	0
10	STONE	1	0
11	BIND	16	0
12	SHALE	2	0
13	BIND	12	0
14	SHALE	3	0
15	CLUNCH, *ſtone and ſometimes cank*	54	0
16	SOFT COAL	4	0
17	CLAY	0	6
18	SOFT COAL	4	6
19	CLUNCH *and* BIND	21	0
20	COAL	1	0
21	BIND	1	0
22	*Strong, broad* BIND	25	0
23	COAL	6	0
		222	3

Mr Forſter has given an account of ſome of the ſtrata of the South-Sea iſlands, the ſubſtance of which may be ſeen in the following table.

SOUTH GEORGIA.

1. No ſoil, except in a few crevices of the rocks.
2. Ponderous ſlate, with ſome irony particles, in horizontal ſtrata, perpendicularly interſected with veins of quartz.

Southern Iſle of NEW ZEALAND.

1. Fine light black mould, in ſome places nine inches deep, but generally not ſo much.
2. An argillaceous ſubſtance, nearly related to the claſs of TALCONS, turned into earth by the action of the air.
3. The ſame ſubſtance farther indurated, in oblique ſtrata, generally dipping to the ſouth.

EASTER ISLAND.

1. Reddiſh-brown duſty mould, looking as if it had been burnt.
2. Burnt rocks, reſembling ſlags or droſs and other volcanic matters.

MARQUESAS.

1. Clay mixed with mould.
2. An earthy argillaceous ſubſtance mixed with tarras and puzzolana.

O-TAHEITEE.

The ſhores are coral rock, extending from the reef encircling theſe iſles to the very high water-mark. There begins the ſand, formed in ſome places from ſmall ſhells and rubbed pieces of coral; but in others the ſhores are covered with blackiſh ſand, conſiſting of the former ſort mixed with black, ſometimes glittering, particles of mica, and here and there ſome particles of the refractory iron ores called in England SKIM, the *ferrum micaceum* of Linnæus, and KALL the *molybdænum ſpuma lupi* of the ſame author. The plains from the ſhores to the foot of the hills are covered with a very fine thick ſtratum of black mould, mixed with the above-mentioned ſand, which the natives manure with ſhells. The firſt and lower range of hills are formed of a red ochreous earth, ſometimes ſo intenſely red, that the natives uſe it to paint their canoes and cloth. The higher hills conſiſt of a hard, compact, and ſtiff clayey ſubſtance, hardening into ſtone when out of the reach of the ſun and air. At the top of the valleys, along the banks of the rivers, are large maſſes of coarſe granite ſtones of various mixtures; in one place are pillars of a grey, ſolid baſaltes; and, in ſeveral others, fragments of black baſaltes.

FRIENDLY ISLANDS and NEW HEBRIDES.

The ſame with the above.

MALLICOLLO.

Yellowiſh clay mixed with common ſand.

TANNA, *a Volcanic Iſland.*

The chief ſtrata here are clay mixed with aluminous earth, interſperſed with lumps of pure chalk. The ſtrata of the clay are about ſix inches, deviating very little from the horizontal line.

NEW CALEDONIA and the *adjacent Iſles.*

The ſhores conſiſt of ſhell-ſand, and particles of quartz; the ſoil in the plains a black mould mixed with this ſand. The ſides of the hills compoſed of a yellow ochreous clay, richly ſpangled with ſmall particles of cat-ſilver, or a whitiſh kind of daze, the *mica argentea* of Linnæus. The higher parts of the hills conſiſt of a ſtone called by the German miners *geſtelſtein*, compoſed of quartz and great lumps of the above cat-ſilver. The latter is ſometimes of an intenſely red or orange colour, by means of an iron ochre.

“ From the above account, “ ſays Mr Forſter,” it appears, I think, evidently, that all the high tropical iſles of the South Sea have been ſubject to the action of volcanoes. Pyritical and ſulphureous ſubſtances, together with a few iron-ſtones, and ſome veſtiges of copper, are no doubt found in ſeveral of them: but the mountains of New Caledonia are the moſt likely to contain the richeſt metallic veins; and the ſame opinion, I ſuſpect, may be formed of the mountains in New Zealand.”

In the city of Modena in Italy, and for ſome miles round that place, there is the moſt ſingular arrangement of ſtrata perhaps in the whole world. From the ſurface of the ground to the depth of 14 feet, they meet with nothing but the ruins of an ancient city. Being come to that depth, they find paved ſtreets, artificers ſhops, floors of houſes, and ſeveral pieces of inlaid work. After theſe ruins they find a very ſolid earth, which one would think had never been removed; but a little lower they find it black and marſhy, and full of briars. Signior Ramazzini in one place found a heap of wheat entire at the depth of 24 feet; in another, he found filbert-trees with their nuts. At the depth of about 28 feet, they find a bed of chalk, about 11 feet deep, which cuts very eaſily; after this a bed of marſhy earth of about two feet, mixed with ruſhes, leaves, and branches. After this bed comes another of chalk, nearly of the ſame thickneſs; and which ends at the depth of 42 feet. This is followed by another bed of marſhy earth like the former; after which comes a new chalk-bed, but thinner, which alſo has a marſhy bed underneath it. This ends at the depth of 63 feet; after which they find ſand mingled with ſmall gravel, and ſeveral marine ſhells. This ſtratum is uſually about five feet deep, and underneath it is a vaſt reſervoir of water. It is on account of this water that the ſoil is ſo frequently dug, and the ſtrata ſo well known in this part of the world. After coming to the ſandy bottom above-mentioned, the workmen pierce the ground with a terebra or auger, when the water immediately ſprings up with great force, and fills the well to the brim. The flow is perpetual, and neither increaſes by rain, nor decreaſes by drought. Sometimes the auger meets with great trees, which give the workmen much trouble; they alſo ſometimes ſee at the bottom of theſe wells, great bones, coals, flints, and pieces of iron.

It has been aſſerted by ſome, that the ſpecific gravity of the ſtrata conſtantly increaſed with the depth from the ſurface. But Dr Leigh, in his Natural Hiſtory of Lancaſhire, ſpeaking of the coal-pits, denies the ſtrata to lie according to the laws of gravitation: obſerving, that the ſtrata there are firſt a bed of marle, then free-ſtone, next iron-ſtone, then coal, or channel mire, then ſome other ſtrata, then coal again, &c. This determined Mr Derham to make a nicer inquiry into the matter; accordingly, in 1712, he cauſed divers places to be bored, laying the ſeveral ſtrata by themſelves; and afterwards determined very carefully their ſpecific gravity. The reſult was, that in his yard the ſtrata were gradually ſpecifically heavier and heavier, the lower and lower they went; but in another place in his fields, he could not perceive any difference in the ſpecific gravities.

Acquainting the Royal Society therewith, their operator Mr Haukſbee was ordered to try the ſtrata of a coal-pit, which he did to the depth of 30 ſtrata: the thickneſs and ſpecific gravity of each whereof he gives us in a table in the Philoſophical Tranſactions; and from the whole makes this inference, that it evidently appears the gravities of the ſeveral ſtrata are in no manner of order, but purely caſual, as if mixed by chance.

STRATAGEM, in the art of war, any device for deceiving and ſurpriſing an enemy.

STRATH, in the Scottiſh language, ſignifies a long narrow valley, with a river running along the bottom.

STRATHNAVER, a ſubdiviſion or diſtrict of the county of Sutherland in Scotland; bounded on the north by the ocean, on the eaſt by Caithneſs, on the ſouth by Sutherland properly ſo called, and on the weſt partly by Roſs and partly by the ocean.

STRAWBERRY, in botany. See FRAGARIA.

STRAWBERRY-*Tree*. See ARBUTUS.

STRENGTH, in phyſiology, the ſame with force or power.

STRENGTHENERS, or CORROBORANTS, ſuch medicines as add to the bulk and firmneſs of the ſolids; and ſuch are all agglutinant and aſtringent medicines. See MATERIA MEDICA, n° 30. 36.

STRIATED LEAF, among botaniſts, one that has a number of longitudinal furrows on its ſurface.

STRIKE, a meaſure of capacity, containing four buſhels.

STRIX, the OWL; in ornithology, a genus belonging to the order of accipitres. The bill is hooked, but has no cere or wax; the noſtrils are covered with ſetaceous feathers; the head is very large, as are alſo the ears and eyes; and the tongue is bifid. There are 12 ſpecies; the moſt remarkable are,

1. The bubo, or eagle-owl, in ſize is almoſt equal to an eagle. Irides bright yellow; head and whole body finely varied with lines, ſpots and ſpecks of black, brown, cinereous, and ferruginous. Wings long; tail ſhort, marked with duſky bars. Legs thick, covered to the very end of the toes with a cloſe and full down of a teſtaceous colour. Claws great, much hooked, and duſky.—It has been ſhot in Scotland and in Yorkſhire. It inhabits inacceſſible rocks and deſert places; and preys on hares and feathered game. Its appearance in cities was deemed an unlucky omen; Rome itſelf once underwent a luſtration becauſe one of them ſtrayed into the capitol. The ancients had them in the utmoſt abhorrence; and thought them, like the ſcreech-owls, the meſſengers of death. Pliny ſtyles it *bubo funebris*, and *noctis monſtrum*.

> *Solaque culminibus ferali carmine bubo*
> *Sæpe queri et longas in fletum ducere voces.* VIRGIL.
>
> Perch'd on the roof, the bird of night complains,
> In lengthen'd ſhrieks and dire funeral ſtrains.

2. The otus, or long-eared owl, is found, though not frequently, in the north of England, in Cheſhire, and in Wales. Mr Haſſelquiſt has ſeen it alive in Cairo, and it is not unfrequent all over Egypt. The weight of the female, according to Mr Willughby, is 10 ounces; the length 14 and a half; the breadth 3 feet 4 inches; the irides are of a bright yellow; the bill black; the breaſt and belly are of a dull yellow, marked with ſlender brown ſtrokes pointing downwards; the thighs and vent-feathers of the ſame colour, but unſpotted. The back and coverts of the wings are varied with deep brown and yellow; the quill-feathers of the ſame colour, but near the ends of the outmoſt is a broad bar of red; the tail is marked with duſky and reddiſh bars, but beneath appears aſh-coloured; the horns or ears are about an inch long, and conſiſt of ſix feathers variegated with yellow and black; the feet are feathered down to the claws.

3. The ſhort-eared owl, is 14 inches; extent three feet; the head is ſmall and hawk-like; the bill is duſky; weight 14 ounces; the circle of feathers that immediately ſurrounds the eyes is black; the larger circle white, terminated with tawny and black; the feathers on the head, back, and coverts of the wings, are brown, edged with pale dull yellow; the breaſt and belly are of the ſame colour, marked with a few long narrow ſtreaks of brown pointing downwards; the quill-feathers are duſky, barred with red; the tail is of a very deep brown, adorned on each ſide the ſhaft of the four middle feathers with a yellow circle which contains a brown ſpot; the tip of the tail is white. The horns of this ſpecies are very ſmall, and each conſiſts of only a ſingle feather; theſe it can raiſe or depreſs at pleaſure; and in a dead bird they are with difficulty diſcovered. This kind is ſcarcer than the former; both are ſolitary birds, avoiding inhabited places. Theſe ſpecies may be called *long-winged owls*; the wings when cloſed reaching beyond the end of the tail; whereas in the common kinds they fall ſhort of it.—This is a bird of paſſage, and has been obſerved to viſit Lincolnſhire in the beginning of October, and to retire early in the ſpring; ſo probably, as it performs its migrations with the woodcock, its ſummer-retreat is Norway. During day it lies hid in

long old graſs; when diſturbed, it ſeldom flies far, but will light, and ſit looking at one, at which time the horns may be ſeen very diſtinctly. It has not been obſerved to perch on trees like other owls; it will alſo fly in ſearch of prey in cloudy hazy weather. Farmers are fond of ſeeing theſe birds in the fields, as they clear them from mice. It is found frequently on the hill of Hoy in the Orkneys, where it flies about and preys by day like a hawk. It is found alſo in Lancaſhire, which is a hilly and wooded country; and in New-England and Newfoundland.

4. The flammea, or common white owl. The elegant plumage of this bird makes amends for the uncouthneſs of its form: a circle of ſoft white feathers ſurround the eyes. The upper part of the body, the coverts, and ſecondary feathers of the wings, are of a fine pale yellow: on each ſide the ſhafts are two grey and two white ſpots placed alternate: the exterior ſides of the quill-feathers are yellow; the interior white, marked on each ſide with four black ſpots: the lower ſide of the body is wholly white; the interior ſides of the feathers of the tail are white; the exterior marked with ſome obſcure duſky bars; the legs are feathered to the feet: the feet are covered with ſhort hairs: the edge of the middle claw is ſerrated. The uſual weight is 11 ounces; its length 14 inches; its breadth 3 feet.—This ſpecies is almoſt domeſtic; inhabiting, for the greateſt part of the year, barns, hay-lofts, and other out-houſes; and is as uſeful in clearing thoſe places from mice as the congenial cat: towards twilight it quits its perch, and takes a regular circuit round the fields, ſkimming along the ground in queſt of field-mice, and then returns to its uſual reſidence: in the breeding-ſeaſon it takes to the eaves of churches, holes in lofty buildings, or hollows of trees. During the time the young are in the neſt, the male and female alternately ſally out in queſt of food, make their circuit, beat the fields with the regularity of a ſpaniel, and drop inſtantly on their prey in the graſs. They very ſeldom ſtay out above five minutes; return with their prey in their claws; but as it is neceſſary to ſhift it into their bill, they always alight for that purpoſe on the roof, before they attempt to enter their neſt. This ſpecies does not hoot; but ſnores and hiſſes in a violent manner; and while it flies along will often ſcream moſt tremendouſly. Its only food is mice. As the young of theſe birds keep their neſt for a great length of time, and are fed even long after they can fly, many hundreds of mice will ſcarcely ſuffice to ſupply them with food. Owls caſt up the bones, fur, or feathers of their prey, in form of ſmall pellets, after they have devoured it, in the ſame manner as hawks do. A gentleman, on grubbing up an old pollard-aſh that had been the habitation of owls for many generations, found at the bottom many buſhels of this rejected ſtuff. Some owls will, when they are ſatisfied, like dogs, hide the remainder of their meat.

5. The ulula, or tawny owl. The female of this ſpecies weighs 19 ounces; the length is 14 ounces; the breadth 2 feet 8 inches; the irides are duſky: the ears in this, as in all owls, very large; and their ſenſe of hearing very exquiſite. The colour of this kind is ſufficient to diſtinguiſh it from every other: that of the back, head, coverts of the wings, and on the ſcapular feathers, being a fine tawny red, elegantly ſpotted and powdered with black or duſky ſpots of various ſizes: on the coverts of the wings, and on the ſcapulars, are ſeveral large white ſpots: the coverts of the tail are tawny, and quite free from any marks: the tail is variouſly blotched, barred and ſpotted with pale red and black; in the two middle feathers the red predominates: the breaſt and belly are yellowiſh, mixed with white, and marked with narrow black ſtrokes pointing downwards: the legs are covered with feathers down to the toes.—This is a hardier ſpecies than the former; and the young will feed on any dead thing, whereas thoſe of the white owl muſt have a conſtant ſupply of freſh meat. It is the ſtrix of Aldrovandus, and what we call the *ſcreech-owl;* to which the folly of ſuperſtition had given the power of preſaging death by its cries. The ancients believed that it ſucked the blood of young children: a fact not incredible; for Haſſelquiſt deſcribes a ſpecies found in Syria, which frequently in the evening flies in at the windows, and deſtroys the helpleſs infant.

> *Nocte volant, pueroſque petunt nutricis egentes,*
> *Et vitiant cuneis corpora rapta ſuis.*
> *Carpere dicuntur lactentia viſcera roſtris,*
> *Et plenum poto ſanguine guttur habent.*
> *Eſt illis ſtrigibus nomen, ſed nominis hujus*
> *Cauſa quod horrenda ſtridere nocte ſolent.* Ovid Faſt. vi. 135.

6. The ulula, or brown owl, agrees with the former in its marks; differing only in the colours: in this, the head, wings, and back, are of a deep brown, ſpotted with black in the ſame manner as the former: the coverts of the wings and the ſcapulars are adorned with ſimilar white ſpots: the exterior edges of the four firſt quill-feathers in both are ſerrated: the breaſt in this is of a very pale aſh-colour mixed with tawny, and marked with oblong jagged ſpots: the feet, too, are feathered down to the very claws: the circle round the face is aſh-coloured, ſpotted with brown.—Both theſe ſpecies inhabit woods, where they reſide the whole day: in the night they are very clamorous; and when they hoot, their throats are inflated to the ſize of an hen's egg. In the duſk they approach our dwellings; and will frequently enter pigeon-houſes, and make great havoc in them. They deſtroy numbers of little leverets, as appears by the legs frequently found in their neſts. They alſo kill abundance of moles, and ſkin them with as much dexterity as a cook does a rabbet. Theſe build in hollow trees or ruined edifices; lay four eggs, of an elliptic form, and of a whitiſh colour.

7. The paſſerina, or little owl, is very rare in England; it is ſometimes found in Yorkſhire, Flintſhire, and alſo near London: in ſize it ſcarcely exceeds a thruſh, though the fulneſs of its plumage makes it appear larger: the irides are of a light yellow; the bill of a paper-colour; the feathers that encircle the face are white tipt with black; the head brown, ſpotted with white; on the breaſt is a mixture of white and brown; the belly is white, marked with a few brown ſpots; the tail of the ſame colour with the back; in each feather barred with white; in each adorned with circular white ſpots, placed oppoſite to one another on both ſides the ſhaft; the legs and feet are covered with feathers down to the claws.—The Italians made uſe of this owl to decoy ſmall birds to the limed twig: the method

3 MA 53

Plate CCLXXV

Fig. 1. SUS Babyruſſa, or Indian Hog.

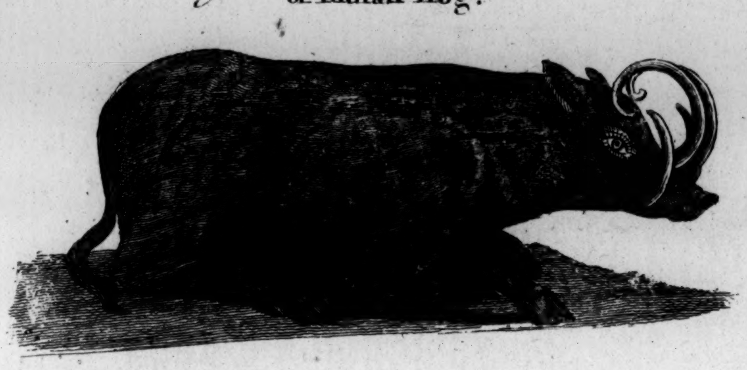


Fig. 2. Tapir.

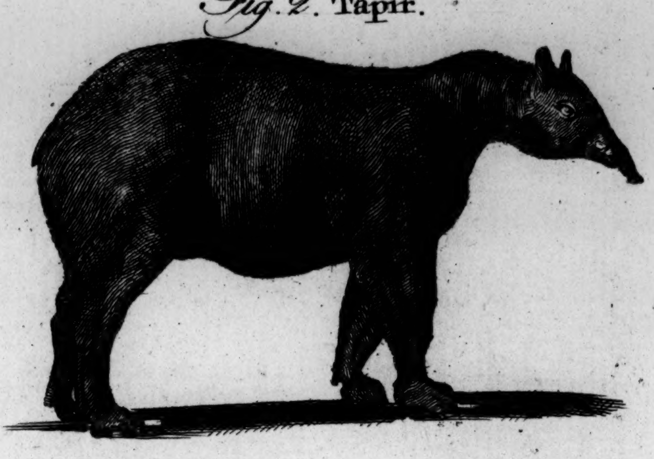


Fig. 6.

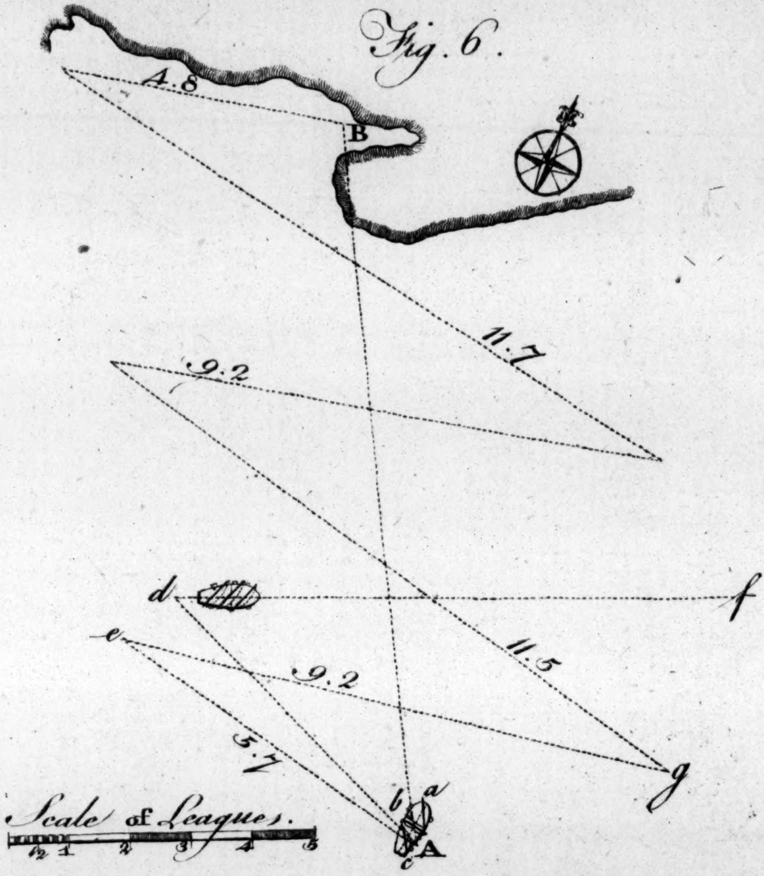

4.8
B
11.7
9.2
d
f
e
11.5
9.2
5.7
b
a
A
c
g
Scale of Leagues.
½ 1 2 3 4 5

Fig. 4. Oſtrich.

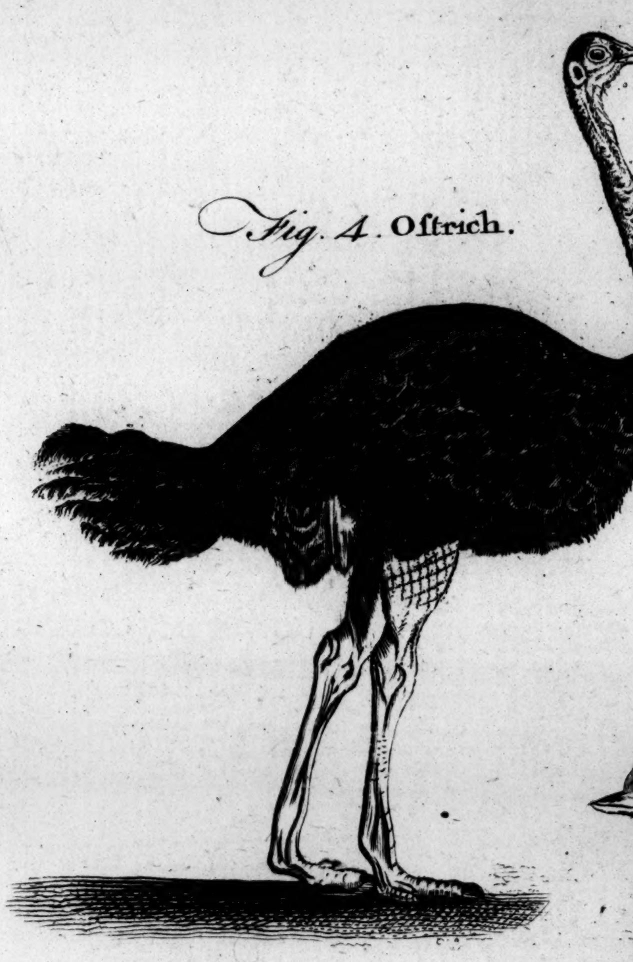


Fig. 3

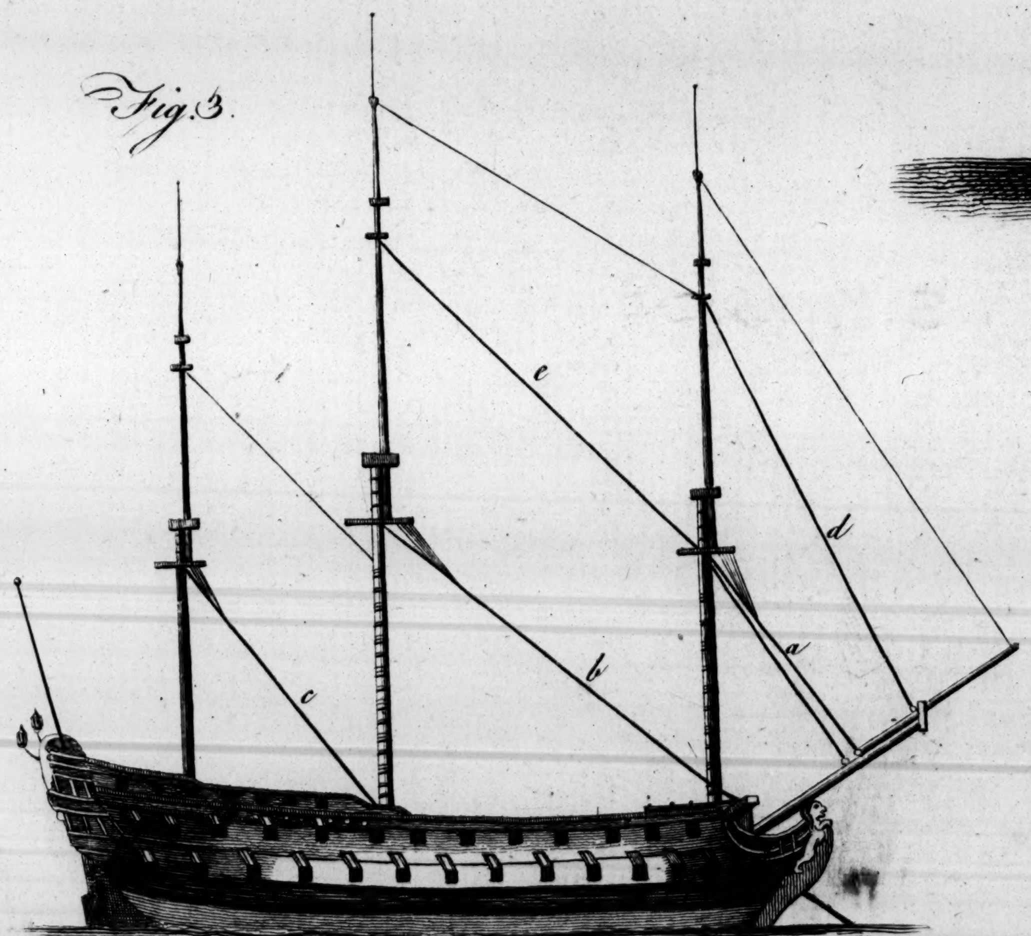
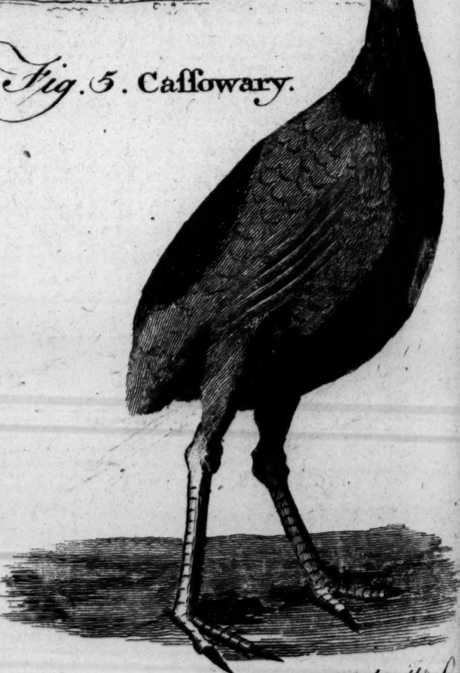


Fig. 5. Caſſowary.



A. Bell Sculp

method of which is exhibited in Olina's *Uccelliera*, p. 65. Mr Steuart, author of the Antiquities of Athens, informed Mr Pennant, that this ſpecies of owl was very common in Attica; that they were birds of paſſage, and appeared there the beginning of April in great numbers; that they bred there; and that they retired at the ſame time as the ſtorks, whoſe arrival they a little preceded.

8. The orientalis, or oriental owl, is of the ſize of the common owl, living in the ruins and old deſerted houſes of Egypt and Syria, and ſometimes in thoſe that are inhabited. The Arabs in Egypt call it *maſſaſa*; the Syrians, *bana*. It is very ravenous in Syria; and in the evenings, if the windows are left open, it flies into houſes, and kills infants, unleſs they are carefully watched; wherefore the women are much afraid of it.

STROBILUS, in botany. See there, p. 1293.

STROMBOLI, the moſt northerly of the Lipari iſlands, lying on the Tuſcan Sea, towards the coaſt of Sicily. There are but a few families which inhabit one ſide of it; for the middle parts are raiſed up into an high volcano, continually throwing out fire and ſmoke. Sir William Hamilton paſſed by this iſland in his voyage to Sicily, but did not land. He obſerved that the volcano threw out great quantities of ſtones, and aſhes; but no lava, excepting now and then a very little, which would run a ſmall way down the ſide of the mountain, and there congeal.

STROPHE, in ancient poetry, a certain number of verſes, including a perfect ſenſe, and making the firſt part of an ode. See POETRY, p. 6305.

STRUMÆ, ſcorphulous tumours ariſing on the neck and throat, conſtituting what is commonly called the *king's evil*. See MEDICINE, n° 446

STRUTHIO, the OSTRICH; a genus belonging to the order of grallæ. The bill is ſomewhat conical; the noſtrils are oval; the wings ſhort, and not fit for flying; and the feet are of the running kind. There are three ſpecies.

1. The camelus, or common oſtrich, is the largeſt of all birds. Travellers affirm that they are ſeen as tall as a man on horſeback; and even ſome of thoſe that have been brought into England were above ſeven feet high. The head and bill ſomewhat reſemble thoſe of a duck; and the neck may be likened to that of a ſwan, but that it is much longer; the legs and thighs reſemble thoſe of an hen; though the whole appearance bears a ſtrong reſemblance to that of a camel. But though uſually ſeven feet high from the top of the head to the ground, from the back it is only four; ſo that the head and neck are above three feet long. From the top of the head to the rump, when the neck is ſtretched out in a right line, it is ſix feet long, and the tail is about a foot more. One of the wings, without the feathers, is a foot and an half; and being ſtretched out, with the feathers, is three feet.

The plumage is much alike in all; that is, generally black and white; though ſome of them are ſaid to be grey. There are no feathers on the ſides, nor yet on the thighs, nor under the wings. The lower part of the neck, about half way, is covered with ſtill ſmaller feathers than thoſe on the belly and back; and thoſe alſo are of different colours.

All theſe feathers are of the ſame kind, and peculiar to the oſtrich; for other birds have ſeveral ſorts, ſome of which are ſoft and downy, and others hard and ſtrong. Oſtrich-feathers are almoſt all as ſoft as down, being utterly unfit to ſerve the animal for flying, and ſtill leſs adapted to be a proper defence againſt external injury. The feathers of other birds have the webs broader on one ſide than the other, but thoſe of the oſtrich have their ſhaft exactly in the middle. The upper part of the head and neck are covered with a very fine clear white hair, that ſhines like the briſtles of a hog; and in ſome places there are ſmall tufts of it, conſiſting of about twelve hairs, which grow from a ſingle ſhaft about the thickneſs of a pin.

At the end of each wing, there is a kind of ſpur almoſt like the quill of a porcupine. It is an inch long, being hollow and of an horny ſubſtance. There are two of theſe on each wing; the largeſt of which is at the extremity of the bone of the wing, and the other a foot lower. The neck ſeems to be more ſlender in proportion to that of other birds, from its not being furniſhed with feathers. The ſkin in this part is of a livid fleſh-colour, which ſome, improperly, would have to be blue. The bill is ſhort and pointed, and two inches and an half at the beginning. The external form of the eye is like that of a man, the upper eyelid being adorned with eye-laſhes which are longer than thoſe on the lid below. The tongue is ſmall, very ſhort, and compoſed of cartilages, ligaments, and membranes, intermixed with fleſhy fibres. In ſome it is about an inch long, and very thick at the bottom; others it is but half an inch, being a little forked at the end.

The thighs are very fleſhy and large, being covered with a white ſkin, inclining to redneſs, and wrinkled in the manner of a net, whoſe meſhes will admit the end of a finger. Some have very ſmall feathers here and there on the thighs; and others again have neither feathers nor wrinkles. What are called the legs of birds, in this are covered before with large ſcales. The end of the foot is cloven, and has two very large toes, which, like the leg, are covered with ſcales. Theſe toes are of unequal ſizes. The largeſt, which is on the inſide, is ſeven inches long, including the claw, which is near three-fourths of an inch in length, and almoſt as broad. The other toe is but four inches long, and is without a claw.

The internal parts of this animal are formed with no leſs ſurpriſing peculiarity. At the top of the breaſt, under the ſkin, the fat is two inches thick; and on the fore-part of the belly it is as hard as ſuet, and about two inches and an half thick in ſome places. It has two diſtinct ſtomachs. The firſt, which is lowermoſt, in its natural ſituation ſomewhat reſembles the crop in other birds; but it is conſiderably larger than the other ſtomach, and is furniſhed with ſtrong muſcular fibres, as well circular as longitudinal. The ſecond ſtomach, or gizzard, has outwardly the ſhape of the ſtomach of a man; and upon opening is always found filled with a variety of diſcordant ſubſtances; hay, graſs, barley, beans, bones, and ſtones, ſome of which exceed in ſize a pullet's egg. The kidneys are eight inches long and two broad, and differ from thoſe of other birds in not being divided into lobes. The heart and lungs are ſeparated by a midriff as in quadrupeds; and the parts of generation alſo bear a very ſtrong reſemblance and analogy.

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The Struthophagi have another method of taking this bird: they cover themſelves with an oſtrich's ſkin, and paſſing up an arm through the neck, thus counterfeit all the motions of this animal. By this artifice they approach the oſtrich, which becomes an eaſy prey. He is ſometimes alſo taken by dogs and nets: but the moſt uſual way is that mentioned above.

When the Arabians have thus taken an oſtrich, they cut its throat; and making a ligament below the opening, they ſhake the bird as one would rinſe a barrel: then taking off the ligature, there runs out from the wound in the throat a conſiderable quantity of blood mixed with the fat of the animal; and this is conſidered as one of their greateſt dainties. They next flea the bird; and of the ſkin, which is ſtrong and thick, ſometimes make a kind of veſt, which anſwers the purpoſes of a cuiraſs and a buckler.

There are others who, more compaſſionate or more provident, do not kill their captive, but endeavour to tame it, for the purpoſes of ſupplying thoſe feathers which are in ſo great requeſt. The inhabitants of Dara and Lybia breed up whole flocks of them, and they are tamed with very little trouble. But it is not for their feathers alone that they are prized in this domeſtic ſtate; they are often ridden upon and uſed as horſes. Moore aſſures us, that at Joar he ſaw a man travelling upon an oſtrich; and Adanſon aſſerts, that at the factory of Podore he had two oſtriches, which were then young, the ſtrongeſt of which ran ſwifter than the beſt Engliſh racer, although he carried two negroes on his back. As ſoon as the animal perceived that it was thus loaded, it ſet off running with all its force, and made ſeveral circuits round the village; till at length the people were obliged to ſtop it by barring up the way. How far this ſtrength and ſwiftneſs may be uſeful to mankind, even in a poliſhed ſtate, is a matter that perhaps deſerves inquiry.

2. The emu.—Of this bird, which many call the *American oſtrich*, but little is certainly known. It is an inhabitant of the new continent, and is chiefly found in Guiana, along the banks of the Oroonoko, in the inland provinces of Brazil and Chili, and the vaſt foreſts that border on the mouth of the river Plata. Many other parts of South America were known to have them; but as men multiplied, theſe large and timorous birds either fell beneath their ſuperior power, or fled from their vicinity.

The emu, though not ſo large as the oſtrich, is only ſecond to it in magnitude. It is generally found to be ſix feet high, meaſuring from its head to the ground. Its legs are three feet long, and its thigh is near as thick as that of a man. The toes differ from thoſe of the oſtrich, as there are three in the American bird, and but two in the former. Its neck is long, its head ſmall, and the bill flatted like that of the oſtrich; but in all other reſpects it more reſembles the third ſpecies called the *caſſowary*. The form of the body appears round; the wings are ſhort, and entirely unfitted for flying; and it entirely wants a tail. It is covered from the back and rump with long feathers, which fall backward, and cover the anus: theſe feathers are grey upon the back, and white on the belly. It goes very ſwiftly, and ſeems aſſiſted in its motion by a kind of tubercle behind, like an heel, upon which, on plain ground, it treads very ſecurely: in its courſe it uſes a very odd kind of action, lifting up one wing, which it keeps elevated for a time, till, letting it drop, it lifts up the other. What the bird's intention may be in thus keeping only one wing up, is not eaſy to diſcover; whether it makes uſe of this as a ſail to catch the wind, or whether as a rudder to turn its courſe, in order to avoid the arrows of the Indians, yet remains to be aſcertained: however this be, the emu runs with ſuch a ſwiftneſs, that the fleeteſt dogs are thrown out in the purſuit. One of them, finding itſelf ſurrounded by the hunters, darted among the dogs with ſuch fury, that they made way to avoid its rage; and it eſcaped, by its amazing velocity, in ſafety to the mountains.

As this bird is but little known, ſo travellers have given a looſe to their imaginations in deſcribing ſome of its actions, which they were conſcious could not be eaſily contradicted. This animal, ſays Nierenberg, is very peculiar in the hatching of its young. The male compels 20 or 30 of the females to lay their eggs in one neſt; he then, when they have done laying, chaſes them away, and places himſelf upon the eggs; however, he takes the ſingular precaution of laying two of the nnmber aſide, which he does not ſit upon. When the young ones come forth, theſe two eggs are addled; which the male having foreſeen, breaks one, and then another, upon which multitudes of flies are found to ſettle; and theſe ſupply the young brood with a ſufficiency of proviſion till they are able to ſhift for themſelves.

On the other hand, Wafer aſſerts, that he has ſeen great quantities of this animal's eggs on the deſert ſhores north of the river Plata; where they were buried in the ſand, in order to be hatched by the heat of the climate. Both this, as well as the preceding account, may be doubted; and it is more probable that it was the crocodile's eggs which Wafer had ſeen, which are undoubtedly hatched in that manner.

When the young ones are hatched, they are familiar, and follow the firſt perſon they meet. I have been followed myſelf, ſays Wafer, by many of theſe

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tains. Of all known animals, the oſtrich is by far the ſwifteſt in running: upon obſerving himſelf, therefore, purſued at a diſtance, he begins to run at firſt but gently; either inſenſible of his danger, or ſure of eſcaping. In this ſituation, he ſomewhat reſembles a man at full ſpeed; his wings, like two arms, keep working with a motion correſpondent to that of his legs; and his ſpeed would very ſoon ſnatch him from the view of his purſuers; but, unfortunately for the ſilly creature, inſtead of going off in a direct line, he takes his courſe in circles; while the hunters ſtill make a ſmall courſe within, relieve each other, meet him at unexpected turns, and keep him thus ſtill employed, ſtill followed, for two or three days together. At laſt, ſpent with fatigue and famine, and finding all power of eſcape impoſſible, he endeavours to hide himſelf from thoſe enemies he cannot avoid, and covers his head in the ſand or the firſt thicket he meets. Sometimes, however, he attempts to face his purſuers; and though in general the moſt gentle animal in nature, when driven to deſperation, he defends himſelf with his beak, his wings, and his feet. Such is the force of his motion, that a man would be utterly unable to withſtand him in the ſhock.

The Struthophagi have another method of taking this bird: they cover themſelves with an oſtrich's ſkin, and paſſing up an arm through the neck, thus counterfeit all the motions of this animal. By this artifice they approach the oſtrich, which becomes an eaſy prey. He is ſometimes alſo taken by dogs and nets: but the moſt uſual way is that mentioned above.

When the Arabians have thus taken an oſtrich, they cut its throat; and making a ligament below the opening, they ſhake the bird as one would rinſe a barrel: then taking off the ligature, there runs out from the wound in the throat a conſiderable quantity of blood mixed with the fat of the animal; and this is conſidered as one of their greateſt dainties. They next flea the bird; and of the ſkin, which is ſtrong and thick, ſometimes make a kind of veſt, which anſwers the purpoſes of a cuiraſs and a buckler.

There are others who, more compaſſionate or more provident, do not kill their captive, but endeavour to tame it, for the purpoſes of ſupplying thoſe feathers which are in ſo great requeſt. The inhabitants of Dara and Lybia breed up whole flocks of them, and they are tamed with very little trouble. But it is not for their feathers alone that they are prized in this domeſtic ſtate; they are often ridden upon and uſed as horſes. Moore aſſures us, that at Joar he ſaw a man travelling upon an oſtrich; and Adanſon aſſerts, that at the factory of Podore he had two oſtriches, which were then young, the ſtrongeſt of which ran ſwifter than the beſt Engliſh racer, although he carried two negroes on his back. As ſoon as the animal perceived that it was thus loaded, it ſet off running with all its force, and made ſeveral circuits round the village; till at length the people were obliged to ſtop it by barring up the way. How far this ſtrength and ſwiftneſs may be uſeful to mankind, even in a poliſhed ſtate, is a matter that perhaps deſerves inquiry.

2. The emu.—Of this bird, which many call the *American oſtrich*, but little is certainly known. It is an inhabitant of the new continent, and is chiefly found in Guiana, along the banks of the Oroonoko, in the inland provinces of Brazil and Chili, and the vaſt foreſts that border on the mouth of the river Plata. Many other parts of South America were known to have them; but as men multiplied, theſe large and timorous birds either fell beneath their ſuperior power, or fled from their vicinity.

The emu, though not ſo large as the oſtrich, is only ſecond to it in magnitude. It is generally found to be ſix feet high, meaſuring from its head to the ground. Its legs are three feet long, and its thigh is near as thick as that of a man. The toes differ from thoſe of the oſtrich, as there are three in the American bird, and but two in the former. Its neck is long, its head ſmall, and the bill flatted like that of the oſtrich; but in all other reſpects it more reſembles the third ſpecies called the *caſſowary*. The form of the body appears round; the wings are ſhort, and entirely unfitted for flying; and it entirely wants a tail. It is covered from the back and rump with long feathers, which fall backward, and cover the anus: theſe feathers are grey upon the back, and white on the belly. It goes very ſwiftly, and ſeems aſſiſted in its motion by a kind of tubercle behind, like an heel, upon which, on plain ground, it treads very ſecurely: in its courſe it uſes a very odd kind of action, lifting up one wing, which it keeps elevated for a time, till, letting it drop, it lifts up the other. What the bird's intention may be in thus keeping only one wing up, is not eaſy to diſcover; whether it makes uſe of this as a ſail to catch the wind, or whether as a rudder to turn its courſe, in order to avoid the arrows of the Indians, yet remains to be aſcertained: however this be, the emu runs with ſuch a ſwiftneſs, that the fleeteſt dogs are thrown out in the purſuit. One of them, finding itſelf ſurrounded by the hunters, darted among the dogs with ſuch fury, that they made way to avoid its rage; and it eſcaped, by its amazing velocity, in ſafety to the mountains.

As this bird is but little known, ſo travellers have given a looſe to their imaginations in deſcribing ſome of its actions, which they were conſcious could not be eaſily contradicted. This animal, ſays Nierenberg, is very peculiar in the hatching of its young. The male compels 20 or 30 of the females to lay their eggs in one neſt; he then, when they have done laying, chaſes them away, and places himſelf upon the eggs; however, he takes the ſingular precaution of laying two of the nnmber aſide, which he does not ſit upon. When the young ones come forth, theſe two eggs are addled; which the male having foreſeen, breaks one, and then another, upon which multitudes of flies are found to ſettle; and theſe ſupply the young brood with a ſufficiency of proviſion till they are able to ſhift for themſelves.

On the other hand, Wafer aſſerts, that he has ſeen great quantities of this animal's eggs on the deſert ſhores north of the river Plata; where they were buried in the ſand, in order to be hatched by the heat of the climate. Both this, as well as the preceding account, may be doubted; and it is more probable that it was the crocodile's eggs which Wafer had ſeen, which are undoubtedly hatched in that manner.

When the young ones are hatched, they are familiar, and follow the firſt perſon they meet. I have been followed myſelf, ſays Wafer, by many of theſe young oſtriches; which at firſt are extremely harmleſs and ſimple; but as they grow older, they become more cunning and diſtruſtful, and run ſo ſwift, that a greyhound can ſcarcely overtake them. Their fleſh, in general, is good to be eaten, eſpecially if they be young. It would be no difficult matter to rear up flocks of theſe animals tame, particularly as they are naturally ſo familiar; and they might be found to anſwer domeſtic purpoſes, like the hen or the turkey. Their maintenance could not be expenſive, if, as Narborough ſays, they live entirely upon graſs.

3. The caſſowary is a bird which was firſt brought into Europe by the Dutch from Java in the Eaſt Indies; in which part of the world it is only to be found. Next to the preceding, it is the largeſt and the heavieſt of the feathered ſpecies.

The caſſowary, though not ſo large as the former, yet appears more bulky to the eye; its body being nearly equal, and its neck and legs much thicker and ſtronger in proportion; this conformation gives it an air of ſtrength and force, which the fierceneſs and ſingularity of its countenance conſpire to render formidable. It is five feet and an half long from the point of the bill to the extremity of the claws. The legs are two feet and an half high from the belly to the end of the claws. The head and neck together are a foot and an half; and the largeſt toe, including the claw, is five inches long. The claw alone of the leaſt toe is three inches and a half in length. The wing is ſo ſmall that it does not appear, it being hid under the feathers of the back. In other birds, a part of the feathers ſerve for flight, and are different from thoſe that ſerve for merely covering; but in the caſſowary all the feathers are of the ſame kind, and outwardly of the ſame colour. They are generally double, having two long ſhafts, which grow out of a ſhort one which is fixed in the ſkin. Thoſe that are double are always of an unequal length; for ſome are 14 inches long, particularly on the rump, while others are not above three. The beards that adorn the ſtem or ſhaft are about half-way to the end, very long, and as thick as an horſe-hair, without being ſubdivided into fibres. The ſtem or ſhaft is flat, ſhining, black, and knotted below; and from each knot there proceeds a beard; likewiſe the beards at the end of the large feathers are perfectly black, and towards the root of a grey tawny colour; ſhorter, more ſoft, and throwing out fine fibres like down; ſo that nothing appears except the ends, which are hard and black; becauſe the other part, compoſed of down, is quite covered. There are feathers on the head and neck; but they are ſo ſhort and thinly ſown, that the bird's ſkin appears naked, except towards the hinder part of the head, where they are a little longer. The feathers which adorn the rump are extremely thick; but do not differ in other reſpects from the reſt, excepting their being longer. The wings, when they are deprived of their feathers, are but three inches long; and the feathers are like thoſe on other parts of the body. The ends of the wings are adorned with five prickles, of different lengths and thickneſs, which bend like a bow: theſe are hollow from the roots to the very points, having only that ſlight ſubſtance within which all quills are known to have. The longeſt of theſe prickles is 11 inches; and it is a quarter of an inch in diameter at the root, being thicker there than towards the extremity; the point ſeems broken off.

The part, however, which moſt diſtinguiſhes this animal is the head; which, though ſmall, like that of an oſtrich, does not fail to inſpire ſome degree of terror. It is bare of feathers, and is in a manner armed with an helmet of horny ſubſtance, that covers it from the root of the bill to near half the head backwards. This helmet is black before and yellow behind. Its ſubſtance is very hard, being formed by the elevation of the bone of the ſkull; and it conſiſts of ſeveral plates, one over another, like the horn of an ox. Some have ſuppoſed that this was ſhed every year with the feathers; but the moſt probable opinion is, that it only exfoliates ſlowly like the beak. To the peculiar oddity of this natural armour, may be added the colour of the eye in this animal, which is a bright yellow; and the globe being above an inch and a half in diameter, give it an air equally fierce and extraordinary. The hole of the ear is very large and open, being only covered with ſmall black feathers. The ſides of the head, about the eye and ear, being deſtitute of any covering, are blue, except the middle of the lower eye-lid, which is white. The part of the bill which anſwers to the upper jaw in other animals, is very hard at the edges above, and the extremity of it like that of a turkey-cock. The end of the lower mandible is ſlightly notched, and the whole is of a greyiſh brown, except a green ſpot on each ſide. As the beak admits a very wide opening, this contributes not a little to the bird's menacing appearance. The neck is of a violet-colour, inclining to that of ſlate; and it is red behind in ſeveral places, but chiefly in the middle. About the middle of the neck before, at the riſe of the large feathers, there are two proceſſes formed by the ſkin, which reſemble ſomewhat the gills of a cock, but that they are blue as well as red. The ſkin which covers the fore-part of the breaſt, on which this bird leans and reſts, is hard, callous, and without feathers. The thighs and legs are covered with feathers, and are extremely thick, ſtrong, ſtraight, and covered with ſcales of ſeveral ſhapes; but the legs are thicker a little above the foot than in any other place. The toes are likewiſe covered with ſcales, and are but three in number; for that which ſhould be behind is wanting. The claws are of a hard ſolid ſubſtance, black without and white within.

The internal parts are equally remarkable. The caſſowary unites with the double ſtomach of animals that live upon vegetables, the ſhort inteſtines of thoſe that live upon fleſh. The inteſtines of the caſſowary are 13 times ſhorter than thoſe of the oſtrich. The heart is very ſmall, being but an inch and an half long, and an inch broad at the baſe. Upon the whole, it has the head of a warrior, the eye of a lion, the defence of a porcupine, and the ſwiftneſs of a courſer.

Thus formed for a life of hoſtility, for terrifying others, and for its own defence, it might be expected that the caſſowary was one of the moſt fierce and terrible animals of the creation. But nothing is ſo oppoſite to its natural character: it never attacks others; and inſtead of the bill, when attacked, it rather makes uſe of its legs, and kicks like a horſe, or runs againſt its purſuer, beats him down, and treads him to the ground.

The manner of going of this animal is not leſs extraordinary than its appearance. Inſtead of going directly forward, it ſeems to kick up behind with one leg; and then making a bound onward with the other, it goes with ſuch prodigious velocity, that the ſwifteſt racer would be left far behind.

The ſame degree of voraciouſneſs which we perceived in the oſtrich, obtains as ſtrongly here. The caſſowary ſwallows every thing that comes within the capacity of its gullet. The Dutch aſſert, that it can devour not only glaſs, iron, and ſtones, but even live and burning coals, without teſtifying the ſmalleſt fear or feeling the leaſt injury. It is ſaid, that the paſſage of the food through its gullet is performed ſo ſpeedily, that even the very eggs which it has ſwallowed whole paſs through it unbroken in the ſame form they went down. In fact, the alimentary canal of this animal, as was obſerved above, is extremely ſhort; and it may happen, that many kinds of food are indigeſtible in its ſtomach, as wheat or currants are to man, when ſwallowed whole.

The caſſowary's eggs are of a grey-aſh colour, inclining to green. They are not ſo large nor ſo round as thoſe of the oſtrich. They are marked with a number of little tubercles of a deep green, and the ſhell is not very thick. The largeſt of theſe is found to be 15 inches round one way, and about twelve the other.

The ſouthern parts of the moſt eaſtern Indies ſeems to be the natural climate of the caſſowary. His domain, if we may ſo call it, begins where that of the oſtrich terminates. The latter has never been found beyond the Ganges; while the caſſowary is never ſeen nearer than the iſlands of Banda, Sumatra, Java, the Molucca iſlands, and the correſponding parts of the continent. Yet even here this animal ſeems not to have multiplied in any conſiderable degree, as we find one of the kings of Java making a preſent of one of theſe birds to the captain of a Dutch ſhip, conſidering it as a very great rarity.

STRYMON, (anc. geog.), formerly *Conozus*; a river conſtituting the ancient limits of Macedonia and Thrace; riſing in mount Scombrus, (Ariſtotle). Authors differ as to the modern name of this river.

STRYPE (John), was deſcended from a German family, born at London, and educated at Cambridge. He was vicar of Low Layton in Eſſex, and diſtinguiſhed himſelf by his compilations of Lives and Memoirs; in which, as Dr Birch remarks, his fidelity and induſtry will always give a value to his writings, however deſtitute they may be of the graces of ſtyle. He died in 1737, after having enjoyed his vicarage near 68 years.

STUCCO, in building, a compoſition of white marble pulverized, and mixed with plaſter of lime; and the whole being ſifted and wrought up with water is to be uſed like common plaſter: this is called by Pliny *marmoratum opus*, and *albarium opus*.

A patent has lately been granted to Mr B. Higgins for inventing a new kind of ſtucco or water-cement, more firm and durable than any heretofore. Its compoſition, as extracted from the ſpecification ſigned by himſelf, is as follows. " Drift-ſand, or quarry (A) ſand, which conſiſts chiefly of hard quartoſe flat-faced grains with ſharp angles; which is the freeſt, or may be moſt eaſily freed by waſhing, from clay, ſalts, and calcareous, gypſeous, or other grains leſs hard and durable than quartz; which contains the ſmalleſt quantity of pyrites or heavy metallic matter inſeparable by waſhing; and which ſuffers the ſmalleſt diminution of its bulk in waſhing in the following manner, is to be preferred before any other. And where a coarſe and a fine ſand of this kind, and correſponding in the ſize of their grains with the coarſe and fine ſands hereafter deſcribed, cannot be eaſily procured, let ſuch ſand of the foregoing quality be choſen as may be ſorted and cleanſed in the following manner.

" Let the ſand be ſifted in ſtreaming clear water, through a ſieve which ſhall give paſſage to all ſuch grains as do not exceed one-ſixteenth of an inch in diameter; and let the ſtream of water and the ſifting be regulated ſo that all the ſand, which is much finer than the Lynn-ſand commonly uſed in the London glaſs-houſes, together with clay and every other matter ſpecifically lighter than ſand, may be waſhed away with the ſtream, whilſt the purer and coarſer ſand, which paſſes through the ſieve, ſubſides in a convenient receptacle, and whilſt the coarſe rubbiſh and rubble remain on the ſieve to be rejected.

" Let the ſand which thus ſubſides in the receptacle be waſhed in clean ſtreaming water, through a finer ſieve, ſo as to be further cleanſed and ſorted into two parcels; a coarſer, which will remain in the ſieve which is to give paſſage to ſuch grains of ſand only as are leſs than one-thirtieth of an inch in diameter, and which is to be ſaved apart under the name of *coarſe ſand*; and a finer, which will paſs through the ſieve and ſubſide in the water, and which is to be ſaved apart under the name of *fine ſand*.—Let the coarſe and the fine ſand be dried ſeparately, either in the ſun or on a clean iron-plate ſet on a convenient furnace, in the manner of a ſand-heat (B).

" Let lime be choſen (C) which is ſtone-lime, which heats the moſt in ſlaking, and ſlakes the quickeſt when duly watered; which is the freſheſt made and cloſeſt kept; which diſſolves in diſtilled vinegar with the leaſt effervеſcence, and leaves the ſmalleſt reſidue inſoluble, and in this reſidue the ſmalleſt quantity of clay, gypſum, or martial matter.

(A) " This is commonly called *pit-ſand*.

(B) " The ſand ought to be ſtirred up continually until it is dried, and is then to be taken off; for otherwiſe the evaporation will be very ſlow, and the ſand which lies next the iron plate, by being overheated, will be diſcoloured.

(C) " The preference given to ſtone-lime is founded on the preſent practice in the burning of lime, and on the cloſer texture of it, which prevents it from being ſo ſoon injured by expoſure to the air, as the more ſpongy chalk-lime is; not on the popular notion that ſtone-lime has ſomething in it whereby it excels the beſt chalk in the cementing properties. The gypſum contained in lime-ſtone remains unaltered, or very little altered, in the lime, after the burning; but it is not to be expected that clay or martial matter ſhould be found in their native ſtate, in well-burned lime; for they concrete or vitrify with a part of the calcareous earth, and conſtitute the hard grains or lumps, which remain undiſſolved in weak acids, or are ſeparable from the ſlaked lime by ſifting it immediately through a ſieve.

“ Let the lime choſen according to theſe important rules, be put in a braſs-wired ſieve to the quantity of 14 pounds. Let the ſieve be finer than either of the foregoing ; the finer, the better it will be ; let the lime be ſlaked (D) by plunging it in a butt filled with ſoft water, and raiſing it out quickly and ſuffering it to heat and fume, and by repeating this plunging and raiſing alternately, and agitating the lime, until it be made to paſs through the ſieve into the water ; and let the part of the lime which does not eaſily paſs through the ſieve be rejected : and let freſh portions of the lime be thus uſed, until as many (E) ounces of lime have paſſed through the ſieve as there are quarts of water in the butt. Let the water thus impregnated ſtand in the butt cloſely covered (F) until it becomes clear ; and through wooden (G) cocks placed at different heights in the butt, let the clear liquor be drawn off as faſt (H) and as low as the lime ſubſides, for uſe. This clear liquor I call the *cementing liquor* (I). The freer the water is from ſaline matter, the better will be the cementing liquor made with it.

“ Let 56 pounds of the aforeſaid choſen lime be ſlaked, by gradually ſprinkling on it, and eſpecially on the unſlaked pieces, the cementing liquor, in a cloſe (K) clean place. Let the ſlaked part be immediately (L) ſifted thro' the laſt-mentioned fine braſs-wired ſieve : Let the lime which paſſes be uſed inſtantly or kept in air-tight veſſels, and let the part of the lime which does not paſs through the ſieve be rejected (M).—This finer richer part of the lime which paſſes through the ſieve I call *purified lime*.

“ Let bone-aſh be prepared in the uſual manner by grinding the whiteſt burnt bones, but let it be ſifted to be much finer than the bone-aſh commonly ſold for making cupels.

“ The moſt eligible materials for making my cement being thus prepared, take 56 pounds of the coarſe ſand and 42 pounds of the fine ſand ; mix them on a large plank of hard wood placed horizontally ; then ſpread the ſand ſo that it may ſtand to the height of ſix inches with a flat ſurface on the plank ; wet it with the cementing liquor ; and let any ſuperfluous quantity of the liquor, which the ſand in the condition deſcribed cannot retain, flow away off the plank. To the wetteſt ſand add 14 pounds of the putrefied lime in ſeveral ſucceſſive portions, mixing and beating them up together in the mean time with the inſtruments generally uſed in making fine mortar : then add 14 pounds of the bone-aſh in ſucceſſive portions, mixing and beating all together. The quicker and the more perfectly theſe materials are mixed and beaten together, and the ſooner the cement thus formed is uſed, the better (N) it will be. This I call the *water-cement coarſe-grained*, which is to be applied in building, pointing, plaſtering, ſtuccoing, or other work, as mortar and ſtucco now are ; with this difference chiefly, that as this cement is ſhorter than mortar or common ſtucco, and dries ſooner, it ought to be worked expeditiouſly in all caſes ; and in ſtuccoing, it ought to be laid on by ſliding the trowel upwards

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(D) “ This method of impregnating the water with lime is not the only one which may be adopted. It is however preferred before others, becauſe the water clears the ſooner in conſequence of its being warmed by the ſlaking lime ; and the gypſeous part of the lime does not diffuſe itſelf in the water ſo freely in this way as it does when the lime is ſlaked to fine powder in the common method, and is then blended with the water ; for the gypſeous part of the lime ſlakes at firſt into grains rather than into fine powder, and will remain on the ſieve after the pure lime has paſſed through, long enough to admit of the intended ſeparation ; but when the lime is otherwiſe ſlaked, the gypſeous grains have time to ſlake to a finer powder, and paſſing through the ſieve, diſſolve in the water along with the lime. I have imagined that other advantages attended this method of preparing the lime-water, but I cannot yet ſpeak of them with preciſion.

(E) “ If the water contains no more acidulous gas than is uſually found in river or rain water, a fourth-part of this quantity of lime, or leſs, will be ſufficient.

(F) “ The calcareous cruſt which forms on the ſurface of the water ought not to be broke, for it aſſiſts in excluding the air, and preventing the abſorption of acidulous gas whereby the lime-water is ſpoiled.

(G) “ Braſs-cocks are apt to colour a part of the liquor.

(H) “ Lime-water cannot be kept many days unimpaired, in any veſſels that are not perfectly air-tight. If the liquor be drawn off before it clears, it will contain whiting, which is injurious ; and if it be not inſtantly uſed after it is drawn limpid from the butt into open veſſels, it will grow turbid again, and depoſit the lime changed to whiting by the gas abſorbed from the air. The calcareous matter which ſubſides in the butt reſembles whiting the more nearly as the lime has been more ſparingly employed ; in the contrary circumſtances, it approaches to the nature of lime ; and in the intermediate ſtate, it is fit for the common compoſition of the plaſterers for inſide ſtucco.

(I) “ At the time of writing this ſpecification, I preferred this term before that of lime-water, on grounds which I had not ſufficiently examined.

(K) “ The vapour which ariſes in the ſlaking of lime contributes greatly to the ſlaking of theſe pieces which lie in its way ; and an unneceſſary waſte of the liquor is prevented, by applying it to the lime heaped in a pit or in a veſſel, which may reſtrain the iſſue of the vapour, and direct it through the maſs. If more of the liquor be uſed than is neceſſary to ſlake the lime, it will create error in weighing the ſlaked powder, and will prevent a part of it from paſſing freely through the ſieve. The liquid is therefore to be uſed ſparingly, and the lime which has eſcaped its action is to be ſprinkled apart with freſh liquor.

(L) “ When the aggregation of the lumps of lime is thus broken, it is impaired much ſooner than it is in the former ſtate, becauſe the air more freely pervades it.

(M) “ Becauſe it conſiſts of heterogeneous matter or of ill-burnt lime ; which laſt will flake and paſs through the ſieve, if the lime be not immediately ſifted after the ſlaking, agreeable to the text.

(N) “ Theſe proportions are intended for a cement made with ſharp ſand, for incruſtation in expoſed ſituations, where it is neceſſary to guard againſt the effects of hot weather and rain. In general, half this quantity of bone-aſhes will be found ſufficient; and although the incruſtation in this latter caſe will not harden deeply ſo ſoon, it will be ultimately ſtronger, provided the weather be favourable.

“ The injuries which lime and mortar ſuſtain by expoſure to the air, before the cement is finally placed in a quieſcent ſtate, are great ; and therefore our cement is the worſe for being long beaten, but the better as it is quickly beaten until the mixture is effected, and no longer.

upwards on it; that the materials uſed along with this cement in building, or the ground on which it is to be laid in ſtuccoing, ought to be well wetted with the cementing liquor in the inſtant of laying on the cement; and that the cementing liquor is to be uſed when it is neceſſary to moiſten the cement, or when a liquid is required to facilitate the floating of the cement.

“ When ſuch cement is required to be of a finer texture, take 98 pounds of the fine ſand, wet it with the cementing liquor, and mix it with the purified lime and the bone-aſh in the quantities and in the manner above deſcribed; with this difference only, that 15 pounds of lime, or (o) thereabouts, are to be uſed inſtead of 14 pounds, if the greater part of the ſand be as fine as Lynn ſand. This I call *water-cement fine-grained.* It is to be uſed in giving the laſt coating, or the finiſh to any work intended to imitate the finer-grained ſtones or ſtucco. But it may be applied to all the uſes of the water-cement coarſe-grained, and in the ſame manner.

“ When for any of the foregoing purpoſes of pointing, building, &c. ſuch a cement is required much cheaper and coarſer-grained, then much coarſer clean ſand than the foregoing coarſe ſand, or well-waſhed fine rubble, is to be provided. Of this coarſeſt ſand or rubble take 56 pounds, of the foregoing coarſe ſand 28 pounds, and of the fine ſand 14 pounds; and after mixing theſe, and wetting them with the cementing liquor in the foregoing manner, add 14 pounds, or ſomewhat leſs, of the (p) purified lime, and then 14 pounds, or ſomewhat leſs, of the bone-aſh, mixing them together in the manner already deſcribed. When my cement is required to be white, white ſand, white lime, and the whiteſt bone-aſh, are to be choſen. Grey ſand, and grey bone-aſh formed of half-burnt bones, are to be choſen to make the cement grey; and any other colour of the cement is obtained, either by chooſing coloured ſand, or by the admixture of the neceſſary quantity of coloured talc in powder, or of coloured vitreous or metallic powders, or other durable colouring ingredients commonly uſed in paint.

“ To the end that ſuch a water cement as I have deſcribed may be made as uſeful as it is poſſible in all circumſtances; and that no perſon may imagine that my claim and right under theſe letters-patent may be eluded by divers variations which may be made in the foregoing proceſs without producing any notable defect in the cement; and to the end that the principles of this art, as well as the art itſelf, of making my cement, may be gathered from this ſpecification and perpetuated to the public; I ſhall add the following obſervations.

“ This my water-cement, whether the coarſe or fine grained, is applicable in forming artificial ſtone, by making alternate layers of the cement and of flint, hard ſtone, or brick, in moulds of the figure of the intended ſtone, and by expoſing the maſſes ſo formed to the open (q) air to harden.

“ When ſuch cement is required for water (r) fences, two-thirds of the preſcribed quantity of bone-aſhes are to be omitted; and in the place thereof an equal meaſure of powdered terras is to be uſed; and if the ſand employed be not of the coarſeſt ſort, more terras muſt be added, ſo that the terras ſhall be by weight one-ſixth part of the weight of the ſand.

“ When ſuch a cement is required of the fineſt grain (s) or in a fluid form, ſo that it may be applied with a bruſh, flint-powder, or the powder of any quartoſe or hard earthy ſubſtance, may be uſed in the place of ſand; but in a quantity ſmaller as the flint or other powder is finer; ſo that the flint-powder, or other ſuch powder, ſhall not be more than ſix times the weight of the lime, nor leſs than four times its weight. The greater the quantity of lime within theſe limits, the more will the cement be liable to crack by quick drying, and *vice verſa*.

“ Where ſuch ſand as I prefer cannot be conveniently procured, or where the ſand cannot be conveniently waſhed and ſorted, that ſand which moſt reſembles the mixture of coarſe and fine ſand above preſcribed, may be uſed as I have directed, provided due attention is paid to the quantity of the lime, which is to be the greater (t) as the ſand is the finer, and *vice verſa*.

“ Where ſand cannot be eaſily procured, any durable ſtony body, or baked earth groſsly powdered (u) and ſorted nearly to the ſizes above preſcribed for ſand, may be uſed in the place of ſand, meaſure for meaſure, but not weight for weight, unleſs ſuch groſs powder be as heavy ſpecifically as ſand.

(o) “ The quantity of bone-aſhes is not to be increaſed with that of the lime; but it is to be leſſened as the expoſure and purpoſes of the work will admit.

(p) “ Becauſe leſs lime is neceſſary, as the ſand is coarſer.

(q) “ But they muſt not be expoſed to the rain until they are almoſt as ſtrong as freſh Portland ſtone; and even then they ought to be ſheltered from it as much as the circumſtances will admit. Theſe ſtones may be made very hard and beautiful, with a ſmall expence of bone-aſh, by ſoaking them, after they have dried thoroughly and hardened, in the lime-liquor, and repeating this proceſs twice or thrice, at diſtant intervals of time. The like effect was experienced in incruſtations.

(r) “ In my experiments, mortar made with terras-powder, in the uſual method, does not appear to form ſo ſtrong a cement for water-fences as that made, according to the ſpecification, with coarſe ſand; and I ſee no more reaſon for avoiding the uſe of ſand in terras-mortar, than there would be for rejecting ſtone from the embankment. The bone-aſhes meant in this place are the dark grey or black ſort. I am not yet fully ſatisfied about the operation of them in this inſtance.

(s) “ The qualities and uſes of ſuch fine calcareous cement are recommended chiefly for the purpoſe of ſmoothing and finiſhing the ſtronger cruſtaceous works, or for waſhing walls to a lively and uniform colour. For this laſt intention, the mixture muſt be as thin as new cream, and laid on briſkly with a bruſh, in dry weather; and a thick and durable coat is to be made by repeated waſhing; but is not to be attempted by uſing a thicker liquor; for the coat made with this laſt is apt to ſcale, whilſt the former endures the weather much longer than any other thin calcareous covering that has been applied in this way. Fine yellow ochre is the cheapeſt colouring-ingredient for ſuch waſh, when it is required to imitate Bath-ſtone, or the warm-white ſtones.

(t) “ If ſea-ſand be well waſhed in freſh water, it is as good as any other round ſand.

(u) “ The cement made with theſe and the proper quantities of purified lime and lime-water, are inferior to the beſt,

"Sand may be cleanſed from every ſofter, lighter, and leſs durable matter, and from that part of the ſand which is too fine, by various methods preferable (x), in certain circumſtances, to that which I have deſcribed.

"Water may be found naturally free from fixable gas, ſelenite, or clay: ſuch water may, without any notable inconvenience, be uſed in the place of the cementing liquor; and water approaching this ſtate will not require ſo much lime as I have ordered to make the cementing liquor; and a cementing liquor ſufficiently uſeful may be made by various methods of mixing lime and water in the deſcribed proportions, or nearly ſo.

"When ſtone-lime cannot be procured, chalk-lime or ſhell-lime, which beſt reſembles ſtone-lime, in the characters above written of lime, may be uſed in the manner deſcribed, except that fourteen pounds and a half of chalk-lime will be required in the place of fourteen pounds of ſtone-lime. The proportion of lime which I have preſcribed above may be increaſed without inconvenience, when the cement or ſtucco is to be applied where it is not liable to dry quickly; and in the contrary circumſtance this proportion may be diminiſhed; and the defect of lime in quantity or quality may be very advantageouſly ſupplied (y), by cauſing a conſiderable quantity of the cementing liquor to ſoak into the work, in ſucceſſive portions and at diſtant intervals of time, ſo that the calcareous matter of the cementing liquor, and the matter attracted from the open air, may fill and ſtrengthen the work.

"The powder of almoſt every well-dried or burnt animal-ſubſtance may be uſed inſtead of bone-aſh; and ſeveral earthy powders, eſpecially the micaceous and the metallic; and the elixated aſhes of divers vegetables whoſe earth will not burn to lime; and the aſhes of mineral fuel, which are of the calcareous kind, but will not burn to lime, will anſwer the ends of bone-aſh in ſome degree.

"The quantity of bone-aſh deſcribed may be leſſened without injuring the cement, in thoſe circumſtances eſpecially which admit the quantity of lime to be leſſened, and in thoſe wherein the cement is not liable to dry quickly. And the art of remedying the defects of lime may be advantageouſly practiſed to ſupply the deficiency of bone-aſh, eſpecially in building and in making artificial ſtone with this cement.

STUDDING sails, certain light ſails extended, in moderate and ſteady breezes, beyond the ſkirts of the principal ſails, where they appear as wings upon the yard-arms.

STUFF, in commerce, a general name for all kinds of fabrics of gold, ſilver, ſilk, wool, hair, cotton, or thread, manufactured on the loom; of which number are velvets, brocades, mohairs, ſatins, teffeties, cloths, ſerges, &c.

STUKELY (Dr William), a celebrated antiquarian, deſcended from an ancient family in Lincolnſhire, was born at Holbech in 1687, and educated in Bennet college, Cambridge. While an under-graduate, he often indulged a ſtrong propenſity to drawing and deſigning; but made phyſic his principal ſtudy, and firſt began to practiſe at Boſton in his native country. In 1717, he removed to London; where, on the recommendation of Dr Mead, he was ſoon after elected a fellow of the royal ſociety: he was one of the firſt who revived that of the antiquarians in 1718, and was their ſecretary for many years during his reſidence in town. In 1729, he took holy orders by the encouragement of archbiſhop Wake; and was ſoon after preſented by lord chancellor King with the living of All-Saints in Stamford. In 1741, he became one of the founders of the Egyptian ſociety, which brought him acquainted with the benevolent duke of Montague, one of the members; who prevailed on him to leave Stamford, and preſented him to the living of St George the Martyr, Queen Square. He died of a ſtroke of the palſy in 1765. In his phyſical capacity, his *Diſſertation on the Spleen* was well received; and his *Itinerarium Curioſum*, the firſt-fruit of his juvenile excurſions, was a good ſpecimen of what was to be expected from his riper age. His great learning, and profound reſearches into the dark remains of antiquity, enabled him to publiſh many elaborate and curious works: his friends uſed to call him the *arch-druid* of his age. His diſcourſes, intitled *Palæographia Sacra*, on the vegetable creation, beſpeak him a botaniſt, philoſopher, and divine.

STUM, in the wine-trade, denotes the unfermented juice of the grape after it has been ſeveral times racked off and ſeparated from its ſediment. The caſks are for this purpoſe well matched or fumigated with brimſtone every time, to prevent the liquor from fermenting, as it would otherwiſe readily do, and become wine.

STUPIDITY. The Greek word μωρωσις correſponds moſt with our Engliſh word *ſtupidity* or *fooliſhneſs*, (in the common acceptation of it), which is, when reaſon is rendered ſomewhat defective. The immediate cauſes are, a deficiency of vital heat, or a defect in the brain. Stupid children ſometimes become ſprightly youths; but if ſtupidity continues to the age of puberty, is is hardly ever removed. If ſtupidity follows upon a violent paſſion, an injury done to the head, or other evident cauſe, if it continues long, it becomes incurable. But the ſtupidity which conſiſts in a loſs of memory, and ſucceeds a lethargy, ſpontaneouſly ceaſes when the lethargy is cured.

STUPOR, a numbneſs in any part of the body, whether occaſioned by ligatures obſtructing the blood's motion, by the palſy, or the like.

STUPPA,

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beſt, as the grains of theſe powders are more periſhable and brittle than thoſe of ſand. They will not therefore be employed, unleſs for the ſake of evaſion, or for want of ſand: in this latter caſe, the finer powder ought to be waſhed away.

(x) "This and the next paragraph is inſerted with a view to evaſions, as well as to ſuggeſt the eaſier and cheaper methods which may be adopted in certain circumſtances, by artiſts who underſtand the principles which I endeavoured to teach.

(y) "This practice is noticed, as the remedy which may be uſed for the defects ariſing from evaſive meaſures, and as the method of giving ſpongy incruſtations containing bone-aſhes the greateſt degree of hardneſs."

STUPPA, or Stupe, in medicine, is a piece of cloth dipped in ſome proper liquor, and applied to an affected part.

STURGEON. See Accipenser.

STURMIUS (John), a learned philologer and rhetorician, was born at Sleida in Eiſel near Cologne in 1507. He ſtudied at firſt in his native country with the ſons of count de Manderſcheid, whoſe receiver his father was. He afterward purſued his ſtudy at Liege in the college of St Jerom, and then went to Louvain in 1524. Five years he ſpent there, three in learning and two in teaching. He ſet up a printing-preſs with Rudger Reſcius profeſſor of the Greek tongue, and printed ſeveral Greek authors. He went to Paris in 1529, where he was highly eſteemed, and read public lectures on the Greek and Latin writers, and on logic. He married there, and kept a great number of boarders: but as he liked what were called the *new opinions*, he was more than once in danger; and this undoubtedly was the reaſon why he removed to Straſburg in 1537, in order to take poſſeſſion of the place offered him by the magiſtrates. The year following he opened a ſchool, which became famous, and by his means obtained of Maximilian II. the title of an univerſity in 1566. He was very well ſkilled in polite literature, wrote Latin with great purity, and was a good teacher. His talents were not confined to the ſchool; for he was frequently intruſted with deputations in Germany and foreign countries, and diſcharged theſe employments with great honour and diligence. He ſhowed extreme charity to the refugees on account of religion: He not only laboured to aſſiſt them by his advice and recommendations; but he even impoveriſhed himſelf for them. He died in his 82d year, after he had been for ſome time blind. He publiſhed many books; the principal of which are, 1. *Partitiones Dialecticæ.* 2. *De Educatione Principum.* 3. *De Nobilitate Anglicana.* 4. *Linguæ Latinæ reſolvendæ Ratio.* 5. Excellent Notes on Ariſtotle's and Hermogeneus's Rhetoric, &c.

He ought not to be confounded with *John Sturmius*, a native of Mechlin, and phyſician and profeſſor of mathematics at Louvain, who alſo wrote ſeveral works.

STURNUS, the starling; a genus belonging to the order of paſſeres. The beak is ſubulated, depreſſed, and ſomewhat blunt; the ſuperior mandible is entire, and ſomewhat open at the edges; the noſtrils are marginated above; and the tongue is ſharp and emarginated. There are five ſpecies, the principal of which are,

1. The vulgaris, or ſtare. The weight of the male of this ſpecies is about three ounces; that of the female rather leſs. The length is eight inches three quarters: the breadth fourteen inches. Bill, in old birds, yellow. The whole plumage is black, very reſplendent, with changeable blue, purple, and copper: each feather marked with a pale yellow ſpot. The leſſer coverts are edged with yellow, and ſlightly gloſſed with green. The quill-feathers and tail duſky: the former edged with yellow on the exterior ſide; the laſt with dirty white. The legs of a reddiſh brown.—The ſtare breeds in hollow trees, eaves of houſes, towers, ruins cliffs, and often in high rocks over the ſea, ſuch as that of the iſle of Wight. It lays four or five eggs, of a pale-greeniſh aſh-colour; and makes its neſt of ſtraw, ſmall fibres of roots, and the like. In winter, ſtares aſſemble in vaſt flocks: they collect in myriads in the fens of Lincolnſhire, and do great damage to the fen-men, by rooſting on the reeds, and breaking them down by their weight; for reeds are the thatch of the country, and are harveſted with great care. Theſe birds feed on worms and inſects; and it is ſaid that they will get into pigeon-houſes, for the ſake of ſucking the eggs. Their fleſh is ſo bitter as to be ſcarce eatable. They are very docile, and may be taught to ſpeak.

2. The cinclus, or water-ouzel, weighs two ounces and a half: the length ſeven inches one quarter: the breadth eleven: the bill is narrow, and compreſſed ſideways: the eyelids are white; the head, cheeks, and hinder part of the neck, are duſky, mixed with ruſt-colour: the back, coverts of the wings, and of the tail, alſo duſky, edged with bluiſh aſh-colour: the throat and breaſt white: the belly ferruginous, vent-feathers a deep aſh-colour: the legs are of a pale blue before, black behind: the tail ſhort and black, which it often flirts up as it is ſitting.—This bird frequents ſmall brooks, particularly thoſe with ſteep banks, or that run through a rocky country. It is of a very retired nature, and never ſeen but ſingle or with its mate. It breeds in holes in the banks, and lays five white eggs adorned with a fine bluſh of red. It feeds on inſects and ſmall fiſh; and, as Mr Willughby obſerves, though not web-footed, will dart itſelf after them quite under water. The neſt is conſtructed in a curious manner, of hay and fibres of roots, and lined with dead oak-leaves, having a portico or grand entrance made with green moſs.

STYE, or Stythe, in the eye. See Crithe.

STYLE, a word of various ſignifications, originally deduced from *ſtylos*, a kind of bodkin wherewith the ancients wrote on plates of lead, or on wax, &c. and which is ſtill uſed to write on ivory-leaves and paper prepared for that purpoſe, &c.

Style, in dialling, denotes the gnomon or cock of a dial raiſed on the plane thereof to project a ſhadow.

Style, in botany. See there, p. 1296.

Style, in matters of language, a particular manner of expreſſing one's thoughts agreeably to the rules of ſyntax; or, as F. Buffier more accurately defines it, the manner wherein the words are arranged among themſelves ſuitably to the genius of the language. See Oratory, n° 99—121.

Style, in juriſprudence, the particular form or manner of proceeding in each court of juriſdiction, agreeable to the rules and orders eſtabliſhed therein: thus we ſay, the ſtyle of the court of Rome, of chancery, of parliament, of the privy-council, &c.

Style, in muſic, denotes a peculiar manner of ſinging, playing, or compoſing; being properly the manner that each perſon has of playing, ſinging, or teaching; which is very different both in reſpect of different geniuſes, of countries, nations, and of the different matters, places, times, ſubjects, paſſions, expreſſions, &c. Thus we ſay, the ſtyle of Paleſtrina, of Lully, of Corelli, of Handel, &c.; the ſtyle of the Italians, French, Spaniards, &c.

Old Style, the Julian method of computing time, as the *New* Style is the Gregorian method of computation. See Astronomy, n° 295.

STYLET, a ſmall dangerous kind of poniard which may be concealed in the hand, chiefly uſed in treacherous aſſaſſinations. The blade is uſually triangular, and ſo ſmall that the wound it makes is almoſt imperceptible.

STYLITES, or PILLAR SAINTS, an appellation given to a kind of ſolitaries who ſpent their lives on the tops of columns, to be, as they imagined, the better diſpoſed for meditation, &c. See ECCLESIASTICAL HISTORY, n° 79. The extremity of theſe columns were only three feet in diameter, with a kind of rail or ledge about it, that reached almoſt to the girdle, ſomewhat reſembling a pulpit. The faquirs, or devout people of the eaſt, imitate this extraordinary kind of life even to this day.

STYLO-GLOSSUS,
STYLO-*Hyoidæus*,
STYLO-*Pharyngæus*,
STYLOIDES,
} The names of different muſcles in the human body. See ANATOMY, *Table of the Muſcles*.

STYPTIC, in pharmacy, medicines which by their aſtringency ſtop hæmorrhages, &c.

STYRAX, the STORAX-TREE; a genus of the monogynia order, belonging to the dodecandria claſs of plants. There is but one ſpecies, viz. the officinalis. It is a native of Paleſtine, Syria, the iſlands of the Archipelago, and alſo grows plentifully in the neighbourhood of Rome. It riſes with a woody ſtalk 12 or 14 feet high, ſending out many ligneous branches covered with a greyiſh bark. The flowers come out from the ſides of the branches upon footſtalks, which ſuſtain five or ſix flowers in a bunch; theſe have one very white petal, which is funnel-ſhaped, the lower part being tubulous and cylindrical, and the upper divided into five obtuſe ſegments which ſpread open, not flat, but rather inclining to an angle.—It may be propagated by ſowing the ſeeds in pots plunged in a moderate hot-bed, towards the latter end of ſummer. The gum of this tree is very fragrant, and is uſed in medicine. See STORAX.

STYX, (anc. geog.), a fountain dropping a deadly water, accounted ſacred, between Monacris and Pheneus in Arcadia.—*Styx*, a lake of Theſſaly, from which the river Titareſſus ran, (Pliny).—A river of hell, (Homer, Heſiod, Virgil, Ovid); held in ſuch veneration by the gods, that an oath of any god by it was inviolable; and whatever god preſumed to break it was ſtript of divinity, and debarred nectar for 100 years.

SUBALTERN, a ſubordinate officer, or one who diſcharges his poſt under the command and ſubject to the direction of another; ſuch are lieutenants, ſublieutenants, coronets, and enſigns, who ſerve under the captain.

SUBCLAVIAN, in anatomy, is applied to any thing under the arm-pit or ſhoulder, whether artery, nerve, vein, or muſcle.

SUBDOMINANT, in muſic, a name given by M. Rameau to the fourth note of the tone, which of conſequence is the ſame interval from the tonic when deſcending as the dominant in riſing. This denomination ariſes from the affinity which this author finds by inverſion between the minor mode of the ſubdominant and the major mode of the tonic.

SUBER, the CORK-TREE, in botany. See QUERCUS.

SUBJECT, a perſon under the rule and dominion of a ſovereign prince or ſtate.

SUBJECT is alſo uſed for the matter of an art or ſcience, or that which it conſiders, or whereon it is employed: thus the human body is the ſubject of medicine.

SUBINFEUDATION, was where the inferior lords, in imitation of their ſuperiors, began to carve out and grant to others minuter eſtates than their own, to be held of themſelves; and were ſo proceeding downwards *in infinitum*, till the ſuperior lords obſerved, that by this method of ſubinfeudation they loſt all their feodal profits, of wardſhips, marriages, and eſtreats, which fell into the hands of theſe meſne or middle lords, who were the immediate ſuperiors of the terretenant, or him who occupied the land. This occaſioned the ſtat. of Weſtm. 3. or *quia emptores*, 18 Ed. I. to be made; which directs, that, upon all ſales or feoffments of lands, the feoffee ſhall hold the ſame, not of his immediate feoffer, but of the chief lord of the fee of whom ſuch feoffer himſelf held it. And from hence it is held, that all manors exiſting at this day muſt have exiſted by immemorial preſcription; or at leaſt ever ſince the 18 Ed. I. when the ſtatute of *quia emptores* was made.

SUBJUNCTIVE, in grammar. See GRAMMAR.

SUBLIMATE, a chemical preparation, conſiſting of quickſilver united with the marine acid. See CHEMISTRY, n° 251.

SUBLIMATION, in chemiſtry, the condenſing and collecting, in a ſolid form, by means of veſſels aptly conſtructed, the fumes of bodies raiſed from them by the application of a proper heat. See CHEMISTRY, n° 82.

SUBLIME, or SUBLIMITY. See GRANDEUR, and ORATORY, n° 111, 112.

SUBORDINATION, a relative term, expreſſing the degree of inferiority betwixt one thing and another.

SUBORNATION, in law, a ſecret, underhand, preparing, inſtructing or bringing in a falſe witneſs; and from hence *ſubornation of perjury* is the preparing or corrupt alluring to perjury. Subornation of witneſſes we read of in the 32 Hen. 8. c. 9. And in procuring or ſuborning a witneſs to give falſe teſtimony in any court of record concerning lands or goods, the offender ſhall forfeit 40 l. or ſuffer impriſonment for half a year, ſtand on the pillory, &c. by 6th Eliz. c. 9.

SUBPŒNA, in law, a writ whereby common perſons are called into chancery, in ſuch caſes where the common law hath provided no ordinary remedy; and the name of it proceeds from the words therein, which charge the party called to appear at the day and place aſſigned, *ſub pœna centum librarum*, &c. The ſubpœna is the leading proceſs in the courts of equity; and by ſtatute, when a bill is filed againſt any perſon, proceſs of ſubpœna ſhall be taken out to oblige the defendant to appear and anſwer the bill, &c.

SUBPOENA *ad teſtificandum*, a writ or proceſs, to bring in witneſſes to give their teſtimony. If a witneſs on being ſerved with this proceſs does not appear, the court will iſſue an attachment againſt him; or a party, plaintiff or defendant, injured by his non-attendance, may maintain an action againſt the witneſs. See *Blackſt. Com.* vol. III. p. 369.

SUBPOENA *in Equity*, a proceſs in equity, calling on a defendant to appear and anſwer to the complainant's ant's bill. See ſtat. 5th Geo. II. c. 25. which enacts, that where the party cannot be found to be ſerved with a ſubpœna, and abſconds (as believed) to avoid being ſerved, a day ſhall be appointed him to appear to the bill of the plaintiff; which is to be inſerted in the London Gazette, read in the pariſh-church where the defendant laſt lived, and fixed up at the Royal Exchange: and if the defendant doth not appear upon that day, the bill ſhall be taken *pro confeſſo*.

SUBREPTITIOUS, a term applied to a letter, licence, patent, or other act, fraudulently obtained of a ſuperior, by concealing ſome truth which, had it been known, would have prevented the conceſſion or grant.

SUBSCRIPTION, in general, ſignifies the ſignature put at the bottom of a letter, writing, or inſtrument.

In commerce, it is uſed for the ſhare or intereſt which particular perſons take in a public ſtock or a trading-company, by writing their names, and the ſhares they require, in the books or regiſter thereof.

Subscription, in the commerce of books, ſignifies an engagement to take a certain number of copies of a book intended to be printed, and a reciprocal obligation of the bookſeller or publiſher to deliver the ſaid copies, on certain terms.—Theſe ſubſcriptions, which had their riſe in England about the middle of the laſt century, are now become frequent in France and Holland, but exceedingly more ſo of late among ourſelves.

SUBSEQUENT, ſomething that comes after another, particularly with regard to the order of time.

SUBSIDY, in law, ſignifies an aid or tax granted to the king by parliament, for the neceſſary occaſions of the kingdom; and is to be levied on every ſubject of ability, according to the rate or value of his lands or goods: but this word, in ſome of our ſtatutes, is confounded with that of cuſtoms. See Tax.

SUBSTANCE, ſomething that we conceive to ſubſiſt of itſelf, independently of any created being, or any particular mode or accident. See Metaphysics, n° 50, 52, 87—93, 137, 148, &c.

SUBSTANTIAL, in the ſchools, ſomething belonging to the nature of ſubſtance.

SUBSTANTIVE, in grammar. See Grammar.

SUBSTITUTE, a perſon appointed to officiate for another, in caſe of abſence or other legal impediment.

SUBSTITUTION, in the civil law, a diſpoſition of a teſtament, whereby the teſtator ſubſtitutes one heir for another, who has only the uſufruit, and not the property, of the thing left him.

SUBSTRACTION, or Subtraction, in arithmetic, the ſecond rule, or rather operation, in arithmetic, whereby we deduct a leſs number from a greater, to learn their preciſe difference. See Arithmetic.

Substraction, in algebra. See Algebra.

SUBTERRANEOUS, whatever is under ground: thus naturaliſts ſpeak of ſubterraneous fires, ſubterraneous damps, &c.

SUBTILE, in phyſics, an appellation given to whatever is extremely ſmall, fine, and delicate; ſuch as the animal-ſpirits, the effluvia of odorous bodies, &c. are ſuppoſed to be.

SUBULATED, ſomething ſhaped like an awl.

SUCCEDANEUM, in pharmacy, denotes a drug ſubſtituted in the place of another, in medical compoſition.

SUCCESSION, in philoſophy, an idea which we get by reflecting on that train of ideas conſtantly following one another in our minds when awake. See Metaphysics, n° 61.

Succession, in law. See Descent.

Succession *to the Crown*. See Hereditary *Right*.—From the days of Egbert, the firſt ſole monarch of England, even to the preſent, the four cardinal maxims mentioned in that article have ever been held conſtitutional canons of ſucceſſion. It is true, as Sir William Blackſtone obſerves, this ſucceſſion, through fraud or force, or ſometimes through neceſſity, when in hoſtile times the crown deſcended on a minor or the like, has been very frequently ſuſpended; but has generally at laſt returned back into the old hereditary channel, though ſometimes a very conſiderable period has intervened. And, even in thoſe inſtances where the ſucceſſion has been violated, the crown has ever been looked upon as hereditary in the wearer of it. Of which the uſurpers themſelves were ſo ſenſible, that they for the moſt part endeavoured to vamp up ſome feeble ſhow of a title by deſcent, in order to amuſe the people, while they gained the poſſeſſion of the kingdom. And, when poſſeſſion was once gained, they conſidered it as the purchaſe or acquiſition of a new eſtate of inheritance, and tranſmitted or endeavoured to tranſmit it to their own poſterity, by a kind of hereditary right of uſurpation. See *Blackſt. Com.* v. i. 197—216. From the hiſtorical view there given, it appears, that the title to the crown is at preſent hereditary, though not quite ſo abſolutely hereditary as formerly: and the common ſtock, or anceſtor, from whom the deſcent muſt be derived, is alſo different. Formerly, the common ſtock was king Egbert; then William the conqueror; afterwards, in James I.'s time, the two common ſtocks united; and ſo continued till the vacancy of the throne in 1688: now it is the princeſs Sophia, in whom the inheritance was veſted by the new king and parliament. Formerly, the deſcent was abſolute, and the crown went to the next heir without any reſtriction: but now, upon the new ſettlement, the inheritance is conditional; being limited to ſuch heirs only, of the body of the princeſs Sophia, as are Proteſtant members of the church of England, and are married to none but Proteſtants.

And in this due medium conſiſts the true conſtitutional notion of the right of ſucceſſion to the imperial crown of theſe kingdoms. The extremes between which it ſteers are each of them equally deſtructive of thoſe ends for which ſocieties were formed and are kept on foot. Where the magiſtrate, upon every ſucceſſion, is elected by the people, and may by the expreſs proviſion of the laws be depoſed (if not puniſhed) by his ſubjects, this may ſound like the perfection of liberty, and look well enough when delineated on paper; but in practice will be ever productive of tumult, contention, and anarchy. And, on the other hand, divine indefeaſible hereditary right, when coupled with the doctrine of unlimited paſſive obedience, is ſurely of all conſtitutions the moſt thoroughly ſlaviſh and dreadful. But when ſuch an hereditary right as our laws have created and veſted in the royal ſtock, is cloſely interwoven with thoſe liberties which are equally the inheritance of the ſubject; this union will form a conſtitution, in theory the moſt beautiful of any, in practice the moſt approved, and, we truſt, in duration the moſt permanent.

SUCCORY, in botany. See CICHORIUM.

SUCCOTH, (anc. geog.); a place beyond Jordan, over-againſt Zortan on this ſide; ſo called from Jacob's fixing his tents there.—Another *Succoth*, the firſt manſion of the Iſraelites after their departure from Rameſes towards the Red Sea.

SUCCUBUS, a term uſed by ſome writers for a dæmon who aſſumes the ſhape of a woman, and as ſuch lies with a man; in which ſenſe it ſtands oppoſed to *incubus*, which was a dæmon in form of a man, that lies with a woman. But the truth is, the ſuccubus is only a ſpecies of the night-mare. See MEDICINE, n° 430.

SUCKER, in ichthyology. See CYCLOPTERUS.

SUCKERS, in gardening, the ſame with OFFSETS.

SUCKING-FISH. See ECHENEIS.

SUCKLING (Sir John), an Engliſh poet and dramatic writer, was the ſon of Sir John Suckling, comptroller of the houſehold to king Charles I. and born at Witham in Eſſex in 1613. He diſcovered an uncommon propenſity to the acquiring of languages, inſomuch that he is reported to have ſpoken Latin at five years of age, and to have wrote it at nine. When he was grown up, he travelled; but ſeems to have affected nothing more than the character of a courtier and fine gentleman; which he ſo far attained, that he was allowed to have the peculiar happineſs of making every thing he did become him. In his travels he made a campaign under the great Guſtavus Adolphus; and his loyalty, if not his valour, appeared in the beginning of our civil wars: for, after his return to England, he raiſed a troop of horſe for the king's ſervice, entirely at his own charge; and mounted them ſo completely and richly, that they are ſaid to have coſt him 12,000 l. This troop, with Sir John at its head, behaved ſo ill in the engagement with the Scots, upon the Engliſh borders, in 1639, as to occaſion the famous lampoon compoſed by Sir John Mennis; "Sir John he got him an ambling nag, &c." This ballad, which was ſet to a briſk tune, was much ſung by the parliamentarians, and continues to be ſung to this day. This diſaſtrous expedition, and the ridicule that attended it, was ſuppoſed to have haſtened his death; being ſeized by a fever, of which he died, at 28 years of age. He was a ſprightly wit, and an eaſy verſifier, but no great poet. His works, conſiſting of a few poems, letters, and plays, have nevertheleſs gone thro' ſeveral editions.

SUCTION, the act of ſucking or drawing up a fluid, as air, water, milk, or the like, by means of the mouth and lungs; or, in a ſimilar manner, by artificial means. See PNEUMATICS and HYDROSTATICS.

SUDATORY, a name given by the ancient Romans to their hot or ſweating rooms; ſometimes alſo called *Laconica*.

SUDORIFIC, an appellation given to any medicine that cauſes or promotes ſweat.

SUESSIONES, a branch of the Remi, a people of Gallia Belgica, (Pliny); called ſometimes *Sueſſones*, in the lower age *Sueſſi*; ſituated between the Remi to the eaſt, the Nervii to the north, the Veromandui to the weſt, and the Meldæ to the ſouth, in the tract now called *le Soiſſonois*.—*Sueſſiones*, *Sueſſones*, and *Sueſſonæ*, the name of their city in the lower age; thought to have been formerly called *Noviodunum*, (Cæſar.) Now *Soiſſons*.

SUET, SEVUM, or *Sebum*, in anatomy, the ſolid fat found in ſeveral animals, as ſheep, oxen, &c. but not in the human ſpecies. See the article FAT.—It is of the ſevum that tallow is made. See TALLOW.

SUETONIUS TRANQUILLUS (Caius), a famous Latin hiſtorian, was born at Rome, and became ſecretary to the emperor Adrian about the 118th year of the Chriſtian æra; but that poſt was taken from him three years after, when ſeveral perſons fell under that prince's diſpleaſure for not ſhowing the empreſs Sabina all the reſpect ſhe deſerved. During his diſgrace he compoſed many works, which are loſt. Thoſe now extant are his Hiſtory of the XII firſt Emperors, and a part of his Treatiſe of the illuſtrious Grammarians and Rhetoricians. Pliny the Younger was his intimate friend, and perſuaded him to publiſh his books. His Hiſtory of the XII Roman Emperors is very much commended by moſt of our learned humaniſts. He repreſents, in a continued ſeries of choice and curious particulars, without any digreſſions or reflections, the actions of the emperors, without omitting their vices, which he expoſes with all their deformity, and with the ſame freedom mentions the good qualities of the very ſame perſons; but the horrid diſſoluteneſs and obſcene actions he relates of Tiberius, Caligula, Nero, &c. have made ſome ſay, that he wrote the lives of the emperors with the ſame licentiouſneſs with which they lived. The edition of this hiſtory procured by Grævius at Utrecht in 1672, with the excellent Commentaries of Torrentius and Caſaubon, and the notes of ſome other learned critics, is much eſteemed. That edition was reprinted in 1691.

SUEVI, the Catti or Chatti of Cæſar, (Strabo); placed on the Rhine: the reaſon of Cæſar's calling them thus does not appear, though conſiderably diſtant from the proper Suevi or Alemanni.

SUEVI, (Tacitus); a common name of the people ſituated between the Elbe and the Viſtula, diſtinguiſhed otherwiſe by particular names; as in Ptolemy, *Suevi Angeli, Suevi Sennones*.

SUEVUS, (anc. geog.) a river of Germany; thought to be the ſame with the Viadrus or Oder, emptying itſelf at three mouths into the Baltic, the middlemoſt of which is called *Swine* or *Swene*; which laſt comes nearer the name *Suevus*.

SUEZ, a ſmall city, from which the iſthmus that joins Africa with Aſia hath its name. It ſtands about 30 hours eaſt from Cairo, by the road called *Tauriche Beni Iſrael*, i. e. *the road of the children of Iſrael*, at the bottom of the Heroopolitan Gulph, or weſtern branch of the Red Sea; and has about 200 houſes, and an old caſtle. Here alſo is a ſmall haven, but ſo ſhallow that ſhips of any burden cannot get into it; however, there is a good road by it, where they can ride ſafely and at eaſe. The greateſt inconvenience of the place is, that it has no ſweet water nearer than four or five miles. We are even told, that there are not above half a dozen wells betwixt Cairo and Mecca, at leaſt in the road the pilgrims go, which lies to the northward of this, and even theſe are bitteriſh and brackiſh. Suez was formerly a place of great trade; but ſince the way to the Eaſt Indies by the Cape of Good Hope hath been diſcovered, it hath been upon the decline. The place on the weſt coaſt of the gulph, where the children of Iſrael are ſuppoſed to have entered it, is called *Badea*, about ſix miles to the north of Cape Korondel, on the other ſide of the gulph, as we are informed in a letter from the ingenious Edward Wortley Montague, F. R. S. to Dr Watſon, containing an account of his journey from Cairo to the Written Mountains in the deſert of Sinai. Oppoſite to Badeah is a ſtrong current, which ſets to the oppoſite ſhore, about ſouth-eaſt, with a whirlpool called *Birque Pharaone*, the *well* or *pool of Pharaoh*, being the place where his hoſt is ſaid to have been deſtroyed. We are told by the ſame gentleman, that the Egyptian ſhore from Suez to Badea is ſo rocky and ſteep, that there was no entering upon the gulph but at one of theſe two places; that it is high water in the gulph always when the moon is at her meridian height; that at Suez it flows ſix feet; that the ſpring-tides are nine feet, and in the variable months, from the beginning of November to the end of April, ſometimes twelve; that, from the beginning of May to the beginning of October, a northerly wind generally riſes and goes down with the ſun, which is often very ſtrong; that this wind never fails in theſe months, unleſs there be ſome violent ſtorm; that the reſt of the year the winds are variable, and when they blow hard at ſouth ſouth-eaſt, ſet up the ſea through the narrow ſtrait of Babel-Mandel, and up this weſtern branch or gulph, through its mouth, between Gebel El-Zait on the weſt, and the ſouthernmoſt point of the Bay of Tor on the eaſt, where it is not above 12 or 14 miles over. This wind, it is probable, hindering the water from going out, is the occaſion of the extraordinary increaſe in the ſpring-tides. The Egyptian, Weſtern, or Thebaic ſhore, from Badea ſouthward to oppoſite Tor on the eaſtern ſhore, is all mountainous and ſteep; and at Elim, the northernmoſt point of the bay of Tor, ends the ridge of mountains which begin on the eaſtern ſhore of this weſtern branch at Korondel.

SUFFOCATION, in medicine, the privation of reſpiration or breathing. See the articles DROWNING, HANGING, &c.

SUFFOLK, a county of England. Its name is contracted from *Southfolk*, ſo called from its ſituation in regard to Norfolk. It is bounded on the weſt by Cambridgeſhire; on the ſouth by Eſſex, from which it is parted by the river Stour; on the eaſt, by the German ocean; and on the north by Norfolk, ſeparated from it by the leſſer Ouſe and the Waverley. It is upwards of 40 miles in length; about 25, at a medium, in breadth; and 156 in circumference. It contains 22 hundreds, 32 market-towns, 275 pariſhes, upwards of 34,000 houſes, and more than 200,000 inhabitants. The whole is divided into two parts; viz. the liberty of St Edmund, and the Geldable; the former of which contain the weſt parts of the county, and the other the eaſt; and there is a grand jury for each at the aſſizes. The air is reckoned as wholeſome and pleaſant as any in the kingdom; nor is it otherwiſe upon the ſea coaſt, which is dry and ſandy, and free from ſalt-marſhes. The ſoil, except to the weſt and upon the ſea-coaſt, is very rich, being a compound of clay and marle. Towards the ſea there are large heaths and tracts of ſand; but theſe produce hemp, rye, and peaſe, and feed great flocks of ſheep. About Newmarket, the ſoil is much the ſame; but in high Suffolk or the woodlands, beſides wood, there are very rich paſtures, where abundance of cattle are fed. In other parts of the county, as about Bury, there is plenty of corn. As this county is noted for the richneſs of its paſtures, ſo is it for butter and cheeſe, eſpecially the former, which is ſaid to be extraordinary fine; ſo that being packed up in firkins, it is ſold for all uſes both by ſea and land, and conveyed to many parts of England, eſpecially to London. The inland parts of the county are well ſupplied with wood for fuel, and thoſe upon the ſea-coaſt with coals from Newcaſtle. The manufactures of the county are chiefly woollen and linen cloth. It lies in the dioceſe of Norwich; has two archdeacons, viz. of Sedbury and Suffolk; gives title of earl to a branch of the Howards; ſends two members to parliament for the county; and two for each of the following places, Ipſwich, Dunwich, Orford, Aldborough, Sudbury, Eye, and St Edmund's-Bury. The county is extremely well watered by the following rivers, which either traverſe its borders or run acroſs into the German ocean, viz. the Leſſer Ouſe, the Waverley, the Blithe, the Deben, the Orwell or Gripping, and the Stour.

SUFFRAGAN, an appellation given to ſimple biſhops with regard to archbiſhops, on whom they depend, and to whom appeals lie from the biſhops courts.

SUFFRAGE, denotes a vote given in an aſſembly, where ſomething is deliberated on, or where a perſon is elected to an office or benefice.

SUFFRUTEX, among botaniſts, denotes an under-ſhrub, or the loweſt kind of woody plants, as lavender.

SUGAR, in natural hiſtory, is properly the eſſential part of the ſugar-cane.

The ſugar-cane grows *naturally* in both Indies; where it is likewiſe *cultivated* for its juice.

In the manner of their growth, form of their leaves, and make of their panicle, the ſugar-canes reſemble the reeds which grow in wet marſhy grounds in England or elſewhere; except that the canes are far larger, and, inſtead of being hollow as the reeds, are filled with a white pith, containing the ſweet juice or liquid, which ſtamps ſuch an amazing value upon theſe plants. The intermediate diſtance between each joint of a cane is of different lengths, according to the nature of the ſoil, richneſs of the manure, and different temperature of the weather during its growth; it ſeldom exceeds, however, four inches in length and an inch in diameter. The length of the whole cane likewiſe depends upon the above circumſtances. It generally grows to perfection in about fourteen months, when its height, at a medium, is about ſix feet, ſometimes more, ſometimes leſs. The body of the cane is ſtrong, but brittle; of a fine ſtraw-colour, inclining to a yellow. The extremity of each is covered, for a conſiderable length, with many long graſſy leaves or blades, ſharply and finely ſawed on their edges; the middle longitudinal rib being high and prominent.

The bottom part of the ſugar-cane top is about the thickneſs of one's finger; and as it contains a good deal of the natural ſweetneſs of the plant, it is uſually cut into pieces of an inch and a half long, and given to the ſaddle-horſes in the Weſt Indies. It is very nouriſhing food, and fattens them apace. The mill-horſes, mules, and aſſes, are likewiſe fed, during crop-time, on ſugar-cane tops and the ſkimming of the ſugar-coppers; which laſt muſt be adminiſtered ſparingly at firſt, for fear of griping, and perhaps killing them.

The canes, when ripe, are ſqueezed between the iron-caſed rollers of wind-mills or cattle-mills. The juice thus preſſed out, is boiled firſt in a very large copper or cauldron, being mixed with a very ſmall quantity of lime. In default of lime, a ſtrong ley of aſhes will anſwer the ſame purpoſe, and was indeed originally uſed, though the firſt is generally thought to have greater efficacy. The benefits ariſing from either ſubſtance are probably to be attributed, in great meaſure, to their alkaline qualities. The ſugar-cane, when ripe, is of all plants the ſweeteſt; there is, however, a latent acid ſtill lurking in the juice, as is manifeſt by its turning ſour if ſuffered to remain unboiled any conſiderable time after expreſſion. The addition, therefore, of white lime, which the planters call *temper*, is neceſſary to deſtroy, in a great meaſure, the remaining acid, and to form a neutral ſalt.

Lime, or the ſtrong ley juſt mentioned, likewiſe ſerves to carry off all impurities from the liquor. When the quantity of temper is duly proportioned, if the liquor is put into a glaſs, the immediate ſeparation will follow; the ſordes ſettle at the bottom, and the juice remains tranſparent at top. On the other hand, if there is a deficiency of temper, the ſeparation will be imperfect; and if there is a ſuperfluity, there will be no ſeparation at all.

After the lime is mixed with the juice in the copper or cauldron, the impurities in queſtion being no longer intimately united with the boiling liquor, and being forced about with the heat of the fire, are eaſily entangled in a viſcous tough ſubſtance, naturally in the cane-juice, with which they riſe to the top of the copper, forming a thick tough ſcum.

The clarification of the liquor, as far as is done in the firſt copper, is perfected after the more groſs ſcum is taken off; the remaining impurity, as the liquor boils, is ſkimmed off from the four or five remaining coppers, into which the liquor is ſucceſſively poured; each of the coppers being gradually leſs, as containing a leſs quantity of liquor.

In its paſſage to the fourth copper, the liquor is ſtrained through a thick woolen cloth, where it leaves all the remaining impurities that had eſcaped the ſummer.

After this a light white ſcum is taken off; and when this ceaſes to ariſe in any conſiderable quantity, and the liquor, by long boiling, becomes more of a ſyrup than a thin liquid, it is then poured into the firſt tache, and from this to a leſſer, till it is conveyed to the laſt. When it has here attained the due conſiſtence neceſſary to become ſugar, it may be aſſerted, ſays Hughes, from whom this account is chiefly extracted, that no more than a ſeventh part of the whole remains; which diminution is occaſioned by the impurities being ſcummed off, and the watery particles evaporated.

From this laſt ſtage it is conveyed, whilſt of the conſiſtency of a thick granulated ſyrup, into a large braſs cooler, where it ſhoots into cryſtals, which are the genuine and eſſential ſalts of the plant; theſe are forwarded by gently ſtirring the whole maſs, by which means the air is admitted to every part, and the particles of ſugar diſengage themſelves from the clammy ſubſtance, which is termed *melaſſes*.

When it has grained or cryſtallized, it is removed from the cooler into pots or moulds, which are earthen, and of a pyramidal form, containing from eight to thirteen gallons.

About twenty-four hours after the ſugar is potted, the ſmall round hole in the bottom of each pot is unſtopped, and the pots put upon earthen jars, containing about four gallons each: into theſe veſſels the melaſſes drain from the ſugar; which, in this degree of perfection, is called *muſcavado*, and is fit for exportation in a month, or ſooner.

From the abovementioned ſkimmings, mixed with a quantity of water and melaſſes, and fermented, is extracted that ſpirituous liquor called *rum*; and from the great quantity of oil in the cane-juice, which is tranſmitted in abundance to the rum, proceeds the excellency of that ſpirit, compared with brandy. The latter wanting this oilineſs, ſtimulates and lacerates the coats of the ſtomach; whereas the former, if meliorated by age and drank moderately, ſerves, by its oilineſs, to lubricate and preſerve the bowels. See Rum.

The moſt natural, and perhaps the only proper, method of producing canes, is by ſuckers, or with the tender tops of old canes. Theſe being cut into pieces of about a foot long, planted in holes of about ſix inches deep and two feet wide, and covered with good manure, each piece will produce from its roots a great number of canes.

But it may not be unacceptable to give a more particular account both of the cultivation of the plant, and the proceſs of ſugar-making, according to the moſt approved methods.

Martin's Eſſay on Planterſhip.

1. *Beſt Method of cultivating Sugar-canes.*—In ſtiff ſoils where canes require moſt age, half the quantity of land intended for the crop ſhould be planted in September; but in hot looſe ſoils in October, and November; and the whole planting-ſeaſon ſhould conclude with the month of January or February (A), when the tops of the firſt canes cut may furniſh the laſt pieces planted. By ſtrict obſervance of this method, the canes will be at full maturity in the proper ſeaſon for yielding moſt ſugar, which is from the 1ſt of January (if the weather permits) to the 29th of July. But by grinding later, we hazard not only the deſtruction of our wind-mills by hurricanes, but make bad ſugar, at infinite expence of time and labour, both of negroes and cattle, when the juice of the canes becomes weak and wateriſh. There is not therefore a greater error in the whole practice of planterſhip, than to make ſugar or to plant canes at improper ſeaſons of the year; for, by miſmanagements of this kind, every ſucceeding crop is put out of regular order.

The land being well manured and mellowed by fallowing,

(A) In light luxuriant ſoils, canes planted in April or May often produce largely; but it ſeems not prudent to delay ſo long, for fear of a diſappointment by drought.

lowing, let it be lined into ſpaces of four feet diſtance, and then holed either backwards or ſidewiſe (B) as the manager thinks beſt; taking particular care that the cane-holes be made ſquare at the bottom, and heaping the banks high, ſo as to take up little ſpace. After holing, the land ſhould lie in that poſture until every little lump crumbles into fine mould, and then be planted before weeds ſpring up in any great abundance; for if planting in due time is neglected, the ſoil ſubſides, grows compact again, and defeats much of all the former tillage. The land being thus holed and mellowed by fallowing, let two good plants be put into each hole at equal diſtance from the centre; for if many plants be put into an hole, the ſprouts will riſe too plentifully, ſo as to hinder each other's growth, and produce very ſmall ſpindling canes, which can yield but little ſugar; for ſugar-canes require more air and ſun-ſhine than moſt other vegetables.

The plants being thus placed in each hole, with the eyes horizontally, muſt be covered, in looſe dry ſoils, not above two inches deep; but in ſtiff ground one inch is ſufficient, leaving the banks to be added by ſmall acceſſions at every weeding, and the one-third to be reſerved for covering the ſtools of the rattoons, which will much forward their growth: but let the common cuſtom of drawing mould into hillocks round each ſtool of young canes be avoided; becauſe that practice breaks the young ſuperficial fibres, and leaves them bare to periſh by the ſcorching ſun. Stiff or clay-ſoils, if well drained in the manner before directed, may be planted hollow, as the lighteſt, to the ſame advantage; for covering the ſtools of rattoons with one-third of the bank left for that purpoſe, is preferable to hoe-ploughing alone. As ſuch level ſtiff ſoils, free from ſtones, are moſt improveable by the plough, the huſbandman's chief care ſhould be to plough the land into ridges, riſing gradually from the ſides to the centres: for then the rain-water will paſs off with eaſe through the furrows, and ſave all the hand-labour of draining, except ſmall trenches round each field, through which the water may paſs gently without waſhing away the mould: for where all preceding arts are practiſed to pulveriſe the ſoil, peculiar care muſt be taken to prevent its waſhing away by floods of rain, or the land will ſoon become barren.

It has been ſuggeſted before, that two good plants are ſufficient for an hole of the dimenſions above-mentioned; but in ſmaller holes, one only is uſed by ſome judicious planters with good ſucceſs. Drawn plants from rattoon-ſprouts of ſix or eight months old are very good; and in ſome reſpects preferable to the tops of old canes, as having ſhort joints, and of courſe more eyes, and plumper than the others. It is, however, generally obſerved, that the tops of old canes are the hardieſt plants, capable of bearing the extremity of dry or wet weather better than any other; but if the fibrous roots of drawn plants are cut off, no man will have reaſon to complain. To uſe the tops of grown canes for the laſt pieces planted, from January to May, is very good management: but drawn plants will anſwer perfectly well at all other ſeaſons of the year; and of theſe an abundance may be provided by a right forecaſt, if unſeaſonable droughts do not prevent; and good allowance muſt be made for ſuch events. By that the planter divides his plantation into three, four, or five equal parts, in proportion to his ſtrength of hands and cattle, allowing one third, fourth, or fifth part to be planted every year: and if he contrives to cut plants always from a contiguous field, much cartage in wet weather will be prevented; much of his negroes time ſaved in paſſing from one diſtant field to another, and ſtill more if mules are employed to carry plants.

But after all this care in the preceding proceſs, ſure diſappointment will attend the planter who neglects timely weeding his young canes; which, by once being over-run by weeds, will be ſo ſtinted as never to become very good by any ſubſequent helps: let therefore every manager be as careful and nice in preſerving his canes clean from all weeds, as the floriſt is of his parterre; poſtponing every other work when that calls for his labour. And if inſtead of ſcraping up theſe weeds with common hoes, according to the preſent practice, he could employ the Kentiſh hoe-plough, infinite hand-labour may be ſaved: or if the nature of his ſoil be ſtiff or ſtony, ſo that the hoe-plough cannot be uſed, it is very probable, that by digging all weeds into the ſoil with ſpades or hoes, and looſening it by that means, as gardeners do in England, the ſugar-canes would be ſo invigorated, as to recompenſe the labour beyond our preſent conception. No devaſtation by that pernicious inſect called the *blaſt* could then take place. All the ſchemes hitherto propoſed for curing that evil are vain impracticable ſpeculations, or a waſte of time and labour to little purpoſe. But if it be a fact, that the blaſt commits moſt ravage in poor land, and affects not the luxuriant ſugar-canes of a rich ſoil, the cure of the evil is certain and obvious. Manure and cultivate your lands ſo as to render them rich and fruitful, and you will prevent the blaſt (c); more eſpecially if (according to the Engliſh huſbandry) the produce is changed, by planting potatoes, yams, or corn, in dry ſoils, and eddoes or potatoes in ſtiff lands: for by theſe arts the planter may be ſure (if favoured by natural ſeaſons) of canes that will reward his labour by plentiful crops of ſugar; and it muſt then be his intereſt, by ſkill and care, to make it as good as poſſible; which ſhall be the ſubject of the following ſection, after having given ſome new directions for the cultivation of rattoons.

It has been obſerved above, that the ſtools or roots from whence canes are cut, are apt to corrupt at the parts left above ground, and theſe of courſe canker the whole ſtool: hence it is that rattoons, or canes ſpringing from thoſe ſtools, are ſeldom very good, except in very rich ſoils; and therefore ſome good planters, to prevent thoſe ſtubs above ground, draw their canes for ſugar from the roots, which we believe effectual, but very laborious: but by a late experiment, it is found a leſs laborious method, after uncovering

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(B) If the holes are made four feet wide one way, and five feet from bank to bank, the bottom of the hole will be a true ſquare.

(c) It is, however, certainly a miſtake to ſay, that the blaſt infects not the canes of a rich ſoil. The contrary is known to be true by experience: and therefore the beſt and only effectual cure is wiping the blades by wet cloths, until wet weather completes the cure.

vering the ſtools, by taking off the traſh, ſo ſoon as the canes are carried out of the field, to cut by a ſharp hoe all the heads of the cane-ſtools, three inches below the ſurface of the ſoil, and then fill the hole with fine mould; by which means all the ſprouts riſing from below derive more nutriment, and grow with vigour far beyond expectation.

2. *Beſt Method of making Sugar.* In making good ſugar, there is a great variety of incidents, of which if any one fails, the end is abſolutely fruſtrated: the wiſe planter, therefore, muſt be very attentive to every minute ſtep throughout the whole proceſs. It muſt be his firſt care to keep his mill in perfect good order, ſo that common accidents may not retard his crop in the ſeaſon when canes yield the moſt and beſt ſugar: every part of his works muſt be very clean, and his coppers hung ſo judiciouſly, as to boil perfectly well with little fuel; for nothing contributes more to the making of good ſugar than quick boiling, after the cane-juice is well clarified. To this end, therefore, the great coppers, or firſt clarifiers, ſhould be hung ſingly, or to ſeparate fires, and pinned about 10 or 12 inches from the bottom, that the ſcum may be ſeparated by ſlow degrees, and kept floating upon the ſurface long enough to be taken off perfectly: for if the liquor be ſuffered to boil with violence, the ſcum will incorporate again with it, and never after be ſeparable but by the refining-pan; and thus dark foul ſugar is made of that cane-juice which might have produced, by good management, fine bright ſugar of much greater value at the market. This is a point of great importance to every planter, whoſe profit depends much upon the goodneſs of his ſugar; for the worſt pays the ſame freight, duty, and charges, as the very beſt.

The cane-juice, therefore, after being ſtrained at the mill through a braſs-wire ſieve, ought to run down to the boiling-houſe in ſpouts lined with lead, to preſerve it from tainting (D); and being let into the firſt clarifier, muſt be there boiled over a moderate fire until perfectly freed from all ſcum; afterwards it muſt be ſtrained through a thick coarſe blanket, and then boiled to ſugar with all poſſible celerity. But let the coppers be ever ſo judiciouſly hung, the liquor cannot be boiled with due quickneſs, unleſs the manager takes peculiar care to provide great plenty of dry fuel or mill-traſh. The good planter, therefore, will lay up a ſtock of bruſh-wood cut from the hedges of his boundary before the crop begins; or, if he has plenty of wood, enough to ſerve the uſes of his ſtill-houſe; by which means he may ſoon lay up a large fund of mill-traſh, and pack it either in ricks or in a large traſh-houſe, that the progreſs of his crop may not be hindered by every ſhower, or his ſugar ſpoiled by dull fires.

The judicious boiler's next care is to provide quick-lime of the beſt ſort to temper his liquor; for otherwiſe the ſugar will be clammy, than which it cannot have a worſe quality. That defect in ſugar ariſes from two very different cauſes; for ſlow boiling and bad temper-lime have the very ſame effect. The lime made from marble, or any other land lime-ſtones, is the ſtrongeſt, and preferable to that made from white ſea-coral; and the newer it is from the kiln, the better: for by keeping it in the tighteſt caſks for any long duration, ſome of its good qualities evaporate; and therefore, in the daily uſe of it, the air muſt be excluded.

It is impoſſible to preſcribe exactly the quantity of lime neceſſary for every ſort of cane-juice. It has, however, been obſerved, that five ounces of the beſt quick-lime are ſufficient for 100 gallons of good cane-juice. Inſtead of increaſing the quantity of lime, Mr Martin adviſes the uſe of powdered alum; one quarter of of an ounce of which, or leſs, to a ſtrike of ſugar, will give both firmeſs and largeneſs of grain: experiment will ſoon determine whether more or leſs alum will be requiſite. It is a good rule in general to give a full quantity, which can only be determined preciſely by the firſt ſugar made; but by dipping a ſkimmer into the tach when the liquor is boiled to near a ſyrup height, and by giving it two or three quick twirls, and then hanging the edges of it downward, an obſerving eye will diſcern the liquor falling from the ſkimmer in glaſſy flakes. If theſe hang long, the liquor is not ſufficiently tempered; but if ſhort, breaking near to the edge of the ſkimmer, it is tempered enough. When cane-juice is tainted by exceſſive drought, ſo as to make foxy bad ſugar, there are various methods in uſe of extracting the taint. Among theſe, Mr Martin never found any ſo effectual as by high tempering the liquor; and, when it is boiled to a thick ſyrup, throwing into the tach two or three gallons of fair water, which, by ſudden ſolution, throws up the taint or viſcous ſcum (conſiſting of the lighteſt particles) upon the ſurface; from whence it muſt be ſkimmed off with all expedition, and reſerved for diſtillation. This is a very effectual method of making ſtrong bright ſugar from cane-juice very much tainted, provided it be rich or at full maturity; but if the ſugar-canes are much tainted while the juice is wateriſh, all attempts to make good ſugar of it are vain and fruitleſs: for then it is fit only for diſtillation. Indeed a ſtrong or large-grained ſugar cannot by any art be made from wateriſh juice, even though untainted by drought; and therefore, when the planter finds his cane-juice of that ſort, let him ſtrip his canes from all the traſh, ſuffering them to ſtand for ſix weeks expoſed to the air and ſun; and he will find that labour amply recompenſed by a large product of very good ſugar, as experience has often evinced.

After duly tempering the cane-juice with the ſtrongeſt quicklime, clarifying it over a moderate fire, and ſtraining it as before deſcribed, let it be boiled with the utmoſt quickneſs to a middling ſugar-height, which will give it a large grain, and a fair colour, never-failing qualities to procure the beſt price at market. This art of boiling ſugar, though of the greateſt importance to every planter, is generally leaſt underſtood either by overſeers or their maſters; but that point of greateſt conſequence is truſted wholly to the ſkill of negro-boilers, who indeed arrive by long habit to ſome degree of judgment by *the eye only.* To that eye-art Mr Martin ſays he has attended with all diligence, but could never acquire a critical exactneſs: for the ſight, of all the other ſenſes, is moſt fallible and ſubject to deception: a little more or leſs butter thrown

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(D) Mill-ciſterns, and all receivers through which cane-juce paſſes, ſhould be lined with lead: becauſe wood ſoon taints it; and the greateſt artiſt cannot make the beſt ſugar with tainted juice.

thrown into the tach will alter the whole appearance, and often deceive the moſt attentive and experienced eye; and no doubt there are other cauſes leſs obſervable, which produce the like effect; and therefore he recommends boiling by the *touch* alſo, which is abundantly more certain, as two witneſſes are better than one.

This art of boiling by the touch is called *taking a proof;* but to impart by words the knowledge of it is as impoſſible as to teach any other mechanic art, which can be attained by practice only. However, the method of doing it is by a pan-ſtick, of four feet and an half long, eighteen inches of which is made rounding for the graſp of the left hand, and three feet flatwiſe, about two inches broad, and an inch thick: by immerging this pan-ſtick into the liquor when boiled to a pretty thick conſiſtence, it will be ſmeared; upon which the boiler puts his right thumb, taking up a ſufficient quantity, and touching then the thumb with the fore-finger, draws the liquid ſugar like a thread at the inſtant when the heat is going off: this thread, when broken, will ſhrink from the thumb to the ſuſpended fore-finger in ſeveral lengths, as the boiler intends: for the different lengths at which this thread hangs to the fore-finger determine preciſely the different degrees of boiling ſugar; and theſe degrees are propotioned to the ſeveral ſizes of moulds, or ſugar-pots, in which it is cured. The denominations by which theſe degrees are determined by refiners, are, *piece*, *lump*, and *loaf-height*. *Piece-height* is the higheſt degree, and ſuited to the moulds of the largeſt ſize, which contain about nine gallons: the thread of *piece-height* is about three inches long: that of *lump-height*, ſuitable to moulds of half the former ſizes, is when the thread ſtands at about an inch from the ſuſpended fore-finger: and *loaf-height*, ſuitable to the ſmalleſt moulds, is determined by the thread of a quarter of an inch long from the ſuſpended finger: and this *latter proof* is generally moſt ſuitable to the planter's purpoſes of making muſcovado-ſugar; which ought to be of a large grain, well ſeparated from melaſſes. It has been ſaid above, that the boiler muſt take a ſufficient quantity of the liquid ſugar upon his thumb, to make an exact proof. That ſufficiency cannot be expreſſed in words preciſely; but muſt be juſt enough to allow the drawing of a thread, and not more; for that will occaſion ſome deception. In like manner, if the thread is drawn any other time than at the critical moment when the heat of the liquid ſugar goes off the thumb, the boiler will be deceived; for, if the liquid ſugar is either too hot or too cold when drawn into a ſtring, it will vary the appearance. In taking proof, the young learner muſt expect to bliſter his thumb; but, to gave him as little pain as poſſible, when he takes up the liquid ſugar, let him obſerve to keep his finger and thumb nimbly moving from and to each other in gentle contact, and then draw the ſtring at that inſtant when the intenſe heat is going off; by which means he will ſave his thumb from bliſtering, and obtain an exact *proof*, according to the rules above preſcribed.

The method of boiling muſcovado-ſugar is below loaf-height (E); and if then it is cooled with quickneſs in a broad ſuperficies, and in a wooden cooler, the ſugar will be of a larger grain than if cooled in a deep or copper veſſel. But if the ſugar is intended to be cured in pots or earthen moulds, it muſt be cooled in copper or deep wooden coolers, that it may be conveyed from thence into the pots while in the ſtate of a thick liquid. This will occaſion the grain of ſugar to be ſmaller, (and more eſpecially if judiciouſly ſtirred while in the cooler), which is an advantage to the colour of clayed ſugar: for a multitude of ſurfaces will reflect more rays of light, and conſequently appear whiter, than larger particles, which have fewer ſurfaces. For that reaſon the moſt expert planters of Barbadoes generally boil their ſugar higher than moſt other people; but whether to ſo much profit, muſt be determined by future experience: for if a much leſs quantity of very white ſugar is obtained by boiling high, then, by the contrary method, the queſtion is, whether the greater price is an adequate recompence for ſo great a loſs of weight. In Mr Martin's opinion, it is not: however, it is worth the trouble to determine that point by exact weight and meaſure. In ſuch computations the refined Barbodoes managers exceed all our iſlanders.

The quantity and thinneſs of the clay-batter muſt be exactly proportioned, *not to the quantity of ſugar* ſo much as to the degree of height to which it is boiled, which the *face* or ſurface of the ſugar in each pot muſt determine: for if the cruſt breaks near the centre, the ſugar is high-boiled, and will require a thinner batter; and ſo, *vice verſa*, the nearer to the edge of the pot the ſurface cracks, the thicker muſt be the clay: for clay-batter is only the means of filtering the water through the ſugar by eaſy degrees, ſo as to waſh the grains from all the yellowneſs, or tinge of melaſſes, without diſſolving the ſmalleſt particles. In this proportion, therefore, conſiſts chiefly the art of claying, not to ſink the pot of ſugar by a double clay lower from the brim than five inches, and yet to whiten the whole maſs alike to the bottom. But this cannot be effected without great judgment in boiling equally; and in ſeparating the pots into ſeveral claſſes, ſo as to clay each parcel in a manner ſuitable to the degree of boiling: for want of this art it is that a planter may grow poorer by claying his ſugar, than if he makes only plain muſcovado: for the loſs of ſugar diſſolved into melaſſes by claying injudiciouſly, cannot be compenſated by converting it into rum. He therefore who propoſes to clay ſugar to advantage, muſt firſt learn the art of boiling by the *touch*, as the only criterion of boiling to a degree of exactneſs: he muſt learn alſo all the other proceſs of halling and ſtirring the ſugar after it is filled into the pots, by which ſmall errors in boiling may be in ſome meaſure rectified. The ſame ſkill is requiſite to boil ſugar which is intended to be cured in pots, *without being clayed;* and therefore that practice is very unprofitable: for though ſugar properly boiled will cure beſt in pots, yet if there be the leaſt error in boiling,

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(E) That is the greateſt height for rich cane-juice; but when wateriſh, it will be high enough when a thread can be drawn.—It is a general maxim, that the weak cane-juice muſt be tempered very high and boiled low. The former is abſolutely falſe; for a due temper muſt be obſerved: to boil it very low, is right, and that is a candy height.

boiling, it will occaſion the ſugar to be of a very ſmall grain, as is generally the caſe of Jamaica-ſugar. For if the ſame ſugar, which is of a ſmall grain, had, by being put into pots, been cooled with quickneſs in a broad wooden cooler, and cured in hogſheads, the grain would have been much larger, as a ſingle experiment will evince. But if, in conformity to old cuſtoms, a manager will chooſe to cure in pots, let him cool his ſugar in a ſhallow broad cooler, till it becomes very thick, and only liquid enough to be taken up with a ladle, and put into the pots: for by that means he will have a much larger-grained ſugar, than by the practice of putting it hot into pots. It is a common practice to ſtir hot ſugar once or twice after being put into the coolers; which is a ſure means of breaking the grain, at the very inſtant while the ſugar is granulating.

3. *Refining of Sugar.*—Sugar is afterwards refined from the coarſe ſtate in which it generally comes from abroad, to various degrees of purity by new ſolutions, and is ſold at different prices, and under different names, according to the degree of purity it is brought to. Our ſugar-refiners firſt diſſolve it in water, then clarify the ſolution by boiling with whites of eggs and deſpumation; and after due evaporation pour it into moulds; where the fluid part being drained off, and the ſugar concreted, its ſurface is covered with moiſt clay as before. The ſugar thus once refined, by repetition of the proceſs, becomes the double-refined ſugar of the ſhops.

The *candy-ſugar*, or that in cryſtals, is prepared by boiling down ſolutions of ſugar to a certain pitch, and then removing them into a hot room, with ſticks placed acroſs the veſſel for the ſugar to ſhoot upon: and theſe cryſtals prove of a white or brown colour, according as the ſugar uſed in the proceſs was pure or impure.

SUGAR *from different Plants.*——In ſome parts of North America, particularly in Canada, a kind of ſugar is prepared from the juice which iſſues upon wounding or boring certain ſpecies of the maple-tree, one of which is named from hence the *ſugar-maple;* as alſo from the wild or black birch, the honey-locuſt, and the hickery. The maple is moſt commonly made uſe of for this purpoſe, as being the richeſt, and as beſt enduring the long and ſevere winters of that climate. The juice is boiled down, without any addition, to a thick conſiſtence; then taken off from the fire, kept ſtirring till its heat is abated, and ſet in a cold place; where the ſugar quickly concretes into grains, reſembling common brown powder-ſugar.

The trees are tapped early in the ſpring, about the time that the ſnow begins to melt. It is obſervable, that when the weather begins to grow warm, they bleed no more; and that, after the bleeding has ſtopt, they begin to run again upon covering the roots with ſnow. The more ſevere the winter has been, the juice is found to be richer and in greater quantity. The trees which grow on hills or high land yield a richer juice than thoſe which are produced in low countries; and the middle-aged than the young or the old.

Mr Kalm informs us, in the Swediſh Tranſactions for the year 1751, that one tree, if the ſummer does not come on haſtily, will yield about forty-two gallons of juice (Engliſh wine-meaſure), and that the quantity which iſſues in one day is from three to ſix gallons: that eleven gallons of juice of middling quality give a pound of ſugar, and that ſometimes a pound has been gained from three gallons and a half: that two perſons can in one ſpring prepare commodiouſly 200 pounds. He obſerves, that this ſugar is weaker than that from the ſugar-cane; but that for ſome purpoſes it anſwers better, as for chocolate and preſerves. It is likewiſe eſteemed more medicinal. Conſiderable quantities are brought annually into Europe, particularly France, and there employed in diſorders of the breaſt. It is reckoned that a pound of common ſugar goes as far in ſweetening as two pounds of maple-ſugar.

The large maple, commonly called *ſycamore-tree,* bleeds alſo in Europe a ſweet juice, from which an actual ſugar has been prepared. In the Tranſactions above-mentioned, for the year 1754, there is an account of ſome experiments made in this view upon the Swediſh maple. Eight trees, none of them under thirty years, bled in four days fourteen gallons of juice; which, inſpiſſated, gave two pounds and a half of brown-ſugar. Another time, the ſame eight trees bled in three days ten gallons and a half; which yielded one pound four ounces of ſugar, with half a pound of ſyrup. It is the ſaccharine juice of the maple-tree, which, exuding upon the leaves, renders them ſo apt to be preyed upon by inſects.

The common birch bleeds alſo a large quantity of a ſweetiſh juice, which yields, on being inſpiſſated, a ſweet ſaline concrete, not however perfectly of the ſaccharine kind, but ſeeming to approach more to the nature of manna.

There are ſundry other vegetables, raiſed in our own country, which afford ſaccharine concretes; as beet-roots, ſkirrets, parſneps, potatoes, celeri, red-cabbage ſtalks, the young ſhoots of Indian wheat. The ſugar is moſt readily obtained from theſe, by making a tincture of the ſubject in rectified ſpirit of wine; which, when ſaturated by heat, will depoſit the ſugar upon ſtanding in the cold.

ACID *of Sugar.* See CHEMISTRY, n° 300.

SUGILLATION, in medicine, an extravaſation of blood in the coats of the eye, which at firſt appears of a reddiſh colour, and afterwards livid or black. If the diſorder is great, bleeding and purging are proper, as are alſo diſcutients.

SUICIDE. See SELF-*Murder.*

SUIDAS, a Greek writer, according to ſome, flouriſhed in the 11th century, under the reign of the emperor Alexius Comnenus; according to others, before the 10th century. He wrote in Greek an Hiſtorical and Geographical Dictionary or Lexicon; a work which, though not always ſtrictly accurate, is nevertheleſs of great importance, as it contains many things taken from the ancients that are nowhere elſe to be found. The beſt edition of Suidas is that of Kuiſter, in Greek and Latin, with notes, printed in 3 vols fol.

SUIT, is uſed in different ſenſes; as, 1. Suit of court, or ſuit-ſervice, which is an attendance the tenant owes to his lord's court. 2. Suit-covenant, where a perſon has covenanted to do ſervice in the court of the lord. 3. Suit-cuſtom, which is where one and his anceſtors have owed ſuit time out of mind. 4. It is uſed for a petition to the king or any perſon of dignity, where a lord diſtrains his tenant for ſuit, and none is due. In this caſe, the party may have an attachment againſt him to appear in the king's court.

Suit, in law, the ſame with action. The Romans introduced pretty early ſet forms for actions and ſuits in their law, after the example of the Greeks; and made it a rule, that each injury ſhould be redreſſed by its proper remedy only. *Actiones*, ſay the Pandects, "*compoſitæ ſunt quibus inter ſe homines diſceptarent, quas actiones ne populus prout vellet inſtitueret, certas ſolenneſque eſſe voluerunt.*" The forms of theſe actions were originally preſerved in the books of the pontifical college as choice and ineſtimable ſecrets, till one Cneius Flavius, the ſecretary of Appius Claudius, ſtole a copy and publiſhed them to the people. The concealment was ridiculous: but the eſtabliſhment of ſome ſtandard was undoubtedly neceſſary to fix the true ſtate of a queſtion of right; leſt, in a long and arbitrary proceſs, it might be ſhifted continually, and be at length no longer diſcernible. Or, as Cicero expreſſes it, "*ſunt jura, ſunt formulæ, de omnibus rebus conſtitutæ, ne quis aut in genere injuriæ, aut in ratione actionis, errare poſſit. Expreſſæ enim ſunt ex uniuſcujuſque damno, dolore, incommodo, calamitate, injuria, publicæ à prætore formulæ, ad quas privata lis accommodatur.*" And in the ſame manner our Bracton, ſpeaking of the original writs upon which all our actions are founded, declares them to be fixed and immutable, unleſs by authority of parliament. And all the modern legiſlators of Europe have found it expedient, from the ſame reaſons, to fall into the ſame or a ſimilar method. In England, the ſeveral ſuits, or remedial inſtruments of juſtice, are, from the ſubject of them, diſtinguiſhed into three kinds; actions *perſonal*, *real*, and *mixed*.

Perſonal actions are ſuch whereby a man claims a debt, or perſonal duty, or damages in lieu thereof; and likewiſe whereby a man claims a ſatiſfaction in damages for ſome injury done to his perſon or property. The former are ſaid to be founded upon contracts, the latter upon *torts* or wrongs: and they are the ſame which the civil law calls "*actiones in perſonam, quæ adverſus eum intenduntur qui ex contractu vel delicto obligatus eſt aliquid dare vel concedere.*" Of the former nature are all actions upon debt or promiſes; of the latter are all actions for treſpaſſes, nuiſances, aſſaults, defamatory words, and the like.

Real actions, (or, as they are called in the Mirror, *feodal actions*) which concern real property only, are ſuch whereby the plaintiff, here called the *demandant*, claims title to have any lands or tenements, rents, commons, or other hereditaments, in fee-ſimple, fee-tail, or for term of life. By theſe actions formerly all diſputes concerning real eſtates were decided; but they are now pretty generally laid aſide in practice, upon account of the great nicety required in their management, and the inconvenient length of their proceſs: a much more expeditious method of trying titles being ſince introduced, by other actions perſonal and mixed.

Mixed actions are ſuits partaking of the nature of the other two, wherein ſome real property is demanded, and alſo perſonal damages for a wrong ſuſtained. As for inſtance, an action of waſte: which is brought by him who hath the inheritance, in remainder or reverſion, againſt the tenant for life, who hath committed waſte therein, to recover not only the land waſted, which would make it merely a real action; but alſo treble damages, in purſuance of the ſtatute of Gloceſter, which is a perſonal recompence; and ſo both, being joined together, denominate it a *mixed action*.

The orderly parts of a ſuit are theſe; 1. The original *writ*. 2. The *proceſs*. 3. The *pleadings*. 4. The *iſſue* or demurrer. 5. The *trial*. 6. The *judgment*, and its incidents. 7. The proceedings in nature of *appeals*. 8. The *execution*. See theſe articles.

SULLY. See Bethune.

SULPHUR, an inflammable ſubſtance of a yellow colour, conſiſting of the vitriolic acid and principle of inflammability united. For its properties, See Chemistry, nº 50, 114, 122, 165, 321, 334, 469.

Sulphur is found naturally formed in vaſt quantity about volcanoes, and in ſome kinds of minerals. It is extracted from its ores either by melting or ſubliming. What we uſe is all brought from other countries; but it is certain that the metallic ores in this country contain a very conſiderable quantity of ſulphur, which, in the common way of working, is diſſipated in the air. Dr Watſon has ſhown, in a paper on lead-ore, in the Philoſophical Tranſactions, that the quantity thus diſſipated amounts to not leſs than 700 tons annually in the various lead-mines in England. Volcanoes, earthquakes, &c. have been thought to take their riſe from large beds of ſulphur ſuppoſed to lie underground; but it is much more probable that ſulphur is the effect rather than the cauſe of theſe phenomena. See Volcano.

Sulphur unites eaſily with all metallic matters, excepting gold, platina, and zinc; at leaſt we have not found the means of uniting it with theſe, directly, and without ſome intermediate ſubſtance. The degrees of affinity with which ſulphur combines with thoſe metals to which it may be readily united, are different; for it not only unites more eaſily and abundantly with ſome than with others, but it alſo quits thoſe with which it has a leſs affinity, to unite with others to which it has a ſtronger affinity.

The affinities of ſulphur, according to Mr Geoffroy's table, are, fixed alkali, iron, copper, lead, ſilver, regulus of antimony, mercury, and gold; and, according to Mr Gellert's table, they are, iron, copper, tin, lead, ſilver, biſmuth, regulus of antimony, mercury, arſenic, and cobalt: gold and zinc are marked in this table as being incapable of uniting with ſulphur.

The compounds formed by ſulphur with different metals, are different; but all of them poſſeſs a metallic luſtre, without any ductility: theſe combinations of ſulphur and of metals are very frequently found in a natural ſtate. Almoſt all the metals which we dig from the earth are naturally found combined with ſulphur, forming moſt of the ores and metallic minerals.

The properties of the combinations of ſulphur with metallic matters have been little examined, becauſe theſe combinations are not of any uſe; but, on the contrary, when they are found, they muſt be decompoſed, that the metals may be obtained ſeparately from the ſulphur. Nevertheleſs, we know, not only that metals have different degrees of affinity with ſulphur; in conſequence of which property, ſulphur may be, and actually is, in many metallurgical operations, ſeparated from ſome metals by means of others to which it is more diſpoſed to unite; but we alſo know that ſulphur facilitates the fuſion of hard and difficultly fuſible metals, ſuch as copper and iron; and that, on the contrary, it renders the ſoft and fuſible metals, as tin and lead, leſs eaſily fuſible. Theſe ſingular effects ſeem to proceed from the difference of the affinity of ſulphur to the ſeveral metals.

Sulphur may be ſeparated from metallic matters by ſeveral methods. Firſt, as ſulphur is volatile, and as theſe metallic matters are fixed, or at leaſt leſs volatile than ſulphur, the mere action of fire is ſufficient to ſeparate ſulphur from moſt metals. As this method is ſimple, and not expenſive, it is generaly employed to ſeparate ſulphur from ores; which effect is produced by the torrefaction or roaſting of theſe ores. We muſt, however, except the ore of mercury, or native cinnabar, and alſo the combinations of arſenic with ſulphur, which cannot be decompoſed without an intermediate ſubſtance, from the great volatility of mercury and of arſenic: although perhaps it would not be impoſſible to ſeparate the ſulphur from theſe compounds, without an intermediate ſubſtance, by a heat carefully applied, long continued, and with acceſs of air.

Secondly, ſeveral combinations of ſulphur with metals may be decompoſed by means of acids; which diſſolve the metallic matter, without attacking the ſulphur. But in ſeveral of theſe compounds, the ſulphur defends the metal from the action of the acids; and this ſeparation by acids does frequently not ſucceed, or ſucceeds only imperfectly. Crude antimony is one of the ſulphurated metallic ſubſtances from which ſulphur may moſt eaſily be ſeparated by means of aqua regia. This menſtruum ſeizes readily the regulus of antimony contained in mineral antimony, and ſeparates from it the ſulphur, which then appears in form of a white powder.

Laſtly, we may, as we have already ſaid, ſeparate ſeveral metals from ſulphur by means of other metals, to which the ſulphur has a greater affinity. This ſeparation is practiſed in ſeveral operations, as in the dry parting, the purification of gold by antimony, the decompoſition of cinnabar, of orpiment, and of crude antimony.

The uſes of ſulphur are conſiderably extenſive in chemiſtry, in medicine, and in arts. The liver of ſulphur is employed in chemiſtry for ſeveral ſolutions. Sulphur is alſo uſeful for ſeveral fuſions, precipitations, and ſeparations of metals and minerals, as we have already mentioned. Laſtly, as ſulphur contains a very large quantity of vitriolic acid, a method has been found, and is now practiſed, of extracting from it this acid, by burning ſulphur in cloſe veſſels, with the addition of ſome nitre, and by an operation ſimilar to that of the clyſſus.

Sulphur is employed in medicine, both internally and externally, for aſthmatic diſeaſes of the breaſt, and for ſeveral diſeaſes of the ſkin of the nature of the itch. The internal preparations of ſulphur are, flowers of ſulphur, waſhed ſulphur, magiſtery of ſulphur, tablets, balſams, livers of ſulphur, and others; in ſome of which this ſubſtance is not altered, but only purified and divided; and in others, is combined and aſſociated with other ſubſtances; without reckoning the ſulphureous combinations of antimony and of mercury.

Some phyſicians and chemiſts, conſidering that ſulphur is unſoluble in water, and capable of reſiſting the action of moſt menſtruums, have advanced, that it can produce no effect when taken internally, ſingle and unaltered: but this aſſertion ſeems to be without foundation; for we are certain that the ſweat and perſpiration of thoſe who take ſulphur internally, have a ſmell evidently ſulphureous. Beſides, ſulphur is much more ſoluble than is generally believed. It is attacked by all oily and ſaponaceous ſubſtances, and conſequently by almoſt all animal liquors.

We cannot eaſily form a very diſtinct and clear idea of the manner in which ſulphur acts internally upon our bodies; but, from obſervations made upon its effects, it appears to be dividing, ſtimulating, and ſomewhat heating: it principally acts upon the perſpirable parts of the body, the chief of which are the ſkin and lungs; and from this property it is particularly uſeful in ſome diſeaſes of theſe parts.

Sulphur is alſo a powerful repellent; as appears from its curing ſeveral kinds of itch, merely by external application in form of ointments and pomatums.

Several mineral waters, which are drank or uſed as baths for ſome diſeaſes, owe their good qualities to ſulphur contained in them.

Sulphur is alſo uſed in ſeveral arts. By means of it fine impreſſions of engraved ſtones are taken*. Matches are formed of it; and its utility as an ingredient in the preparation of gun-powder and fire-works is well known. Laſtly, it is uſed for whitening wool, ſilk, and many other matters expoſed to its vapour during its combuſtion; the colours and redneſs of which could not be deſtroyed by any other ſubſtance, but are quickly effaced by this acid vapour.

SULPICIA, an ancient Roman poeteſs, who lived under the reign of Domitian, and has been ſo much admired as to be termed the *Roman Sappho*. We have nothing, however, left of her writing, but a ſatire, or rather the fragment of one, againſt Domitian, who publiſhed a decree for the baniſhment of philoſophers from Rome: which ſatire is to be found in Scaliger's *Appendix Virgiliana*. She is mentioned by Martial and Sidonius Apollinaris; and is ſaid to have addreſſed a poem on conjugal love to her huſband Calenus, a Roman knight.

SULPICIUS (Severus), an eccleſiaſtical writer who flouriſhed about the beginning of the 5th century, and was cotemporary with Rufinus and St Jerom. He was the diſciple of St Martin of Tours, whoſe life he has written; and the friend of Paulinus biſhop of Nola, with whom he held an intimate correſpondence. The principal of his works is his *Hiſtoria Sacra*, from the creation of the world to the conſulate of Stilicho and Aurelian, about the year 400; in which his ſtyle is elegant beyond the age he lived in.

SULTAN, or SOLDAN, a title or appellation given the emperor of the Turks.

Vattier will have the word Turkiſh, and to ſignify *king of kings*; adding, that it was firſt given the Turkiſh princes Angrolipex and Maſgud, about the year 1055; others will have it originally Perſian, alleging, in proof hereof, an ancient medal of Coſroe; others derive it from *ſoldanus, quaſi ſolus dominus*; others from the Hebrew שלט, *ſchalat*, "to rule, reign."

It had its riſe under Mahmoud, ſon of Sebecteghin, the firſt emperor of the dynaſty of the Gaznevides, towards

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* See the article CASTS.

wards the cloſe of the fourth century of the æra of the Hegira: when that prince going to Segeſtan to reduce Kalaf governor of that province, who affected the ſovereignty, Kalaf was no ſooner advertiſed of his coming, than he went out to meet him, delivered the keys of his fortreſs, and owned him his *ſultan*, that is, his lord or commander. The title pleaſed Mahmoud ſo well, that he aſſumed it ever afterwards; and from him it paſſed to his deſcendents, and to other Mahometan princes.

SUM, ſignifies the quantity that ariſes from the addition of two or more magnitudes, numbers, or quantities together.

SUMACH, in botany. See RHUS.

SUMATRA, the largeſt, excepting Borneo, of the Sunda iſlands in the Eaſt Indies. It extends itſelf north-weſt and ſouth-eaſt; having Malacca on the north, Borneo on the eaſt, and Java on the ſouth-eaſt, from which it is parted by the ſtraits of Sunda. It is divided by the equinoctial nearly into two equal parts; extending to 6° of latitude, north and ſouth. It is about 250 leagues in length, 60 in breadth, and 500 in circumference. It is very rich and fertile; yielding not only ſulphur, rice, ginger, pepper, camphire, caſſia, ſandal, and other woods and drugs; but alſo fine tin, iron, copper, ſilver, gold, and diamonds. It is ſo rich in gold, that it is ſuppoſed to be the Ophir and golden Cherſoneſe of the ancients; but what the Europeans trade with them for chiefly is their pepper. The camphire of Sumatra is looked upon as the very fineſt in the Indies, and, as Mr Charles Miller aſſures us, is worth 200l. *per* hundred weight on the ſpot. It bears a great price in China, where they make uſe of it as a kind of leaven, mixing it with their own which is a coarſer kind, to which they think it gives odour and ſpirit.

Both the Engliſh and Dutch have ſeveral colonies and ſettlements here. The chief of the Britiſh ſettlements are thoſe of Bencoolen and Fort Marlborough, on the weſt coaſt; from whence the Eaſt India company import more pepper than from any country in India. There are alſo great quantities of the beſt walking-canes imported from thence.

The natives are of a very dark ſwarthy complexion, but not black. According to Mr Miller's account, they are canibals. The coaſts are poſſeſſed by Mohammedan princes, of whom the king of Achen, at the north end of the iſland, is the moſt conſiderable. The inland country is in poſſeſſion of ſeveral Pagan princes, who have little correſpondence with foreigners. The animals here are much the ſame as thoſe on the neighbouring continent of Malacca.

SUMMARY, in matters of literature. See ABRIDGEMENT.

SUMMER, one of the ſeaſons of the year, commencing in theſe northern regions on the day the ſun enters Cancer, and ending when he quits Virgo: or, more ſtrictly and univerſally, the ſummer begins on the day when the ſun's meridian diſtance from the zenith is the leaſt, and ends on the day when his diſtance is a mean betwixt the greateſt and ſmalleſt. The end of ſummer coincides with the beginning of winter. See SEASONS.

SUMMER-*Iſlands*. See BERMUDAS.

SUMMIT, the top or vertex of any body or figure, as of a triangle, cone, pyramid, &c.

SUMMONS, in law, a citing or calling a perſon to any court, to anſwer a complaint, or even to give in his evidence.

SUMPTUARY LAWS, are laws made to reſtrain exceſs in apparel, and prohibit coſtly clothes, of which heretofore we had many in England; but they are all repealed by 1 Jac. 1. 3 Inſt. 199.

SUN, SOL, ☉, in aſtronomy, the great luminary which enlightens the world, and by its preſence conſtitutes day. See ASTRONOMY, *paſſim*.

Mock-SUN. See PARHELION.

SUN-*Fiſh of the Iriſh*. See SQUALUS.

SUN-*Flower*, in botany. See HELIANTHUS.

SUNDA ISLANDS, a general name for a cluſter of iſlands in the India Ocean, between 93° and 120° of E. Longitude, and between 8° North and 8° South Latitude. The particular names of the iſlands are, *Borneo*, *Sumatra*, *Java*, *Bally*, *Lawboe*, and *Banca*. See theſe articles.

SUNDAY, or the LORD'S-DAY, a ſolemn feſtival obſerved by Chriſtians on the firſt day of every week, in memory of our Saviour's reſurrection.

This is the principal and moſt noted of the Chriſtian feſtivals, and was obſerved with great veneration in the ancient church, from the time of the apoſtles, who themſelves are often ſaid to have met on that day for divine ſervice. It is likewiſe called the *Sabbath-day*, as being ſubſtituted in the room of the Jewiſh ſabbath. See the article SABBATH.

The ancients retained the name *Sunday*, or *dies ſolis*, in compliance with the ordinary forms of ſpeech, the firſt day of the week being ſo called by the Romans, becauſe it was dedicated to the worſhip of the ſun.

SUOVETAURILIA, an ancient Roman ſacrifice, ſo called becauſe it conſiſted of a pig (*ſus*), a ſheep, or rather ram (*ovis*), and a bull (*taurus*). They were all males, to denote the maſculine courage of the Roman people. It was likewiſe called *ſolitaurilia*, becauſe the animals offered up were always *ſolida*, whole or uncut.

SUPERCARGO, a perſon employed by merchants to go a voyage, and overſee their cargo or lading, and diſpoſe of it to the beſt advantage.

SUPERCILIUM, in anatomy, the eye-brow. See ANATOMY, n° 406.

SUPEREROGATION, in theology, what a man does beyond his duty, or more than he was commanded to do. The Romaniſts ſtand up ſtrenuouſly for works of ſupererogation, and maintain that the obſervance of evangelical councils is ſuch. By means hereof, a ſtock of merit is laid up, which the church has the diſpoſal of, and which ſhe diſtributes in indulgences to ſuch as need. The reformed church do not allow of any work of ſupererogation.

SUPERFETATION, in medicine, a ſecond or after-conception, happening when the mother, already pregnant, conceives of a latter coition; ſo that ſhe bears at once two fœtuſes of unequal age and bulk, and is delivered of them at different times. We meet with inſtances of ſuperfetations in Hippocrates, Ariſtotle, Du Laurens, &c.: but they are ſaid to be much more frequent in hares and ſows. Naturaliſts hold, that female rats are frequently born with young rats in their wombs; and we are told of extraordinary inſtances of this kind in the female part of the human ſpecies, by Bartholine, Mentzelius, and in the hiſtory of the Royal Academy of Arts and Sciences.

SUPERFICIES, or Surface, in geometry, a magnitude conſidered as having two dimenſions; or extended in length and breadth, but without thickneſs or depth.

SUPERFINE, in the manufactories, a term uſed to expreſs the ſuperlative fineneſs of a ſtuff: thus a cloth, a camblet, &c. are ſaid to be ſuperfine when made of the fineſt wool, &c. or when they are the fineſt that can be made.

SUPERINTENDANT, in the French cuſtoms, an officer who has the prime management and direction of the finances or revenues of the king.

SUPERIOR, ſomething raiſed above another; or ſome perſon that has a right to command another.

Superior, in Scots law. See Law, N° cclxiv. 3. clxv. 2. & clxvi.

SUPERLATIVE, in grammar, one of the three degrees of compariſon, being that inflection of nouns adjective that ſerves to augment and heighten their ſignification, and ſhows the quality of the thing denoted to be in the higheſt degree. See Grammar.

SUPERNUMERARY, ſomething over and above a fixed number. In ſeveral of the offices are ſupernumerary clerks, to be ready on extraordinary occaſions.

SUPERSTITION, extravagant devotion; or religion wrong directed or conducted.

SUPERVISOR, a ſurveyor or overſeer.

SUPINATION, in anatomy, the action of a ſupinator muſcle, or the motion whereby it turns the hand ſo as that the palm is lifted up towards heaven.

SUPINE, in Latin grammar, part of the conjugation of a verb, being a verbal ſubſtantive of the ſingular number, and the fourth declenſion.

There are two kinds of ſupines. One, called the *firſt ſupine*, ending in *um* of the accuſative caſe, is always of an active ſignification, and marks a motion; as, *abiit deambulatum.* The other, called the *laſt ſupine*, and ending in *u* of the ablative caſe, is of a paſſive ſignification, and is governed by ſubſtantives or adjectives; as, *facile dictu*, &c.

SUPPER, the evening repaſt.—Suppers that are heavy ſhould be avoided, becauſe the ſtomach is more oppreſſed with the ſame quantity of food in an horizontal poſture than in an erect one, and becauſe digeſtion goes on more ſlowly when we ſleep than when we are awake. They ſhould be eaten long enough before bed-time, that they may be nearly digeſted before going to ſleep; and then a draught of pure water will dilute that which remains in the ſtomach.

SUPPLEMENT, in matters of literature, an appendage to a book, to ſupply what is wanting therein.

SUPPORTED, in heraldry, a term applied to the uppermoſt quarters of a ſhield when divided into ſeveral quarters, theſe ſeeming as it were ſupported or ſuſtained by thoſe below. The chief is ſaid to be ſupported when it is of two colours, and the upper colour takes up two-thirds of it. In this caſe it is ſupported by the colour underneath.

SUPPORTERS, in heraldry, figures in an atchievement placed by the ſide of the ſhield, and ſeeming to ſupport or hold up the ſame. Supporters are chiefly figures of beaſts: figures of human creatures for the like purpoſe are called *tenants*.

SUPPOSITION, in muſic, according to Rouſſeau, has two ſenſes.

1. When ſeveral notes riſe or deſcend diatonically in one part upon the ſame ſound in another, then theſe diatonick notes cannot all form a harmony, nor enter at once into the ſame chord: there are ſome of them, therefore, which muſt be reckoned as nothing; and it is theſe notes foreign to the harmony which are called *notes by ſuppoſition*.

The general rule is, when the notes are equal, that all thoſe which are ſtruck in the perfect time ſhould carry harmony; thoſe which paſs during the imperfect time are notes of ſuppoſition, which are only placed there on account of the melody, and to form gradations conjoined. The reader will ſee what is meant by conjoined or diſjoined gradations, by conſulting Music, art. 50. But, to render the matter perſpicuous, let it be undeſtood, that, in gradations conjoined, the higheſt ſound of the inferior degree forms likewiſe the loweſt of the ſuperior; whereas, in ſuch as are diſjoined, the ſeries from beginning to end continually riſes or deſcends by ſome one interval or another; and in this caſe the higheſt note of the loweſt degree will not begin the ſucceeding ſeries, which muſt commence at leaſt a tone or ſemitone above it. Let it be obſerved, that by perfect and imperfect times we would be leſs underſtood to mean the principal diviſions of the bar, than even the aliquot parts of each diviſion. Thus, if there were two equal notes in the ſame time, or, in other words, two aliquot parts in the ſame principal diviſion of the bar, it is the firſt of theſe notes or parts which carries the harmony; the ſecond is a note of ſuppoſition. If the time conſiſts of four equal notes, the firſt and third carry harmony, the ſecond and fourth are notes of ſuppoſition, &c.

Sometimes this order is reverſed; the firſt note is paſſed over by ſuppoſition, and the ſecond carries harmony: but in that caſe the duration of the ſecond note is generally increaſed by a point, at the expence of the firſt.

All this conſtantly ſuppoſes a diatonick procedure by conjoined gradations; for when the degrees are diſjoined, there is no ſuch thing as ſuppoſition, and all the notes ought to enter into the chord.

2. Thoſe are alſo called *chords by ſuppoſition* in which the continued baſs adds or ſuppoſes ſome ſounds beneath the fundamental baſs; which occaſions ſuch chords always to occupy a larger compaſs than the extent of the octave.

The diſſonances of chords by ſuppoſition ſhould always be prepared by ſyncopations, and reſolved in deſcending diatonically upon ſome ſound of a chord under which the ſuppoſed baſs may be recognized as a fundamental, or at leaſt as a continued baſs. For this reaſon, chords by ſuppoſition, if thoroughly examined, may all of them paſs for mere ſuſpenſes.

There are three kinds of chords by ſuppoſition; all of them are chords of the ſeventh. The firſt, when the ſupperadded ſound is a third below the fundamental; ſuch is the chord of the ninth: if the chord of the ninth is formed by the mediant ſuperadded beneath the chord containing the ſenſible note in the minor mode, in that caſe the chord takes the name of the fifth redundant. The ſecond kind is, when the ſound ſuppoſed is a fifth beneath the fundamental, as in the chord of the fourth, otherwiſe called the *eleventh;* if the chord contains the ſenſible note, and the tonic be ſuppoſed, the chord takes the name of *ſeventh redundant.* The third kind is that where the ſuppoſed ſound is beneath a chord of the ſeventh diminiſhed: if it is a third below, that is to ſay, if the ſound ſuppoſed be the dominant, the chord is called a *chord of the ſecond minor and third major;* it is very little in practice: if the ſound ſuperadded be a fifth below, or if that ſound be the mediant, the chord is called a *chord of the fourth and fifth redundant;* and if it is a ſeventh below, that is to ſay the tonic itſelf, the chord takes the name of the *ſixth minor,* and *ſeventh redundant.* With reſpect to the inverſion of theſe different chords, where the ſuppoſed ſound is transferred to the higher parts, as it is only admitted by a licence, it ſhould not be practiſed without choice and circumſpection. At the word ACCORD, in Rouſſeau's *Muſical Dictionary,* will be found all thoſe which are tolerable.

SUPPOSITORY, a kind of medicated cone or ball, which is introduced into the anus for opening of the belly. Suppoſitories are uſually made of ſoap, ſugar, alum, or a piece of tallow-candle about the length of a man's thumb and the breadth of a finger; though they may be made ſmaller for children, and ſometimes a little thicker for adults.

SUPPRESSION, in medicine, is generally uſed to ſignify a retention of urine or of the menſes.

SUPPURATION, the ſecond way wherein an inflammation terminates; being a converſion of the inſpiſſated blood and the firſt adjacent parts, as the veſſels and fat, into pus or matter; which diſorder, when it has not yet found an opening, is generally called an *abſceſs.*

SUPRASPINATUS, in anatomy. See there, *Table of the Muſcles.*

SUPREMACY, the ſuperiority or ſovereignty of the king. See SOVEREIGNTY.

SUR, or SHUR, (anc. geog.) a deſart of Arabia Petrea, extending between Paleſtine and the Arabian Gulph; into which the Iſraelites, on their landing out of the Red Sea, firſt came, Exod. xv. 22. Again, Numb. xxxiii. 8. it is ſaid, that from the ſea they went three days journey into the Wilderneſs of Etham; whence ſome conclude that Etham and Shur are the ſame wilderneſs; or only differ as a part from the whole, Shur being the general name, and Etham that part of it lying neareſt to Etham; thus contending, that the paſſage through the ſea was ſtraight forwards. Others, on the contrary, from the intent of the paſſage through the ſea, namely, the drowning of the Egyptians, maintain, that they only took a circuit or compaſs in the ſea, which as they entered into they alſo came out of, in the Wilderneſs of Etham. Now called *Corondel,* (Thevenot.)

SURAT, a ſea-port town of Aſia, in the province of Guzarat, and in the peninſula on this ſide the Ganges. It was built in the year 1660, on the banks of the river Tapa, the then mart-town being in another place: and when the Engliſh removed from it to this, others followed their example; and in a few years it became a large place, and is now ſaid to have 200,000 inhabitants. Its trade is very conſiderable; for from 1690 to 1705, the revenues ariſing from the cuſtom-houſe and other things amounted to 162,500 pounds. In this city there are as many different religions as in Amſterdam; for there are Mahometans of ſeveral ſects, and many ſorts of Gentoos, of which the Banyans are the moſt numerous. Theſe are either merchants, bankers, brokers, accountants, collectors, or ſurveyors; but there are very few handicraftſmen, except taylors and barbers. It is ſaid that there are 85 different ſects among them, who never eat with each other. There are alſo Talapoins, who are great enemies to the Papiſts, and preach up morality to be the beſt guide of human life. They live upon alms, ſeldom ſpeak in the ſtreets, and extend their charity even to birds and beaſts. Of Perſees there are a great number about Surat and the adjacent countries. They were baniſhed from Perſia in the 7th century, becauſe they would not change their religion. They never marry into any other religion, which keeps their complexion almoſt as fair as that of the Europeans. Beſides thoſe, there are Jews and Armenian Chriſtians, who are all great merchants. The fields about Surat are all plain; and the ſoil is fertile, except towards the ſea, which is ſandy and barren. All ſorts of proviſions are very cheap, and they have as good wheat as in Europe. They have various ſorts of fowls; and plenty of antelopes in their foreſts, though but few deer. There are no fine buildings, but many of the houſes are large; and there are caravanſaries and moſques. The French have a little church near the old Engliſh factory, where they keep a few capuchins, who practiſe ſurgery without a reward. The Engliſh and Dutch agents make a good figure here, and they always maintain a good underſtanding with the officers of ſtate and juſtice. The affairs of the Eaſt India company are managed by a preſident and council; and the former lives in great ſplendor. The Mahometan women are always veiled when they appear abroad, and their dreſs is much the ſame as the men. The Gentoo women are bare-faced, and their legs are bare up to the knee. They have ſeveral gold and ſilver rings on their noſes, ears, legs, and toes. Surat, together with the citadel, was taken by the Engliſh in April 1759, and afterwards ceded to them by the Great Mogul. It is 160 miles north of Bombay, and 375 ſouth-weſt of Agra. E. Long. 72. 25. N. Lat. 21. 10.

SURD, in arithmetic and Algebra, denotes any number or quantity that is incommenſurable to unity: otherwiſe called an *irrational number* or *quantity.* See ALGEBRA, n° 10, 11.

SURETY, in law, generally ſignifies the ſame with BAIL.

SURFACE. See SUPERFICIES.

SURFEIT, in medicine, a ſickneſs with a ſenſation of a load at the ſtomach, uſually proceeding from ſome error in diet, either with regard to the quantity or quality of the food taken. Sometimes, however, a ſurfeit is only a plethora from indolence and full but improper feeding; in which caſe perſpiration is defective, and eruptions form themſelves on the ſkin.

A ſurfeit from animal-food, as muſcles, putrid fleſh, &c. is beſt remedied by the uſe of vegetable acids, which may be taken diluted with water, a vomit being premiſed, and this even though a vomiting and purging both attend.

When an exceſs of feeding is the cauſe, the primæ viæ being evacuated, and the nature of the plethora attended to, that the load may be properly evacuated, the indication of cure will be, to recover the perſpiratory diſcharge, conſiſtent with which diuretics may be uſed in preference to medicines which produce any other evacuation.

Surfeit, in farriery. See there, § xix.

SURGE, in the ſea-language, the ſame with a wave. See Wave.

SURGEON, or Chirurgeon, one that profeſſes the art of Surgery.

In England there are two diſtinct companies of ſurgeons now occupying the ſcience or faculty of ſurgery; the one company called *barbers*, the other *ſurgeons*, which latter are not incorporated.—The two are united to ſue, and be ſued, by the name of maſters or governors and commonalty of the myſtery of barbers and ſurgeons of London. 32 H. VIII. c. 42.

No perſon uſing any barbery or ſhaving in London, ſhall occupy any ſurgery, letting of blood, or other matter; drawing of teeth only excepted.—And no perſon uſing the myſtery or craft of ſurgery ſhall occupy or exerciſe the feat or craft of barbery, or ſhaving; neither by himſelf, nor any other for his uſe. 32 VIII. 8. c. 42.

By the ſame ſtatute, ſurgeons are obliged to have ſigns at their doors.

The French chirurgeons being refuſed to be admitted into the univerſities, (notwithſtanding that their art makes a branch of medicine,) on pretence of its bordering a little on butchery or cruelty, aſſociated themſelves into a brotherhood, under the protection of S. Coſmus and S. Damian: on which account, according to the laws of their inſtitution, they are obliged to dreſs and look to wounds *gratis* the firſt Monday of each month.

They diſtinguiſh between a chirurgeon of the long robe, and a barber-chirurgeon. The firſt has ſtudied phyſic, and is allowed to wear a gown. The ſkill of the other, beſides what relates to the management of the beard, is ſuppoſed to be confined to the more ſimple and eaſy operations in chirurgery; as bleeding, tooth-drawing, &c.

They were formerly diſtinguiſhed by badges: thoſe of the long gown bore a caſe of inſtruments; the barber, a baſon.

SURGERY.

SURGERY, a branch of medicine, including the knowledge of all thoſe diſeaſes wherein the application of the hand is neceſſary, whether ſuch diſeaſes are occaſioned by external injuries, or take their riſe from internal cauſes, with the method of performing all mannual operations which may be neceſſary in ſuch caſes.

Part I. HISTORY of SURGERY.

1 Origin of the art.

THAT ſurgery was coeval with the other branches of medicine, or perhaps antecedent to any of them, will not admit of doubt. The wars and contentions which have taken place among mankind almoſt ever ſince their creation, neceſſarily imply that there would be occaſion for ſurgeons at a very early period; and probably theſe external injuries would for ſome time be the only diſeaſes for which a cure would be attempted, or perhaps thought practicable.—In the ſacred writings we find much mention of balſams, particularly the balm of Gilead, as excellent in the cure of wounds: though at the ſame time we are informed that there were ſome wounds which this balſam could not heal; as indeed we know, at this day, there are many wounds which, though curable by internal medicines, will reſiſt the moſt powerful external applications.

2 Of the ſurgery of the ancient Greeks.

Concerning the ſurgery practiſed among the Egyptians, Jews, and Aſiatic nations, we know little or nothing. The Greeks were thoſe from whom the art deſcended to us, though they confeſſedly received it from the eaſtern nations. The firſt Greek ſurgeons on record are Æſculapius, and his ſons Podalirius and Machaon. Æſculapius flouriſhed about 50 years before the Trojan war; and his two ſons diſtinguiſhed themſelves in that war both by their valour and ſkill in curing wounds. This indeed is the whole of the medical ſkill attributed to them by Homer; for in the plague which broke out in the Grecian camp, he does not mention their being at all conſulted. Nay, what is ſtill more ſtrange, though he ſometimes mentions his heroes having their bones broke, he never takes notice of their being reduced or cured by any other than ſupernatural means; as in the caſe of Æneas, whoſe thigh-bone was broken by a ſtone caſt at him by Diomed. The methods which theſe two famous ſurgeons uſed in curing the wounds of their fellow-ſoldiers ſeems to have been the extracting or cutting out the dart which inflicted it, and applying emollient fomentations or ſtyptics, when neceſſary, to the wound: and to theſe they undoubtedly attributed much more virtue than they could poſſibly poſſeſs; as appears from the following lines, where Homer deſcribes Eurypylus as wounded and under the hands of Patroclus, who would certainly practiſe according to the directions of the ſurgeons.

> Patroclus cut the forky ſteel away;
> Then in his hands a bitter root he bruis'd,
> The wound he waſh'd, the ſtyptic juice infus'd.
> The *cloſing fleſh* that inſtant ceas'd to glow;
> The wound to torture, and the blood to flow.

3 State of the art in the time of Hippocrates.

Till the days of Hippocrates we know very little of what was the practice of the Greek ſurgeons. From him, however, we learn, that the practice of blood-letting, cupping, and ſcarification, was know to them; alſo the uſe of warm and emollient fomentations, iſſues made with hot irons, peſſaries, injections, fumigations, &c. Hippocrates alſo gives directions with regard to fractures, luxations, ulcers, fiſtulas, He directs the extenſion, reduction, bandages, and ſplints, proper to be uſed in fractures and luxations of different bones, with ſeveral machines to increaſe the extenſion when neceſſary. He directs the laxity and tightneſs of the bandages; the intervals for unlooſing and binding them on again; the poſition and repoſe of the fractured member, the regimen and diet; and he mentions the time when a callus is uſually formed. He treats alſo of fractures of the ſkull, and the method of applying the trepan. In his treatment of ulcers, he ſpeaks of reducing fungous fleſh by means of eſcharotics, ſome of which are alum, nitre, verdigreaſe, quicklime, &c.

4 Surgery becomes a diſtinct branch.

In the time of Ptolemy Philopater of Egypt, medicine, all the branches of which had hitherto been practiſed by the ſame perſon, was now divided into three, viz. the dietetic, pharmaceutic, and ſurgical; from which time to the preſent, ſurgery has continued to be reckoned a diſtinct profeſſion from medicine, though very improperly, in the opinion of the beſt authors.

5 Archagathus the firſt Roman ſurgeon expelled the city.

Surgery appears not to have exiſted in Rome, notwithſtanding the warlike genius of the people, for more than 500 years. Archagathus, a Greek, was the firſt profeſſor of that art in the city; and ſo frequently employed the knife, hot irons, and other cruel methods of cure, that he was branded with the opprobrious title of *hangman*, and expelled the city, where no phyſician or ſurgeon of eminence again made his appearance for 180 years. At this time Aſclepiades undertook the profeſſion of medicine; but ſeems to have dealt little in ſurgery. Neither have we any thing of importance on that ſubject till the time of Celſus, who flouriſhed during the reigns of Auguſtus and Tiberius.—In his ſurgery, all the improvements from Hippocrates to his own days are collected; the moſt minute and trifling diſeaſes are not omitted. An eminent ſurgeon, of the moderns, emphathically exhorts every perſon in that profeſſion "to keep Celſus in his hands by day and by night." He deſcribes the ſigns of a fractured ſkull, the method of examining for the fracture, of laying the ſkull bare by an inciſion in the form of the latter X, and afterwards of cutting away the angles, and of applying the trepan, with the ſigns of danger and of recovery. He obſerved, that ſometimes, though very rarely, a fatal concuſſion of the brain might happen, the blood-veſſels within the ſkull being burſt, yet the bone remaining entire. After the opperation of the trepan, ſponges and cloths wet in vinegar, and ſeveral other applications, were made to the head; and, throughout, ſevere abſtinence was enjoined. In violent fractures of the ribs, he ordered veneſection; low diet; to avoid paſſions of mind, loud ſpeaking, motion, and every thing that might excite coughing or ſneezing; cloths wet in wine, roſes and oil, and other applications, were laid over the fracture. The cure of fractures, in the upper and lower extremities, he ſaid were nearly alike; that fractures differ in degree of violence and danger, in being ſimple or compound, that is, with or without a wound of the fleſh, and in being near to the joint. He directs the extenſion of the member by aſſiſtants; the reduction, by the ſurgeon's hands, of the fractured bones into their natural ſituation; and to bind the fractured part with bandages of different lengths, previouſly dipped in wine and oil: on the third day freſh bandages are to be applied, and the fractured member fomented with warm vapour, eſpecially during the inflammation. Splints, if neceſſary, are to be applied, to retain the bones in a fixed poſition. The fractured arm is to be ſuſpended in a broad ſling hung round the neck: the fractured leg is to be incloſed in a kind of caſe, reaching above the ham, and accommodated likewiſe with a ſupport to the foot, and with ſtraps at the ſide, to keep the leg ſteady: in the fractured thigh-bone, the caſe is to extend from the top of the hip to the foot. He deſcribes the method of treating compound fractures, and of removing ſmall fragments of ſplinters of bones; and the manner of extracting darts. In luxations of the ſhoulder, he mentions ſeveral methods of giving force to the extenſion, and of replacing the diſlocated bone. One method ſimilar to Hippocrates was, to ſuſpend the patient by the arm; the fore-part of the ſhoulder, at the ſame time, reſting upon the top of a door, or any other ſuch firm fulcrum. Another method was to lay the patient ſupine, ſome aſſiſtants retaining the body in a fixed poſition, and others extending the arm in the contrary direction; the ſurgeon, in the mean time, attempting, by his hands, forcibly to reduce the bone into its former place.

6 State of ſurgery in the time of Celſus.

If a large inflammation was expected to enſue after a wound, it was ſuffered to bleed for ſome time, and blood was drawn from the arm. To wounds accompanied with conſiderable hæmorrhage, he applied a ſponge wet in vinegar, and conſtant preſſure: if neceſſary, for the violence of the hæmorrhage, ligatures were made round the veſſels, and ſometimes the bleeding orifice was ſeared up with the point of a hot iron. On the third day freſh dreſſings were applied. In conſiderable contuſions, with a ſmall wound of the fleſh, if neither nerves nor blood-veſſel prevented, the wound was to be enlarged. Abſtinence and low diet, in all ſuch accidents, was preſcribed; cloths wet with vinegar, and ſeveral other applications, were directed to the inflamed part. He obſerves, that freſh wounds may be healed without compound applications: Hippocrates uſed a piece of dry ſponge, and condemned greaſy ingredients. In external gangrene, Celſus cut into the ſound fleſh; and when the diſeaſe, in ſpite of every effort, ſpread, he adviſed extirpation of the member. After cutting to the bone, the fleſh was then ſeparated from it, and drawn back, in order to ſave as much fleſh as poſſible to cover the extremity of of the bone. Celſus, though extremely diffuſe in the deſcription of ſurgical diſeaſes, and of various remedies and external applications, yet is nearly ſilent on the method and proceſs of extirpating members; from which, comparing his treatiſe with the modern ſyſtems, we might infer, that the operation was then ſeldomer practiſed than at preſent. He deſcribes the ſymptoms of that dangerous inflammation the carbuncle, and directed immediately to burn or to corrode the gangrened part. To promote the ſuppuration of abſceſſes, he ordered poultices of barley-meal, or of marſhmallows, or the ſeeds of linſeed and fenugreek. He alſo mentions the compoſitions of ſeveral repellent cataplaſms. In that ſuperficial inflammation called the *eryſipelas*, he applied ceruſs, mixed with the juice of ſolanum or nightſhade. Sal ammoniac was ſometimes mixed with his plaſters.

He is very minute in deſcribing diſeaſes of the eyes, ears, and teeth, and in preſcribing a multitude of remedies and applications. In inflammation of the eyes,

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the enjoined abſtinence and low diet, reſt, and a dark room: if the inflammation was violent, with great pain, he ordered veneſection and a purgative; a ſmall poultice of fine flower, ſaffron, and the white of an egg, to be laid to the forehead to ſuppreſs the flow of pituita; the ſoft inſide of warm white bread dipped in wine, to be laid to the eye; poppy and roſes were alſo added to his collyriums, and various ingredients too tedious to enumerate. In chronic watery defluxions of the eyes, he applied aſtringents, cupped the temples, and burnt the veins over the temple and forehead. He couched cataracts by depreſſing the cryſtalline lens to the bottom of the orbit. Teeth, looſened by any accident, he directs, after the example of Hippocrates, to be faſtened with a gold thread to thoſe adjoining on each ſide. Previous to drawing a tooth, he ordered the gum to be cut round its neck; and if the tooth was hollow, it was to be filled with lead before extraction, to prevent its breaking by the forceps. He deſcribes not only the inflammation, but likewiſe the elongation, of the uvula: he alſo deſcribes the polypus, and ſome other diſeaſes affecting the noſe.

He deſcribes ſeveral ſpecies of herniæ or ruptures, and alſo the hydrocele or dropſy of the ſcrotum, and the manual aſſiſtance required in thoſe complaints. After the return of the inteſtines into the abdomen, a firm compreſs was applied to that part of the groin through which they protruded, and was ſecured by a bandage round the loins. In ſome caſes, after the return of inteſtinal ruptures, he diminiſhed the quantity of looſe ſkin, and formed a cicatrix, ſo as to contract over the part, to render it more rigid and capable of reſiſting. He deſcribes various diſeaſes of the genital parts, a difficulty of urine, and the manner of drawing off the water by a catheter; the ſigns of ſtone in the bladder, and the method of ſounding or feeling for that ſtone. Lithotomy was at that time performed by introducing two fingers into the anus; the ſtone was then preſſed forward to the perinæum, and a cut made into the bladder; and by a crooked inſtrument, made in a particular form, the ſtone was extracted. He deſcribes the manner of performing this operation on both the ſexes, of treating the patient, and the ſigns of recovery and of danger. Hippocrates had even ventured to cut into the kidney, either to give a diſcharge to abſceſſes or to extract ſtones.

Celſus directed various corroſive applications and injections to fiſtulas; and, in the laſt extremity, opened them to the bottom with a knife, cutting upon a grooved inſtrument or conductor. In old callous ulcers, he made a new wound, by either cutting away the hard edges, or corroding them with verdigreaſe, quick-lime, alum, nitre, and with ſome vegetable eſcharotics. He mentions the ſymptoms of caries in the bone; directs the bone to be laid bare, and to be pierced with ſeveral holes, or with the trepan, or to be burnt or raſped, in order to promote an exfoliation of the corrupted part; afterwards to apply nitre and ſeveral other ingredients. One of his applications to a cancer was auripigmentum or arſenic. He directs the manner of tapping the abdomen in the aſcites, and of drawing blood by the lancet and cupping-glaſſes. His cupping-glaſſes ſeem not to have been ſo convenient as the modern: they were made either of braſs or horn, and were unprovided with a pump. He cured varicoſe veins by uſtion or by inciſion. He gives directions for extracting the dead fœtus from the womb, in whatever poſition it ſhould preſent; and, after delivery, applied to the private parts ſoft cloths wet in an infuſion of vinegar and roſes. In Celſus's works there is a great redundance and ſuperfluity of plaſters, ointments, eſcharotics, collyriums, of ſuppurating and diſcutient cataplaſms, and external applications of every kind, both ſimple and compound: perhaps, amongſt the multitude, there are a few uſeful remedies now laid aſide and neglected.

7 Surgery of Galen.

The laſt writer of conſequence who flouriſhed at Rome was Galen, phyſician to the emperor Marcus Aurelius. His works are for the moſt part purely medicinal; however, he wrote alſo on ſurgery, and made Commentaries on the Surgery of Hippocrates. He opened the jugular veins, and performed arteriotomy at the temples; directed leeches, ſcarification, and cupping-glaſſes, to draw blood. He alſo deſcribed with accuracy the different ſpecies of herniæ or ruptures.

8 Of Aëtius and Paulus Egineta.

In the year 500 flouriſhed Aëtius, in whoſe works we meet with many obſervations omitted by Celſus and Galen, particularly on the ſurgical operations, the diſeaſes of women, the cauſes of difficult labours, and modes of delivery. He alſo takes notice of the dracunculus, or worm under the ſkin, a diſeaſe at preſent common in Africa. Aëtius, however, is greatly excelled by Paulus Egineta, who flouriſhed in 640; and whoſe treatiſe on ſurgery is ſuperior to that of Celſus or all the other ancients. He directs how to extract darts; to perform the operation ſometimes required in dangerous ruptures or herniæ, where the inteſtines cannot by any other means be returned back; he directs alſo to tie up punctured arteries in the operation for the aneuriſm. Galen, Paulus, and all the ancients, ſpeak only of one ſpecies of aneuriſm, and define it to be "a tumour ariſing from arterial blood, extravaſated from a ruptured artery." The aneuriſm from a dilatation of the artery is a diſcovery of the moderns. In violent inflammations of the throat, where immediate danger of ſuffocation was threatened, Paulus performed the operation of bronchotomy. In obſtinate defluxions upon the eyes, he opened the jugular veins. He deſcribes the manner of opening the arteries behind the ears in chronic pains of the head. He wrote alſo upon obſtetrics, on difficult labours, and other female diſeaſes. Fabricius ab Aquapendente, a celebrated ſurgeon of the 16th century, has followed Celſus and Paulus as text-books.

9 The art revives among the Arabians.

From the time of Paulus Egineta to the year 900, no writer of any conſequence, either on medicine or ſurgery, appeared. At this time the Arabian phyſicians Rhazes and Avicenna revived in the Eaſt the medical art, which as well as others was almoſt all entirely extinguiſhed in the Weſt. Avicenna's *Canon Medicinæ*, or General Syſtem of Medicine and Surgery, was for many ages celebrated through all the ſchools of phyſic. It was principally compiled from the writings of Galen and Rhazes. The latter had correctly deſcribed the ſpina ventoſa, accompanied with an enlargement of the bone, caries, and acute pain. In difficult labours he recommends the fillet to aſſiſt in the extraction of the fœtus; and for the ſame purpoſe Avicenna recommends the forceps. He deſcribes the compoſition

tion of ſeveral coſmetics to poliſh the ſkin and make the hair grow or fall off.

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Albucaſis
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Notwithſtanding this, however, it was not till the time of Albucaſis, who flouriſhed in the year   , that ſurgery came into repute among the Arabians. Rhazes complains of their groſs ignorance, and that the manual operations were performed by the phyſicians ſervants. Albucaſis enumerates a tremendous liſt of operations, ſufficient to fill us with horror. The hot iron and cauteries were favourite remedies of the Arabians; and, in inveterate pains, they repoſed, like the Egyptians and eaſtern Aſiatics, great confidence in burning the part. He deſcribes accurately the manner of tapping in the aſcites; mentions ſeveral kinds of inſtruments for drawing blood; and has left a more ample and correct delineation of ſurgical inſtruments than any of the ancients. He gives various obſtetrical directions for extracting the fœtus in caſes of difficult labours. He mentions the bronchocele, or prominent tumour on the neck, which, he tells us, was moſt frequent among the female ſex. We are alſo informed by this writer, that the delicacy of the Arabian women did not permit male ſurgeons to perform lithotomy on females; but, when neceſſary, it was executed by one of their own ſex.

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From the 11th century to the middle of the 14th, the hiſtory of ſurgery affords nothing remarkable except the importation of that nauſeous diſeaſe the leproſy into Europe. St Lewis king of France had caught the leproſy in the Cruſades; and in order to a cure, was preſcribed the blood of young children, as a potion, by the Jewiſh phyſicians. It does not appear that either external or internal remedies were of any avail in curing it, or indeed thought to be ſo; but, by taking proper precautions to ſeparate the infected from the ſound, it gradually diſappeared. The diſcovery of America introduced a new and more terrible diſeaſe than the leproſy, namely, the venereal; which at its origin appeared in loathſome ulcers affecting the genitals, and by degrees the palate and uvula. Swellings and buboes aroſe in the groin: in its more advanced ſtages, excruciating pains were felt in the bones, eſpecially at night; ſcabs and ſmall running ſores covered the ſkin; nodes or protuberances appeared in the forehead; the bones became at length carious, enlarged, and rotten: many, after lingering for months under ſuch wretched calamities, others, for a year or more, loſt their palate, noſe, eyes, lips, teeth, genitals; and, before death, preſented a cadaverous ſpectacle of deformity and corruption. Even at this day, when the diſeaſe has become much milder, venereal ulcers will ſometimes appear with ſuch inveteracy as to give no ſmall trouble to the ſurgeon who attempts to remove them.

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Soon after this the ſcurvy, with all its train of direful, and for a long time incurable, ulcers, rigid muſcles, and rotten gums, made its appearance. The ſtate of medical knowledge did not, in thoſe ages, admit of a certain and eaſy cure either for the venereal diſeaſe or ſcurvy, nor was the true cure of the latter known till within theſe few years.

13
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tury.

At the beginning of the 16th century ſurgery was held in contempt in this iſland, and was practiſed indiſcriminately by barbers, farriers, and ſow-gelders: the barbers and ſurgeons company continued for 200 years after to be incorporated, both in London and Paris. In Holland and ſome parts of Germany, even at this day, barbers exerciſe the razor and lancet alternately. The ſurgeons company in London, however, have now diſengaged themſelves from that diſhonourable connection: they are now likewiſe authoriſed to examine and to grant certificates to young ſurgeons, which qualify them to purchaſe or to be appointed to a medical commiſſion in the army or navy. Even yet, however, the diſtinction between phyſicians and ſurgeons is by far too great, and their reciprocal ignorance of theſe different branches of the ſame ſcience frequently embarraſſes both phyſician and ſurgeon, often to the great danger of the patient, as will appear in the ſequel of this article.

14
Too great
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between
ſurgeons
and phyſi-
cians.

Surgery, in the ſtrict limitation of the word *, is principally confined to wounds, fractures, luxations, tumours, ulcers, and to the different manual operations, inſtruments, and bandages. Theſe are the themes of general ſyſtems of ſurgery. On this ſcience and art, amongſt the ancient ſurviving writers, Hippocrates, Celſus, Galen, P. Ægineta, and Albucaſis, alone poſſeſs any intrinſic excellence.

It is within the laſt three centuries that we have any original improvement in ſurgery, from the æra of the Arabians; nor do we know of any eminent Britiſh ſurgical writers until within the laſt 130 years. "In Germany," ſays Heiſter, "all the different ſurgical operations, at the beginning even of the 18th century, were left to empirics; the reſt were contented to cure a wound, open a vein or an abſceſs, return a fractured or luxated bone; but they ſeldom or never ventured to perform any of the difficult operations: he alſo ſpeaks of their groſs ignorance of the Latin language."

15
Writers on
ſurgery in
the 16th
century.

The firſt ſurgical work of the 16th century, entitled to any pre-eminence or criticiſm, is that of J. Carpus; but in the effulgence of later writers his light is ſcarce perceptible. F. ab Aquapendente, an Italian, publiſhed a ſyſtem of Surgery, containing a deſcription of the various diſeaſes, accidents, and operations. Boerhaave pays this author the following compliment: *Ille ſuperavit omnes, et nemo illi hanc diſputat gloriam; omnibus potius quam hocce carere poſſumus.* About the ſame period, A. Parey, a Frenchman, made ſeveral important additions to ſurgery, particularly in his collection of caſes of wounds, fractures, and other accidents which occur during war. The ancients, who were ignorant of powder and fire-arms, are defective in this part of military ſurgery. Parey pretends to have firſt invented the method of tying, with a needle and ſtrong ſilk-thread waxed, the extremities of large arteries, after the amputation of a member. The ligature of the blood-veſſels is, however, merely a revival of the ancient practice, which had fallen into diſuſe: throughout the dark ages, the hot iron, cauteries, and ſtrong aſtringents, were ſubſtituted in its place. B. Maggius and L. Botallus wrote on the cure of gunſhot wounds. J. A. Cruce wrote a ſyſtem of ſurgery.

16
In the 17th
and 18th
centuries.

In the 17th century, ſurgery was enriched with ſeveral ſyſtems, and with detached or miſcellaneous obſervations. The principal authors are, M. A. Severinus, V. Vidius, R. Wiſeman, Le Clerc, J. Scultetus, J. Mangetus, C. Magatus, Spigellius, F. Hildanus, T. Bartholin, P. de Marchett.

The 18th century opens with ſeveral eminent ſurgi-

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* *Black's Hiſtorical Sketch.*

17 Improvements in lithotomy.

cal writers and improvements. In the operation of lithotomy, as deſcribed by Celſus, the rectum or lower gut, and often the ſeminal ducts, were wounded, fiſtulas enſued, or the power of generation was annihilated. The moderns therefore invented three methods different from that of Celſus. One method, and the earlieſt, was to introduce a catheter into the urethra and bladder, and upon that to make a direct inciſion through the urethra into the bladder. J. de Romanis, an Italian, in the 16th century, was the original inventor of this operation, a deſcription of which was publiſhed by his pupil Marianus. Another method, much later invented, was to diſtend the bladder as large as poſſible with urine, and when thus enlarged and elevated, to open into it through the abdominal muſcles, immediately above the os pubis. Theſe were called the *high* and *low operations*; Celſus's, the *apparatus minor*. A French prieſt called *Frere Jacques* introduced another improvement, ſomewhat different from the modern low operation, or apparatus major. Jacques's inciſion was directed obliquely and to one ſide of the urethra, avoiding as much as poſſible to open any conſiderable extent of the urinary canal. Inconveniences ſtill attended theſe various experiments in lithotomy. Jacques was a bold raſh man, and ignorant of anatomy; of 60, cut by him for the ſtone, 25 died ſoon after; others ſurvived, but under an incontinence of urine and fiſtulas, and only 13 were perfectly cured. The prieſt's operation and ſucceſs is deſcribed by J. Merey. A grooved catheter was afterwards invented to conduct the inciſion-knife; other ſurgeon added the cutting-gorget; and, with theſe improvements, Jacques's lateral operation is now conſidered as one of the moſt ſafe and ſucceſsful. Douglas, Cheſelden, and afterwards Le Dran, took uncommon pains to explain and to improve this operation. J. Denys alſo wrote well on the ſtone and lithotomy.

18 Inventions of M. Petit.

J. Petit of Paris wrote on diſeaſes of the bones, fractures, diſlocations, and caries. Boerhaave ſays, *Tractatus hic nunquam ſibi parem habuit.* Petit invented the ſcrewed tourniquet, which can be braced or relaxed at pleaſure, and, in the hurry of battles, is extremely uſeful to compreſs the large arteries, and to ſtop the hæmorrhage. Tourniquets were not uſed until towards the end of the 17th century. The ancients, previous to amputation, only made a tight ligature round the member, or attempted to graſp and compreſs the arteries with the hand and fingers: from theſe defects, amongſt them, the amputation of any large member was thought tremendous, and was too frequently fatal. Of late years, the agaric, growing upon old oak-trees, has been extolled as a powerful ſtyptic in hæmorrhagies from large veſſels.

19 Different ſyſtems of ſurgery.

A complete deſcription of the different ſurgical accidents and diſeaſes, and of the principal ſurgical operations, as executed from the beginning of the 18th century to the preſent time, with deſcriptions and plates of the inſtruments and bandages, will be ſeen in thoſe celebrated writers, French, German, and Engliſh, P. Dionis and De la Faye, J. Garengeot, H. F. le Dran, L. Heiſter, and S. Sharp. Heiſter's Syſtem conſiſts of two quarto volumes, and is prefaced with a large catalogue of writers. To Sharp's Compendium of the ſurgical operations is added a volume called *A Critical Inquiry into the Modern Practice of Surgery.* To theſe may be added, Saviard's Surgical Obſervations, J. Z. Platner's Surgical Inſtitutions. On gunſhot wounds, and on fractures, Ranby and Bromfield merit peruſal. Splints of a new conſtruction, to retain fractured bones in a ſteady poſition until a callus is formed, were invented by Sharp, and improved by Pott. Gouch, with meritorious ingenuity, has invented and publiſhed a deſcription of ſeveral machines, to ſecure fractured bones in a fixed ſtation. As ſuch accidents occur ſo frequently in life, and above all during war, every invention of this ſort, and the author, is entitled to public thanks. There is infinitely more ſkill and addreſs required to ſave a fractured member, than to cut it off. Knives and ſaws are dreadful alternatives; and we have already an exuberant ſtock of treatiſes on extirpation.

20 Of diſeaſes of the urethra and fiſtulas.

Numbers had dragged through a great part of life, and many had died in excruciating agony, from obſtructions of the urethra and fiſtulas, the conſequence of venereal gleets, and other cauſes. To remedy ſuch complaints, we find bougies of different conſtructions and materials recommended by the moderns, and deſcribed with more or leſs accuracy in moſt of the ſurgical ſyſtems. In the preſent century, Daran and Goulard have written diſſertations expreſsly upon this ſubject. Goulard's Treatiſe on the Preparations of Lead, and its utility in external inflammations, ſprains, contuſions, and a variety of complaints, is alſo well entitled to peruſal.

21 Of ruptures.

In preventing the protruſion of inguinal ruptures, the modern ſteel-bandages called *truſſes* are more effectual than the ancient. The nature of the hernia congenita, or inguinal rupture of infants, was obſcure before the publications of Haller, Hunter, and Pott. The laſt author has written excellent treatiſes on ruptures, and on the hydrocyle.

22 Diſeaſes of the eyes.

On diſeaſes of the eyes, and ſurgical operations on thoſe organs, the moſt celebrated treatiſes are written by Maitre Jean, C. St Yves, D. Mauchard, and Taylor. Daviel, a modern French ſurgeon, rejected the operation of depreſſing the cryſtalline lens with a needle to the bottom of the orbit, in couching of cataracts; he made an inciſion through the external coat of the eye, and extracted this humour entire. In the former mode, the lens frequently aſcended, and again interrupted the rays of light.

23 Of the teeth.

On the teeth, their diſeaſes, the dentiſt operations, and the dentition of infants, we have two excellent treatiſes, one in French, the other in Engliſh, written by P. Fauchard and by J. Hunter. We do not meet amongſt the ancients with any mention of artificial teeth. Hippocrates and Celſus only direct the immediate reinſtating into their ſockets ſound teeth ſuddenly looſened from the jaw. With us, artificial teeth are commonly made from the hard tuſk of a ſea-horſe. Another modern invention, in which, unfortunately, the advantages and diſadvantages are balanced, is that of tranſplanting ſound teeth of ſimilar ſhape and ſize from one head, and fixing them inſtantaneouſly into the freſh ſockets of another perſon's jaws; there they are tied to the neighbouring teeth by a waxed ſilk thread, and in a few weeks are firmly graſped and ſecured by the gums.

Through the writings of almoſt all the eminent anatomiſts,

tomiſts, there are a variety of miſcellaneous ſurgical obſervations. To recapitulate their names in detail would be ſuperfluous.

The great ſuperiority of the moderns above the ancients in the knowledge of anatomy, and the ſuperiority likewiſe in the conſtruction and workmanſhip of their inſtruments, neceſſarily render all their operations much more ſafe and proſperous.

PART II. THEORY OF SURGERY.

24 heories of rgery and edicine onnected.

IN the extenſive ſignification in which we have taken the word *ſurgery*, it is plain that the theory muſt include the greateſt part, if not the whole, of the theory of medicine. Fevers, for inſtance, may terminate by a critical ſwelling; and the ſurgeon who ſhould ignorantly attempt to diſcuſs a tumor of this kind, might do much miſchief. Ulcers may ariſe from various internal cauſes; and the perſon who ſhould attempt to cure them by external applications alone would certainly fail. In like manner, the treatment of a ſimple wound becomes exceedingly different, according to the conſtitution and habit of body in the perſon who is wounded: from all which it is plain, that there is no theory which will in all caſes anſwer; but that the ſurgeon muſt be well acquainted with the other branches of medicine, or he cannot practiſe with any kind of certainty or ſucceſs.—We ſhall begin, however, with thoſe caſes where the cure is moſt eaſy.

SECT. I. *Of Simple Wounds.*

25 f mortal ounds.

The firſt thing to be conſidered in the inſpection of a wound is, whether it is likely to prove mortal or not. This knowledge can only be had from anatomy, by which the ſurgeon will be able to determine what parts are injured; and, from the offices which theſe parts are calculated to perform, whether the human frame can ſubſiſt under ſuch injuries. It is not, however, eaſy for the moſt expert anatomiſt always to prognoſticate the event with certainty; only this rule he ought always to lay down to himſelf, to draw the moſt favourable prognoſis the caſe will bear, or even more than the rules of his art will allow. This is particularly incumbent on him in ſea-engagements, where the ſentence of death is executed as ſoon as pronounced, and the miſerable patient is thrown alive into the ſea upon the ſurgeon's declaring his wound to be mortal. There are, beſides, inſtances on record where wounds have healed which the moſt ſkilful ſurgeons have deemed mortal. In the war before laſt, an officer was ſhot quite through the body by a muſket-ball, which penetrated the ſubſtance of the lungs; yet be recovered, though not without great difficulty. Mr Forſter informs us that Tupia, a native of the iſland of O-Taheitee, had been run through the body by one of the ſpears headed with the bone of the ſting-ray; and yet this wound was healed. He informs us alſo, that in others of that country he had obſerved the marks of ſuch deſperate wounds, that he could not imagine how life could have ſubſiſted under them. In general, however, thoſe wounds are juſtly deemed mortal,

26 he moſt vourable rognoſis ght always to be awn.

27 ſtances of eſperate ounds being healed.

28 ifferent nds of ounds hich are ceſſarily ortal.

1. That penetrate the cavities of the heart, and all thoſe wounds of the viſcera where the large blood-veſſels are opened; ſuch are large wounds of the lungs, liver, ſpleen, kidneys, ſtomach, inteſtines, meſentery, pancreas, uterus, aorta; of the iliac, cœliac, renal, meſenteric, and carotid arteries, (eſpecially if they are wounded near their origin), of the ſubclavian alſo or vertebral, of the vena cava, the iliac vein, internal jugular, vertebral, renal, or meſenteric veins; of the vena porta, and of other large veins that lie deep in the body; becauſe their ſituation will not admit of proper applications to reſtrain the flux of blood.

2. Thoſe wounds are no leſs mortal than the former which obſtruct or entirely cut off the paſſage of the animal-ſpirits through the body. Such are wounds of the cerebellum, medulla oblongata, and ſome violent ſtrokes of the brain itſelf; though the cortical ſubſtance of the brain may be much injured, and yet the patient recover. There is reaſon to apprehend very great danger when the ſmall veins or arteries which are contained in the cranium are injured: for the blood flowing from them into the internal ſinuſes of the brain, either produces too great a preſſure upon thoſe very tender parts of the brain, and ſo obſtructs the courſe of the blood and ſpirits; or, being corrupted, putrifies the brain itſelf, if it cannot be evacuated by the aſſiſtance of the trepan; which is the caſe when this accident happens at the lower part of the cranium, or in the ſinuſes of the brain. Nor is there leſs danger where the nerves which tend to the heart are wounded, or entirely divided; for, after this, it is impoſſible for the heart to continue its motion.

3. To this claſs alſo are to be refered all wounds that entirely deprive the animal of the faculty of breathing. Therefore there is great danger where the aſpera arteria is completely divided; for, where it is only divided in part, it may be healed again by the aſſiſtance of an expert ſurgeon. To this place alſo belong violent ſhocks of the bronchia, mediaſtinum, and diaphragm, eſpecially the tendinous parts of it.

4. Thoſe wounds alſo which interrupt the courſe of the chyle to the heart are no leſs incurable than the former; ſuch are wounds of the ſtomach, inteſtines, receptacle of the chyle, thoracic duct, and larger lacteals: to which we may add wounds of the œſophagus, if they are large; though death is not ſo ſudden an attendant upon theſe wounds, but for want of nouriſhment they are greatly weakened by degrees, and die conſumptive.

5. Wounds which are inflicted upon membranous parts that are ſituated in the abdomen, and contain ſome ſecreted fluid on the bladders, either for the bile or urine, the ſtomach, inteſtines, receptacle of the chyle, and lacteal veſſels. The fluids contained in theſe parts, when once they are let looſe into the cavity of the abdomen, cannot be properly diſcharged, and therefore eaſily corrode the internal parts of the body; and the membranes that contained them are generally ſo fine, that they will not admit of agglutination, eſpecially ſince no medicine from without can be applied; though ſome few, indeed, have recovered after ſlight wounds in theſe parts.

29 Of ſuch as become mortal when left to themſelves.

6. We ſhall next proceed to deſcribe thoſe wounds which prove fatal if neglected and left to nature. By theſe are meant thoſe wounds that produce inſtant

death unleſs relieved by preſent aſſiſtance, but are curable by a good ſurgeon called in time; ſuch are wounds of the larger external blood-veſſels, which might be remedied by ligature. Of this kind are wounds of the brachial or crural artery, unleſs they are too near the trunk of the body. Wounds in the large arteries of the cubit or tibia, of the branches of the external carotid and temporal artery, are of this kind; to theſe may be added wounds of the jugular and other veins ſituated upon the external parts of the body.

30
Of thoſe that become mortal by accident.

7. Wounds are properly ſaid to become mortal by accident, where the patient's death is occaſioned either by the ill conduct of the patient himſelf, or by the ignorance or neglect of his ſurgeon, the wound itſelf being deemed curable. Under this head are to be reckoned, 1. Thoſe wounds which the ſurgeon has neglected to cleanſe ſufficiently, though he had it in his power to do it; as when ſome foreign body, which might eaſily have been extracted, is left in the wound by the careleſſneſs of the ſurgeon, and produces inflammations, hæmorrhagies, convulſions, and at laſt death itſelf. So in wounds of the thorax and abdomen, if the ſurgeon does not uſe his utmoſt diligence to evacuate the grumous blood, it will corrupt there, and, by drawing the neighbouring parts into conſent, will expoſe the patient to inſtant death. Therefore great care muſt be taken that the lips of the wound do not cloſe till the blood which is collected in the cavity of the body be all evacuated, if poſſible; which may be eaſily perceived by the difficulty of breathing, and other bad ſymptoms, being removed: but if any of the larger internal veſſels are wounded, then all attempts to diſcharge the blood are vain; for the violence of the hæmorrhagy takes off the patient. 2. Wounds alſo are reckoned mortal by accident which are treated or ſearched in too rough a manner by the ſurgeon; for if wounds be handled roughly that are full of nervous parts or large blood-veſſels, there is great danger of bringing on hæmorrhagies, convulſion, inflammation, gangrene, and death itſelf. The caſe alſo is the ſame, 3. In external wounds which are ſlight of themſelves, but the patient is loſt by the violence of the inflammation which is brought on and increaſed by the ſurgeon's injudicious treatment. Or, 4. When any one is taken off by the violence of the hæmorrhagy from a wound of the hand or foot; for in this caſe a ſurgeon might eaſily have ſtopped the blood by the application of proper remedies, or by ligature. Or, 5. Where the patient is guilty of any intemperance in eating or drinking, of exceſs of any paſſion, of expoſing himſelf to the cold air, or of uſing any violent exerciſe; for by this means wounds, more eſpecially thoſe of the head, by being liable to freſh hæmorrhagies and other dangerous accidents, frequently become mortal, notwithſtanding the ſurgeon uſes his utmoſt care and ſkill. Under this head alſo are to be reckoned, 6. Thoſe wounds of the head where the patient is loſt by the vaſt quantity of blood which is extravaſated in the cavity of the cranium, and confined there; but where he might have been relieved, if the trepan had been uſed in time: for though wounds of this kind generally prove incurable, yet, as there is a poſſibility of ſaving a perſon in theſe circumſtances by the uſe of the trepan, this may properly be reckoned amongſt the doubtful caſes, and not deemed abſolutely mortal.

31
Of ſuch as are attended with dangerous ſymptoms.

In examining wounds, the next conſideration is, whether the parts injured are ſuch as may be ſuppoſed to induce dangerous ſymptoms, either immediately or in ſome time during the courſe of the cure. In order to proceed here with any degree of certainty, it is neceſſary to be well acquainted with thoſe ſymptoms which attend injuries of the different parts of the body.

32
Appearances of a ſimple wound left to heal naturally.

If the ſkin only and part of the cellular ſubſtance is divided, the firſt conſequence is an effuſion of blood; the lips of the wound retract, become tumefied, and red and inflamed; leaving a gap of conſiderable wideneſs, according to the length and deepneſs of the wound. Along with this inflammation, if a very conſiderable portion of ſkin and cellular ſubſtance is divided, a ſlight fever ſeizes the patient; the effuſion of blood in the mean time ſtops, and the wound is partly filled up with a cake of coagulated blood. Underneath this cake, the ſmall veſſels pour forth a clear liquor, which in a ſhort time becomes converted into pus *. Below this pus granulations of new fleſh ariſe, the cake of coagulated blood looſens, a new ſkin covers the place where the wound was, and the whole is healed up; only there remains a mark, called a *cicatrix* or *ſcar*, ſhowing where the injury had been received.

All wounds are accompanied with a conſiderable degree of pain, eſpecially when the inflammation comes on; and this though the diviſion reaches no farther than the ſkin and cellular ſubſtance.

33
Of wounds of the muſcles.

But if the muſcular fibres are alſo divided, the pain is much greater, becauſe the ſound part of the muſcle is ſtretched by the contraction of the divided part and the action of the antagoniſt muſcle, which it is now leſs fitted to bear. The wound now alſo gaps much more than where the cellular ſubſtance only is divided, inſomuch that if left to itſelf the ſkin will cover the muſclar fibres without any intervention of cellular ſubſtance, and not only a very unſightly cicatrix remains, but the uſe of the muſcle is in ſome meaſure loſt.—If the muſcle happens to be totally divided, its parts retract to a very conſiderable diſtance; and unleſs proper methods be taken, the uſe of it is certainly loſt ever afterwards.

34
Of wounded arteries.

If by a wound any conſiderable artery happens to be divided, the blood flows out with great velocity, and by ſtarts diſtinguiſhing the pulſe of the artery; the patient ſoon becomes faint with loſs of blood; nor does the hæmorrhagy ſtop until he faints away altogether, when the ends of the divided veſſel cloſe by their natural contractility; and if as much *vis vitæ* ſtill remains as is ſufficient to renew the operations of life, he recovers after ſome time, and the wound heals up as uſual. The part of the artery which is below the wound in the mean time becomes uſeleſs, and its ſides collapſe, ſo that all the inferior part of the limb would be deprived of the vital fluid, were it not that the ſmall branches ſent off from the artery above the wounded place become enlarged and capable of carrying on the circulation. Nature alſo, after a wonderful manner, often produces new veſſels from the ſuperior extremity of the divided artery, by which the circulation is carried on as formerly.

35
Dangerous conſequences of theſe wounds.

However, the conſequences of ſuch a profuſe hæmorrhagy may be very dangerous to the patient, by inducing ex-

* See the articles Pus and Mucus.

extreme debility, polypous concretions in the heart and large veſſels, or an univerſal dropſy in caſe the patient recovers. This happens eſpecially where the artery is partially divided; becauſe then the veſſel cannot contract in ſuch a manner as to cloſe the orifice: however, if the wound is but ſmall, the blood gets into the cellular ſubſtance and inteſtines of the muſcles, ſwelling up the member to an extreme degree, forming what is called a *ſpurious aneuriſm*. Thus the hæmorrhagy ſoon ſtops externally; but great miſchiefs are apt to flow from the confinement of the extravaſated blood. This is now found to have the power of diſſolving not only the fleſhy parts, but alſo the bones themſelves; and thus not only the uſe of the limb is entirely loſt, but the patient is brought into great danger of his life, if proper aſſiſtance be not obtained in a ſhort time.—It not unfrequently happens, that when a large artery has been wounded or totally divided, ſo that the parts which were wont to be ſupplied with blood by that veſſel become totally or in great meaſure deprived of it, a mortification then enſues which cannot be prevented or cured: in ſome caſes the limb remains paralytic or inſenſible through life.

36
ower of xtravaſated lood in iſſolving ones.

37
Wounds of he membranes, erves, or endons.

Wounds of the membranes, nerves, or tendons, are attended with the moſt direful ſymptoms. The peculiar ſymptom indeed which attends a wounded membrane is an eryſipelas. This is to a membrane what a ſimple inflammation is to a fleſhy part: and hence the danger of an eryſipelas of the face more than of any other part of the body; for there is ſuch a connection between the external and internal membranes all over the body, that an affection of the one ſeldom fails to bring on an affection of the other. When a nerve or tendon is entirely divided, the pain is but trifling, though the conſequences are often dangerous. If the nerve is large, all the parts to which it is diſtributed below the wound immediately loſe the power of motion and ſenſation; nor is it uncommon, in ſuch caſes, for them to be ſeized with a gangrene. This, however, does not hold univerſally. According to Dr Kirkland, it takes place only when all or the greateſt part of the nerves belonging to a particular part are divided or tied. "If the ſpinal marrow" ſays he, "is divided near to the head, we know the parts below ſoon loſe their action irrecoverably; or if the bundle of nerves paſſing out of the axilla were divided or tied, ſenſation in the greateſt part of the arm below would probably be loſt. But we all know, that in performing the operation for an aneuriſm in the arm, if the nerves which accompany the brachial artery are tied, a temporary numbneſs is only felt, and ſenſation in any degree below the ligature is not loſt.—I have ſeen the ſuperior cubital nerve torn aſunder above the elbow, in a gun-ſhot wound, with conſiderable loſs of ſubſtance; and a temporary palſy only was the conſequence."

38
Dr Kirkand's opiion.

39
atal ſympoms atending the artial divion of a erve or endon.

When the tendon belonging to any muſcle is totally divided, that muſcle immediately exerts its contractile power; the divided ends of the tendon are removed to a conſiderable diſtance; and, unleſs proper aſſiſtance is obtained, the action of the muſcle is for ever loſt. But when either nerve or tendon happens to be partially divided, the caſe is much worſe. The diſtraction of the parts which remain whole, occaſioned by the divided parts contracting themſelves, occaſions the moſt excruciating pain, which frequently terminates in convulſions of the worſt kind, particularly thoſe moſt fatal ſpaſms termed *tetanus* and *opiſthotanus*, which often attend wounds in nervous or tendinous parts.

40
Wounds of the thorax.

Wounds which penetrate the cavities of the thorax or abdomen are always exceedingly dangerous, becauſe there is ſcarce a poſſibility of all the viſcera eſcaping unhurt. A wound is known to have penetrated the cavity of the thorax principally by the diſcharge of air from it at each inſpiration of the patient, by an extreme difficulty of breathing, coughing up blood, &c. Such wounds, however, are not always mortal, though very frequently ſo. The lungs, nay even the heart itſelf, may be wounded, and yet the patient recover. Van Swieten relates, that a ſtag was found to have a cicatrix of a wound formerly inflicted on the cone of its heart. The ſame author alſo is of opinion, that wounds even of the right ventricle are not abſolutely mortal, as the force of contraction in this ventricle is not very great: however, it is otherwiſe when the laſt ventricle is wounded, the great force with which it contracts, continually dilating the wound, and extravaſating the blood in ſuch quantities, that life cannot poſſibly ſubſiſt.—Wounds of the diaphragm are almoſt always mortal, either by inducing fatal convulſions immediately, or by the aſcent of the ſtomach, which the preſſure of the abdominal muſcles forces up through the wound into the cavity of the thorax; and of this Van Swieten gives ſeveral inſtances.—Even though the wound does not penetrate into the cavity of the thorax, the very worſt ſymptoms may follow. For if the wound deſcends deeply among the muſcles, and its orifice lies higher, the extravaſated humours will be therein collected, ſtagnate, and corrupt in ſuch a manner as to form various ſinuſes; and after having eroded the pleura, it may at length paſs into the cavity of the thorax. The matter having once found a vent into this cavity, will be continually augmenting from the diſcharge of the ſinuous ulcer, and the lungs at laſt conſumed by ſoaking in corrupted matter. This is moſt to be dreaded from thoſe ſinuous ulcers which run behind the ribs; for there is then no opportunity either of compreſſing the parts, or dilating the wound in order to procure a diſcharge of the matter. If, in caſes of wounds in the thorax, the ribs or ſternum happen to become carious, the cure will be extremely tedious and difficult. Galen relates the caſe of a lad who received a blow upon his ſternum in the field of exerciſe: it was firſt neglected, and afterwards badly healed; but, four months afterwards, matter appeared in the part which had received the blow. A phyſician made an inciſion into the part, and it was ſoon after cicatrized: but in a ſhort time a new collection of matter made its appearance, and upon a ſecond inciſion the wound refuſed to heal. Galen found the ſternum carious; and having cut off the diſeaſed part, the pericardium itſelf was obſerved to be corroded, ſo that the heart could be ſeen quite naked; notwithſtanding which, the wound was cured in no very long time.

41
Wounds of the lungs and heart not always mortal.

42
Of the diaphragm exceedingly dangerous.

43
Danger of wounds which do not penetrate the cavity of the thorax.

44
Extraordinary caſe of a carious ſternum and mortified pericardium.

45
Of diſtinguiſhing wounds of the thorax from thoſe of the abdomen.

Great caution is neceſſary in determining whether the wound has really penetrated into the thorax or the abdomen: for the former deſcends much farther in the back than in the fore part; and there are inſtances of ſurgeons penetrating the abdomen inſtead of the thorax, when attempting to perform the operation for an empyema. However, as the lungs are almoſt always wounded when the cavity of the thorax is penetrated, the ſymptoms ariſing from thence can ſcarcely be miſtaken.

46 Of an emphyſema.

—Another ſymptom which frequently, though not always, attends wounds of the thorax, is an emphyſema. This is occaſioned by the air eſcaping from the wounded lungs, and inſinuating itſelf into the cellular memberane; which being pervious to it over the whole body, the tumour paſſes from one part to another, till at laſt every part is inflated to a ſurpriſing degree. An inſtance is given, in the Memoirs of the Royal Academy, of a tumour of this kind, which on the thorax was eleven inches thick, on the abdomen nine, on the neck ſix, and on the reſt of the body four; the eyes were in a great meaſure thruſt out of their orbits by the inflation of the cellular membrane; and the patient died the fifth day. This was occaſioned by a ſtab with a ſword.

47 Wounds of the abdomen.

Wounds of the abdomen are not much leſs dangerous than thoſe of the thorax, by reaſon of the importance of the viſcera which are lodged there.

48 An hernia or fiſtulous ulcer ſometimes the conſequence of wounds of the integuments.

When the wound does not penetrate the cavity, there is ſome danger of an hernia being formed by the dilatation of the peritonæum through the weakened integuments, and the danger is greater the larger the wound is. Thoſe wounds which run obliquely betwixt the interſtices of the muſcles often produce ſinuous ulcers of a bad kind. For as there is always a large quantity of fat interpoſed every where betwixt the muſcles of the abdomen, if a wound happens to run between them, the extravaſated humours, or matter there collected, not meeting with free egreſs through the mouth of the wound, often makes its way in a ſurpriſing manner through the panniculus adipoſus, and forms deep ſinuoſities between the muſcles; in which caſe the cure is always difficult, and ſometimes impoſſible.

49 Signs of a wound penetrating the cavity of the abdomen.

If a large wound penetrates the cavity of the abdomen, ſome of the viſcera will certainly be protruded through it; or if the wound is but ſmall, and cloſed up with fat ſo that none of the inteſtines can protrude themſelves, we may yet know that the cavity of the abdomen is pierced, and probably ſome of the viſcera wounded, by the acute pain and fever, paleneſs, anxiety, faintings, hickup, cold ſweats, and weakened pulſe, all of which accompany injuries of the internal parts. The miſchiefs which attend wounds of this kind proceed not only from the injury done to the viſcera themſelves, but from the extravaſation of blood and the diſcharge of the contents of the inteſtines into the cavity of the abdomen; which, being of a very putreſcent nature, ſoon bring on the moſt violent diſorders.

50 Wounds of the inteſtines will ſometimes heal ſpontaneouſly.

Hence wounds of the abdominal viſcera are very often mortal, though not always ſo. It appears, that the ſmall inteſtines have been totally divided, and yet the patient has recovered. Wounds both of the ſmall and large inteſtines have healed ſpontaneouſly, even when they were of conſiderable magnitude; ſo that both the contents of the inteſtine have been freely diſcharged thro' the wound in it, and part of the inteſtine itſelf has been protruded through the wound of the integuments. When this laſt is the caſe, however, there is great danger from the mere contact of the external air; and indeed the wound moſt commonly proves generally mortal where any conſiderable portion of the inteſtine has been protruded, even though itſelf ſhould not be wounded.

51 Wounds of the meſentery and liver very dangerous.

When the meſentery is injured, the danger is extreme, both on account of the blood-veſſels which are every where diſperſed through it, and the membranous nature of the meſentery itſelf, which is as ſubject to the eryſipelatous inflammation as the other membranes of the body. Wounds of the liver are alſo exceedingly dangerous, on account of the nature of that viſcus; for as the circulation of the blood is there very ſlow, and the ſubſtance of the liver itſelf is exceedingly ſoft and tender, the ſmalleſt acrimony in the matter is ſufficient to deſtroy the whole, by producing incurable abſceſſes.

52 But not thoſe of the ſpleen and pancreas.

Wounds of the ſpleen and pancreas are ſaid not to be dangerous; and there are even ſome inſtances of theſe parts being cut out of living animals without any conſiderable injury; but thoſe of the kidneys, urinary bladder, and gall-bladder, are almoſt always mortal.

53 Of wounds of the head.

Wounds of the head, even though they penetrate only through the external integuments, are not without danger, chiefly on account of the danger ariſing from the membranes of the brain, the pericranium, and the concuſſion of the brain by the ſtroke of the wounding inſtrument. Even contuſions on the head, without any external wound, have ſometimes brought on the moſt violent ſymptoms, and this when every thing ſeemed for a while to be in a fair way.

54 Mr Pott's diviſion of them into two claſſes.

Mr Pott, in his excellent Treatiſe upon Injuries of the Head from external Violence, divides wounds of the head into two kinds, viz. lacerated wounds, and thoſe made by puncture. The former he ſubdivides into other two kinds, viz. thoſe in which the ſcalp, though torn or unequally divided, ſtill keeps its natural ſituation, and is not ſeparated from the cranium to any conſiderable diſtance beyond the breadth of the wound; and thoſe in which it is conſiderably detached from the parts it ought to cover.

55 Of thoſe in which the ſcalp is ſeparated from the cranium.

The latter are the moſt dangerous; as in ſuch caſes the pericranium is moſt commonly inflamed, and communicates the injury to the membranes of the brain, whence follow the moſt fatal ſymptoms. Small wounds, or ſuch as are made by inſtruments that pierce rather than cut, are in general more apt to be troubleſome than thoſe which are larger, and, in the head particularly, are ſometimes attended with very alarming ſymptoms. The parts capable of being hurt by ſuch wounds are the ſkin, tela celluloſa, the expanded tendons of the muſcles of the ſcalp, and the pericranium. If the wound affects the cellular membrane only, and has not reached the aponeuroſis or pericranium, the inflammation and tumour affect the whole head and face, the ſkin of which wears a yellowiſh caſt, and is ſometimes thick ſet with ſmall bliſters containing a ſerum of the ſame colour. It receives the impreſſion of the fingers, and becomes pale for a moment, but returns immediately to its inflamed colour: it is not very painful to the touch, and the eyelids and ears are always comprehended in the tumefaction: the former are ſometimes diſtended in ſuch a manner as to be cloſed; a feveriſh heat and thirſt generally accompany it; the patient is reſtleſs, has a quick pulſe, and moſt commonly a nauſea and inclination to vomit. This generally happens to perſons of a bilious habit, and is indeed an inflammation of the eryſipelatous kind; but though its appearance is alarming, it is not often attended with danger. The wound does indeed neither look well, nor yield a kindly diſcharge while the fever continues; but ſtill the ſcalp continues to adhere firmly to the ſkull, and the patient does not complain of that tenſive pain, nor is afflicted with that fatiguing reſtleſſneſs, which generally attends miſchief underneath the cranium.

56 f ſuch as ffect the rain and its embranes.

Wounds and contuſions of the head which affect the brain and its membranes are alſo ſubject to an eryſipelatous kind of ſwelling and inflammation, but very different both in its character and conſequences from the preceding. In this the febrile ſymptoms are much higher; the pulſe harder and more frequent; the anxiety and reſtleſſneſs extremely fatiguing; the pain in the head intenſe, and generally attended with irregular ſhiverings, which are not followed by a critical ſweat, nor afford any relief to the patient. Theſe ſhiverings are moſt frequently a ſign of matter forming between the dura mater and the ſkull; and indeed ſhivering generally accompanies the formation of matter in any part of the body, as ſhall be explained when we come to treat of abſceſſes. In the former caſe, the eryſipelas generally appears within the firſt three or four days; whereas in the latter it ſeldom comes on till ſeveral days after the accident, when the ſymptomatic fever is got to ſome height. In the ſimple eryſipelas, although the wound be undigeſted, yet it has no other mark of miſchief; the pericranium adheres firmly to the ſkull, and upon the ceſſation of the fever all appearances become immediately favourable. In that which accompanies injury done to the parts underneath, the wound not only has a ſpongy, glaſſy, unhealthy aſpect; but the pericranium in its neighbourhood ſeparates of its own accord from the bone, and quits all coheſion with it. Theſe appearances indicate great danger, and commonly end in death.

57 f wounds hich paſs rough all e integuents to e pericraium.

If the wound be a ſmall one, and has paſſed thro' the tela celluloſa to the aponeuroſis and pericranium, it is ſometimes attended with very alarming ſymptoms. The inflamed ſcalp does not ariſe to ſuch a degree of tumefaction as in the eryſipelas, neither does it pit or retain the impreſſion of the fingers. It is of a deep red colour, unmixed with the yellow tint of the eryſipelas: it appears tenſe, and is extremely painful to the touch. As it is not an affection of the tela celluloſa, and as the ears and the eye-lids are not covered by the parts in which the wound is inflicted, they are ſeldom, if ever, included in the tumour, though they may partake of the general inflammation of the ſkin: it is generally attended with acute pain in the head, and ſuch a degree of fever as prevents ſleep, and ſometimes brings on a delirium.

58 f thoſe here the ll is cleft, part of it off.

In violent wounds of the head, it not unfrequently happens that the ſkull is cleft, or even a part of it entirely taken off, ſometimes with and ſometimes without injuring the brain. Theſe wounds, though very dangerous, are not always mortal, unleſs the medullary ſubſtance of the brain be injured; for this never fails to bring on death in a ſhort time. There have been inſtances of people who by wounds of this kind had a conſiderable portion of the dura mater expoſed for the remainder of their life, and yet felt no remarkable inconvenience, farther than that the brain was exceedingly tender; and they felt great pain, giddineſs, dimneſs of ſight, &c. even on a ſlight preſſure of that part.

59 Wounds of the joints dangerous.

In wounds of the joints there is always a conſiderable difficulty of cure, by reaſon of the efflux of the ſynovia, which ſerves for lubricating the parts; and there is alſo great danger on account of the number of tendons, ligaments, and ſynovial glands, which are ſituated about the articulations. In this caſe, ſmall wounds are more dangerous than large ones, eſpecially when the former cannot be enlarged. The danger is leaſt when the wound is ſituated in the upper part of the joint, and has not penetrated through the capſular ligament. The ſymptoms attending a wounded joint are, violent pain, inflammation, &c. with an efflux of thick whitiſh matter almoſt of the conſiſtence of honey, called *melicera*, and is indeed no other than the ſynovia which lubricates the joint. This flux it is very difficult to reſtrain, and by it the wound is prevented from healing: at laſt the wound degenerates into an ulcer with callous lips, which ends in an incurable fiſtula; and even if the wound ſhould at laſt be healed up, the joint for the moſt part remains ſtiff and contracted, ſo that the limb cannot be ſtretched out.

60 A prognoſis cannot be drawn with certainty.

From the preceding account of the ſymptoms attending wounds in the different parts of the body, the ſurgeon may be enabled to judge in ſome meaſure of the event; though it muſt always be remembered, that wounds, even thoſe which ſeemed to be of the ſlighteſt nature, have, contrary to all expectation, proved mortal, chiefly by inducing convulſions or a locked jaw; ſo that no certain prognoſtic can be drawn on ſight of recent wounds. We ſhall now, however, proceed to conſider their treatment.

61 Virtues of balſams and ſalves in curing wounds imaginary.

For the cure of wounds, it has been already obſerved, that the ancients imagined balſams, the juice of herbs, &c. to be a kind of ſpecifics. In after-ages, and in countries where balſams are not eaſily to be procured, ſalves have been ſubſtituted in their place; and even at this day there are many who reckon a ſalve or ointment eſſentially neceſſary for healing the ſlighteſt cut. It is certain, however, that the cure of wounds cannot be effected, nay, not even forwarded in the leaſt, by ointments, unleſs in particular caſes or by accident. That power which the human frame has of repairing the injuries done to itſelf, which by phyſicians is called *vis medicatrix naturæ*, is the ſole agent in curing external injuries, and without this the moſt celebrated balſams would prove ineffectual. 62 Three ſtages to be obſerved in the curing of wounds. There are three ſtages to be obſerved in the cure of a wound: the firſt, called *digeſtion*, takes place when the ends of the wounded veſſels contract themſelves, and pour out the liquor which is converted into pus. As ſoon as this appears, the ſecond ſtage, in which the fleſh begins to *grow up*, takes place; and as this proceeds, the edges of the wound acquire a fine bluiſh or pearl colour, which is that of the new ſkin beginning to cover the wound as far as the fleſh has filled it up. This proceſs continues, and the ſkin advances from all ſides towards the centre, which is called the *cicatrizing* of the wound. For the promoting of each of theſe proceſſes, there were ointments formerly much in vogue. A compoſition of turpentine and the yolk of an egg was named *digeſtive ointment*, from the power it was ſuppoſed to have of promoting the formation of pus; baſilicon and other ointments were ſuppoſed to promote

63 None of theſe can be promoted by any ointment.

64 Of cleanſing and dreſſing wounds.

mote the growth of fleſh, and there were ointments alſo for cicatrizing. But it is now found, that no ointment whatever is capable of promoting theſe operations; and it is only neceſſary to keep the wound clean, and to prevent the air from having acceſs to it. This, indeed, nature takes care to do by covering the wounded part with a cake of coagulated blood; but if a wound of any conſiderable magnitude ſhould be left entirely to nature, the pus would form below the cruſt of coagulated blood in ſuch quantity, that it would moſt probably corrupt, and the wound degenerate into a corroding ulcer. It is neceſſary, therefore, to cleanſe the wound once a-day; and for this purpoſe it will be proper to apply a little ointment ſpread on ſoft ſcraped lint. For the firſt dreſſing, dry lint is uſually applied, and ought to be allowed to remain for two or three days, till the pus is perfectly formed; after which the ointment may be applied as juſt now directed; and, in a healthy body, the wound will heal without further trouble. As to the ointment employed, it is almoſt indifferent what it be, provided it has no acrid or ſtimulating ingredients in its compoſition; and hence the digeſtive ointment above-mentioned is rather hurtful than otherwiſe, on account of the ſtimulating nature of the turpentine which makes part of its compoſition.

65 Where ſuture is neceſſary.

But though, in general, wounds thus eaſily admit of a cure, there are ſeveral circumſtances which require a different treatment, even in ſimple diviſions of the fleſhy parts, when neither the membranous nor tendinous parts are injured. Theſe are, 1. Where the wound is large, and gapes very much, ſo that, if allowed to heal in the natural way, the patient might be greatly diſfigured by the ſcar. In this caſe, it is proper to bring the lips of the wound near to each other, and to join them by ſuture, either of the dry or bloody kind, as the wound is more ſuperficial or lies deeper.

66 Of extracting foreign bodies.

2. When foreign bodies are lodged in the wound, as when a cut is given by glaſs, &c. it is neceſſary by all means to extract them before the wound is dreſſed; for it will never heal until they are diſcharged. Sometimes it happens that theſe bodies are ſituated in ſuch a manner as not to be capable of being extracted without lacerating the adjacent parts, which would occaſion violent pain and other bad ſymptoms. In this caſe it is neceſſary to enlarge the wound ſo that theſe offending bodies may be eaſily removed. This treatment, however, is chiefly neceſſary in gunſhot wounds, of which we ſhall treat in the next ſection.

67 Of uſing compreſſes, &c.

3. When the wound is made in ſuch a manner that it runs for ſome length below the ſkin, and the bottom is much lower than the orifice. In this caſe, the matter collected from all parts of the wound will be lodged in the bottom of it, where, corrupting by the heat, it will degenerate into a fiſtulous ulcer. To prevent this, we muſt uſe compreſſes, applied ſo that the bottom of the wound may ſuffer a more conſiderable preſſure than the upper part of it. Thus the matter formed at the bottom will be gradually forced upwards, and that formed at the upper part will be incapable of deſcending by its weight; the divided parts in the mean time eaſily uniting when brought cloſe together. Indeed, the power which nature has of uniting divided parts of the human body is very ſurpriſing; for, according to authors of credit, even if a piece of fleſh is totally cut out, and applied in a ſhort time afterwards to the place from whence it was cut, the two will unite. On this principle Taliacotius, profeſſor at Bologna, pretended to reſtore loſt parts, as noſes, ears, lips, &c. by cutting out a piece of the arm and adapting it to the part. But though theſe are juſtly looked upon to be ridiculous pretenſions, we are certain that a part cut out of a living body does not entirely loſe its vital power for ſome time, as is evident from the modern practice of tranſplanting teeth; and from an experiment of Dr Hunter's at London, where he put the teſticle of a cock into the belly of a living hen, which adhered to the liver, and became connected to it by means of blood-veſſels *. We have therefore the greateſt reaſon to hope, that the divided parts of the human body, when cloſely applied to each other, will cohere without leaving any ſinus or cavity between them. However, if this method ſhould fail, and matter ſtill be collected in the depending part of the wound, it will be neceſſary to make an opening in that part in order to let it out; after which, the wound may be cured in the common way.

68 Of taking away fungous fleſh.

4. During the courſe of the cure it ſometimes happens, that the wound, inſtead of filling up with fleſhy granulations of a florid colour, ſhoots up into a glaſſy-like ſubſtance which riſes above the level of the ſurrounding ſkin, at the ſame time that, inſtead of laudable pus, a thin ill-coloured and fetid ichor is diſcharged. In this caſe the lips of the wound loſe their beautiful pearl colour, and become callous and white, nor does the cicatrizing of the wound at all advance. When this happens in a healthy patient, it generally proceeds from ſome improper management, eſpecially the making uſe of too many emollient and relaxing medicines, an immoderate uſe of balſams and ointments. Frequently nothing more is requiſite for taking down this fungus than dreſſing with dry lint; at other times deſiccative powders, ſuch as calamine, tutty, calcined alum, &c. will be neceſſary; and ſometimes red precipitate mercury muſt be uſed. This laſt, however, is apt to give great pain, if ſprinkled in its dry ſtate upon the wound; it is therefore moſt proper to grind it with ſome yellow baſilicon ointment, which makes a much more gentle, though at the ſame time efficacious, eſcharotic. Touching the overgrown parts with blue vitriol is alſo found very effectual.

69 Of the regimen of the patient in wounds.

Hitherto we have conſidered the wounded patient as otherwiſe in a ſtate of perfect health; but it muſt be obſerved, that a large wound is capable of diſordering the ſyſtem to a great degree, and inducing dangerous diſeaſes which did not before exiſt.—If the patient is ſtrong and vigorous, the pain and inflammation of the wound great, a conſiderable degree of fever may ariſe, which it will be neceſſary to check by bleeding, low diet, and other antiphlogiſtic regimen, at the ſame time that the inflamed lips of the wound and parts adjacent are to be treated with emollient fomentations or cataplaſms till the pain and ſwelling abate. On the other hand, it may happen, when the patient is of a weak and lax habit, that the vis vitæ may not be ſufficient to excite ſuch an inflammation in the wound as is abſolutely neceſſary for its cure. In this caſe, the edges of the wound look pale and ſoft; the wound itſelf ichorous and bloody, without any ſigns of fleſhy granulations; or if any new fleſh ſhoots

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* See Blood, n° 19.

up, it is of the fungous glaſſy kind above-mentioned. To ſuch wounds all external applications are vain; it is neceſſary to ſtrengthen the patient by proper internal remedies, among which the bark has a principal place, until the wound begins to alter its appearance. In ſuch perſons, too, there is ſome danger of a hectic fever by the abſorption of matter into the body when the wound is large; and this will even take place during the courſe of the cure, even when the appearances have been at firſt as favourable as could be wiſhed. This happens generally when the wound is large, and a great quantity of matter formed: for by this diſcharge the patient is weakened, ſo that the pus is no ſooner formed, than it is by the abſorbent veſſels re-conveyed into the body, and feveriſh heats immediately affect the patient. For this the beſt remedy is to exhibit the bark copiouſly, at the ſame time ſupporting the patient by proper cordials and nouriſhing diet. Indeed, in general, it will be found, that, in the caſe of wounds of any conſiderable magnitude, a more full and nouriſhing regimen is required than the patient, even in health, has been accuſtomed to; for the diſcharge of pus alone, where the quantity is conſiderable, proves very debilitating, if the patient is not ſtrengthened by proper diet. And it is conſtantly found, that the cure of ſuch ſores goes on much more eaſily when the patient is kept in his uſual habit of body, than when his ſyſtem is much emaciated by a very low allowance; and, for the ſame reaſon, purgatives, and whatever elſe tends to weaken the conſtitution, are improper in the cure of wounds.

70
Of hæmorrhagies.

Hæmorrhagies very frequently happen in wounds, either from a diviſion of one large artery, or of a number of ſmall ones. In this caſe, the firſt ſtep to be taken by the ſurgeon is to effect a temporary ſtoppage of the blood by means of ſtrong compreſſion. In the head, as well as in the trunk of the body, the eaſieſt method of applying preſſure of this kind is by means of doſſils of linen or charpie, held firmly upon the mouths of the bleeding veſſels, either by the hands of an aſſiſtant or the uſe of a proper bandage: but it is better when preſſure can be applied to the ſuperior part of the artery, as it not only ſecures the veſſel equally well, but admits of the neceſſary ligature being applied with greater freedom. Where accidents of this kind, therefore, happen to any of the limbs, and preſſure can be made on the ſuperior part of the artery, the tourniquet is immediately to be applied.

71
Ancient ſurgeons defective in the knowledge of ſtopping hæmorrhagy.

The patient being in this manner ſecured from immediate danger, the ſurgeon muſt take the proper means for preventing any return. In this the ancients were extremely defective. Being ignorant of the uſe of the tourniquet, and equally ſo of the method of tying up blood-veſſels, they could only apply doſſils of linen covered with aſtringent powders for the ſmall arteries, and for the larger ones they had no other reſource but ſearing with red-hot irons. This cruel remedy they applied even in caſes of amputation; and we find that ſome ancient chirurgical writers ordered the fleſh to be divided down to the bone by a red-hot knife: but the effects even of this are by no means to be depended upon farther than as a temporary relief; for, in general, the pulſation of the larger arteries ſoon overcomes all reſiſtance from the eſchar occaſioned by the cautery. Styptic powders are ſtill leſs efficacious; and though ſponge, agaric, and fungous ſubſtances of various kinds, have been recommended even by the more ſkilful modern ſurgeons, yet the application of the ligature, and that alone, can be depended upon where the larger arteries are divided. In performing this operation there are two different methods; one in which the nerve which runs along with the artery, and part of the circumjacent muſcles, are taken in with the artery in the ligature; the other, in which the divided artery is taken hold of by a pair of forceps, or by an hooked inſtrument called the *tenaculum*, and tied up by itſelf. The former method is liable to great objection, on account of the violent ſymptoms it occaſions; particularly extreme pain, ſpaſms, and convulſions, not only of the part affected, but even of the whole ſyſtem.

72
Ligature of the veſſels can alone be depended on.

Spaſmodic twitches are frequently found † to occur after the amputation of limbs, and are often the ſource of much diſtreſs. In ſome inſtances they are no doubt to be conſidered as the effect of other cauſes; but in various caſes it has happened, that demonſtrative proof has been obtained of their ariſing from the ligatures of arteries having been applied in an improper manner. When ſuch convulſive affections occur after amputations, and the uſual means of preventing them have failed, effectual relief may be frequently obtained by deſtroying the ligatures altogether, ſo as to remove the compreſſion upon the nerves; care being taken at the ſame time to renew the ligatures upon the arteries immediately, without comprehending any of the contiguous parts.

† *Bell's Surgery*, p. 35.

73
Bad effects of including the nerves in the ligature.

74
Arteries may be ſafely tied up by themſelves.

Practitioners have commonly been afraid of tying up blood-veſſels by themſelves without the intervention of ſome of the ſurrounding parts, on the ſuppoſition of the coats of arteries not being of a ſufficient firmneſs for bearing that degree of compreſſion neceſſary for the prevention of hæmorrhagy.—This, however, originates from an idea of the coats of arteries not being ſo ſtrong as they really are, and of a great degree of force being neceſſary for compreſſing the ſides of arteries into cloſe contact with one another. But it is now well known, that even very ſmall arteries are poſſeſſed of much firmneſs: and it is alſo certain, that, even in the largeſt arteries of the arm or thigh, a very ſlight degree of compreſſion is fully ſufficient, not only for reſtraining hæmorrhagy, but for ſecuring the ligature on the very ſpot to which it is firſt applied; and in ſmall veſſels the force neceſſary for this purpoſe is trifling indeed, being far leſs than is commonly practiſed. It has alſo been objected to this mode of ſecuring blood-veſſels by themſelves, that the ligatures, although they ſhould not cut the arteries through, yet are more apt to ſlip than when ſome of the ſurrounding parts are comprehended along with them; and, in ſome inſtances, it is ſaid that arteries retract ſo far, that they cannot in any other way be laid hold of than by means of the crooked needle in the ordinary method. Long and repeated experience, however, of a few individuals, of this mode of taking up arteries by themſelves, has put the fact beyond a doubt, that it is equally ſecure as any other yet invented (A).—Fatal hæmorrhagies after capital operations, either from inattention or ſome other

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(A) See an eſſay upon this ſubject, by Mr Aitken, an ingenious ſurgeon of Warrington.

other cauſe, do now and then indeed happen in the hands of the moſt able practitioners; but occurrences of this nature have as frequently happened when the curved needle was employed, as when the blood-veſſels were ſecured by themſelves without any of the contiguous parts being included.

75 Advantages of the inſtrument called the *tenaculum*.

In a few inſtances it may happen, that a bleeding veſſel, from lying at the bottom of a deep wound, cannot be laid hold of in any other manner than by the curved needle being made to paſs round it. Such occurrences, however, are exceedingly rare. Among other advantages which the tying of arteries by means of the tenaculum has over the old mode of operating, there is ſtill one we have not yet taken notice of. It often happens, after amputations and other operations where the larger arteries have been tied, that the ligatures do not come eaſily away, from being made to run ſo deep as with the curved needle is commonly neceſſary. In ſome inſtrances much pain and trouble has occurred from this circumſtance, the ligature remaining quite immoveable for a great many weeks: and after all, we have ſeen it neceſſary for the ſurgeon to put the patient to a great deal of pain, by being obliged to cut out the threads with a ſcalpel. But when the tenaculum is uſed, every riſk of this kind is effectually avoided, from the ligatures generally falling off of their own accord, in the courſe of the third or fourth dreſſing of the ſore.

From what has been ſaid, therefore, we ſhall conſider it as a practice that ought to be eſtabliſhed, that, in forming the ligature of arteries, the nerves and other contiguous parts ſhould be carefully avoided.

76 How the ſmaller veſſels are to be ſecured.

The principal artery being in this manner ſecured, all the veſſels of the part muſt one after another be taken up in the ſame manner, by firſt looſening the tourniquet in order to diſcover them, and afterwards applying the ligature to each in the manner directed. It often happens, however, that the loſs of blood the patient has ſuſtained, a tendency to deliquium which may take place for the time, the fear he labours under, and the degree of cold to which the ſore is expoſed, have all together ſuch an effect upon the ſmaller arteries, as to prevent them for the time from diſcharging their contents; and as arteries left in ſuch a ſtate without being ſecured, generally burſt out on the removal of theſe cauſes, a circumſtance which always occaſions much trouble to the practitioner, as well as a great deal of pain to the patient, every ſurgeon therefore ought to pay the niceſt attention to this point. The tourniquet ſhould be made perfectly looſe; any coagulated blood on the ſurface of the ſore ought to be carefully waſhed off with a ſponge and warm water; and the patient, if faintiſh, ought to get a glaſs of wine or ſome other cordial; and after all, the ſurgeon ought to examine, with the moſt minute attention, the uſual courſe which the veſſels of the part are known to take. This being done, every artery of the part, even the ſmalleſt that can be diſtinguiſhed, ought to be ſecured with a ligature: for ſuch veſſels as appear exceedingly trifling while the part is yet expoſed to the air, after the patient becomes warm in bed, when of courſe the ſolids become relaxed and the fluids expand, even the ſmalleſt branches of arteries that happen to be neglected, will now be capable of producing much miſchief, by diſcharging very conſiderable quantities of blood; and, as little or no injury can ever occur by the proper application of ligatures to all the arteries that preſent themſelves, the greateſt attention ought at all times to be paid to this circumſtance.

77 When the crooked needle is to be made uſe of.

When the principal arteries of a ſtump or other large wound have been taken up, and a little blood continues to be diſcharged, but appears to come from ſundry ſmall veſſels only, the ſurgeon, unleſs he is much accuſtomed to this kind of buſineſs, is induced to think, that as they are very trifling to appearance, ſo he need not be at the trouble of tying them, as the neceſſary compreſſion of the bandages proper for the wound will in all probability effect a total ſtoppage of the hæmorrhagy. In a general oozing of a ſmall quantity of blood from the whole ſurface of a ſore, and when no particular veſſel can be diſtinguiſhed, there is a neceſſity for truſting to this remedy; but whenever an artery can be diſcovered, of whatever ſize it may be, it ought unqueſtionably to be ſecured by a ligature. It very rarely happens that any inconvenience occurs from ligatures when properly applied; but many lives have been loſt from a remiſſneſs in this article. But when, from the deepneſs of a wound, or from any other cauſe, ſome particular artery cannot be properly ſecured by the tenaculum, in this caſe we are under the neceſſity of employing the crooked needle. But it frequently happens, that conſiderable quantities of blood are diſcharged, not from any particular veſſel, but from all the ſmall arteries over the ſurface of the ſore. In wounds of great extent, patticularly after the extirpation of cancerous breaſts, and in other operations where extenſive ſores are left, this ſpecies of hæmorrhagy often proves very troubleſome by being exceedingly difficult to ſuppreſs.

78 Of the different cauſes of hæmorrhagies.

Bleedings of this kind ſeem evidently to proceed from two very different and oppoſite cauſes. *Firſt*, Either from too great a quantity of blood contained in the veſſels, or from an over-degree of tone in the veſſels themſelves; or, perhaps, from a combination of both theſe cauſes. But, *ſecondly*, Such evacuations undoubtedly happen moſt frequently in ſuch conſtitutions as are very relaxed and debilitated; either from a putrid diſſolved ſtate of the blood, or from a want of tone in the containing veſſels, or, in ſome inſtances, from a concurrence of both.

79 Coagulated blood powerfully reſtrains a hæmorrhagy.

In conſtitutions perfectly healthy, when the fluids are not tainted with any degree of putreſcency, and the ſolids are poſſeſſed of their natural tonic powers, on the occurrence of wounds even of the moſt extenſive nature, as ſoon as the larger arteries are ſecured, all the ſmall veſſels that have been divided, in conſequence of that contractile power with which in a ſtate of health they are endowed, and from the ſtimulus of the external air to which they are now expoſed, are diminiſhed not only in their diameters, but alſo in their length; in conſequence of which, they recede conſiderably within the ſurface of the ſurrounding parts. This cauſe of itſelf would probably in the greateſt number of inſtances prove ſufficient for reſtraining all loſs of blood from the ſmaller arteries; but, in the ſound ſtate of conſtitution of which we have now been ſpeaking, another very powerful agent is provided by nature for producing the ſame effect. From the extremities of the divided veſſels which at firſt diſcharged red blood only, there now, in their contracted ſtate, oozes out a more thin, though viſcid fluid, containing a great proportion of the coagulable parts of the blood; and this being equally diſtributed over the ſurface of the wound, by its balſamic agglutinating powers has undoubtedly a very conſiderable influence in reſtraining all ſuch hæmorrhagies.

In conſtitutions altogether healthy, where neither of the ſtates of diſeaſe we have alluded to preponderates over the other, we find, that as ſoon as the larger arteries of wounds are ſecured, nature, in the manner already deſcribed, generally puts a ſtop to all farther diſcharge. So that, whenever the contrary happens, by a tedious oozing continuing from the ſurface of the ſore, we ought then to pay particular attention to the habit of body with which it is connected.

80 When phlebotomy is uſeful.

When ſuch an occurrence happens in a patient young and vigorous, and where the tone of the muſcular fibres is evidently great, the moſt effectual means of putting a ſtop to the diſcharge is to relax the vaſcular ſyſtem, either by opening a vein in ſome other part, or, what gives ſtill more immediate relief, by untying the ligature on one of the principal arteries of the part, ſo as to allow it to bleed freely: thoſe violent ſpaſmodic twitchings too, ſo frequent after operations on any of the extremities, when they do not depend on a nerve being included in the ligature with the artery, are in this manner more effectually relieved than by any other means.

By the ſame means the patient, from being in a febrile heat and much confuſed, ſoon becomes very tranquil: the violent pulſation of the heart and larger arteries abates, and the blood not being propelled with ſuch impetuoſity into the ſmaller veſſels of the part, they are thereby left at more liberty to retract; and as in this ſtate they do not pour forth red blood ſo freely, they are the more readily covered with that viſcid glutinous fluid which we have already ſhown to be one of the moſt important means intended by nature for the prevention of ſuch hæmorrhagies. At the ſame time that, by the means recommended, we endeavour to allay the commotion produced in the ſyſtem, the patient ought to be kept exceedingly cool; wine and other cordials ſhould be rigidly avoided; cold water, acidulated either with the mineral or vegetable acids, ought to be the only drink; motion of every kind, particularly of the part affected, ſhould be guarded againſt; and the wound being gently covered with ſoft charpie, ought to be tied up with a bandage ſo applied as to produce a moderate degree of preſſure on the extremities of the divided parts.

81 Opiates.

In every extenſive wound attended with hæmorrhagies of this kind, and particularly when violent ſpaſmodic affections of the muſcles ſupervene, together with the means already recommended large doſes of opiates are found highly beneficial; for whatever hurtful effects may have been apprehended from opiates in ſome inflammatory affections, every practitioner who has ventured on a free uſe of them muſt admit, that in all occurrences of this nature their influence far ſurpaſſes that of any other remedy.

As ſoon therefore as a ſufficient quantity of blood has been diſcharged, and the wound being dreſſed and the patient laid to reſt, a doſe of opium proportioned to the violence of the ſymptoms ought to be immediately exhibited. It ought to be remarked, however, that in all ſuch circumſtances, much larger doſes of the remedy are neceſſary than in ordinary caſes requiring the uſe of opiates. Small doſes, inſtead of anſwering any good purpoſe, ſeem frequently rather to aggravate the various ſymptoms; ſo that whenever they are here had recourſe to, they ought always to be given in quantities ſufficient for the intended effect.

82 Hæmorrhagies moſt frequent in lax habits

Although hæmorrhagies of this nature do now and then occur in firm vigorous conſtitutions, yet they undoubtedly happen much more frequently in relaxed enfeebled habits, where the ſolids have loſt part of their natural firmneſs, and the fluids have acquired ſome degree of putreſcency. As the veſſels in this ſituation of matters are ſuppoſed to have been deprived of that degree of tone of which we wiſh them to be poſſeſſed, inſtead of reſtraining the patient from the uſe of cordials, as is done uſually in every caſe of hæmorrhagy, a moderate uſe of generous wine ought to be immediately preſcribed; for nothing, it may be obſerved, tends ſo much, in ſuch circumſtances, to reſtrain hæmorrhagies, as a well-directed uſe of proper cordials. By tending to invigorate and brace the ſolids, they thereby enable the arterial ſyſtem to give a due reſiſtance to the contained fluids; and the ſame cauſe, it may be obſerved, has a conſiderable influence in reſtoring to the fluids that viſcidity of texture, of which in all ſuch inſtances we ſuppoſe them to be deprived.

83 Uſe of wine and cordials in ſuch caſes.

Whenever, therefore, ſuch tedious hæmorrhagies occur in relaxed debilitated habits, a free uſe of Port, Madeira, or any other wine whoſe ſtrength and goodneſs can be depended on, ought to be immediately allowed; a nouriſhing diet alſo becomes proper; the patient ought to be kept cool; and the mineral acids, from their known utility in every ſpecies of hæmorrhagy, ought alſo to be preſcribed. Reſt of body is here proper too; and opiates, when indicated either by pain or ſpaſmodic affections of the muſcles, ought never to be omitted.

84 External applications.

Together with theſe remedies adapted to the general ſyſtem, particular dreſſings, appropriated to the ſtate of the parts to which they are to be applied, have been found very beneficial. We have already remarked, that in firm healthy conſtitutions, as ſoon as the diſcharge of blood which naturally occurs in every large wound is over, the parts come ſoon to be covered with a viſcid coagulable effuſion from the mouths of the now retracted arteries; but in conſtitutions of an oppoſite nature, where the ſolids are much relaxed, the blood in general is found in ſuch a diſſolved ſtate as to afford no ſecretion of this nature.

In order therefore to ſupply as much as poſſible the deficiency of this natural balſam, different artificial applications have been invented. Duſting the part with ſtarch or wheat-flour, has ſometimes been found of uſe; and gum arabic in fine powder has been known to anſwer when theſe failed.

Applications of this kind, indeed, have been uſed with ſucceſs in all ſuch hæmorrhagies, with whatever habit of body they happen to be connected; but they have always proved more particularly ſerviceable in relaxed conſtitutions, attended with a diſſolved ſtate of the blood and an enfeebled muſcular ſyſtem. We may here uſe with freedom, too, a remedy which in ſuch circumſtances generally proves ſerviceable, but which, in conſtitutions of an oppoſite nature, ought never to

85 Alcohol when uſeful.

be employed. The remedy alluded to is alcohol, or any other ardent ſpirits, impregnated with as great a quantity as they can diſſolve of myrrh or any other of the heating viſcid gums. The balſamum traumaticum of the ſhops, a remedy of this nature, has long been famous for its influence in ſuch caſes: but that indiſcriminate uſe of this and ſimilar applications which has long prevailed with ſome practitioners, has undoubtedly done much harm; for as they are all poſſeſſed of very ſtimulating powers, they of courſe tend to aggravate every ſymptom in wounds connected with a tenſe ſtate of fibres, when much pain, and eſpecially when ſpaſmodic muſcular affections prevail. But in conſtitutions where the blood appears to be in a diſſolved ſtate, and where the arterial ſyſtem ſeems evidently to require a ſtimulus, remedies of this claſs come to be very uſeful; inſomuch that, in every conſtitution of this kind where hæmorrhagies prove troubleſome, no application whatever is found to anſwer better than charpie immerſed in an agglutinating ſpirituous balſam of this nature.

86 Preſſure to be uſed when every other method fails.

By a due perſeverance in one or other of the plans here pointed out, it will ſeldom happen that hæmorrhagies of this nature are not at laſt put a ſtop to: but when the contrary does occur, when, notwithſtanding the uſe of the remedies recommended, a diſcharge of blood ſtill continues, together with the means already adviſed, an equal moderate preſſure ought to be applied over the whole ſurface of the ſore, to be continued ſo long as the neceſſity of the caſe ſeems to indicate.

In finiſhing the dreſſings of ſuch wounds, after the charpie and compreſſes have been applied, a bandage properly adapted to the part ought to conclude the whole, and in ſuch a manner as to produce as equal a degree of preſſure over the ſurface of the ſore as poſſible. But it now and then happens that no bandage whatever can be ſo applied as to produce the deſired effect; and in ſuch caſes the hand of an aſſiſtant is the only reſource. In theſe inſtances, a perſon's hand being firmly applied over the dreſſings ſo as to produce a very equal degree of preſſure, will commonly ſucceed when no other remedy is found to have much influence.

87 Of wounds of the nerves, &c.

88 Sometimes happen in blood-letting.

89 Symptoms of a punctured nerve or tendon.

Wounds of the nerves, tendons, and membranes, as they are attended with much more violent ſymptoms than thoſe where even conſiderable arteries are divided, ſo they frequently reſiſt every method of cure propoſed by the moſt ſkilful practitioners. In the ſimple proceſs of blood-letting, it frequently happens that the tendinous expanſion called the *aponeuroſis* of the biceps muſcle is wounded, or even the tendon of that muſcle itſelf is punctured, by the point of the lancet; or ſometimes a nerve which happens to lie in the neighbourhood is partially divided. Any one of theſe wounds, though they are the ſmalleſt we can well ſuppoſe to be given, are frequently very dangerous and difficult of cure. It ſometimes immediately happens on the introduction of the lancet, that the patient complains of a moſt exquiſite degree of pain; and when this occurs, we may reſt aſſured that either a nerve or tendon has been wounded. On ſome occaſions, by proper management, ſuch as evacuating a conſiderable quantity of blood at the orifice newly made, by keeping the part at perfect reſt, and preſerving the patient in as cool a ſtate as poſſible, the pain at firſt complained of will gradually abate, and at laſt go off entirely, without any bad conſequence whatever. At other times, however, this pain which occurs inſtantaneouſly on the introduction of the lancet, inſtead of abating, begins ſoon to increaſe; a fullneſs, or ſmall degree of ſwelling, takes place in the parts contiguous to the wound; the lips of the ſore become ſomewhat hard and inflamed; and, in the courſe of 24 hours or ſo from the operation, a thin watery ſerum begins to be diſcharged at the orifice.

If by the means employed relief is not ſoon obtained, theſe ſymptoms generally continue in nearly the ſame ſtate for two or perhaps three days longer. At this time the violent pain which at firſt took place becomes ſtill more diſtreſſing; but inſtead of being ſharp and acute as before, it is now attended with the ſenſation of a burning heat, which ſtill goes on to increaſe, and proves, during the whole courſe of the ailment, a ſource of conſtant diſtreſs to the patient. The fullneſs and hardneſs in the lips of the wound begin to increaſe, and the ſwelling in the neighbouring parts gradually extends over the whole member; from the foot upwards over the thigh, when the operation has been done in the lower extremity; and from the elbow down the fore-arm, and along the humerus over to the pectoral muſcle and other contiguous parts, when the accident has occurred at the uſual place of blood-letting in the arm. The parts at laſt become exceedingly tenſe and hard; an eryſipelatous inflammatory colour frequently appears over the whole member; the pulſe by this time has generally become very hard and quick; the pain is now intenſe, the patient exceedingly reſtleſs; twitchings of the tendons occur to a greater or leſſer degree; on ſome occaſions, a locked jaw and other convulſive affections ſupervene; and all theſe ſymptoms continuing to increaſe, it moſt frequently happens, that the torture under which the patient has been groaning is at laſt terminated by death.

Different opinions have prevailed reſpecting the cauſe of theſe ſymptoms. By ſome they have been imputed to wounds of the tendons. By others the tendons are ſuppoſed to be ſo entirely deſtitute of ſenſibility, as to be quite incapable of producing ſo much diſtreſs; ſo that wounds of the nerves they conſider on all ſuch occaſions as the true cauſe of the various ſymptoms we have mentioned.

90 Mr Hunter's explanation of theſe ſymptoms.

One or other of theſe ideas continued to be the only ſource for explaining the various phenomena found to occur in this malady, till a different opinion was at laſt ſuggeſted by the ingenious Mr John Hunter of London. Mr Hunter ſuppoſes, that all the dreadful ſymptoms found now and then to be induced by the operation of blood-letting, may be more readily accounted for from an inflamed ſtate of the internal ſurface of the vein, than from any other cauſe. Such a ſtate of the vein he has often traced in horſes that have died of ſuch ſymptoms from veneſection, where the internal coat of the vein was always found much inflamed, not only in the neighbourhood of the part where the orifice was made, but on ſome occaſions the inflammation extended along the whole courſe of the vein, and ſeemed at laſt to reach the heart itſelf. Some inſtances, too, have occurred, of the ſame appearances in the human body, where the veins after death were found in a ſtate of high inflammation. And on other occaſions, in-

inflammation having in this manner been once excited, has been known to terminate in ſuppuration; and the matter thus produced being in the courſe of circulation carried to the heart, Mr Hunter ſuppoſes that in ſuch caſes death may have been induced by that cauſe alone.

Bell's Surgery, p. 113

91 Objections to his hypotheſis.

There can be no reaſon to doubt the fact held forth by Mr Hunter, that in ſuch inſtances the vein in which the orifice has been made has frequently after death been found greatly inflamed: but however ingenious his arguments may be for concluding that this ſtate of the vein is the original cauſe of all the bad ſymptoms enumerated, and although we muſt allow that ſuch an inflammatory affection of a vein muſt have a conſiderable influence in aggravating the various ſymptoms previouſly induced by other cauſes; yet we may very fairly conclude, that it could not probably in any one inſtance be able to account with ſatisfaction for their firſt production.

In many inſtances the patient, at the very inſtant of the operation, feels a very unuſual degree of pain. In ſome caſes, the violence of the pain is almoſt unſupportable: now this we can never ſuppoſe to have been produced by the mere puncture of a vein; for although the coats of veins are not perhaps entirely deſtitute of feeling, yet we know well that they are not endowed with ſuch a degree of ſenſibility as to render it probable ſuch intenſe pain could ever be induced by their being punctured in any way whatever. This inflamed ſtate of the veins therefore, as detected by Mr Hunter after death, muſt be conſidered rather as being produced by, than as being productive of, ſuch affections; and that ſuch ailments ſhould frequently produce an inflammation of the contiguous veins, is a very probable conjecture. In the courſe of 48 hours or ſo from the operation, when the febrile ſymptoms are juſt commencing, ſuch a degree of hardneſs and evident inflammation is induced over all the parts contiguous to the orifice, that it would be ſurpriſing indeed if the vein, which is thus perhaps entirely ſurrounded with parts highly inflamed, ſhould eſcape altogether.. We ſhall therefore proceed upon the ſuppoſition of this inflamed ſtate of the veins being a conſequence rather than the cauſe of ſuch ailments; and of courſe we now revert to one or other of the opinions long ago adopted on this ſubject, that all the train of bad ſymptoms found on ſome occaſions to ſucceed to venæſection, proceeds either from the wound of a nerve or of a tendon.

92 Tendons when punctured produce as bad ſymptoms as wounded nerves.

That a partial wound of a nerve will now and then produce very diſtreſſing ſymptoms, no practitioner will deny: but it has been attempted to be ſhown, that tendons are almoſt totally deſtitute of ſenſibility; and it has therefore been ſuppoſed, that their being wounded can never account for the various ſymptoms known to occur in ſuch caſes. There is great reaſon however to think, that in different inſtances the ſame train of ſymptoms have been induced by different cauſes; that in one inſtance a wounded nerve, and in others pricks of the tendons, have given riſe to them, as we have already ſuppoſed.

93 Method of cure.

However, in order to prevent as much as poſſible the conſequent inflammation and other ſymptoms which uſually enſue, a conſiderable quantity of blood ſhould be immediately diſcharged at the orifice juſt made: the limb, for ſeveral days at leaſt, ought to be kept in a ſtate of perfect reſt, care being at the ſame time taken that the muſcles of the part be all preſerved in as relaxed a ſtate as poſſible: the patient ſhould be kept cool; on a low diet; and, if neceſſary, gentle laxatives ought to be adminiſtered.

By ſuch management alone, the fatal ſymptoms we have enumerated may frequently be prevented; and when they do occur in caſes where the above precautions have not been taken, they may be conſidered to be as much the conſequence of negligence in the after-treatment, as of any thing peculiarly bad in the nature of the original accdent.

When, however, notwithſtanding the means recommended, the ſymptoms, inſtead of diminiſhing, rather become more violent; if the lips of the orifice turn hard and more inflamed, if the pain becomes more conſiderable, and eſpecially if the ſwelling begins to ſpread, other remedies come then to be indicated. In this ſtate of the complaint, topical blood-letting, by means of leeches applied as near as poſſible to the lips of the wound, frequently affords much relief; and when the pulſe is full and quick, it even becomes neceſſary to evacuate large quantities of blood by opening a vein in ſome other part.

94 External applications.

The external applications uſually employed in this ſtate of the complaint, are, warm emollient fomentations and poultices. In ſimilar affections of other parts no remedies with which we are acquainted would probably be found more ſucceſsful; for as warm fomentations and cataplaſms prove in general very powerful agents in the formation of pus, and as nothing would ſo certainly relieve the ſymptoms which uſually occur here as a free ſuppuration, applications of this nature were made therefore with ſome apparent propriety: but it is now almoſt certain, that little or no advantage is ever to be expected from remedies of this claſs. And in fact we find, in the complaint now under conſideration, that all ſuch applications, inſtead of being productive of any advantage, rather do harm. The heat of the part is here one of the moſt diſtreſſing ſymptoms; ſo that, inſtead of affording relief, warm emollient applications rather tend to augment this ſource of uneaſineſs. The lips of the wound, from not being capable of producing a good ſuppuration, are by the additional heat applied to them through the medium of ſuch applications, rendered ſtill more hard, ſwelled, and of courſe more painful; and the ſwelling of the contiguous parts alſo becomes more diffuſe over the reſt of the member.

By Ambroſe Parré, Dionis, Heiſter, and others, inſtead of emollient remedies, oil of turpentine, tincture of myrrh, and other heating applications, are recommended. "That theſe would not prove effectual, ſays Mr Bell, I cannot from experience pretend to ſay; for ſuſpecting their powerful ſtimulating effects might in caſes of this nature prove too irritating for parts already by diſeaſe rendered exquiſitely ſenſible, I have never, I muſt own, ventured to uſe them: but I can from repeated experience aſſert, that cooling aſtringent applications afford much more eaſe, and, upon the whole, in all ſuch ailments, prove more effectual, than warm emollients; and of this claſs the moſt effectual I have ever uſed, are the ſaturnine applications. The parts chiefly affected being alternately covered with cloths wet with a ſolution of ſaccharum ſaturni, and pledgits

95 Cooling aſtringents of great uſe.

be employed. The remedy alluded to is alcohol, or any other ardent ſpirits, impregnated with as great a quantity as they can diſſolve of myrrh or any other of the heating viſcid gums. The balſamum traumaticum of the ſhops, a remedy of this nature, has long been famous for its influence in ſuch caſes: but that indiſcriminate uſe of this and ſimilar applications which has long prevailed with ſome practitioners, has undoubtedly done much harm; for as they are all poſſeſſed of very ſtimulating powers, they of courſe tend to aggravate every ſymptom in wounds connected with a tenſe ſtate of fibres, when much pain, and eſpecially when ſpaſmodic muſcular affections prevail. But in conſtitutions where the blood appears to be in a diſſolved ſtate, and where the arterial ſyſtem ſeems evidently to require a ſtimulus, remedies of this claſs come to be very uſeful; inſomuch that, in every conſtitution of this kind where hæmorrhagies prove troubleſome, no application whatever is found to anſwer better than charpie immerſed in an agglutinating ſpirituous balſam of this nature.

86 Preſſure to be uſed when every other method fails.

By a due perſeverance in one or other of the plans here pointed out, it will ſeldom happen that hæmorrhagies of this nature are not at laſt put a ſtop to: but when the contrary does occur, when, notwithſtanding the uſe of the remedies recommended, a diſcharge of blood ſtill continues, together with the means already adviſed, an equal moderate preſſure ought to be applied over the whole ſurface of the ſore, to be continued ſo long as the neceſſity of the caſe ſeems to indicate.

In finiſhing the dreſſings of ſuch wounds, after the charpie and compreſſes have been applied, a bandage properly adapted to the part ought to conclude the whole, and in ſuch a manner as to produce as equal a degree of preſſure over the ſurface of the ſore as poſſible. But it now and then happens that no bandage whatever can be ſo applied as to produce the deſired effect; and in ſuch caſes the hand of an aſſiſtant is the only reſource. In theſe inſtances, a perſon's hand being firmly applied over the dreſſings ſo as to produce a very equal degree of preſſure, will commonly ſucceed when no other remedy is found to have much influence.

87 Of wounds of the nerves, &c.

88 Sometimes happen in blood-letting.

89 Symptoms of a punctured nerve or tendon.

Wounds of the nerves, tendons, and membranes, as they are attended with much more violent ſymptoms than thoſe where even conſiderable arteries are divided, ſo they frequently reſiſt every method of cure propoſed by the moſt ſkilful practitioners. In the ſimple proceſs of blood-letting, it frequently happens that the tendinous expanſion called the *aponeuroſis* of the biceps muſcle is wounded, or even the tendon of that muſcle itſelf is punctured, by the point of the lancet; or ſometimes a nerve which happens to lie in the neighbourhood is partially divided. Any one of theſe wounds, though they are the ſmalleſt we can well ſuppoſe to be given, are frequently very dangerous and difficult of cure. It ſometimes immediately happens on the introduction of the lancet, that the patient complains of a moſt exquiſite degree of pain; and when this occurs, we may reſt aſſured that either a nerve or tendon has been wounded. On ſome occaſions, by proper management, ſuch as evacuating a conſiderable quantity of blood at the orifice newly made, by keeping the part at perfect reſt, and preſerving the patient in as cool a ſtate as poſſible, the pain at firſt complained of will gradually abate, and at laſt go off entirely, without any bad conſequence whatever. At other times, however, this pain which occurs inſtantaneouſly on the introduction of the lancet, inſtead of abating, begins ſoon to increaſe; a fullneſs, or ſmall degree of ſwelling, takes place in the parts contiguous to the wound; the lips of the ſore become ſomewhat hard and inflamed; and, in the courſe of 24 hours or ſo from the operation, a thin watery ſerum begins to be diſcharged at the orifice.

If by the means employed relief is not ſoon obtained, theſe ſymptoms generally continue in nearly the ſame ſtate for two or perhaps three days longer. At this time the violent pain which at firſt took place becomes ſtill more diſtreſſing; but inſtead of being ſharp and acute as before, it is now attended with the ſenſation of a burning heat, which ſtill goes on to increaſe, and proves, during the whole courſe of the ailment, a ſource of conſtant diſtreſs to the patient. The fullneſs and hardneſs in the lips of the wound begin to increaſe, and the ſwelling in the neighbouring parts gradually extends over the whole member; from the foot upwards over the thigh, when the operation has been done in the lower extremity; and from the elbow down the fore-arm, and along the humerus over to the pectoral muſcle and other contiguous parts, when the accident has occurred at the uſual place of blood-letting in the arm. The parts at laſt become exceedingly tenſe and hard; an eryſipelatous inflammatory colour frequently appears over the whole member; the pulſe by this time has generally become very hard and quick; the pain is now intenſe, the patient exceedingly reſtleſs; twitchings of the tendons occur to a greater or leſſer degree; on ſome occaſions, a locked jaw and other convulſive affections ſupervene; and all theſe ſymptoms continuing to increaſe, it moſt frequently happens, that the torture under which the patient has been groaning is at laſt terminated by death.

Different opinions have prevailed reſpecting the cauſe of theſe ſymptoms. By ſome they have been imputed to wounds of the tendons. By others the tendons are ſuppoſed to be ſo entirely deſtitute of ſenſibility, as to be quite incapable of producing ſo much diſtreſs; ſo that wounds of the nerves they conſider on all ſuch occaſions as the true cauſe of the various ſymptoms we have mentioned.

90 Mr Hunter's explanation of theſe ſymptoms.

One or other of theſe ideas continued to be the only ſource for explaining the various phenomena found to occur in this malady, till a different opinion was at laſt ſuggeſted by the ingenious Mr John Hunter of London. Mr Hunter ſuppoſes, that all the dreadful ſymptoms found now and then to be induced by the operation of blood-letting, may be more readily accounted for from an inflamed ſtate of the internal ſurface of the vein, than from any other cauſe. Such a ſtate of the vein he has often traced in horſes that have died of ſuch ſymptoms from veneſection, where the internal coat of the vein was always found much inflamed, not only in the neighbourhood of the part where the orifice was made, but on ſome occaſions the inflammation extended along the whole courſe of the vein, and ſeemed at laſt to reach the heart itſelf. Some inſtances, too, have occurred, of the ſame appearances in the human body, where the veins after death were found in a ſtate of high inflammation. And on other occaſions, in-

inflammation having in this manner been once excited, has been known to terminate in ſuppuration; and the matter thus produced being in the courſe of circulation carried to the heart, Mr Hunter ſuppoſes that in ſuch caſes death may have been induced by that cauſe alone.

Bell's Surgery, p. 113

91
Objections to his hypotheſis.

There can be no reaſon to doubt the fact held forth by Mr Hunter, that in ſuch inſtances the vein in which the orifice has been made has frequently after death been found greatly inflamed: but however ingenious his arguments may be for concluding that this ſtate of the vein is the original cauſe of all the bad ſymptoms enumerated, and although we muſt allow that ſuch an inflammatory affection of a vein muſt have a conſiderable influence in aggravating the various ſymptoms previouſly induced by other cauſes; yet we may very fairly conclude, that it could not probably in any one inſtance be able to account with ſatisfaction for their firſt production.

In many inſtances the patient, at the very inſtant of the operation, feels a very unuſual degree of pain. In ſome caſes, the violence of the pain is almoſt unſupportable: now this we can never ſuppoſe to have been produced by the mere puncture of a vein; for although the coats of veins are not perhaps entirely deſtitute of feeling, yet we know well that they are not endowed with ſuch a degree of ſenſibility as to render it probable ſuch intenſe pain could ever be induced by their being punctured in any way whatever. This inflamed ſtate of the veins therefore, as detected by Mr Hunter after death, muſt be conſidered rather as being produced by, than as being productive of, ſuch affections; and that ſuch ailments ſhould frequently produce an inflammation of the contiguous veins, is a very probable conjecture. In the courſe of 48 hours or ſo from the operation, when the febrile ſymptoms are juſt commencing, ſuch a degree of hardneſs and evident inflammation is induced over all the parts contiguous to the orifice, that it would be ſurpriſing indeed if the vein, which is thus perhaps entirely ſurrounded with parts highly inflamed, ſhould eſcape altogether.. We ſhall therefore proceed upon the ſuppoſition of this inflamed ſtate of the veins being a conſequence rather than the cauſe of ſuch ailments; and of courſe we now revert to one or other of the opinions long ago adopted on this ſubject, that all the train of bad ſymptoms found on ſome occaſions to ſucceed to venæſection, proceeds either from the wound of a nerve or of a tendon.

92
Tendons when punctured produce as bad ſymptoms as wounded nerves.

That a partial wound of a nerve will now and then produce very diſtreſſing ſymptoms, no practitioner will deny: but it has been attempted to be ſhown, that tendons are almoſt totally deſtitute of ſenſibility; and it has therefore been ſuppoſed, that their being wounded can never account for the various ſymptoms known to occur in ſuch caſes. There is great reaſon however to think, that in different inſtances the ſame train of ſymptoms have been induced by different cauſes; that in one inſtance a wounded nerve, and in others pricks of the tendons, have given riſe to them, as we have already ſuppoſed.

93
Method of cure.

However, in order to prevent as much as poſſible the conſequent inflammation and other ſymptoms which uſually enſue, a conſiderable quantity of blood ſhould be immediately diſcharged at the orifice juſt made: the limb, for ſeveral days at leaſt, ought to be kept in a ſtate of perfect reſt, care being at the ſame time taken that the muſcles of the part be all preſerved in as relaxed a ſtate as poſſible: the patient ſhould be kept cool; on a low diet; and, if neceſſary, gentle laxatives ought to be adminiſtered.

By ſuch management alone, the fatal ſymptoms we have enumerated may frequently be prevented; and when they do occur in caſes where the above precautions have not been taken, they may be conſidered to be as much the conſequence of negligence in the after-treatment, as of any thing peculiarly bad in the nature of the original accdent.

When, however, notwithſtanding the means recommended, the ſymptoms, inſtead of diminiſhing, rather become more violent; if the lips of the orifice turn hard and more inflamed, if the pain becomes more conſiderable, and eſpecially if the ſwelling begins to ſpread, other remedies come then to be indicated. In this ſtate of the complaint, topical blood-letting, by means of leeches applied as near as poſſible to the lips of the wound, frequently affords much relief; and when the pulſe is full and quick, it even becomes neceſſary to evacuate large quantities of blood by opening a vein in ſome other part.

94
External applications.

The external applications uſually employed in this ſtate of the complaint, are, warm emollient fomentations and poultices. In ſimilar affections of other parts no remedies with which we are acquainted would probably be found more ſucceſsful; for as warm fomentations and cataplaſms prove in general very powerful agents in the formation of pus, and as nothing would ſo certainly relieve the ſymptoms which uſually occur here as a free ſuppuration, applications of this nature were made therefore with ſome apparent propriety: but it is now almoſt certain, that little or no advantage is ever to be expected from remedies of this claſs. And in fact we find, in the complaint now under conſideration, that all ſuch applications, inſtead of being productive of any advantage, rather do harm. The heat of the part is here one of the moſt diſtreſſing ſymptoms; ſo that, inſtead of affording relief, warm emollient applications rather tend to augment this ſource of uneaſineſs. The lips of the wound, from not being capable of producing a good ſuppuration, are by the additional heat applied to them through the medium of ſuch applications, rendered ſtill more hard, ſwelled, and of courſe more painful; and the ſwelling of the contiguous parts alſo becomes more diffuſe over the reſt of the member.

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95
Cooling aſtringents of great uſe.

pledgits ſpread with Goulard's cerate, are kept more cool and eaſy than by any other remedy I have ever happened to uſe."

In all ſuch caſes therefore, ſo ſoon as the number of leeches proportioned to the violence of the ſymptoms have been applied to the parts chiefly affected, and have diſcharged a ſufficient quantity of blood, the ſwelling ought to be covered with pieces of ſoft linen wet in the ſaturnine ſolution; and theſe being kept conſtantly moiſt for the ſpace of a few hours, ſhould be ſucceeded by Goulard's cerate; and thus every part, in any degree affected, ought to be alternately covered with one or other of theſe applications ſo long as any degree of ſwelling remains.

96
Low diet, phlebotomy and opiates, uſeful.

The febrile ſymptoms which occur muſt at the ſame time be attended to, by keeping the patient cool, on a low diet, preſerving a lax ſtate of the bowels; and, if neceſſary, farther quantities of blood ought to be evacuated.

For the violence of the pain, which is ſometimes ſo exceſſive as to deſtroy entirely the patient's reſt, opiates ought to be freely exhibited; and when twitchings of the tendons and other convulſive ſymptoms ſupervene, medicines of this kind become ſtill more particularly neceſſary. In order, however, to have a proper influence in this ſtate of the complaint, opiates ought to be given in very full doſes; otherwiſe, inſtead of anſwering any good purpoſe, they conſtantly tend to aggravate the different ſymptoms, not only by increaſing the heat and reſtleſſneſs, but by having an evident influence in rendering the ſyſtem more ſuſceptible than it was before of the pain and other diſtreſſing effects produced upon it by the wound: whenever opiates, therefore, are in ſuch circumſtances employed, the doſes ought always to be conſiderable.

97
When other means fail, inciſion is neceſſary.

It often happens, however, in this very alarming diſorder, either from neglecting the matter altogether on the accident firſt happening, as is too frequently the caſe, or from an improper ſubſequent treatment by warm emollient applications, that opiates and all the other remedies enumerated are afterwards had recourſe to without any advantage whatever: the fever, pain, and ſwelling of the parts continuing, convulſive affections of the muſcles at laſt occur, all tending to indicate the moſt imminent danger. In this ſituation of matters, if we have not immediate recourſe to ſome effectual means, the patient will ſoon fall a victim to the diſorder; and the only remedy from which in theſe circumſtances much real advantage is to be expected, is a free and extenſive diviſion of the parts in which the orifice producing all the miſchief was at firſt made. We know well, from the repeated experience of ages, that much more pain and diſtreſs of every kind is commonly produced by the partial diviſion either of a nerve or of a tendon, than from any of theſe parts being at once cut entirely acroſs. Now the intention of the operation here recommended, is to produce a complete diviſion of the nerve or tendon we ſuppoſe to have been wounded by the point of the lancet, and which we conſider as the ſole cauſe of all the ſubſequent diſtreſs.

98
Cautions to be obſerved in performing it.

The operation now recommended being attended with a good deal of pain, and being put in practice for the removal of ſymptoms from which it is perhaps difficult to perſuade the patient that much danger can occur, all the remedies we have mentioned ſhould be firſt made trial of before it is propoſed: but at the ſame time, care ought to be taken that the diſorder is not allowed to proceed too far before we have recourſe to it; for if the patient ſhould be previouſly much weakened by the feveriſh ſymptoms having continued violent for any length of time, neither the remedy now propoſed, nor any other with which we are acquainted, would probably have much influence. So ſoon therefore as the courſe already preſcribed has been fairly tried, and is found to be inadequate to the effects expected from it, we ought immediately to have recourſe to a free diviſion of the parts chiefly affected; the manner of doing which will be deſcribed in its proper place.

99
Of a total diviſion of tendons.

Theſe are the general methods of treating ſimple wounds of the nerves, tendons, or membranes; but where the wounds are very large, and attended with great diſtraction, laceration, and loſs of ſubſtance, ſome farther directions will be neceſſary; but of theſe we ſhall treat in the next ſection. The total diviſion of a tendon is not attended with much danger where the action of the muſcle belonging to it is not neceſſary to life: for the divided ends of tendons will very readily unite if they are kept cloſe together; and may either be conjoined by ſuture, or retained in that poſture by a proper bandage.

100
Wounds of the thorax.

In wounds of the thorax, even tho' none of the viſcera ſhould be wounded, we may yet reaſonably expect that a conſiderable quantity of blood will be extravaſated; and this, if very large, muſt be evacuated if poſſible. However, it ought to be particularly obſerved, that this extravaſated blood ſhould not be diſcharged before we are aſſured that the wounded veſſels have done bleeding. When the pulſe appears ſufficiently ſtrong and equal, the extremities are warm, no hickup or convulſion appears, and the patient's ſtrength continues, we may then know that the internal hæmorrhagy has ceaſed, and that the means for diſcharging the blood may now be ſafely uſed. It may, however, be doubted whether the extravaſed blood ought always to be diſcharged by art; ſince it is apparent fron the moſt faithful obſervations, that matter, water, blood, &c. have vaniſhed from the cavities of the thorax, and been afterwards diſcharged by ſweat, urine, &c. Yet this but ſeldom happens; and if we were to truſt to nature only in theſe caſes, it is certain that many would periſh from a deſtruction of the vital viſcera by the extravaſated and putrid blood, who by an artificial extraction of the ſame blood might have been ſaved. The extraction therefore is to be attempted, by putting the body in ſuch a poſture that the blood may flow out through the orifice of the wound; by ſucking through a flexible tube, obtuſe at the end, and having holes in its ſides; by injections of diluent, attenuating, and deterging liquors; by dilating the wound, or perforating the thorax a little above the diaphragm, as in the operation for an empyema. By one or other of theſe methods, wounds of the thorax may generally be cured, provided the viſcera are not injured in ſuch a manner as to render them incapable of performing the offices of life.

101
Of the abdomen.

In wounds of the abdomen, where the inteſtines are injured, they muſt, if poſſible, be joined by what is called the *Glover's ſuture;* though, when the wound is ſmall, they may be left to themſelves. In all wounds of the abdomen, however, there is great danger from the entrance of the air between the integuments and the viſcera. This, if confined, will be rarefied to an extreme degree, and occaſion the moſt violent pains, with incredible diſtenſion of the abdomen. It is neceſſary therefore, that the air which has entered ſhould be expelled, by ſucking and the effort of reſpiration; after which the integuments are to be ſewed together, and the wound is to be cured in the ſame manner as directed for ſimple wounds: only it will require to be dreſſed as ſeldom as poſſible; and a ſpare diet, with other antiphlogiſtic regimen, is here abſolutely neceſſary.

101
Of the inteſtines prolapſed through a wound without being injured.

It ſometimes happens, that, through a large wound of the abdominal integuments, the inteſtine comes out without being injured; yet, if it remains for any time expoſed to the air, the caſe is commonly very dangerous. If aſſiſtance can be had at the moment the wound is given, the inteſtines are immediately to be replaced, and the patient laid in ſuch a poſture that they cannot by their own gravity fall out again. However, if aſſiſtance is not procured in time, and thus the inteſtine is become dry and cold, it ought to be well fomented before it is replaced. Celſus adviſes alſo, that thoſe parts of the inteſtine which prolapſed laſt ſhould be firſt replaced, after which the patient ſhould be gently ſhaken, that each of the inteſtines may reduce itſelf to its proper place, and there remain.—This advice is very neceſſary to be obſerved; otherwiſe violent gripes and other bad conſequences may follow. Garengeot alſo gives us another advice of no ſmall conſequence, namely, that if the wound is in the middle of the abdomen under the navel, penetrating through the rectus muſcle on either ſide, then the prolapſed part of the inteſtine or omentum is frequently liable to be returned under that muſcle, between its body and the tendinous capſule, which very looſely encompaſſes this muſcle below the navel; ſince it might thus be falſely imagined that the inteſtine was returned into the abdomen, whence the moſt violent diſorders might enſue. If the ineſtines are already cold and dry, before any attempts are made to replace them, we ought firſt to be certain that life remains in theſe parts: otherwiſe we might expect an abſolute mortification; and though the mortified parts ſhould caſt off, the contents of the inteſtines would eſcape into the cavity of the abdomen; whence the death of the patient would follow, after the moſt miſerable diſorders.

When the wound of the abdomen is large, the inteſtines eaſily prolapſe, but are as eaſily returned. But when part of an inteſtine has been forced through a narrow wound, the diſorder is much more dangerous. For the prolapſed inteſtine being diſtended by flatus, or the ingeſted aliments driven thither by the periſtaltic motion, it will be inflamed, tumefied, and incapable of being returned through the ſtricture of the wound; whence a ſtoppage of the circulation and gangrene will ſoon follow. In this caſe the utmoſt care is to be taken to reduce the inteſtine to its natural ſize; and warm fomentations are among the principal means for this purpoſe. If theſe ſhould fail, ſome practitioners of great eminence have adviſed the puncturing of the inteſtine in different places in order to diſcharge the flatus. This practice has alſo been recommended in an incarcerated hernia: but is exceedingly diſapproved of by Mr Pott; and even in the preſent caſe it ſeems to be very dubious whether any good can poſſibly ariſe from it. To puncture any part that is already inflamed, muſt undoubtedly add to the inflammation; and it is very improbable that the diſcharge of flatus procured by the punctures would at all be a recompence for the bad conſequences produced by the increaſed inflammation. The method recommended by Celſus ſeems in this caſe to be much more eligible; namely, to dilate the wound in ſuch a manner as to reduce the inteſtine with eaſe. Sometimes theſe methods may ſucceed, and the inteſtine be preſerved whole; though at other times it unavoidably happens that part of it is loſt either by ſuppuration or gangrene. In theſe caſes we muſt uſe our utmoſt endeavours to make the two ends of the inteſtine unite; and if they do ſo, the loſs of the gangrened or ſuppurated part will not be much felt: but if this ſhould be found impracticable, the upper part of the inteſtine ſhould be joined to the edge of the wound; where it will ever afterwards perform the office of an anus, and the fæces will continue to be diſcharged that way through life. It is to be remarked, however, that even in the moſt favourable caſe, viz. where the divided ends of the inteſtine unite, there will always remain a ſtricture on the part; for which reaſon it is requiſite that the patient ſhould be very temperate in his diet, eat ſoft food, and by ſmall quantities at a time; otherwiſe there will be danger of an obſtruction in the place of union, and a rupture may enſue.

103
Treatment neceſſary when part of the inteſtine is gangrened.

104
Remarkable caſe of wounds in the abdomen.

When the omentum appears prolapſed, the ſame general treatment is to be obſerved; only that, when it is dry and mortified, the dead part may ſafely be extirpated.—We ſhall conclude the article of abdominal wounds with a caſe from the memoirs of the academy of ſciences for the year 1705, which ſhows that we ought not to deſpair, even though the moſt deſperate ſymptoms ſhould take place, as long as any vis vitæ remains. A madman wounded himſelf in 18 different places of the abdomen. Eight of theſe penetrated the cavity, and injured the contained viſcera; he had a diarrhœa, nauſea, and vomiting, tenſion of the abdomen, with difficult reſpiration and violent fever, ſo that his life was deſpaired of. During the firſt four days, he was blooded ſeven times; and during the greateſt part of the cure his diet conſiſted almoſt entirely of fleſh-broths, with the addition of ſome mild vegetables. By theſe means he was not only cured of his wounds, but reſtored to his right ſenſes. Seventeen months after, he went mad again, and threw himſelf over a precipice, by which he was inſtantly killed: on opening the body, the wounds were found to have penetrated the middle lobe of the liver, the inteſtinum jejunum, and the colon.

105
Wounds of the head.

In wounds of the head, where the cellular membrane only is affected, and the aponeuroſis and pericranium untouched, phlebotomy, lenient purges, and the uſe of the common febrifuge medicines, particularly thoſe of the neutral kind, generally remove all the threatening ſymptoms mentioned, n° 105. When the inflammation is gone off, it leaves on the ſkin a yellowiſh tint and a dry ſcurf, which continue until perſpiration takes them away; and upon the removal of the diſeaſe, the wound immediately recovers an healthy aſpect, and ſoon heals without further trouble. But in the worſt kind of theſe wounds, that is, where a ſmall wound paſſes through the tela celluloſa and aponeuroſis to the pericranium, the patient will admit of more free evacuations by phlebotomy than in the former. In both, the uſe of warm fomentations is required; but an emollient cataplaſm, which is generally forbid in the eryſipelatous ſwellings, may in this latter caſe be uſed to great advantage. Where the ſymptoms are not very preſſing, nor the habit very inflammable, this method will prove ſufficient; but it ſometimes happens that the ſcalp is ſo tenſe, the pain ſo great, and the ſymptomatic fever ſo high, that by waiting for the ſlow effect of ſuch means, the patient runs a riſk from the continuance of the fever; or elſe the injured aponeuroſis and pericranium, becoming ſloughy, produce an abſceſs, and render the caſe both tedious and troubleſome. A diviſion of the wounded part, by a ſimple inciſion down to the bone, about half an inch or an inch in length, will moſt commonly remove all the bad ſymptoms; and if it be done in time, will render every thing elſe unneceſſary.

106 Of the joints.

In wounds of the joints, if any thing can be done to ſave the limb, it muſt be by dilating the wound in order to diſcharge the humour, which collects in great quantity. At the ſame time the moſt cooling and diſcutient remedies are to be applied to the neighbouring parts, while the wound itſelf is to be treated with drying gums and balſamics. Relaxing and emollient applications are bad, as cauſing a great efflux of humour, which at any rate is too copious. The air and cold are likewiſe to be avoided, and all applications to the wound ought to be of the warm and ſtimulating kind.

SECT. II. *Of contuſed and lacerated Wounds, without or with Fractures of the Bones.*

WHEN the ſmall veſſels are broken by a blow with any hard inſtrument without penetrating the ſkin, at the ſame time that the ſolid fibres of the part are cruſhed, the injury is termed a *contuſion:* and when at the ſame time the ſkin is broken, it is termed a *contuſed and lacerated wound;* becauſe in this caſe the parts are not fairly divided as with a knife, but torn aſunder or violently ſtretched.

107 Simple contuſion deſcribed.

Every contuſion therefore, whether the ſkin is broken or not, may properly be reckoned a wound; for where the injury is ſo ſlight that none of the contents of the ſmall veſſels are extravaſated, it ſcarce deſerves to be mentioned. The immediate conſequence of a contuſion, therefore, is a ſwelling, by reaſon of the extravaſation juſt mentioned; and the ſkin becomes diſcoloured by the blood ſtagnating under it: but as this fluid, even though covered by the ſkin, cannot long remain in its natural ſtate, it thence happens, that the contuſed part ſoon loſes its florid red colour, and becomes blue or black; the thinner parts being in the mean time gradually taken up by the abſorbent veſſels, which at laſt happens to the blood itſelf; the blue diſappears, and is ſucceeded by a yellowiſh colour, ſhowing that the blood is now diſſolved; after which the part recovers its former appearance, and the ruptured veſſels appear to have united as though nothing had happened.

108 Miſchiefs attending violent contuſions.

Theſe are the ſymptoms which attend the ſlighteſt kind of contuſions; but it is evident, that where the blow is ſo violent as to rupture or cruſh ſome of the large nerves, blood-veſſels, tendons, or membranes, all the bad conſequences already mentioned which attend ſimple wounds of thoſe parts will enſue, and they will not at all be alleviated by the circumſtance of the ſkin being whole. Hence it is eaſy to ſee how a contuſion may produce ulcers of the worſt kind, gangrene, ſphacelus, carious bones, &c.; and if it happens to be on a glandular part, a ſcirrhus or cancer is very frequently found to enſue. Even the viſcera themſelves, eſpecially of the abdomen, may be injured by contuſions to ſuch a degree as to produce an inflammation, gangrene, or ſcirrhus, nay inſtant death, without rupturing the ſkin; and ſuch a blow as a man may ſtrike with his fiſt will often be ſufficient for this purpoſe, as has been obſerved in the caſe of ſome celebrated boxers.

109 Contuſions of the head very dangerous.

That the bones may be fractured along with a contuſion, is known by every day's experience; however, without being broken, it is certain that they may be ſo cruſhed and injured, that the medullary ſubſtance contained in them may be vitiated, and thus the moſt grievous diſorders may enſue. But in no part whatever are contuſions more dangerous than in the head, as has been confirmed by the moſt fatal experience. Mr Pott divides into two claſſes thoſe injuries to which the head is liable from contuſion, viz. thoſe in which the miſchief is confined to the ſcalp, and thoſe where the other parts are concerned. The former is of little conſequence; the tumour attending it being eaſily removed, or the extravaſated blood with which it is filled may be diſcharged by a ſmall opening. One circumſtance, however, he ſays, attending this tumour, requires conſiderable attention; for the tumour here ſometimes produces to the fingers a ſenſation as if the cranium was broken and depreſſed; whence an inexperienced ſurgeon might be apt to remove the ſcalp as in the real fracture, and thus give his patient a great deal of unneceſſary pain. The touch therefore being in this caſe fallacious, it is neceſſary to wait for the appearance of other ſymptoms before we proceed to a diviſion of the integuments.

110 Reaſon of extreme danger attending them.

The moſt dangerous contuſions of the head are thoſe where the dura mater and parts within the ſkull are affected; and in order to have a clear idea of this kind of injury, it is neceſſary to recollect, that the veſſels of the pericranium, thoſe of the diploe, or medullary ſubſtance between the two tables of ſome parts of the cranium, and thoſe of the dura mater within it, do all conſtantly and freely communicate with each other; and that this communication is carried on by means of innumerable foramina, found in all parts of both ſurfaces of the ſkull, as well as at the ſutures; that upon the freedom of this communication depends the healthy and ſound ſtate of all the parts concerned in it; and that from the interruption or deſtruction of this proceed moſt of the ſymptoms attending violent contuſions of the head, extravaſations of fluid between the cranium and dura mater, inflammations of the ſaid membrane, and ſimple undepreſſed fracture of the ſkull.

The pericranium is ſo firmly attached to the outer ſurface of the ſkull, as not to be ſeparable from it without conſiderable violence; and when ſuch violent ſeparation is made in a living ſubject (eſpecially if young), the cranium is always ſeen to bleed freely from an infinite number of ſmall foramina. The dura mater, which is a firm ſtrong membrane, is almoſt as intimately attached to the inſide of the ſkull, as the pericranium is to the outſide, and by the ſame means, viz. by veſſels; and by theſe means a conſtant circulation and communication are preſerved and maintained between the two membranes, and the bones dividing them. This all the appearances which attend the ſcalping a living perſon, or the ſeparation of the ſkull from the dura mater of a dead one, (eſpecially if ſuch perſon died apoplectic or was hanged), prove beyond all doubt. In the former, the blood will (as we have already obſerved) be ſeen iſſuing from every point of the ſurface of the cranium: in the latter, not only a conſiderable degree of force will be found neceſſary to detach the ſawed bone from the ſubjacent membrane, but, when it is removed, a great number of bloody points will be ſeen all over the ſurface of the latter; which points, if wiped clean, do immediately become bloody again, being only the extremities of broken veſſels. Theſe veſſels are largeſt at and about the ſutures; at which places the adheſion is the ſtrongeſt, and the hæmorrhage upon ſeparation the greateſt.

111 Communication between the outſide and inſide of the cranium.

112 Miſtakes concerning the attachment of the dura mater.

It has been thought by many, that the dura mater was attached to the ſkull only at the ſutures; that in all other parts it was looſe and unconnected with it; and that it conſtantly enjoyed or performed an oſcillatory kind of motion, or was alternately elevated and depreſſed. This idea and opinion were borrowed from the appearance which the dura mater makes in a living ſubject, after a portion of the ſkull has been removed: but although it has been inculcated by writers of great eminence, yet it has no foundation in truth or nature; and has miſled many practitioners in their opinions, not only of the ſtructure and diſpoſition of this membrane, but in their ideas of its diſeaſes.

The dura mater does, on the internal ſurface of the bones of the cranium, the office of perioſteum, in the ſame manner as the pericranium does on the external, (at leaſt they have no other): to this it is ſo firmly and ſo generally attached, as to be incapable of any even the ſmalleſt degree of motion. The alternate elevation and ſubſidence of it, which are obſervable when any portion of it is laid bare, are owing to a very different cauſe from any power in itſelf; neither are nor can they ever be performed, until a piece of the cranium has been forcibly taken away, and conſequently are not natural or neceſſary.

113 Extravaſations of blood within the cavity of the ſkull.

By blows, falls, and other ſhocks, ſome of the larger of thoſe veſſels which carry on this communication between the dura mater and the ſkull are broken, and a quantity of blood is ſhed upon the ſurface of that membrane. This is one ſpecies of bloody extravaſation, and indeed the only one which can be formed between the ſkull and dura mater. If the broken veſſels be few, and the quantity of blood which is ſhed be ſmall, the ſymptoms are generally ſlight, and by proper treatment diſappear (B). If they are large or numerous, or the quantity of extravaſated fluid conſiderable, the ſymptoms are generally urgent in proportion: but whether they be ſlight or conſiderable, whether immediatly alarming or not, they are always and uniformly ſuch as indicate preſſure made on the brain and nerves, viz. ſtupidity, drowſineſs, diminution or loſs of ſenſe, ſpeech, and voluntary motion.

But it alſo often happens, from the ſame kind of violence, that ſome of the ſmall veſſels which carry on the circulation between the pericranium, ſkull, and dura mater, are ſo damaged as not to be able properly to execute that office, although there are none ſo broken as to cauſe an actual effuſion of blood.

114 What injuries are moſt likely to produce an inflammation of the dura mater.

Smart and ſevere ſtrokes on the middle part of bones, at a diſtance from the ſutures, are moſt frequently followed by this kind of miſchief; the coats of the ſmall veſſels which ſuſtain the injury inflame, and become ſloughy; and in conſequence of ſuch alteration in them, the pericranium ſeparates from the outſide of that part of the bone which received the blow, and the dura mater from the inſide: the latter of which membranes, ſoon after ſuch inflammation, becomes ſloughy alſo, and furniſhes matter; which matter being collected between the ſaid membrane and the cranium, and having no natural outlet whereby to eſcape or be diſcharged, brings on a train of very terrible ſymptoms, and is a very frequent cauſe of deſtruction. The effect of this kind of violence is frequently confined to the veſſels connecting the dura mater to the cranium; in which caſe the matter is external to the ſaid membrane: but it ſometimes happens, that by the force either of the ſtroke or of the concuſſion, the veſſels which paſs between and connect the two meninges, are injured in the ſame manner; in which caſe, the matter formed in conſequence of ſuch violence is found on the ſurface of the brain, or between the pia and dura mater, as well as on the ſurface of the latter, or perhaps in all theſe three ſituations at the ſame time.

115 Difference between this diſeaſe and extravaſations or concuſſions.

The difference of this kind of diſeaſe from either an extravaſation of blood or a commotion of the medullary parts of the brain, is great and obvious. All the complaints produced by extravaſation are (as we have already ſaid) ſuch as proceed from preſſure made on the brain and nerves, and obſtruction to the circulation of the blood through the former; ſtupidity, loſs of ſenſe and voluntary motion, laborious and obſtructed pulſe and reſpiration, &c. and (which is of importance to remark) if the effuſion be all conſiderable, theſe ſymptoms appear immediately or very ſoon after the accident.

116 Symptoms attending an inflamed ſtate of the membranes.

The ſymptoms attending an inflamed or ſloughy ſtate of the membranes, in conſequence of external violence, are very different; they are all of the febrile kind, and never, at firſt, imply any unnatural preſſure: ſuch are, Pain in the head, reſtleſſneſs, want of ſleep, frequent and hard pulſe, hot and dry ſkin, fluſhed countenance, inflamed eyes, nauſea, vomiting, rigor; and toward the end, convulſion, and delirium. And

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(B) This muſt be ſuppoſed to be ſpoken in a general ſenſe; becauſe it is well known, that ſometimes a very ſmall quantity of extravaſated fluid will produce the moſt alarming and moſt preſſing ſymptoms; and that at other times a large quantity will occaſion none at all.

none of theſe appear at firſt, that is, immediately after the accident; ſeldom until ſome days are paſt.

One ſet or claſs of ſymptoms are produced by an extravaſated fluid making ſuch preſſure on the brain and origin of the nerves as to impair or aboliſh voluntary motion and the ſenſes: the other is cauſed by the inflamed or putrid ſtate of the membranes covering the brain, and ſeldom affects the organs of ſenſe until the latter end of the diſeaſe; that is, until a conſiderable quantity of matter is formed, which matter muſt preſs like any other fluid.

117
Blood cannot be converted into pus.

It is a generally received opinion, that blood ſhed from its veſſels, and remaining confined in one place, will become pus; and that the matter found on the ſurface of the dura mater toward the end of theſe caſes was originally extravaſated blood. But that pure blood ſhed from its veſſels by means of external violence, and kept from the air, will not turn to or become matter, is proved inconteſtably by every day's experience in many inſtances; in aneuriſms by puncture, in retained menſes by imperforate vaginæ, and in all ecchymoſes. True pus cannot be made from blood merely; as may be known from the manner in which all abſceſſes are formed, and from every circumſtance attending ſuppuration: and that the matter found on the ſurface of the dura mater, after great contuſions of the head, never was mere blood, we are as certain as obſervation and experience can make us.

118
Diviſion of the ſymptoms by ſome French writers.

Some of the French writers have indeed divided the ſymptoms of what they call a *contuſion of the head*, into two kinds; and have named them *primitive* or *original* ſymptoms, and *ſecondary* or *conſequential* ones: among the former, they rank immediate loſs of ſenſe, hæmorrhagy, involuntary diſcharge of urine and fæces, great propenſity to ſleep, &c.; among the latter they reckon fever, delirium, rigor, convulſion, &c. One kind they impute to the mere extravaſation of blood, the other to its putrefaction.

119
Objections to it.

This account, though ingenious and ſpecious, is not founded on fact. It is true, that the two kinds of ſymptoms are very diſtinct from each other, as well in their nature as in their time and manner of acceſs; and ſo far the remark is true: but from the beſt obſervation and examination, both on the living and on the dead, they appear to proceed from very different cauſes. That both theſe kind of ſymptoms do now and then concur in the ſame patient, is beyond all doubt; and that the caſe is thereby rendered complex, and more difficult to be judged of: but this does not conſtantly happen; and even when it does, there are generally ſuch diſtinguiſhing characteriſtic marks of each, as may prove the truth of what is here aſſerted.

120
Particular account of the progreſs of the diſeaſe.

If there be neither fiſſure nor fracture of the ſkull, nor extravaſation, nor commotion underneath it, and the ſcalp be neither conſiderably bruiſed nor wounded, the miſchief is ſeldom diſcovered or attended to for ſome few days. The firſt attack is generally by pain in the part which received the blow. This pain, tho' beginning in that point, is ſoon extended all over the head, and is attended with a languor or dejection of ſtrength and ſpirits, which are ſoon followed by a nauſea and inclination to vomit, a vertigo or giddineſs, a quick and hard pulſe, and an incapacity of ſleeping, at leaſt quietly. A day or two after this attack, if no means to prevent inflammation are uſed, the part generally ſwells, and becomes puffy and tender, but not painful; neither does the tumour riſe to any conſiderable height, or ſpread to any great extent. If this tumid part of the ſcalp be now divided, the pericranium will be found of a darkiſh hue, and either quite detached or very eaſily ſeparable from the ſkull; between which and it will be found a ſmall quantity of a dark-coloured ichor.

121
Appearance of the ſkull and pericranium.

If the diſorder has made ſuch progreſs that the pericranium is quite ſeparated and detached from the ſkull, the latter will even now be found to be ſomewhat altered in colour from a ſound healthy bone. Of this alteration it is not very eaſy to convey an idea by words; but it is a very viſible one, and what ſome very able writers have noticed. Among theſe Fallopius particularly: *Inſpiciatis diligenter os detectum: quod os, quando eſt in natura ſua, eſt coloris ſubrubri non candidi prorſus, nec rubri prorſus, ſed eſt veluti color miſtus ex albo declinans ad rubicandum, ut ſi multo lacte, aut alio colore candido, poneres parum ſanguinis vel alterius rei rubræ. Sed ſi videritis inæqualitatem coloris in ipſo oſſe detecto, ita ut adſint veluti puncta coloris albi, et aridi oſſis, quæ aridæ aliquando majores ſunt, aliquando minores, &c. ſciatis quod os ſit contuſum.*

From this time the ſymptoms generally advance more haſtily and more apparently; the fever increaſes, the ſkin becomes hotter, the pulſe quicker and harder, the ſleep more diſturbed, the anxiety and reſtleſſneſs more fatiguing; and to theſe are generally added irregular rigors, which are not followed by any critical ſweat, and which, inſtead of relieving the patient, add conſiderably to his ſufferings. If the ſcalp has not been divided or removed until the ſymptoms are thus far advanced, the alteration of the colour of the bone will be found to be more remarkable: it will be found to be whiter and more dry than a healthy one; or, as Fallopius has very juſtly obſerved, it will be found to be more like a dead bone: the ſanies or fluid between it and the pericranium will alſo, in this ſtate, be found to be more in quantity, and the ſaid membrane will have a more livid diſeaſed aſpect.

122
Of the dura mater.

In this ſtate of matters, if the dura mater be denuded, it will be found to be detached from the inſide of the cranium, to have loſt its bright ſilver hue, and to be as it were ſmeared over with a kind of mucus, or with matter, but not with blood. Every hour after this period, all the ſymptoms are exaſperated, and advance with haſty ſtrides: the headach and thirſt become more intenſe, the ſtrength decreaſes, the rigors are more frequent, and at laſt convulſive motions, attended in ſome with delirium, in others with paralyſis or comatoſe ſtupidity, finiſh the tragedy.

123
Of the ſcalp and integuments.

If the ſcalp has not been divided or removed till this point of time, and it be done now, a very offenſive diſcoloured kind of fluid will be found lying on the bare cranium, whoſe appearance will be ſtill more unlike to the healthy natural one; if the bone be now perforated, matter will be found between it and the dura mater, generally in conſiderable quantity, but different in different caſes and circumſtances. Sometimes it will be in great abundance, and diffuſed over a very large part of the membrane; and ſometimes the quantity will be leſs, and conſequently the ſpace which it occupies ſmaller. Sometimes it lies only on the exterior ſurface of the dura mater; and ſometimes it is between it and the pia mater, or alſo even on the ſurface of the brain, or within the ſubſtance of it.

124
Cauſe of theſe ſymptoms.

The primary and original cauſe of all this is the ſtroke upon the ſkull: by this the veſſels which ſhould carry on the circulation between the ſcalp, pericranium, ſkull, and meninges, are injured; and no means being uſed to prevent the impending miſchief, or ſuch as have been made uſe of proving ineffectual, the neceſſary and mutual communication between all theſe parts ceaſes; the pericranium is detached from the ſkull, by means of a ſanies diſcharged from the ruptured veſſels; the bone, being deprived of its due nouriſhment and circulation, loſes its healthy appearance; and the dura mater (its attaching veſſels being deſtroyed, or rendered unfit for their office) ſeparates from the inſide of the cranium, inflames, and ſuppurates.

Whoever will attend to the appearances which the parts concerned make in every ſtage of the diſeaſe, to the nature of the ſymptoms, the time of their acceſs, their progreſs, and moſt frequent event, will find them all eaſily and fairly deducible from the one cauſe which has juſt been aſſigned, *viz.* the contuſion. As the inflammation and ſeparation of the dura mater is not an immediate conſequence of the violence, ſo neither are the ſymptoms immediate, ſeldom until ſome days have paſſed: the fever at firſt is ſlight, but increaſes gradually; as the membrane becomes more and more diſeaſed, all the febrile ſymptoms are heightened; the formation of matter occaſions rigors, frequent and irregular, until ſuch a quantity is collected as brings on delirium, ſpaſm, and death.

125
Appearances when the ſcalp is wounded.

Hitherto we have conſidered this diſeaſe as unaccompanied by any other, not even by an external mark of injury, except perhaps a trifling bruiſe of the ſcalp: let us now ſuppoſe the ſcalp to be wounded at the time of the accident, by whatever gave the contuſion; or let us ſuppoſe, that, the immediate ſymptoms having been alarming, a part of the ſcalp had been removed in order to examine ſkull.

In this caſe the wound will for ſome little time have the ſame appearance as a mere ſimple wound of this part, unattended with other miſchief, would have; it will, like that, at firſt diſcharge a thin ſanies or gleet, and then begin to ſuppurate; it will digeſt, begin to incarn, and look perfectly well. But after a few days all theſe favourable appearances will vaniſh; the ſore will loſe its florid complexion and granulated ſurface, will become pale, glaſſy, and flabby; inſtead of good matter, it will diſcharge only a thin diſcoloured ſanies; the lint with which it is dreſſed, inſtead of coming off eaſily (as in a kindly ſuppurating ſore), will ſtick to all parts of it; and the pericranium, inſtead of adhering firmly to the bone, will ſeparate from it all round, to ſome diſtance from the edges.

This alteration in the face and circumſtances of the ſore, is produced merely by the diſeaſed ſtate of the parts underneath the ſkull; which is a circumſtance of great importance in ſupport of the doctrine advanced; and is demonſtrably proved, by obſerving that this diſeaſed aſpect of the ſore, and this ſpontaneous ſeparation of the pericranium, are always confined to that part which covers the altered or injured portion of the dura mater, and do not at all affect the reſt of the ſcalp; nay, if it has by accident been wounded in any other part, or a portion has been removed from any part where no injury has been done to the dura mater, no ſuch ſeparation will happen; the detachment above will always correſpond to that below, and be found nowhere elſe.

The firſt appearance of alteration in the wound immediately ſucceeds the febrile attack; and as the febrile ſymptoms increaſe, the ſore becomes worſe and worſe, that is, degenerates more and more from a healthy, kindly aſpect.

Through the whole time, from the firſt attack of the fever to the laſt and fatal period, an attentive obſerver will remark the gradual alteration of the colour of the bone if it be bare: at firſt it will be found to be whiter and more dry than the natural one; and as the ſymptoms increaſe, and either matter is collected or the dura mater becomes ſloughy, the bone inclines more and more to a kind of purulent hue or whitiſh yellow: and it may alſo be worth while in this place to remark, that if the blow was on or very near to a ſuture, and the ſubject young, the ſaid ſuture will often ſeparate in ſuch a manner as to let through it a looſe, painful, ill-conditioned fungus; at which time alſo it is no uncommon thing for the patient's head and face to be attacked with an eryſipelas.

We have ſaid, that in thoſe caſes in which the ſcalp is very little injured by the bruiſe, and in which there is no wound, nor any immediately alarming ſymptoms or appearances, that the patient feels little or no inconvenience, and ſeldom makes any complaint until ſome few days are paſt. That at the end of this uncertain time, he is generally attacked by the ſymptoms already recited. That theſe are not preſſing at firſt, but that they ſoon increaſe to ſuch a degree as to baffle all our art; from whence it will appear, that when this is the caſe, the patient frequently ſuffers from what ſeems at firſt to indicate his ſafety, and prevents ſuch attempts being made, and ſuch care from being taken of them, as might prove preventative of miſchief.

126
Uſeful information to be gained when the ſcalp is much injured.

But if the integuments are ſo injured as to excite or claim our early regard, very uſeful information may from thence be collected. For whether the ſcalp be conſiderably bruiſed or not, if in the place of ſuch bruiſe the pericranium be found ſpontaneouſly detached from the ſkull, having a quantity of diſcoloured ſanies between them, under the tumid part, in the manner already mentioned, it may be regarded as a pretty certain indication, either that the dura mater is beginning to ſeparate in the ſame manner, or that, if ſome preventative means be not immediately uſed, it will ſoon ſuffer; that is, it will inflame, ſeparate from the ſkull, and give room for a collection of matter between them. And with regard to the wound itſelf, whether it was made at the time of the accident, or afterward artificially, it is the ſame thing; if the alteration of its appearance be as above related, if the edges of it ſpontaneouſly quit their adheſion to the bone, and the febrile ſymptoms are at the ſame time making their attack, theſe circumſtances will ſerve to convey the ſame information, and to prove the ſame thing.

This particular effect of contuſion is frequently found to attend on fiſſures and undepreſſed fractures of the cranium, as well as on extravaſation of fluids in caſes where the bone is entire; and on the other hand, 127 Separation of the pericranium followed by a ſuppuration of the dura mater.

all theſe do often happen without the concurrence of this individual miſchief. All this is matter of accident: but let the other circumſtances be what they may, the ſpontaneous ſeparation of the altered pericranium in conſequence of a ſevere blow, is almoſt always followed by a ſuppuration between the cranium and dura mater; a circumſtance extremely well worth attending to in fiſſures and undepreſſed fractures of the ſkull, becauſe it is from this circumſtance principally that the bad ſymptoms and the hazard in ſuch caſes ariſe.

It is no very uncommon thing for a ſmart blow on the head to produce ſome immediate bad ſymptoms; which after a ſhort ſpace of time diſappear, and leave the patient perfectly well. A ſlight pain in the head, a little acceleration of pulſe, a vertigo, and ſickneſs, ſometimes immediately follow ſuch accident, but do not continue many hours, eſpecially if any evacuation has been uſed. Theſe are not improbably owing to a ſlight commotion of the brain; which having ſuffered no material injury thereby, they ſoon ceaſe. But if after an interval of ſome time the ſame ſymptoms are renewed; if the patient, having been well, becomes again feveriſh and reſtleſs, and that without any new cauſe; if he complains of being languid and uneaſy, ſleeps diſturbedly, loſes his appetite, has a hot ſkin, a hard quick pulſe, and a fluſhed heated countenance, and neither irregularity of diet nor accidental cold have been productive of theſe, miſchief is moſt certainly impending, and that moſt probably under the ſkull.

128 Signs of an effuſion of fluid under the cranium.

If the ſymptoms of preſſure, ſuch as ſtupidity, loſs of ſenſe, voluntary motion, &c. appear ſome few days after the head has ſuffered injury from external miſchief, they do moſt probably imply an effuſion of a fluid ſomewhere. This effuſion may be in the ſubſtance of the brain; in its ventricles, between its membranes, or on the ſurface of the dura mater: and which of theſe is the real ſituation of ſuch extravaſation, is a matter of great uncertainty; none of them being attended with any peculiar mark or ſign that can be depended upon, as pointing it out preciſely: but the inflammation of of the dura mater, and the formation of matter between it and the ſkull, in conſequence of contuſion, is generally indicated and preceded by a puffy, circumſcribed, indolent tumour of the ſcalp, and a ſpontaneous ſeparation of the pericranium from the ſkull under ſuch tumour.

Theſe appearances therefore following a ſmart blow on the head, and attended with languor, pain, reſtleſſneſs, watching, quick pulſe, headach, and ſlight irregular ſhiverings, do almoſt infallibly indicate an inflamed dura mater, and pus either forming or formed between it and the cranium.

By detachment of the pericranium is not meant every ſeparation of it from the bone which it ſhould cover. It may be and often is cut, torn, or ſcraped off, without any ſuch conſequence: but theſe ſeparations are violent; whereas this is ſpontaneous, and is produced by the deſtruction of thoſe veſſels by which it was connected with the ſkull, and by which the communication between it and the internal parts was carried on: and therefore it is to be obſerved, that it is not the mere removal of that membrane which cauſes the bad ſymptoms, but it is the inflammation of the dura mater; of which inflammation this ſpontaneous ſeceſſion of the pericranium is an almoſt certain indication.

129 Separation of both tables of the cranium ſometimes takes place.

Beſides the miſchiefs already mentioned, Mr Pott obſerves, that ſometimes an exfoliation or ſeparation of both tables of the cranium takes place from external violence, ſuch as happen ſpontaneouſly in old or neglected venereal diſorders. This diſeaſe, which has its ſeat in the diploe, often ſpoils the whole ſubſtance of the bone, and produces a ſeparation of a part of it. This kind of venereal caries is moſt frequently of a ſmall extent, and affects different parts of the ſkull; though ſometimes it may be of large extent in one piece. The ſeparated part is generally quite carious, and appears as if it had been worm-eaten. The ſurface of the bone ſo diſeaſed is ſeldom much elevated, though generally ſomewhat: neither has it often the circumſcribed form and appearance of a true node, as it is called; though now and then it has.

The ſcalp which covers a bone in this ſtate is moſt frequently diſeaſed alſo; ſometimes with one large ill-conditioned ſore; but more often with a number of crude, foul, painful, ſerpiginous ulcers; through moſt of which a probe will diſcover a rough bare bone, and from which is conſtantly diſcharged a greaſy ſtinking ſanies. This complaint is generally accompanied by a nocturnal headach, pocky ſpots, and pains about the breaſt and ſhoulders; and is almoſt always preceded by the former, though very frequently that ſymptom ceaſes, either during the mercurial courſes inſtituted for that purpoſe, or when the pericranium covering the diſeaſed part becomes foul and ſloughy.

The proportion of extent of ſurface which one table of theſe diſeaſed parts of the cranium bears to the diſeaſed part of the other table, is very uncertain, and often very unequal. Sometimes the alteration of the outer table is much more extenſive than that of the inner; in which caſe, when the ſeparation is made, the detached piece comes away very eaſily, and the uncovered part of the dura mater is ſmall compared to the ſize of the external ſore: but ſometimes, on the contrary, the diſeaſe occupies a more conſiderable extent of the inner table than of the outer, and thereby renders the caſe more difficult and the cure more tedious.

130 Of fractures of the cranium.

Where the ſkull is broken, the moſt violent ſymptoms frequently, though not always, take place at the very beginning. Mr Pott divides this kind of injury into two general claſſes, *viz.* thoſe in which the broken parts keep their proper level, and thoſe in which they do not; or, in other words, fractures without and fractures with depreſſion. The ſymptoms of a fractured cranium have been univerſally reckoned, Loſs of ſenſe, giddineſs, vomiting, bleeding at the ears, noſe, mouth, &c. But though theſe do frequently accompany a broken ſkull, they are by no means produced by the breach made in the bone, nor do they indicate any ſuch breach to have been made. They proceed entirely from ſome violence offered to the contents of the cranium, and either do or do not accompany fractures as they happen to be joined with ſuch injuries or not. Theſe ſymptoms are frequently produced by extravaſations of blood or ſerum upon the membranes of the brain, or between them. They may alſo be the conſequence of ſhocks or concuſſions of the brain itſelf, where the ſkull is perfectly entire. On the other hand, the bones of the cranium are ſometimes cracked, broken, nay, even depreſſed, and the patient ſuffers none of theſe ſymptoms. Hence it is difficult to know when the ſkull is fractured and when it is not: and hence ariſes one ſource of danger in contuſions and wounds of the head; for as it is impoſſible to know whether the cranium is fractured or not, the ſurgeon is often not warranted to divide the ſcalp until ſome urgent ſymptoms appear, after which it too frequently happens that all aſſiſtance comes too late. But if by any means the ſurgeon is aſſured that the ſkull is broken, it will then be incumbent on him at all events to proceed in the manner to be afterwards directed for curing theſe kinds of injuries.

131
Difficulty of knowing whether the ſkull is fractured or not.

Sometimes, though rarely, it happens that one of tables of the ſkull only is injured; but in this the ſymptoms are ſo much alike with the foregoing, that it is needleſs to take further notice of them: we ſhall therefore only conſider one ſymptom more, and which attends injuries done to the ſubſtance of the brain itſelf. This is a fungous excreſcence of the brain, ſomewhat reſembling the fungous or proud fleſh already mentioned, which grows up in ill-conditioned wounds in any part of the body. Theſe fungi of the brain ariſe very ſuddenly and unexpectedly, and expand to a conſiderable bulk; and grow the largeſt when the patient is ſeized with a violent fever. However, they are ſeldom formed when the dura mater continues entire; for this membrane, being very ſtrong, ſufficiently confines the brain: but when it is divided, together with the pia mater, the fungi increaſe moſt of all. Theſe ſubſtances ſeem entirely to be produced from the cortical ſubſtance of the brain, and never have any portion of the medulla; whence they are ſometimes extirpated with ſafety, though their appearance is at any rate to be accounted a very bad ſymptom.

132
Fungi of the brain.

133
Of contuſions and lacerations of the membranes.

In violent contuſions and lacerations of the membranes and tendons, all the ſymptoms which we have before mentioned will ariſe with aggravation; and death very frequently enſues, after the moſt terrible convulſions. Theſe are very frequent in gunſhot wounds; but the different ways in which people may be affected in conſequence of theſe wounds, it is impoſſible to recount. One thing to be obſerved in gunſhot wounds is, that the entrance of them is always narrower than the place where the ball comes out, provided it goes quite through the limb; becauſe the violent impetus of the ball drives in and contuſes the fleſh before it as it goes in, while it lacerates and tears it out in going through the other ſide. By reaſon of this extreme contuſion and laceration, there is frequently very little hæmorrhagy from gunſhot wounds, even when conſiderable veſſels are injured; and hence probably proceeds the notion of an eſchar in gunſhot wounds, as if they were burnt by the heat of the bullet. But it is impoſſible that a true eſchar can in this caſe be formed; becauſe it is demonſtrated that bullets acquire no heat while flying in the air, nor unleſs they ſtrike upon an hard obſtacle *. That a violent diſtenſion of the veſſels will prevent hæmorrhagy, is plain from the caſe of thoſe who have unhappily got their arms torn off by entangling about mills or other machinery; for in none of theſe do the axillary artery bleed, notwithſtanding its magnitude. The reaſon of this ſeems to be, that the veſſels entirely loſe their elaſticity, and collapſe by the preſſure of the ſurrounding parts in ſuch a manner that the blood cannot paſs through them.

134
Of gunſhot wounds.

135
Why there is little hæmorrhagy in theſe wounds.

* See *Phil. Tranſ.* Vol. lxxi. part I.

With regard to the cure of ſimple contuſions of the fleſhy parts, they are in general eaſily removed by the common diſcutient applications, of which none is better than vinegar and crude ſal ammoniac. If the blow has been very violent, the part will perhaps ſuppurate; in which caſe it is to be treated as afterwards directed when we come to ſpeak of tumours. The danger of contuſed wounds in the head, however, is greater than in any other part of the body. Here it ſometimes happens, that the ſcalp is ſo wounded at the time of the accident, or ſo torn away, as to leave the bone perfectly bare, and yet the violence has not been ſuch as to produce the evil abovementioned. In this caſe, if the pericranium be only turned back along with the detached portion of ſcalp, there may be probability of its reunion; and it ſhould therefore be immediately made clean and replaced, for the purpoſe of ſuch experiment, which, if it ſucceeds, will ſave much time, and prevent conſiderable deformity. If this attempt does not ſucceed, the detached piece may be removed, and the caſe then becomes as if the ſcalp and the pericranium had been forced away at the time that the wound was firſt inflicted; and the worſt that can happen, is an exfoliation from the bare ſkull (c).

136
Cure of ſimple contuſions.

137
Of contuſed wounds of the head, where the pericranium and ſcalp are detached from the bone.

It does alſo ſometimes happen, that the force which detaches or removes the ſcalp does alſo occaſion the miſchief in queſtion; but the integument being wounded or removed, we cannot have the criterion of the tumour of the ſcalp for the direction of our judgment. In theſe circumſtances our whole attention muſt be directed to the wound and general ſymptoms. The edges of the former will digeſt as well, and look as kindly for a few days, as if no miſchief was done underneath: but after ſome little ſpace of time, when the patient begins to be reſtleſs and hot, and to complain of pain in the head, theſe edges will loſe their vermilion hue, and become pale and flabby; inſtead of matter, they will diſcharge a thin gleet; and the pericranium will looſen from the ſkull, to ſome diſtance from the ſaid edges. Immediately after this, all the general ſymp-

138
Appearance of the wound when the internal parts are injured.

(c) Not that exfoliation is the neceſſary conſequence of the ſkull being laid bare; this depends upon other circumſtances beſides the mere removal of the ſcalp and pericranium. The ſolidity of the ſurface of the bones, the ſize of the veſſels, and the impulſe of the blood through them, are what principally determine that. If the cortex of the bone be not very hard, and the impulſe of the blood be capable of counterbalancing the effects of the external air, a granulation of fleſh will be generated on the ſurface of the bone, which will cover and firmly adhere to it, without throwing off the ſmalleſt exfoliation, eſpecially in young ſubjects. On the contrary, if the bone be much hardened, and the veſſels thereby conſtringed; or if ſuch applications be made uſe of as will produce an artificial conſtriction of them; the ſurface will neceſſarily become dry, and, the juices ceaſing to circulate through it, it muſt part with a ſcale to a certain depth; that is, that part through which the circulation ceaſes to be carried on will be ſeparated from and caſt off by the veſſels which nouriſh the reſt of the bone.

ſymptoms are increaſed and exaſperated, and as the inflammation of the membrane is heightened or extended, they become daily worſe and worſe, until a quantity of matter is formed, and collected, and brings on that fatal period which, though uncertain as to date, very ſeldom fails to arrive.

139
General indications of cure.

The method of attempting the relief of this kind of injury conſiſts in two points; *viz.* to endeavour to prevent the inflammation of the dura mater; or, that being neglected, or found impracticable, to give diſcharge to the fluid collected within the cranium in conſequence of ſuch inflammation.

140
Exceeding uſefulneſs of bleeding.

Of all the remedies in the power of art for inflammations of membranous parts, there is none equal to phlebotomy. To this truth many diſeaſes bear teſtimony; pleuriſies, ophthalmies, ſtrangulated hernias, &c. and if any thing can particularly contribute to the prevention of the ills likely to follow ſevere contuſions of the head, it is this kind of evacuation: but then it muſt be made uſe of in ſuch a manner as to become truly a preventative; that is, it muſt be made uſe of immediately, and freely.

141
It ought never to be omitted.

It will in general indeed be found very difficult to perſuade a perſon, who has had what may be called only a *knock on the pate*, to ſubmit to ſuch diſcipline, eſpecially if he finds himſelf tolerably well. He will be inclined to think, that the ſurgeon is either unneceſſarily apprehenſive, or guilty of a much worſe fault; and yet, in many inſtances, the timely uſe or the neglect of this ſingle remedy makes all the difference between ſafety and fatality.

It may be ſaid, that as the force of the blow, the height of the fall, the weight of the inſtrument, &c. can never preciſely or certainly determine the effect, nor inform us whether miſchief is done under the bone or not, a large quantity of blood may be drawn off unneceſſarily in order to prevent an imaginary evil. This is in ſome degree true; and if the advice juſt given were univerſally followed, many people would be largely bled without neceſſity; but then, on the other hand, many a very valuable life would be preſerved, which for want of this kind of aſſiſtance is loſt. And if it be allowed to uſe ſuch means as may be in themſelves hazardous, ſurely it cannot be wrong to employ one which is not ſo; at leaſt if it be conſidered in a general ſenſe, whatever it may accidentally prove to ſome few particular individuals.

Acceleration or hardneſs of pulſe, reſtleſſneſs, anxiety, and any other degree of fever, after a ſmart blow on the head, are always to be ſuſpected and attended to. Immediate, plentiful, and repeated evacuation by bleeding, have in many inſtances removed theſe, in perſons to whom, in all probability, very terrible miſchief would have happened had not ſuch precaution been uſed. In this, as well as ſome other parts of practice, we neither have nor can have any other method of judging, than by comparing together caſes apparently ſimilar. It is by no means, however, to be inferred from hence, that early bleeding will always prove a certain preſervative; and that they only die to whom it has not been applied: this, like all other human means, is fallible; and perhaps there are more caſes out of its reach than within it: but where preventative means can take place, this is certainly the beſt, and the moſt frequently ſucceſsful.

142
Of perforating the cranium.

The ſecond intention, *viz.* the diſcharge of matter collected under the cranium, can be anſwered only by the perforation of it.

143
Diſpute concerning the performing this operation.

When, from the ſymptoms and appearances already deſcribed, there is juſt reaſon for ſuppoſing matter to be formed under the ſkull, the operation of perforation cannot be performed too ſoon; it ſeldom happens that it is done ſoon enough.

The propriety or impropriety of applying the trephine in caſes where there is neither fiſſure, fracture, nor ſymptom of extravaſation, is a point which has been much litigated, and remains ſtill unſettled either by writers or practitioners.

When there is no reaſon for ſuſpecting either of thoſe injuries, either from the ſymptoms or from the appearances, and the pericranium, whether the ſcalp be wounded or not, remains firmly attached in all parts to the ſkull, there certainly is not (let the general ſymptoms be what they may) any indication where to apply the inſtrument; and conſequently no ſufficient authority for uſing it at all. But whenever that membrane, after the head has received an external violence, ſeparates, or is detached ſpontaneouſly from the bones underneath it, and ſuch ſeparation is attended with the collection of a ſmall quantity of thin brown ichor, an alteration of colour in the ſeparated pericranium, and an unnatural drineſs of the bone, we cannot help thinking that there is as good reaſon for trepanning as in the caſe of fracture: we believe experience would vindicate us, if we ſaid *better* reaſon; ſince it is by no means unfrequent for the former kind of caſe to do well without ſuch operation, whereas the latter (we mean ſuppuration under the ſkull) never can.

144
Ought always to be performed where the pericranium ſeparates from the ſkull.

All the beſt practitioners have always agreed in acknowledging the neceſſity of perforating the ſkull in the caſe of a ſevere ſtroke made on it by gunſhot, upon the appearance of any threatening ſymptoms, even though the bone ſhould not be broken: and very good practice it is. A wound by gunſhot (as far as it relates to the ſkull) is to be regarded only as one attended with a very high degree of contuſion, and therefore moſt likely to produce ſymptoms accordingly; among which, inflammation of the dura matter ſtands principal. Experience confirms both: moſt of the ſymptoms attending wounds of the head made by gunſhot, are ſymptoms of contuſion; and the formation of matter between the cranium and dura mater is a very frequent and very fatal conſequence of ſuch contuſion.

In ſhort, the ſpontaneous ſeparation of the pericranium, if attended with general diſorder of the patient, with a chillineſs, horripilatio, languor, and ſome degree of fever, appears to us, from all the obſervation we have been capable of making, to be ſo ſure and certain an indication of miſchief underneath, either preſent or impending, that we ſhould never heſitate about perforating the bone in ſuch circumſtances.

145
In what caſes it is to be repeated.

When the ſkull has been once perforated, and the dura mater thereby laid bare, the ſtate of the latter muſt principally determine the ſurgeon's future conduct. In ſome caſes one opening will prove ſufficient for all neceſſary purpoſes, in others ſeveral may be neceſſary. This variation will depend on the ſpace of detached dura mater and the quantity of collected matter. The repetition of the operation is warranted both by the nature of the caſe, and by the beſt authorities, there being no compariſon to be made between the poſſible inconvenience ariſing from largely denuding the dura mater, and the certain as well as terrible evils which muſt follow the formation and confinement of matter between it and the ſkull.

146 The antiphlogiſtic regimen neceſſary after the operation.

It can hardly be neceſſary to obſerve, that notwithſtanding the operation of perforation be abſolutely and unavoidably neceſſary, yet the repetition of blood-letting, of cooling laxative medicines, the uſe of antiphlogiſtic remedies, and a moſt ſtrict obſervance of a low diet and regimen, are as indiſpenſably requiſite after ſuch operation as before: the perforation ſets the membrane free from preſſure, and gives vent to collected matter, but nothing more: the inflamed ſtate of the parts under the ſkull, and all the neceſſary conſequences of ſuch inflammation, call for all our attention full as much afterwards as before; and although the patient muſt have periſhed without the uſe of the trephine, yet the merely having uſed it will not preſerve him without every other caution and care.

147 Of caſes where the cranium is fractured.

In thoſe caſes where the bone is evidently fractured, if the ſolution of continuity be either produced by ſuch a degree of violence as hath cauſed a conſiderable diſturbance in the medullary parts of the brain, or has diſturbed any of the functions of the nerves going off from it, or has occaſioned a breach of any veſſel or veſſels, whether ſanguine or lymphatic, and that hath been followed by an extravaſation or lodgement of fluid, the ſymptoms neceſſarily conſequent upon ſuch derangement, or ſuch preſſure, will follow; but they do not follow becauſe the bone is broken: their cauſes are ſuperadded to the fracture; and although produced by the ſame external violence, are yet perfectly and abſolutely independent of it; ſo much ſo, that, as we have already obſerved, they are frequently found where no fracture is.

The operation of the trepan is frequently performed in the caſe of ſimple fractures, and that very judiciouſly and properly. But it is not performed becauſe the bone is broken or cracked: a mere fracture or fiſſure of the ſkull can never require perforation, or that the dura mater under it be laid bare. The reaſon for doing this ſprings from other cauſes than the fracture, and thoſe really independent on it. They ſpring from the nature of the miſchief which the parts within the cranium have ſuſtained, and not from the accidental diviſion of the bone. From theſe ariſe the threatening ſymptoms, from theſe all the hazard, and from theſe the neceſſity and vindication of performing the operation of the trepan.

If a ſimple fracture of the cranium was unattended in preſent with any of the before-mentioned ſymptoms, and there was no reaſon for apprehending any other evil in future, that is, if the ſolution of continuity in the bone was the whole diſeaſe, it could not poſſibly indicate any other curative intention but the general one in all fractures, *viz.* union of the divided parts. But how can ſuch union be promoted or aſſiſted by perforation? It moſt certainly cannot; and yet perforation is abſolutely neceſſary in ſeven caſes out of ten of ſimple undepreſſed fractures of the ſkull.

148 Reaſons for trepanning in the caſe of fractures.

The reaſons for trepanning in theſe caſes are, firſt, the immediate relief of preſent ſymptoms ariſing from preſſure of extravaſated fluid; or, ſecond, the diſcharge of matter formed between the ſkull and dura mater, in conſequence of inflammation; or, third, the prevention of ſuch miſchief as experience has ſhown may moſt probably be expected from ſuch kind of violence offered to the laſt-mentioned membrane.

In the firſt caſe (that of an extravaſated fluid within the cranium), the relief from perforation is not only ſometimes immediate, but frequently is not attainable by any other means. This is a ſufficient proof, not only of its utility, but of its neceſſity.

In the ſecond (of formation of matter between the ſkull and dura mater), there is no natural outlet by which ſuch matter can eſcape; and the only chance of life is from the operation.

In the third, that of mere fracture, without depreſſion of bone, or the appearance of ſuch ſymptoms as indicate commotion, extravaſation, or inflammation, it is uſed as a preventative; and therefore is a matter of choice more than immediate neceſſity.

Many practitioners, both ancient and modern, have therefore diſuſed and condemned it; and have, in caſes where there have been no immediate bad ſymptoms, adviſed to leave the fracture to nature, and not to perform the operation as a preventative, but to wait until its neceſſity may be indicated by ſuch ſymptoms as may both require and vindicate it. This is a point of the utmoſt conſequence in practice, and ought to be very maturely conſidered.

149 Objections to the early uſe of the trephine.

They who object to the early uſe of the trephine, ſpeak of it as being frequently unneceſſary, and as rendering the patient liable to ſeveral inconveniences which may ariſe from uncovering the dura mater before there is any good or at leaſt any apparent reaſon for ſo doing. And in ſupport of this their opinion, they allege many inſtances of ſimple fracture, which have been long undiſcovered, without being attended with any bad ſymptoms; and of others which, though known and attended to from the firſt, have done very well without ſuch operation.

150 Anſwered.

They who adviſe the immediate uſe of the inſtrument, do it upon a preſumption that, in conſiderable violence received by the head, ſuch miſchief is done to the dura mater, and the veſſels by which it is connected to the cranium, that inflammation of the ſaid membrane muſt follow; which inflammation generally produces a collection of matter and a ſymptomatic fever, which moſt frequently baffles all our art, and ends in the deſtruction of the patient.

What the former aſſert is undoubtedly ſometimes true. There have been ſeveral inſtances of undepreſſed fractures of the ſkull, which either from having been undiſcovered at firſt, or neglected, or having been under the care of a practitioner who has diſliked the operation, have done very well without it. This is certainly true, but is not ſufficient to found a general rule of practice upon: in matters of this ſort, a few inſtances are by no means ſufficient to eſtabliſh a precedent: that which is found to be moſt frequently uſeful, is what we ought to abide by; reſerving to ourſelves a liberty of deviating from ſuch general rule in particular caſes.

This is one of thoſe perplexing circumſtances which all writers lament, and all practitioners feel; but which, inſtead of merely complaining of, we ſhould endeavour, as much as in us lies, to correct.

In order to obtain what information we can on this ſubject, we ſhould conſider, firſt, what the miſchiefs are, which may moſt probably be expected to follow, or which moſt frequently do follow, when perforation has been too long deferred or totally neglected; ſecondly, what prejudice or inconvenience does really ariſe from, or is thought to be cauſed by, the operation itſelf, conſidered abſtractedly; and, thirdly, what proportion the number of thoſe who have done well without it bears to that of thoſe who may truly be ſaid to have been loſt for want of it, or of thoſe to whom it might have afforded ſome chance of relief.

151
Dangers ariſing from a delay of the operation.

With regard to the firſt, we have already obſerved in the caſe of ſimple undepreſſed fractures, whenever the trephine is applied, it muſt be with deſign either to relieve or to prevent ills ariſing from other miſchief than the mere breach in the bone; which breach, conſidered ſimply and abſtractedly, can neither cauſe ſuch ills, nor be relieved by ſuch operation. One, and that the moſt frequent, of theſe miſchiefs, is the inflammation, detachment, and ſuppuration of the dura mater, and conſequently the collection of matter between it and the ſkull; a caſe of all others attending wounds of the head, the moſt preſſing, the moſt hazardous, and the leaſt within our power to relieve. Indeed, the only probable method of preventing this evil ſeems to be the removal of ſuch a part of the ſkull as, by being broken, appears plainly to have been the part where the violence was inflicted; and which, if the dura mater becomes inflamed, and quitting its connexion ſuppurates, will, in all probability, cover and confine a collection of matter for which nature has provided no outlet.

152
Thoſe which follow the operation itſelf.

The ſecond conſideration propoſed was, What miſchief or inconvenience may moſt reaſonably be ſuppoſed to follow or to proceed from the mere operation conſidered abſtractedly. They who are averſe to the uſe of it as a preventative, allege that it occaſions a great loſs of time; that it is frequently quite unneceſſary; and that the admiſſion of air to the dura mater, as well as the laying of it bare, is neceſſarily prejudicial.

The former of theſe is undoubtedly true: a perſon whoſe ſkull has been perforated cannot poſſibly be well (that is, cured) in ſo ſhort a ſpace of time as one who has not undergone ſuch operation, ſuppoſing ſuch perſon to have ſuſtained no other injury than the mere fracture; and if the majority of the people whoſe ſkulls are broken, were ſo lucky as to ſuſtain no other injury, that is, if no other miſchief was in theſe caſes in general done to the parts contained within the ſkull, the objection to perforation would be real and great, and the operation a matter of more ſerious conſideration. But this is ſeldom the caſe; by much the larger number of thoſe who ſuffer a fracture of the ſkull, are injured with regard to other parts, and labour under miſchief of another kind additional to the fracture; that is, the parts within the cranium are injured as well as the cranium itſelf. This being the caſe, the loſs or waſte of a little time ceaſes to be an object of ſo great importance. The hazard which it is ſuppoſed may be incurred from laying bare the dura mater is indeed a matter of ſome weight: ſo that it certainly ought not to be done but for very good reaſons: and yet, let the ſuppoſed hazard be what it may, it cannot, in the nature of things, be by any means equal to that which muſt be incurred by not doing it when ſuch operation becomes neceſſary. In ſhort, if we would form a right judgment of this point, the queſtion concerning it ought to ſtand thus: Is the chance of ill which may proceed from merely denuding the dura mater, equal to that of its not being ſo hurt by the blow as to inflame and ſuppurate? Or is the miſchief which may be incurred by mere perforation of the ſkull, equal to the good which it may produce? Theſe queſtions, let thoſe who have ſeen moſt buſineſs of this kind, and who are therefore the beſt judges, conſider and determine.

153
Much leſs than thoſe which attend its delay.

The third conſideration, *viz.* What proportion the number of thoſe who have eſcaped without the operation bears to that of thoſe who have periſhed for want of it, is in great meaſure included in the two preceding; at leaſt the determination of them muſt alſo determine this.

154
Mr Pott's opinion concernin the numbers of thoſe who have periſh ed for wa of it.

"The number of caſes of this kind (ſays Mr Pott) which are neceſſarily brought into a large hoſpital ſo ſituated as Bartholomew's is, in the middle of a populous city, where all kinds of hazardous labour are carried on, has enabled me to make many obſervations on them; and although I have now and then ſeen ſome few of them do well without the uſe of the trephine, yet the much greater number whom I have ſeen periſh with collections of matter within the cranium, who have not been perforated, and for whom there is no other relief in art or nature, has, I muſt acknowledge, rendered me ſo very cautious and diffident, that although I will not ſay that I would always and invariably perform the operation in every caſe of ſimple fracture, yet the caſe muſt be particularly circumſtanced, the proſpect much fairer than it moſt frequently is, and my prognoſtic delivered in the moſt guarded apprehenſive manner, when I omit it. I ſhould be ſorry to be ſo miſunderſtood as to have it ſuppoſed that I mean to ſay, that I think the denudation of the dura mater a matter of abſolute indifference, or that no ill can proceed from it. This I know is a point concerning which the beſt practitioners have differed, and concerning which we will ſtand in need of information; but I think I may venture to ſay, what is fully to my preſent purpoſe, *viz.* that enlarging the opening of a fracture by means of a trephine will not produce or occaſion much riſk or hazard additional to what muſt be occaſioned by the fracture itſelf: that has already let in the air upon the membrane; and therefore that conſideration is, at leaſt in ſome degree, at an end, and the principal point to be determined ſtill remains the ſame, *viz.* Whether, upon a ſuppoſition that the dura mater may poſſibly not have been ſo injured as to inflame and ſuppurate in future, the operation ought not to be practiſed as a preventative, but, on the contrary, ought rather to be deferred until worſe ſymptoms indicate the neceſſity of it? or, Whether it ought in general to be performed early, in order, if poſſible, to prevent and guard againſt a very probable as well as very terrible miſchief?

"I know that it may be ſaid, that a fracture, if of any conſiderable ſize, or whoſe edges are fairly diſtant and unconnected, will of itſelf make ſome way for diſcharge from within: and ſo it certainly may and does, in the caſe of an effuſion of fluid blood; but even in this it very ſeldom proves ſufficient for the purpoſe. But does not the diſtant ſeparation of the edges imply greater ſeparation of the attaching veſſels of the dura mater? and does not experience too often prove this to be the caſe? In truth, the great advantage which is ſometimes derived from conſiderable fractures, is moſt frequent in thoſe caſes where portions of bone are ſo looſe as to be removeable; which removal of bone ſtands in place of perforation, and makes much more for the neceſſity of the operation in other caſes than againſt it, if properly conſidered.

155 Caſes of contuſions of the head without any wound, mentioned by Mr Pott.

In confirmation of the above doctrine Mr Pott adduces a great many caſes. Of contuſions of the head without any wound he mentions five. The firſt, a man that was knocked down in a mob; he ſoon recovered his ſenſes, and, after being plentifully bled, was to appearance well in three days. Six days after, he was taken ill with the ſymptoms of a beginning inflammation of the dura mater; which having continued three days, he was again taken under Mr Pott's care.—It was now twelve days from the accident; and after this the ſymptoms continually increaſed until the ſeventeenth day, when he died. Two days before his death, a tumour, which had ariſen on the ſpot where the injury had been received, was laid open, and a thin brown ſanies diſcharged. The cranium was altered from its healthy appearance, but without fracture or fiſſure. On opening the head, a conſiderable quantity of matter was found betwixt the dura mater and the ſkull under the diſeaſed part, but nowhere elſe.

The ſecond caſe was a boy of nine years of age, who had been ſtunned for a minute or two by a fall from a cart. In two days he ſeemed to be quite well: but in five days after, that is, in ſeven from the accident, he complained of the ſymptoms already mentioned; which having continued for ſix days longer, Mr Pott was called, and found about a third part of the parietal bone covered with a flattiſh tumour, containing a fluid. The ſcalp was now divided, and the cranium found in a diſeaſed ſtate; but a phyſician who alſo attended him over-ruled Mr Pott when he intended to perforate it. The child grew worſe, and died in three days. On opening the body, a collection of matter was found below the diſeaſed part of the bone; and about the middle of it the dura mater was diſcoloured and ſloughy, containing about a ſpoonful of matter betwixt it and the pia mater.

In the third caſe, a labourer fell from a ſcaffold two ſtories high, by which he was ſtunned, but ſeemed well next day. Five days after, he began to complain of the uſual ſymptoms of an oppreſſed brain, to which was added a ſenſation as if a cord was drawn tight round the encephalon; and on the right ſide of his forehead was a ſmall tumour, which being opened, was found to contain a brown fluid. The bone was diſeaſed, and a circular piece of the ſcalp cut out. However, as only internal remedies, ſuch as bleeding, neutral ſalts, &c. were made uſe of, all the ſymptoms were aggravated. On the tenth day, the ſore was pale, ſpongy, and glaſſy, and the ſcalp ſeparated from the ſkull to ſome diſtance. This day a piece of the bone was removed, and the dura mater under it found ſmeared with matter. Next day he was worſe in every reſpect; upon which a larger piece of the bone was removed, and a conſiderable quantity of matter diſcharged. This done, finding his pulſe ſtill high and full, ten ounces of blood were drawn off, and a glyſter injected. The loſs of blood produced a ſwooning, which laſted ſome minutes, after which he ſaid he thought his head was eaſier. As the evening approached, the ſymptoms returned, and therefore ſome leeches were applied to his temples. That night, for the firſt time, he got a little quiet ſleep, and in the morning of the 12th day he ſaid that his head was perfectly eaſy: a very large diſcharge had been made throngh the perforation in the cranium, and the wound in the ſcalp had rather a better aſpect. He was kept ſtrictly to a low regimen; took at firſt the ſal abſynthii mixture freely: when his pain had left him, his phyſician ordered him the bark; and in a very few days every bad ſymptom left him.

The fourth caſe was a lad of about twelve years of age, who was ſtruck ſenſeleſs by the blow of a bat on his forehead, as he ſtood beſide a man playing at cricket. A conſiderable ſwelling aroſe on the part: he was treated with bleeding, purging, and the antiphlogiſtic regimen; and at the end of nine days was diſcharged as well. In five days after, 14 from the accident, he returned with complaints of an oppreſſed brain. The ſymptoms continued to increaſe, notwithſtanding all that could be done, till the 20th, when the forehead which had formerly been ſwelled and ſubſided, beginning again to look tumid and puffy, the integuments were divided; the pericranium was found to have quitted its adheſion for more than the breadth of a crown piece, and between it and the bone was a ſmall quantity of thin diſcoloured fluid. The trephine being applied, a large diſcharge of matter continued for a week; and the boy again got well.

The ſixth caſe terminated fatally, though the trephine was applied on the tenth day. The patient was a woman, a ſeller of greens; who, in a quarrel with her huſband, had been ſtruck over the head with a mopſtick. The blow neither fetched blood nor brought her to the ground; and ſhe continued, notwithſtanding an irregular life, for a week, without any omplaint: ſhe was then taken with the uſual ſymptoms; and, two days after, the operation was performed on one ſide of the ſagittal ſuture, and cloſe to it. The dura mater was altered from its natural colour, and ſmeared over with matter. All the ſymptoms were now aggravated, and a violent eryſipelas came on; upon which the trephine was applied on the other ſide the ſuture, and the ſame kind of appearance found as before. The ſymptoms continued without any abatement; and a third opening being made near to the firſt, vent was thereby given to ſo large a quantity of matter, that Mr Pott was convinced the event muſt be fatal. Accordingly the patient died on the 16th day; and upon opening the head, the dura mater was found covered with matter, under the whole internal ſurface of both parietal bones; but the firm adheſion of the longitudinal ſinus to the ſagittal ſuture had prevented all communication between the two collections of matter.

156 Of contuſions with wounds.

Of ſeven caſes of contuſion with one or more wounds, mentioned by the ſame author, four died, notwithſtanding the operation being performed; the collections of matter being ſo large, or ſo ſituated, that it was impoſſible to give vent to it by art. One of theſe caſes was remarkable, as it ſhows the difference between ſymptoms ariſing from an injury done to the brain at the time the contuſion is received, and that which ſpontaneouſly follows the inflammation of the dura mater: we ſhall therefore give it in Mr Pott's own words.

157
A remarkable one.

“A fireman who was at work on the top of an houſe, fell in with the roof of it; he was taken out ſenſeleſs, and brought in that ſtate to the hoſpital.

“He had on different parts of his body ſeveral wounds and bruiſes, but none of them ſeemed to be of any great conſequence. On his head were four, one of ſome ſize, on the upper part of the frontal bone, near to the coronal ſuture; two on the left parietal; one on the right ſide of his head, juſt above his ear; and a ſmall bruiſe on the upper part of the os occipitis. Of all theſe wounds, the pericranium was divided in one only, viz. that near the coronal ſuture.

“His wounds were dreſſed, he was largely bled, a glyſter was thrown up, and a purging mixture was ordered to be given *cochleatim*, until he ſhould have a diſcharge *per anum*. The next day he was in the ſame ſtate, perfectly ſenſeleſs, had the apoplectic ſtertor, a full labouring interrupted pulſe, and ſome difficulty of reſpiration. He had four or five large ſtools; wherefore his mixture was diſcontinued, but ſixteen ounces more of blood were drawn from one of the jugular veins; which evacuation was repeated again in the evening of the ſame day, to the quantity of eight more. On the third day, being ſtill perfectly ſtupid, diſcharging both urine and fæces involuntarily, and having ſtill a full labouring pulſe, both the temporal arteries were opened, and fourteen ounces drawn from thence. On the fourth, finding no alteration, and being ſatisfied that the man's ſtate could hardly be made worſe, I determined to perforate the cranium; and accordingly ſet a large trephine on the upper part of the frontal bone, where the pericranium had been divided. The dura mater was found to be thinly covered with grumous blood, ſome of which I removed, and thereby made way for the diſcharge of more. The next day (the fifth), finding that what diſcharge had been made during the night was bloody, and that the man was in no reſpect altered for the better, I thought I had ſufficient authority for repeating the operation; which I accordingly did, cloſe by and below the former; and as the blow by which the wound had been inflicted ſeemed to have been almoſt exactly on the top of his head, I made a third opening in the parietal bone, cloſe to the ſuture. The appearance under all was the ſame as under the firſt, viz. a thin layer of grumous, or rather coagulated, blood.

“Next day (the ſixth), toward the evening, the man opened his eyes; and on the ſeventh, in the morning, he ſpake. The diſcharge of blood continued for ſeveral days, and at the end of about a week from this time ceaſed; the dura mater and the wounded ſcalp wearing as good an aſpect as could be wiſhed, and the patient being eaſy and rational.

“On the 18th day, he complained of pain all over the head; was ſick, reached to vomit, and ſaid that he was faint and chilly. On the 19th, his face was fluſhed, his ſkin hot, his pulſe quick and hard. He was let blood, and ordered to have a glyſter, and to take ſome medicines of the febrifuge kind. A day or two more paſſed in this manner, his fever not violent, but rather increaſing than remitting; his pain, though not acute, yet ſuch as to deprive him of his ſleep; little rigors occurring irregularly, no perſpiration, and an exceſſive langour. At laſt, on the 21ſt day, on the upper part of the os occipitis, on the right ſide, where there had been a ſmall bruiſe, a tumour aroſe, ſo characterized as to ſatisfy me that the cauſe of the late alteration of circumſtances lay underneath it: it did not riſe to any height, and contained a ſmall quantity of ſanies, but covered a portion of bone which the pericranium had quitted. I removed the ſcalp, and would have ſet on a trephine; but the man obſtinately refuſed to ſubmit to it.

“On the 25th day he loſt the uſe of his left leg and arm, and was much convulſed in thoſe of his right ſide; which paralyſis and ſpaſm continued until the 27th, and on the 28th he died.

“Upon examining his head, a collection of matter was found under the bare part of the occipital bone; the dura mater under this matter was ſloughy and putrid; and about a deſert-ſpoonful of matter lay between the meninges, juſt under the altered part of the dura mater. In the part where the bloody extravaſation had been, every thing was perfectly fair and free from diſeaſe.

“In this caſe, there ſeems to have been as clear a diſtinction between the bloody extravaſation, with its effects, and the inflammatory ſtate of the dura mater, with its conſequences, as can be deſired. All the firſt ſymptoms were ſuch as were cauſed by mere preſſure of the extravaſated blood; an obliteration of every ſenſible faculty, attended with the principal ſymptoms of an interrupted circulation. Perforation of the ſkull, where this extravaſation had been made, did, by giving diſcharge to the blood, happily remove theſe; and the man was getting well apace, until the ills ariſing from another cauſe, viz. the inflammatory ſeceſſion of the dura mater in conſequence of contuſion, and that in another place, began to appear: they indeed made their attack rather late, nor did they riſe ſo high as they moſt frequently do; but then it muſt be conſidered what diſcipline the poor man had undergone, and what evacuation had been made. Notwithſtanding which, they bore their true, genuine, febrile, inflammatory character, and produced their moſt frequent event. What perforation of the os occipitale might have done, I cannot ſay; I fear but little, as the matter was not only upon but underneath the dura mater, and that too diſeaſed.”

158
Caſes of a caries of t cranium.

Of the caries of the cranium, mentioned n° 129. four examples are brought; of which only one terminated fatally, at leaſt from the apparent injury done to the brain; although another died of a peripneumony, after every thing ſeemed to be in a fair way. In this laſt the trephine was applied upon the carious part of the bone; but in the other three it ſeparated ſpontaneouſly.

159
Of fiſſures and fractures with out depreſſion.

Twelve caſes are related by our author of fiſſures and fractures of the cranium without any depreſſion. Of theſe ſix recovered, and as many died. The ſymptoms were generally the ſame as in contuſions without fractures. In one caſe, indeed, where a girl of 16 had got a violent blow on the head with an iron poker, ſhe had a large wound on the top of her head,

Theory.

head, with a conſiderable fracture on the ſagittal ſuture. The broken pieces were ſo large and ſo looſe that they were removed without any perforation, by which the longitudinal ſinus was left bare for at leaſt two inches in length; but no hæmorrhagy followed from the removal of the fragments.—For three days ſhe was bled twice a-day from one part or other, and ſtools were procured: but all to no purpoſe; ſhe ſtill remained quite inſenſible. On the fifth day an opening was made with a lancet into the longitudinal ſinus, and the blood ſuffered to run off, until her countenance, which had been much fluſhed, became pale; her pulſe, which till then had been full and ſtrong, faultered conſiderably, and ſhe ſhowed all the marks of a deliquium from inanition. A bit of lint was then put on the orifice, and the nurſe was ordered to keep her finger on it, till Mr Pott had viſited the other patients in the houſe. On his return, the part ſhowed no diſpoſition to bleed again, nor did it ever after. That afternoon ſhe opened her eyes, and moved her arms, and the next morning was ſenſible enough to aſk for drink. She retained her ſenſes for ſome days: but a fever coming on, ſhe became delirious and convulſed; and thus died on the 17th day. On opening the head, a conſiderable abſceſs was found on the ſurface of the brain, on one ſide of the falciform proceſs of the dura mater.

In another caſe, though the ſkull was fractured, none of the bad ſymptoms appeared till five weeks after the accident. The patient was a lad of about 22, who had fallen from a high ſcaffold. In his head he had ſuffered no apparent injury; but the radius of the right arm, the tibia and fibula of the left leg, together with one or two of the ribs, were broken. In five weeks he was permitted to get out of bed; but the firſt day of his riſing he complained of being ſick and giddy, which was imputed to weakneſs and confinement, and therefore diſregarded. For three or four days he complained of continual pain in his head, got no ſleep, and was conſtantly feveriſh. As no injury in the head was ſuſpected, nothing was preſcribed but the common antiphlogiſtic regimen. At the end of the ſixth week he complained that his head was painful to the touch; and the day after he made this complaint, had a rigor which laſted half an hour. At laſt a ſwelling, which evidently contained a fluid, appeared on the ſide of the head; and upon opening it, a fracture of the parietal bone, at leaſt three inches long, was found, through which matter iſſued freely. The trephine was applied, a large quantity of matter diſcharged, and the dura mater was found ſloughy. Under this ſloughy part was another collection of matter between the membranes, and below this the brain was conſiderably diſcoloured. The patient died on the 50th day after the accident.

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In two caſes in which the ſkull was fractured, the patients recovered without the leaſt bad ſymptom from firſt to laſt; and though the operation was performed, Mr Pott is of opinion that they would have recovered without it: however, ſuch caſes are but rare; and it is by no means prudent to delay the operation, though no threatening ſymptoms occur even for a very conſiderable time.

160
Of fractures
with depreſ-
ſion.

161
Directions
by chirur-
gical writers
generally
inſufficient.

When fractures are attended with a depreſſion of the bone, they are attended with all the danger of the foregoing claſſes; with this addition, that the depreſſion is attended with ſome urgent ſymptoms, which yet may generally be removed by elevating the depreſſed parts: yet this ought not to prevent every poſſible method being uſed for avoiding the others which appear afterwards, and which are not the leſs ſure on account of the cranium being fractured and depreſſed. The generality of writers have contented themſelves with directing us to raiſe up the depreſſed parts, and thereby to endeavour to remove ſuch ſymptoms as are cauſed by the mere preſſure which the bone makes on the brain: but they have either totally neglected, or very ſlightly paſſed over, what is of full as much conſequence to the patient; we mean the injury which is moſt frequently done to the membranes of the brain, and which, if neglected, will certainly produce that fever and thoſe ſymptoms which ſo often baffle the whole power of medicine.

162
Uncertain
prognoſis
in wounds
of the head.

The combination of different ill effects, proceeding from the ſame primary violence, and concurring in the ſame ſubject, together with the great difficulty of diſtinguiſhing them from each other, is one of the principal cauſes of that perplexing uncertainty attending wounds of the head. When one cauſe of bad ſymptoms has been removed, another, or even ſeveral others, may ſtill remain, each of which ſingly may be ſufficient to deſtroy the patient: and therefore, although the means firſt made uſe of may have been ſuch as have been pointed out by the earlieſt and moſt alarming ſymptoms, and extremely proper for the relief of ſuch complaint, had it been the only one the patient laboured under; yet, in the caſe of a complication, by not being ſufficient to anſwer every requiſite intention, they very often anſwer none, at leaſt not effectually; and, producing only a temporary and partial relief, prove a greater aggravation of our diſappointment.

This every practitioner ſhould know, and this the friends of every patient ſhould be made acquainted with; leſt the former, being deceived by an appearance of amendment, be induced to promiſe what it will not be in his power to perform; and the latter, having had their hopes exalted, ſhould be the more ſeverely hurt by their diſappointment.

163
The de-
preſſed or
cracked
bone muſt
often be to-
tally remo-
ved.

If the fracture be but ſmall, the depreſſion little, and the force with which it was produced not great, the elevator introduced through the perforation may be ſufficient to ſet it to rights; and, if there be no urgent ſymptoms, nor any miſchief done to the internal parts, may be ſufficient for all purpoſes. But if the force was great, if the ſymptoms are immediate and preſſing, if the fracture runs in a form inclined to a circular one, or if the depreſſed piece be cracked all round, the beſt and ſafeſt way is to remove the whole or greater part of the portion ſo depreſſed and circumſcribed.

To thoſe who are unuſed to things of this ſort, ſo large an opening as ſuch method of acting muſt make will have a very tremendous appearance; and they may be inclined to ſuſpect much hazard and inconvenience from laying bare ſo large a portion of the dura mater: but let all ſuch remember, that however large the quantity of membrane may be which ſhall be thus denuded by the operation, yet the ſame quantity at leaſt, moſt probably a much larger, would in all likelihood become inflamed, and generate matter on its ſurface; which matter, for want of a timely, ready, and ſufficient outlet, would do conſiderably more miſchief than the mere detection of the ſaid membrane can do.

164 Why the broken pieces of the cranium are to be removed.

In caſes where the broken pieces of a depreſſed fracture are widely ſeparated from each other, and ſome of them a good deal looſened, the expediency and the propriety of removing ſuch pieces is acknowledged by every body; but few people attend to the reaſon, or inquire why ſuch practice is juſt and proper; if they did, they would alſo ſee, that the free removal of bone was equally proper in the caſe of great violence, as in that of looſened or widely ſeparated pieces. In the latter, the broken parts are removed, becauſe their re-union with the reſt of the cranium, and the preſervation of the attachment of the dura mater to the inner ſurface of them, is thought impoſſible, or at leaſt highly improbable; and that therefore they muſt be in the way, and hinder the free diſcharge of matter from the ſuppurating membrane. And is not the ſame inconvenience full as likely to attend the former? Is it the violence done to the bone, and through it to the membrane, which cauſes the inflammation and ſuppuration? or is it the looſened or ſeparated ſtate of the broken part? If it be the former, (as it moſt undoubtedly muſt be), the ſame precautions, the ſame method of treatment, muſt be equally neceſſary in the one as the other; the reaſons, the intentions, are the ſame in each; and if the conduct be not the ſame, the patient will ſuffer.

The peculiar circumſtances of each individual caſe muſt furniſh direction to the practitioner for his particular conduct. Rules to be laid down by a writer on ſuch ſubject can be only general. The parts which are depreſſed muſt be elevated; ſuch as are looſe and cannot be brought to lie even, ſuch as cannot be prevented from preſſing on the membrane, or ſuch as wound or irritate it, muſt at all events be taken away; the free diſcharge of blood or lymph in preſent, and of matter in future, muſt be provided for; and therefore every ſymptom and appearance muſt carefully and early be attended to, leſt the moſt proper opportunity of giving aſſiſtance be not embraced.

165 Caſes of fractures with depreſſion.

Of four caſes related by our author of fractures with depreſſion, two recovered, and two died. The firſt, who was a girl of about 15, being toſſed by an ox, and falling with her head againſt the ſtones, got a fracture with conſiderable depreſſion. It traverſed the os parietale from before backward, in its middle part between the ſagittal and temporal ſutures, and the depreſſion was on the upper part of the bone. The whole was reduced to a perfect equality, the bone being trephined on the inferior and undepreſſed part. Her head was dreſſed lightly, and about 16 ounces of blood taken from her. She paſſed the following night very unquietly, and the next morning was ſtill inſenſible. She was again freely bled, and a purge was given, which ſoon operated. On the third day ſhe was bled again, on the fourth ſhe became ſenſible, and on the fifth was ſurpriſingly well: but on the ninth ſhe began again to complain of headach, ſickneſs, and giddineſs; and, notwithſtanding all the internal remedies which could be uſed, growing conſtantly worſe, ſhe died in 20 days from the time of the accident. All the internal ſurface of the os parietale above the fracture was detached from the dura mater, and covered with matter, which could not be diſcharged at the perforation, the membrane being inflamed and thruſt tight up againſt it. On this caſe Mr Pott remarks, that though he will not pretend to aſſert that repeated perforations of the upper part of the bone would have preſerved her; yet it would have been her beſt, if not her only chance; and that if he had at that time known as much as afterwards, he ſhould certainly have taken away the greateſt part, if not the whole, of what had been depreſſed.

166 Of extravaſations within the cranium.

We have already obſerved, that the very worſt ſymptoms, nay, even death itſelf, may frequently proceed from an extravaſation of the fluids within the cavity of the cranium, or from a concuſſion of the brain itſelf.—Extravaſations of any kind, and whereever ſituated, within the cranium, are very hazardous, and much more frequently end fatally than happily: but, conſidered as relative to the art of ſurgery, that which conſiſts of merely fluid blood ſituated between the cranium and dura mater is certainly the beſt, as it is the neareſt to the ſurface, and admits the greateſt probability of being relieved by perforation of the ſkull; grumous or coagulated blood, although in the ſame ſituation, by being moſt frequently adherent to the membrane, is not ſo readily diſcharged as the preceding, and therefore more likely to prove deſtructive; and all thoſe which are either under the meninges, or within the cavities or ſubſtance of the brain, as they are very ſeldom within our exact knowledge, ſo they are alſo generally beyond the reach of our art.

167 Method of treating people under ſymptoms of extravaſation.

The method of treating people under theſe unhappy circumſtances is ſomewhat different, according to the ſuppoſed or moſt probable nature of the complaint, and according to the ſymptoms and appearances which it produces or which accompany it. When the ſymptoms which imply a preſſure made on the brain or nerves have been occaſioned merely by a ſhake or concuſſion, and neither blow nor other external violence has been offered to or received by the head, we have no rule whereby to form any other than a general opinion; no mark which can point out to us either the preciſe nature of the diſeaſe, or its particular ſituation; conſequently we have no direction from what part of the head to remove the ſcalp, or where to apply a perforatng inſtrument, and therefore no authority for perforating at all. In this caſe, the only chance of relief is from phlebotomy and an open belly; by which we may hope ſo to leſſen the quantity of the circulating fluids as to aſſiſt nature in the diſſipation or abſorption of what has been extravaſated. This is an effect which, although not highly improbable in itſelf, yet is not to be expected from a ſlight or trifling application of the means propoſed. The uſe of them muſt be proportioned to the hazard of the caſe. Blood muſt be drawn off freely and repeatedly, and from different veins; the belly muſt be kept conſtantly open, the body quiet, and the ſtricteſt regularity of general regimen muſt be rigidly obſerved. By theſe means, very alarming ſymptoms have now and then been removed, and people in ſeemingly very hazardous circumſtances have been recovered. Inſtances of theſe ſucceſſes are not indeed ſo frequent as we could wiſh; but they have been ſufficiently ſo to warrant the attempt, eſpecially in caſes where there are no indications to authoriſe the uſe of any other. But when the ſymptoms of extravaſation are the conſequence of ſuch external violence as leaves a mark where it was inflicted, and when the ſcalp is ſo bruiſed or wounded as to ſhow the place where, we then have ſome degree of aſſiſtance, both in forming a judgment of the moſt probable nature of the complaint, and in uſing the means moſt likely to prove ſucceſsful in its relief. For if the effuſion has been the conſequence of the ſtroke which the head has received, and ſuch effuſion is made immediately under the part ſo ſtricken, the perforation of the cranium in this place may give diſcharge to the extravaſated fluid; and the wound or bruiſe in the ſcalp ſhows us the point from whence we ought to remove a portion of it, in order to perforate the cranium. This is ſometimes the caſe; and the conſequence is ſometimes ſo fortunate, that we ſave a periſhing patient. But although it does now and then happen that we are ſo lucky, yet ſuch ſucceſs is by no means certain or to be depended upon. Every thing relative to this kind of diſorder is fallible and uncertain; and though the extravaſation is ſometimes found immediately under the external mark, yet it often happens that it is not, and that the effuſion is made in a part diſtant from that mark, and to which we have nothing to lead us. Upon the whole, although a bruiſe or wound of the ſcalp does not in theſe caſes neceſſarily or certainly point out the ſeat of an extravaſation; yet when bad ſymptoms urge, and evacuation hath been fully and unſucceſsfully tried, ſuch mark may be deemed a ſufficient, though not unerring, authority for making farther inquiry, by removing the ſcalp and perforating the cranium: for this is a kind of caſe in which we are not to expect certainty, and in which we muſt be content with ſuch information as we can obtain. The opportunities which we have of being ſerviceable are but few; we ſhould therefore ſuffer none to eſcape, but embrace even poſſibility. The general advice given by Fabricius ab Aquapendente is applicable to no part of ſurgery more than to this; in which the loſs of a very ſhort ſpace of time is often abſolutely irretrievable.

If the extravaſation be of blood, and that blood be in a fluid ſtate, ſmall in quantity, and lying between the ſkull and dura mater, immediately under or near to the place perforated, it may happily be all diſcharged by ſuch perforation, and the patient's life may thereby be ſaved; of which many inſtances are producible. But if the event does not prove ſo fortunate, if the extravaſation be ſo large or ſo ſituated that the operation proves inſufficient, yet the ſymptoms having been urgent, general evacuation having been uſed ineffectually, and a wound or bruiſe of the ſcalp having pointed out the part which moſt probably received the blow; although the removal of that part of the ſcalp ſhould not detect any injury done to the bone, yet the ſymptoms ſtill ſubſiſting, we cannot help thinking, that perforation of the cranium is in theſe circumſtances ſo fully warranted, that the omiſſion of it may truly be called a neglect of having done that which might have proved ſerviceable, and, *rebus ſic ſtantibus*, can do no harm. It is very true, that no man can beforehand tell whether ſuch operation will prove beneficial or not, becauſe he cannot know the preciſe nature, degree, or ſituation of the miſchief; but this uncertainty, properly conſidered, is ſo far from being a diſſuaſive from the attempt, that it is generally a ſtrong incitement to make it; it being full as impoſſible to know that the extravaſated fluid does not lie between the ſkull and dura mater, and that under the part ſtricken, as that it does; and if the latter ſhould be the caſe, and the operation be not performed, one, and moſt probably the only, means of relief, will have been omitted.

168 Caſes of concuſſion and extravaſation.

Of concuſſions and extravaſations Mr Pott relates eight inſtances; ſix of whom died, and two recovered. The firſt was a young man who fell from a window two ſtories high, and pitched his head upon a ſugar hogſhead. He was taken up inſenſible, and continued ſo for five days; at the end of which he died, notwithſtanding he had been very largely bled. No external mark of violence was obſerved on the head; the cranium was nowhere injured; the dura mater was every where adherent, and no fluid of any kind betwixt it and the ſkull. Between the dura and pia mater was a conſiderable quantity of blood, principally towards the lower part of the brain.

The ſecond caſe was very ſimilar; the patient expired on the third day, without having ſhown any ſigns of ſenſe. All the ſpace between the frontal bone and the dura mater was covered with grumous blood, firmly adherent to the membrane.—In the third, a ſmall tumour appeared on the right ſide of the head, which thus indicated the ſeat of the miſchief; and, by perforating the ſkull, a large quantity of blood was diſcharged between the dura mater and the ſkull; after which the patient recovered. The fourth was much the ſame: a tumour appeared on the right ſide near the ſagittal ſuture; which indicated the application of the trephine. Thus a conſiderable quantity of blood was diſcharged, and the patient ſoon recovered.—The fourth caſe was remarkable, as ſhowing us how very ſmall contuſions of the head will ſometimes do irreparable miſchief. A boy between three and four years of age, when at play with his brother, fell from a bed on a ſoft carpet. He pitched on his head, and immediately complained of being ſick and giddy; but having vomited, was ſoon after ſo well, that no farther notice was taken of his fall. On the fourth day after this, he again became ſick and giddy. The phyſician who preſcribed for him gave him an emetic, and ſome of thoſe medicines called *nervous*; however, his ſickneſs and giddineſs now and then returned, with a great averſion at motion of any kind. On the 11th day he loſt his ſight; on the 13th the uſe of his right arm; on the 15th he could not ſtand; and on the 18th he died. A conſiderable quantity of bloody ſerum was lodged between the dura and pia mater about the baſis of the brain.—In the fifth caſe, the patient continued 12 days without any general complaint; but on the 13th became giddy and dim-ſighted, and ſoon after died. The ventricles of the brain were full of extravaſated ſerum, and near the origin of the medulla oblongata was a lump of firmly coagulated blood.—The ſeventh and eighth caſes were not materially different: the patients both died comatoſe; and extravaſations of blood, ſerum, or lymph, were found in both.

169 Of wounds in the brain itſelf.

When the brain itſelf is wounded, the treatment can only be to remove all ſuch parts of the broken ſkull as may continue to injure the brain or its membranes;

branes; to take away all ſuch extraneous bodies as can eaſily be got at and extracted without violence; and to make ſuch openings in the cranium as may beſt ſerve for the diſcharge of extravaſated fluids, either immediately or at any future period. When fungi of the brain protrude, it is uſual to tie a thread round their neck, upon which they drop off ſpontaneouſly.

170 Opium recommended by Mr Bromefield in caſes of an oppreſſed brain.

In contuſions of the head, whether attended with fractures or not, Mr Bromefield recommends the uſe of opium; and inſinuates, that moſt of thoſe patients die who are treated only with evacuations and the antiphlogiſtic regimen. The medicine he recommends is Dovar's powder; and the effect expected from it is a diaphoreſis. For this the warm bath is in general a good preparative, as it promotes perſpiration: and ſhould the patient be relieved, the diaphoreſis is to be kept up by medicines of a ſimilar kind; ſuch as vinum antimoniale with the tinctura thebaica. Thus he tells us, that every ſymptom of concuſſion of the brain has in general gone off on a plentiful ſweat being produced by the powder. The medicine was generally continued as the ſymptoms required, till the patient ſeemed out of danger; and where they returned again, the medicine was repeated, and the patient did well. In ſupport of this practice, he gives the following inſtances.

171 Examples in ſupport of the practice.

"A gentleman received a violent blow on the top of his head from a large weight falling on it, which fractured his ſkull and depreſſed it. I attended at the operation, when every poſſibility of future preſſure on the brain from the fractured bone was entirely prevented by the removal of the depreſſed pieces. He took Dovar's ſweating powder, which, he ſaid, always relieved him when it began to operate. He had ſtools as often as was thought neceſſary, and was bled very freely before I ſaw him. As the wound did not begin to digeſt kindly at the uſual period, in the intermediate time between the ſweats, he took the ſal abſinthii neutralized with ſucc. limonum, and a decoction of the bark. About the fifth day he grew comatoſe; and the gentleman whoſe patient he was ſeemed to wiſh he had been bled again. I deſired him to recollect how conſtantly we conſulted the pulſe when we met; and that he had always told me, that in my abſence he was never induced to bleed him from fulneſs; and from the quiet ſtate of his pulſe whenever we met, we judged it unneceſſary. This he allowed; but as the coma was great, I conſented to his loſing ſome blood from the jugular vein, which did not make his pulſe flag, nor was he relieved by the bleeding. When I ſaw him the next day, being the ſixth from the accident, he was dying. I did not ſee the patient after he died; but conclude, that the brain had ſuffered ſo much from the violence of the blow, that let what method ſoever have been followed, the event in this caſe would have been the ſame.

"John King, aged 35 years, having fallen from a ſcaffold, was brought to St George's hoſpital on the 8th of May 1771, quite ſenſeleſs. He had received by the fall two large wounds; one on the anterior, the other on the poſterior part of his head, and his back was violently bruiſed: he had bled a little at his noſe. Immediately after his admiſſion into the hoſpital he was let blood; and from the adminiſtration of a clyſter had two ſtools, and took a ſcruple of Dovar's ſweating powder. On the ninth he was more ſenſible, and complained of great giddineſs, with pain in his forehead and back. He was then ordered to take 10 drops of the tinctura anodyna antimonialis once in four or ſix hours, as the effect might indicate; a fomentation was applied to his back, a ſtool procured in the evening by a clyſter, and Dovar's powder was repeated at bed-time. On the 10th the giddineſs was gone off, the pain was abated, and his head was perfectly eaſy; the uſe of the tinctura anodyna was continued, and his body kept open by a laxative mixture. On the 11th he was free from all complaints; granulations began to appear on the wound, which looked well; and the uſe of the drops was diſcontinued. He remained well till the 16th; about which time he was ſeized with giddineſs and a ſickneſs at his ſtomach. Eight ounces of blood were then taken away, and ſome ſtools procured by a purging draught. On the 19th the giddineſs and ſickneſs entirely left him. On the 21ſt his ſickneſs returned, with great pain in his head: he was then directed to take a ſcruple of Dovar's powder at night. On the 26th all his complaints were gone. He was then ordered to take four ſpoonfuls of the following medicine once in four hours: Sal. abſinth. ℈ii. ſucc. limon. ℥i. decoct. cort. Peruvian. ℥xiv. He remained without any return of his complaints, and was diſcharged on the 12th of June.

"Patrick Darbun, aged 26 years, was admitted into St George's hoſpital the 6th of July 1771, having a large wound on the fore-part of his head, and ſome ſlight bruiſes in different parts of his body. He had fallen from a ſcaffold. It was about an hour after the accident when he was brought to the hoſpital, where the ſurgeon was informed that he had continued ſenſeleſs for half an hour after the fall, and had vomited twice. He had great pain in the parts that were hurt, with ſtupor and heavineſs. Upon a careful examination of the ſkull, no fracture could be diſcovered. Some blood had been taken away before he was brought to the hoſpital, where a purging mixture was given him, and ſome ſtools thereby procured. He then took a ſcruple of Dovar's powder. He complained of great pain in his head and giddineſs on the ſeventh, and had had but little reſt. The tinctura anodyna antimonialis was given him, 10 drops of which he took once in four or ſix hours. He was rather eaſier in the evening, and the pulv. Dovari was repeated at bed-time. On the eighth he was much better; the uſe of the drops was continued. On the ninth the pain in his head and giddineſs were quite gone. He continued to take the drops till the 12th; about which time, he being perfectly well, no more were given. Having remained in the hoſpital till the 31ſt, without any return of his complaints, and the wound being nearly healed, he was made an out-patient by his own deſire, and continued perfectly well.

"John Hyde, a boy about 14 years of age, was, on the 7th of June 1771, admitted into St George's hoſpital, on account of a hurt he had received on his head by falling backwards. The ſcalp was much ſwelled, but without any wound: he complained of giddineſs, and vomited frequently. The ſurgeon made an inciſion into the tumified part, by which the ſkull was laid bare, and a fracture, of about an inch in length, diſcovered upon the ſuperior part of the occipital bone. Some ſtools were procured as ſoon as it was poſſible by a purging mixture, and afterwards one ſcruple of Dovar's powder was given. He had a pretty good night; and on the eighth the vomitings ceaſed, though the pain in his head and giddineſs continued. He was that day directed to take 10 drops of the tinctura anodyna antimonialis once in ſix hours. His giddineſs went off entirely in the evening; but he complained of a little pain in the fractured part. A ſtool was procured by a clyſter, and the uſe of the antimonial anodyne was continued. On the ninth he was free from pain, and took the antimonial anodyne once in ſix hours till the 11th; during which time he was perfectly well, and afterwards was directed to take the neutral mixture, with a decoction of the Peruvian bark. This courſe he purſued for about a week, and on the 26th was made an out-patient. In about three weeks after this, the wound was healed, and the boy perfectly recovered."

172 Of gunſhot wounds.

We ſhall now proceed to the treatment of gunſhot wounds; in which, as the body is frequently mangled in the moſt dreadful manner, the ſurgeon muſt exert the utmoſt of his ſkill both with regard to external and internal remedies. In thoſe made by a muſket or piſtol ball, the moſt immediate conſiderations are, To extract the ball, or any other extraneous body which may have lodged in the wounded part; and to ſtop the hæmorrhagy, if there is an effuſion of blood from the rupture of ſome conſiderable artery.

173 Of extracting the ball.

As to the firſt, *viz.* the extraction of the ball, it is frequently neceſſary to enlarge the wound in order to anſwer this purpoſe; and if the ball has gone quite through, both orifices are to be dilated (provided the ſituation of the part wounded will admit of its being done with ſafety); and particular care is to be taken to preſerve both openings, eſpecially that which is the moſt depending.

In order to get at the ball, or any other foreign matter, probing is to be uſed as ſparingly as poſſible: and this muſt evidently appear to any one who will only conſider the nature of the ſymptoms attendant on penetrating wounds of the breaſt or belly, either from a bullet or ſharp inſtrument; the thruſting in a probe to parts under ſuch circumſtances being unavoidably a freſh ſtab on every repetition of ſuch practice. In wounds of the joints, likewiſe, poking into them muſt be equally condemned, as it can never be uſed without very miſchievous and pernicious conſequences. And indeed, where probing is neceſſary, the finger is to be preferred as the beſt and trueſt probe, where it is practicable to do ſo.

If a ball, or any other foreign body, happens to be lodged near the orifice, or can be perceived by the finger to lie under the ſkin, though at ſome diſtance from the mouth of the wound; in the firſt caſe it is requiſite immediately to remove ſuch extraneous matter; and, on the other occaſion, to cut upon it and take it out: But when it is ſunk deep, and lies abſolutely beyond the reach of the finger, we ought never to thruſt a pair of long forceps into the wounded body, with ſcarce any probability of ſucceſs.

To put this matter in as clear a light as poſſible, we will ſuppoſe a ball to be lodged in any part beyond the reach of the finger, entirely out of the way of being marked by the external touch. Now it will appear evident, upon the leaſt reflection, that thruſting, firſt a long probe in queſt of the bullet, and then, as has been practiſed likewiſe, a longer pair of forceps, either with or without teeth, into a wound of that kind, though with a ſort of certainty to extract it, muſt either contuſe, or irritate and inflame, the parts to a great degree; and conſequently do as much, or more miſchief, than the ball did at firſt by forcing its paſſage ſuch a length of way. And ſhould they at the ſame time lay hold of any nerve, artery, or even common membrane of a muſcle, together with the ball (which can ſcarce ever fail of being the caſe), what ſhocking conſequences would attend ſuch a proceeding! Nor would attempts of this ſort be leſs injurious in caſe a bullet ſhould happen to be lodged in the cavity of the belly or breaſt: whereas lead, it is well known, will lie a long time in ſeveral parts of the body, without any material hurt, or even inconvenience.

A great number of inſtances have occurred, where balls have been quietly lodged in ſeveral parts of the body, till after many years they have worked themſelves a paſſage towards the ſurface, and were very eaſily extracted; and many where balls have been entirely left behind.

174 Of dilating the wounds &c.

In caſe the wound be occaſioned by a muſket or piſtol ſhot, and of courſe but ſmall, it will be neceſſary to dilate it without delay, provided the nature of the part (as was before obſerved) will admit of this with ſafety: for in wounds near a joint, or in very membranous or tendinous parts, the knife, as well as forceps, ſhould be put under ſome reſtraint; nor ſhould any more opening be made than what is abſolutely requiſite for the free diſcharge of the matter lodged within. Wounds in the joints are always dangerous, from whatever cauſe they proceed, whether from a bullet or any cutting inſtrument: and membranous or tendinous parts, whatever ſenſe of feeling they may be allowed, are yet known, paſt diſpute, to ſuffer much from their being thus expoſed to the impreſſions of the air.

175 Of hæmorrhagy.

Whenever the wound is attended with a great effuſion of blood, from the rupture of ſome conſiderable artery, it will be abſolutely neceſſary, with all imaginable diſpatch, to reſtrain the bleeding with the needle; and at the ſame time to be particularly careful that your hold be not eluſive. But the bleedings from the ſmaller veſſels, in all contuſed wounds, are of real ſervice, by unloading the clogged parts, cutting off the main ſources of cuſtomary inflammations, and by that means either totally preventing a fever, or at leaſt rendering it a ſymptom of no threatening tendency: an event on which, in an eſpecial manner, depends the future laudable digeſtion. As for ſtyptic applications, as we have already obſerved, there is no truſting to any of them, where the larger arteries are concerned. Beſides, all ſuch rather retard than promote the cure: for by obſtructing the diſcharge of the ſanies, which in all large wounds precedes digeſtion, the digeſtion is of courſe ſuſpended, while the pent-up ſanies becomes a conſtant additional fuel to the fever.

176 Bleeding, when neceſſary.

Where the wounded perſon has not ſuffered any great loſs of blood, it will be adviſeable to open a vein immediately, and take from the arm a good large quantity; and to repeat bleeding as circumſtances may require, the ſecond, and even the third day. Repeated bleedings in the beginning draw after them many advantages. They prevent a good deal of pain and inflammation, leſſen any feveriſh aſſaults, forward the digeſtion, and ſeldom fail to obviate impoſthumations, and a long train of complicated ſymptoms that are wont otherwiſe to interrupt the cure, miſerably harraſs the poor patient, and too often endanger his life. And even where the feveriſh ſymptoms run high, and there is almoſt a certainty that matter is forming, bleeding, in that ſtate, is very frequently of great advantage; the matter will be made the ſooner for it, and the quantity of it will be leſs. The following inſtance, ſays Mr Ranby, in ſome meaſure demonſtrates the neceſſity of bleeding freely as ſoon as poſſible.

177 A remarkable caſe.

“A young gentleman, a cornet of dragoons, was wounded by a muſket-bullet juſt below the knee, on the inſide. The ball had made a great laceration in the ſkin, and laid the membranes bare about four inches in length. The ſurgeon did not ſee him till two days after the injury. He was then very feveriſh, quite parched up with thirſt, and had a full pulſe, with great pain, ſwelling, and inflammation all round the joint. Immediate bleeding was ordered, a cooling regimen, with proper dreſſings, an emollient clyſter, and an opiate. The next day his pain rather increaſed; wherefore he was let blood a ſecond, and after that a third time. Six days were now elapſed when a miliary eruption ſeized him, with frequent bleedings at the noſe, and a diarrhœa, which laſted about ten days. Mean while matter was formed in ſeveral places about the knee; which, on being let out, flowed in prodigious quantities. The fever declining, the bark was given him; but as that, though joined with an opiate, ran through him, it was judged neceſſary to lay it aſide. Notwithſtanding he was now very weak and low, it was thought, in a conſultation, that the only chance which remained of his ſurviving, was the cutting off his leg. The operation was accordingly performed, but without ſucceſs. Upon examining the knee, there appeared ſeveral cells full of matter communicating with the joint; which had in many places eroded the cartilages of both the great bones.”

178 Of the regimen of the patient in gunſhot wounds.

For the firſt twelve days it will be proper to obſerve a cooling regimen, both in reſpect of the medicines that may be preſcribed, and the diet requiſite for the ſupport of nature. It is abſolutely neceſſary, likewiſe, that the body be conſtantly kept open. Unleſs, therefore, nature does this office of herſelf, a ſtool ſhould be every day procured, either by emollient clyſters, or ſome gentle laxative taken at the mouth; and whenever there is much pain in the wounded parts, immediate recourſe muſt be had to opium.

179 Of external applications

In reſpect to external applications, whatever is of a hot, ſpirituous nature, is remarkably injurious on theſe occaſions; and what no wounded part can in any degree bear. Let the firſt dreſſing be with digeſtive, or lint moiſtened with a little oil; and a very light bandage made, if it can be readily got, with thin flannel: the next with a digeſtive warmed, and over it the bread-and-milk poultice, mixed with a ſufficient quantity of oil to keep it moiſt; and where there is great tenſion, and the wound large, a fomentation ſhould be uſed. This courſe is to be continued till the ſore is clean.

This method will commonly promote a conſtant eaſy perſpiration, abate the pain, very much facilitate the digeſtion, and remove all apprehenſions of any approaching inflammation. The advantage of moiſtening the lint with oil, is the eaſe that is procured to a contuſed wound from ſuch an application, in compariſon of one of an abſorbent drying diſpoſition; which, inſtead of giving free liberty to the ſanious blood to diſcharge itſelf, and conſequently preventing an inflammation, by unloading the part, would poſſibly obſtruct the mouths of the capillary veſſels, and hinder nature from getting rid of that incumbrance which, it is obſervable, ſhe very much affects to throw off. We muſt add here, that tents are never to be made uſe of where they can be poſſibly avoided.

180 Of inflammation where a ball is lodged.

Should an inflammation ſeize any part through the lodgment of a bullet, or any other foreign body, that could with ſafety have been more immediately extracted, all attempts of diſlodging ſuch extraneous matter ſhould be poſtponed till the ſwelling has in ſome meaſure ſubſided, and the inflammatory diſpoſition of the fibres is nearly vaniſhed; unleſs the ball, or other extraneous body, lie at no great diſtance from the orifice; and there be, on that account, a certainty of removing this incumbrance without any material trouble to the patient.

181 Mr Ranby's opinion concerning the proper time of performing amputation.

“If a wound (ſays our author) be of ſuch a deſperate nature as to require amputation (which is always the caſe when it happens in any principal joint), it would certainly be of conſequence could the operation be performed on the ſpot, even in the field of battle; leſt, by deferring it, an inflammation, which one may very reaſonably expect, ſhould obſtruct a work that ought rarely to be entered upon during the continuance of ſo calamitous a circumſtance. The neglecting this critical juncture of taking off a limb, frequently reduces the patient to ſo low a ſtate, and ſubjects the blood and juices to ſuch an alteration, as muſt unavoidably render the ſubſequent operation, if not entirely unſucceſsful, at leaſt exceedingly dubious. And in wounds even where no amputation is required, it is equally adviſable not to defer the care neceſſary to be taken of them; leſt, by the parts being expoſed to the air, there might ariſe a ſeries of very dangerous ſymptoms.

182 How to prevent an hæmorrhagy when the ſlough begins to ſeparate.

“Wounds that border on any conſiderable artery, are very apt to bleed afreſh upon motion, or the return of a free circulation of the blood into the part, which was interrupted at firſt by the violence of the injury offered it; and this is almoſt always the caſe when the ſlough begins to ſeparate. For which reaſon, one ſhould never attempt to remove it by force, but wait with patience till there be a perfect ſeparation of this ſlough; nor be in the leaſt ſhocked at the accident of arteries thus opening themſelves, which a very moderate experience will convince one to be almoſt inevitable. The patient frequently gives warning of what is coming upon him, by complaining of great weight and fulneſs in the limb, which are ever accompanied with more or leſs pulſation in it: an infallible prognoſtic of the conſequences. Let the wound afflict whatſoever part, if theſe complaints attend it, bleeding and the bark are inſtantly to be enjoined.

183 Why a perſon ſometimes dies by loſing a ſmall quantity of blood after an amputation.

“I have known (ſays Mr Ranby) ſeveral inſtances of perſons loſing their lives from the ſtarting of an artery before the ſurgeon could reach them; particularly where an amputation has preceded. And I dare affirm, the quantity of blood loſt, eſpecially in the caſe laſt mentioned, has not amounted to 12 ounces. I do not know how to account for this, otherwiſe than by the drain which had been made from the maſs of blood both before and during the operation; whence a ſudden guſh (though but a moderate one) of blood, after the great quantity already loſt, gives a check to the circulation, and cauſes immediate death. This reflection, I think, ought to be a leſſon of inſtruction to every practitioner to be particularly intent on the faithful diſcharge of his duty in regard to tying the veſſels.”

184 The bark extremely uſeful in gunſhot wounds.

In all large wounds, eſpecially thoſe made by a cannon-ball, there is conſtantly a great laceration of the parts endued with an exquiſite ſenſation. Theſe are ever attended with an excruciating pain, and a diſcharge of a gleety matter; which, if not reſtrained, proves often of the worſt conſequence, by reducing the patient almoſt to a ſkeleton; there being no poſſibility of receiving a ſupply of nouriſhment proportioned to the diſcharge. In this unhappy ſtate, the bark (in doſes of a dram each, and repeated every three hours, or oftener if the ſtomach will bear it) with ſurpriſing efficacy repairs the breach made in the conſtitution by this terrible havoc. In whatever form it be adminiſtered, whether in tincture, extract, or reſin, we muſt ever have an eye to the proportion: for the preſcribing it in leſs quantity is one reaſon why our expectations are often fruſtrated, and the medicine brought unreaſonably into diſgrace; the failure, in point of ſucceſs, being generally owing to ſome irregularity in the giving of it, either by under-doing it, or not ſufficiently perſiſting in its uſe. Elixir of vitriol, taken three times a-day in a glaſs of water, is of ſingular benefit, and proves a very good aſſiſtant to the virtues of the bark: and if the body be coſtive, to each doſe of the bark four or five grains of rhubarb muſt be added, till that inconveniency be remedied. Should the bark run off by more than four or five ſucceſſive ſtools, this effect of it will be checked by a few drops of laudanum, or two ſpoonfuls of the diaſcordium mixture along with it, every time it is given.

185 And elixir of vitriol.

Where the ſore diſcharges a conſiderable quantity of gleety matter, is flabby, looks pale and gloſſy, (which appearances are often conſequent to a loſs of ſubſtance), the bark continually relieves the pain that is predominant in this caſe, and quite changes the complexion of the wound. Nor, in adminiſtering it, is the leaſt attention neceſſary to the quickneſs of the pulſe. And in wounds where, upon every dreſſing, there has been an oozing from the capillary arteries, like water ſqueezed from a ſponge, ſubjecting, of courſe, the patient to no little hazard, the bark, by thickening the matter and leſſening its quantity, procures the moſt ſurpriſing good effects.

186 Mr O'Halloran's opinion of gunſhot wounds.

On the ſubject of gunſhot wounds Mr O'Halloran obſerves, that of all the ſymptoms which attend external accidents, none is more dreaded than inflammation and fever; to guard againſt which, profuſe bleedings, antiphlogiſtics, diluting liquors, and low diet, are ſtrongly recommended. Yet, neceſſary as theſe means are, we may go to too great exceſs in them. Inflammation is the natural conſequence of every wound, and is abſolutely neceſſary for bringing about the proceſs of healing. The more violent the hurt, the greater is its concomitant inflammation. The latter therefore, ſo far from being an object of terror, is greatly to be wiſhed for: its abſence is always a bad ſign; and where it is but ſlow, the act of reunion or healing is very diſtant. If, then, a ſlight inflammation is abſolutely neceſſary to bring a trivial hurt to heal, it muſt of conſequence follow, that a more violent one is requiſite to promote a reunion of parts after a more deſperate accident. Inflammation therefore ſhould not be haſtily repreſſed: it is a true concomitant on all all hurts; and its exceſs or abſence are the only ſymptoms of this claſs againſt which we ſhould guard.

Sect. III. *Of Fractures and Diſlocations.*

187 Fractures, &c. not very generally underſtood.

This is one of thoſe parts of ſurgery which is generally thought to be well underſtood, and the treatment of broken bones to be very eaſily learned. Hence we find it practiſed by thoſe who do not attempt the practice of other parts of the ſcience; yet, notwithſtanding theſe pretenſions, it is certain that much attention and care is neceſſary in reducing fractured and luxated bones, in order to prevent a deformity in the limb, or perhaps worſe conſequences. The general doctrine of fractures is contained under the following heads, as part of the treatment of them. Extenſion; counter-extenſion; coaptation or ſetting; application of medicaments; deligation or bandage; poſition; prevention or relief of accidents.

188 Heads of the common doctrine concerning them.

This is the general arrangement of the ſubject by moſt of the writers on it, and a very juſt and proper one it is; but, notwithſtanding the parade of books under theſe various heads, much leſs alteration will be met with, ſince the times of Hippocrates, Galen and Celſus, than an inquirer might expect, or than the ſubject is capable of.

189 Of extenſion.

The firſt article in the general arrangment is extenſion; under which may alſo be comprehended the ſecond, or counter-extenſion. In order to accompliſh this, we are directed, if the fractnre be of the thigh or leg, to place the patient in a ſupine poſture, and the broken limb in a ſtraight one; than having the upper part of it held firm and ſteady by proper aſſiſtants, we are ordered, by means of hands, ligatures, lacs, or even in ſome caſes by pieces of machinery, to make ſuch an extenſion or ſtreaching of the limb lengthwiſe as ſhall enable the ſurgeon to place the ends of the broken bone in as apt, that is, in as even a poſition, with regard to each other, as the nature of the fracture will admit.—This is a ſhort deſcription of what in the vulgar phraſe is called *ſetting a broken bone;* and is moſt commonly a painful operation to the patient, a fatiguing one to the operator and his aſſiſtants, and, what is worſe, is in many inſtances found to be inefficacious, at leaſt not fully to anſwer the intention of the one or the expectation of the other.

200 The doctrine concerning it erroneous.

Writers in general are very preciſe and formal in the directions which they have given for the due and proper accompliſhment of this purpoſe. They have told us, that the extenſion ſhould be made ſlowly and gradually, and ſhould be continued till the ends of the bone are ſeparated from each other ſufficiently, to admit of the fracture being ſet without riſk of breaking off any points or inequalities, and to enable us to place them perfectly ſmooth and even. All this, like many other of the preceptive parts of phyſic and ſurgery, is very pretty on paper, but not often found to be practicable in the chamber. The directions to continue the extenſion until the ends of the bones are at a certain diſtance, lengthwiſe from each other, plainly implies a conſiderable degree of violence; the limb muſt by ſuch force be not only made longer than its fellow, or than nature ever intended it ſhould be; but it is ordered to be executed while the limb is in ſuch poſition as to put all the muſcles moſt on the ſtretch, and render them leaſt likely to yield to it.

201 When extenſion is neceſſary.

In order to underſtand the dangers of this method rightly, let us for a moment conſider what is or ought to be meant by the terms *extenſion* and *counter-extenſion*, and why they become neceſſary: and here it is plain that neither of them can ever be neceſſary on account of the mere fracture conſidered abſtractedly. The broken ends of the bone or bones are of themſelves inactive; and if not acted upon by other parts, they would always remain motionleſs. When any attempt is made to put them into motion, they of themſelves can make no poſſible reſiſtance, nor can any be made on their part, ſave an accidental one, ariſing from the points of the fracture being entangled with each other; and when they have been once, by the hand of the ſurgeon, placed properly and evenly with regard to each other, they would of themſelves for ever remain ſo. What then is the reaſon why fractured bones always ſuffer a greater or a leſs degree of diſplacement? why is a broken limb almoſt always ſhorter than its fellow? what creates the reſiſtance which we always find in attempting to bring the fractured parts aptly together? whence does it proceed, that when we have done all that is in our power (according to this mode of acting), the ends of the fracture will, in many caſes, become again diſplaced, and lameneſs and deformity frequently enſue? In ſhort, what are the parts or powers which act on the bones, and which, by ſo acting on them, produce all theſe conſequences?

202 The action of the muſcles the only obſtacles to the reduction of a fracture.

Theſe parts are the muſcles, the only moving powers in an animal-body. By the action of theſe on the bones, all locomotion is performed, and cannot be performed without them: and although all bones, when broken, are in ſome degree diſplaced and ſhortened; yet it will always be found, that in proportion as the muſcles ſurrounding or in connection with a bone are ſtrong or numerous, or put into action by inadvertence or ſpaſm, ſo will the diſplacement of the ends of ſuch bone, when fractured, be. The even and ſmooth poſition of the fractured ends of a tibia, when the fibula of the ſame leg is entire and unhurt, that is, when the muſcles therefore cannot act upon the former; the viſible and immediate deformity when both the before-mentioned bones are broken nearly in the ſame place, that is, when the muſcles can act upon and diſplace ſuch fracture; the great difficulty frequently met with in endeavouring to get a broken os femoris to lie even tolerably ſmooth, and to prevent ſuch broken limbs from being much ſhorter than the other; are, among others which might be produced, ſuch ſtrong and irrefragable proofs as need no comment.

From the muſcles then, and from them only, proceeds all the difficulty which we meet with in making our extenſion; and by the reſiſtance of theſe, and of theſe only, are we prevented from being always able to put the ends of a fractured bone immediately into the moſt apt contact.

Let us in the next place conſider what it is which gives to a muſcle, or to the principal muſcles of a limb, the greateſt power of reſiſting any force applied to them *ab externo*, in order to draw them out into greater length; for, whatever that is, the ſame thing will be found to be the cauſe of the different degrees of reſiſtance in ſetting a fracture.

203 Hence the muſcles ought to be relaxed before we attempt the reduction.

Does not the putting the muſcles in a ſtate of tenſion, or into a ſtate approaching nearly to that of tenſion, almoſt neceſſarily produce this effect? or, in other words, does not that poſition of a limb which puts its muſcles into, or nearly into, ſuch a ſtate, give ſuch muſcles an opportunity of exerting their greateſt power either of action or of reſiſtance? This cannot be denied. On the other hand, what is the ſtate or poſition of a muſcle which is moſt likely to prevent it from acting, and to deprive it moſt of its power of reſiſtance? or what is that poſition of a limb, which in the caſe of a broken bone will moſt incapacitate the muſcles from acting on and diſplacing it, and in the greateſt degree remove that reſiſtance which they have it in their power to make to the attempts for the reduction of ſuch fracture? Is it not obvious, that putting a limb into ſuch poſition as ſhall relax the whole ſet of muſcles belonging to or in connection with the broken bone, muſt beſt anſwer ſuch purpoſe? Nothing ſurely can be more evident. If this be granted, will it not follow, that ſuch poſture of a broken limb muſt be the beſt for making the reduction? that is, it muſt be that in which the muſcles will reſiſt the leaſt, and be leaſt likely to be injured; that in which the broken bone will be moſt eaſily ſet, the patient ſuffer leaſt pain in preſent; and that from which future lameneſs and deformity will be leaſt likely to happen. A little attention to what frequently occurs, may perhaps ſerve to illuſtrate and and confirm this doctrine better than mere aſſertion.

204 Why it is eaſy to ſet a fractured os humeri.

What is the reaſon why no man, however ſuperficially acquainted with his art, ever finds much trouble in ſetting a fractured os humeri, and that with very little pain, and a very ſmall degree of extenſion? Is it not becauſe both patient and ſurgeon concur in putting the arm into a ſtate of flexion, that is, into ſuch a ſtate as relaxes all the muſcles ſurrounding the broken bone? and is it not for the ſame reaſon that we ſo very ſeldom ſee (comparatively ſpeaking of this bone with others) a deformity in conſequence of a fracture of it? Let the reduction be attempted with the arm extended from the body, and the difficulty of ſetting will be much increaſed: let the arm be depoſited in an extended ſtraight poſition, and the fracture will be diſplaced, and lie uneven.

205 And difficult to ſet the os femoris.

Apply the ſame kind of reaſoning to the os femoris; that bone whoſe fracture ſo often lames the patient, and diſgraces the ſurgeon. Will it not be more cogent, and more concluſive, in proportion as the muſcles in connection with this bone are more numerous and ſtronger? Let any man, who has been much converſant with accidents of this kind, be aſked, what is the poſture which almoſt every perſon whoſe os femoris has been newly broken puts himſelf into, in order to obtain eaſe, until he gets proper aſſiſtance? Such people almoſt always bend their knee, and lay the broken thigh on its outſide, becauſe this is the moſt eaſy poſture, for obvious reaſons.

206 When the reduction of a fracture ought not to be attempted.

It is a maxim univerſally taught and received, that a fractured limb may be in ſuch ſtate as not to admit of the extenſion neceſſary for its being ſet: that is, if aſſiſtance be not at hand when the accident happens; if they who bring the patient home do it ſo aukwardly or rudely as to bruiſe and hurt the part; if from drunkenneſs, folly, or obſtinacy in the patient, it happens that the limb is ſo diſordered that it is found to be much ſwollen, inflamed, and painful; it is allowed not to be in a ſtate to admit extenſion.

207 Erroneous doctrine concerning fractures.

This maxim is indeed founded upon very juſt principles; but what is the general practice in conſequence of it? It is, to place the limb in an extended ſtraight poſition; to ſecure it in that; and then by proper means, ſuch as fomentation, poultice, &c. to endeavour to remove the tenſion and tumor. Now if it be conſidered that the ſwollen, indurated, and inflamed ſtate of the muſcles is the circumſtance which renders extenſion improper, ſurely it muſt be obvious, that ſuch poſition of the limb as neceſſarily puts theſe very muſcles in ſome degree on the ſtretch, muſt be a very improper one for the accompliſhment of what ought to be aimed at. Under this method of treatment, the the ſpace of time which paſſes in the removal of the tenſion is ſometimes ſo conſiderable, that a happy and even coaptation becomes afterwards impracticable; and then this accident, which nine times in ten is capable of immediate relief, is urged as an excuſe for unneceſſary lameneſs and deformity.

208 Of the poſture of the limb during extenſion.

Here the nature of the complaint points out the relief. Extenſion is wrong; a ſtraight poſition of the thigh or leg is a degree of extenſion, and a ſtill greater degree of it in proportion as the muſcles are in ſuch circumſtances as to be leſs capable of bearing it. Change of poſture, then, muſt be the remedy; or rather the placing the limb in ſuch a manner as to relax all its muſcles, muſt be the moſt obvious and certain method of relieving all the ills ariſing from a tenſe ſtate of them: which change of poſture will be attended with another circumſtance of very great conſequence; which is, that the bones may in ſuch poſture be immediately ſet, and not one moment's time be thereby loſt: a circumſtance of great advantage, indeed; for, whatever may be the popular or prevailing opinion, it is demonſtrably true, that a broken bone cannot be too ſoon put to rights; as muſt appear to every one who will for a moment conſider the neceſſary ſtate of the muſcles, tendons, and membranes ſurrounding, and the medullary organs contained within a large bone broken and unſet; that is, lying in an uneven irregular manner. In ſhort, if the experiment of change of poſture be fairly and properly made, the objections to immediate reduction, from tenſion, tumour, &c. will moſt frequently be found to be groundleſs, and the fracture will be capable of being put to rights, as well at firſt as at any diſtance of time afterward.

209 Reduction ought to be performed as ſoon as poſſible.

210 Proper applications to the fractured limb.

Extenſion having been made, and the broken ends of the bone having been placed as ſmooth and as even as the nature of the caſe will admit, the next circumſtance to be attended to is the application of ſome medicament to the limb; particularly to the fractured part of it. In this, different people act differently. Some make uſe of an adheſive, or what they chooſe to call a *roborant, plaſter;* ſome, of what is commonly called a *cerecloth;* others apply ſpirit of wine, with oil, vinegar, and white of egg; and others the ſpiritus Mindereri, the ſolution of crude ſal ammoniac in vinegar and water, or ſome ſuch kind of medicine. But let the form and compoſition of the application made to the limb be what it may, one thing is clear, viz. that it ſhould be put on in ſuch manner as that it may be renewed and ſhifted as often as may be neceſſary, without moving the limb in any manner; it being certain, that when once a broken thigh or leg has been properly put to rights, and has been depoſited properly on the pillow, it ought not never to be lifted up nor moved from it again without neceſſity, until the fracture is perfectly united; and it is as true, that ſuch neceſſity will not very often occur. This may perhaps ſeem ſtrange to thoſe who are accuſtomed to roll ſimple fractures, and conſequently to lift them up every three or four days in order to renew ſuch kind of bandage: but the neceſſity of this motion ariſes merely from the kind of bandage made uſe of, and not from any circumſtance of the fracture itſelf. That the frequent motion of a fractured limb cannot poſſibly contribute to the eaſe of the patient, will be readily admitted; as alſo it will, that when a broken limb has been once depoſited in the beſt poſition poſſible, it is impoſſible to mend that poſition merely by taking ſuch limb up and laying it down again: from whence it muſt follow, that ſuch kind of apparatus as neceſſitates the ſurgeon frequently to diſturb the limb, cannot be ſo good as one that does not; provided the latter will accompliſh the ſame kind of cure as the former.

211 Motion to be avoided as much as poſſible.

212 And too tight bandages.

The prevention of a flux of humours to a broken limb by bandage, is a common phraſe; but if by the points and edges of the broken bone the muſcles and membranes be unavoidably wounded and torn, or if the ſame kind of miſchief be incurred by the inadvertence or indiſcretion of the patient, or of thoſe who aſſiſted in getting him home, or from the violence uſed in extending the limb and ſetting the fracture, inflammation muſt be excited, and pain and tumefaction will be the conſequence: and theſe will continue for ſome time in every fracture; but that ſpace will be longer or ſhorter in different caſes and under different circumſtances. Evacuation, reſt, and a favourable poſition of the limb, will, and do in general, remove all theſe complaints: but bandage can contribute nothing more than by keeping the applications in their proper place; ſo far from it, that if the bandage be a roller, it muſt, by the frequent neceſſity of its being adjuſted, and the frequent motion of the limb, in ſome degree counteract the proper intention of cure.

213 No great exactneſs neceſſary in ſhifting the bandages.

The old writers are in general very preciſe as to the number of days during which the roller ſhould be ſuffered to remain without being ſhifted, and the number of times which ſuch ſhiftings ſhould be repeated within the firſt fortnight. This exactitude is by no means neceſſary; but if the bandage be ſuppoſed to be of any uſe at all, it is obvious, that it ought to be re-

renewed or adjuſted as often as it may ceaſe to perform the office for which it is deſigned, or whenever it ſhall be found to counteract ſuch office, that is, as often as it ſhall become ſo ſlack as not to contain the fracture at all, or whenever the limb ſhall be ſo ſwollen that the roller makes an improper degree of ſtricture; the former generally occurs every four or five days, the latter is moſt frequent within the firſt week.

214
Superfluous directions concerning them given by many writers.

In moſt of the writers on the ſubject of fractures, we alſo find marks or ſigns laid down for our information concerning the due or undue effect of the bandage on the limb. They tell us, that when that part of it which is below the termination of the roller does not ſwell at all, the bandage is not ſufficiently ſtrict, and will not retain the fracture; that when the ſame part is conſiderably ſwollen, or tenſe, or inflamed, it implies that the binding is too ſtrait; and that a moderate degree of tumefaction is a ſign that the deligation is properly executed.

In conſequence of theſe precepts, many practitioners look more anxiouſly after this degree of tumefaction, than after the true and exact poſition of the limb, and cannot be induced to believe that any thing can be wrong under this appearance: although it is plain, that even this degree of ſwelling is wrong; that it implies ſome kind of obſtruction to the circulation, and cannot ſerve any good purpoſe; and conſequently, that as far as it may be ſuppoſed to be the effect of bandage, ſo far that bandage muſt be faulty.

215
Bandages cannot regulate or reſtrain the callus.

The third purpoſe for which the roller is ſaid to be uſed, is the regulation and reſtraint of the callus.—If we were to form our notion of callus by what the generality of writers have ſaid on this ſubject, we ſhould ſuppoſe, that it was not only a particular juice always ready for the purpoſe; but that, if not reſtrained and regulated by art, it would always flow in ſuch quantity, as to create trouble and deformity; that there were ſpecific remedies for increaſing or decreaſing it, and that it always required the hand and act of ſurgery to manage it. That the callus is ſo far a particlar juice, as that it conſiſts of whatever is deſtined to circulate through the bones for their particular nouriſhment, is beyond all doubt; and that this gelatinous kind of fluid is the medium by which fractures are united, is as true; but that it requires art to manage it, or that art is in general capable of managing and directing it, is by no means true. That this callus or united medium does oftentimes create tumefaction and deformity, or even lameneſs, is true alſo; but the fault in theſe caſes does not lie in the mere redundance of ſuch juice; it is derived from the nature of the fracture, from the inequality of it when ſet, and from the inapt poſition of the broken ends with regard to each other; nor is ſurgery or the ſurgeon any otherwiſe blameable in this caſe, than as it was or was not originally in their power to have placed them better. It is the inequality of the fracture which makes both the real and apparent redundance of callus, and the tumefaction in the place of union. When a bone has been broken tranſverſely, or nearly ſo, and its inequalities are therefore neither many nor great; when ſuch broken parts have been happily and properly coaptated, and proper methods have been uſed to keep them conſtantly and ſteadily in ſuch ſtate of coaptation, the divided parts unite by the intervention of the circulating juice, juſt as the ſofter parts do, allowing a different ſpace of time for different texture and conſiſtence. When the union of a broken bone under ſuch circumſtances has been procured, the place where ſuch union has been made will be very little preceptible; it will be no deformity, nor will it occaſion any inconvenience. It will indeed be diſcoverable, like a cicatrix of a wound in a ſofter part: but there will be no redundance of callus, becauſe none will be wanted; neither will there be a neceſſity for any particular management on the part of the ſurgeon, to repreſs or keep it in order. But when a bone has been broken very obliquely or very unequally; when the parts of a fracture are ſo circumſtanced as not to admit of exact coaptation; when ſuch exact coaptation as the fracture perhaps would have admitted, has not been judiciouſly made; when, from unmanageableneſs, inadvertence, or ſpaſm, the proper poſition of the limb has not been attended to or preſerved; in all ſuch caſes there muſt be conſiderable inequality of ſurface; there muſt be riſings on one ſide, and depreſſions on another; and in ſuch caſes the juice circulating through the bone cannot accompliſh the union in the ſame quantity, the ſame time, or in the ſame manner. The broken parts not being applied exactly to each other, there cannot be the ſame aptitude to unite; and according to the greater or leſſer degree of exactitude in the coaptation, that is, according as the ends of the bones are or have been placed more or leſs even with regard to each other, will the inconvenience and the deformity be, and ſtill muſt, when the fracture is not ſet at all; but the broken ends of the bone unite laterally, or by touching each other's ſides. The perioſteum covering every fracture will remain thickened for ſome time, and a degree of fulneſs or riſing will be thereby cauſed about the place where ſuch fracture has been united; but time, and the uſe of the muſcles, ſoon in general remove this.

216
Why the callus ſometimes produces deformity and lameneſs.

217
In what caſes the joints can not be bended.

Two kinds of fracture there are which do not admit of the bent poſition of the joints, *viz.* that of the proceſſus olecranon at the elbow, and that of the patella: in theſe a ſtraight poſition of the arm and leg is neceſſary; in the former, to keep the fractured parts in contact till they are united; in the latter, to bring them as near to each other as may beſt ſerve the purpoſe of walking afterward (A).

With regard to the fracture of the patella, an opinion

(A) Although a ſtraight poſition of the limb is neceſſary for the broken patella, yet this very poſition becomes ſo, upon the ſame principle, as renders the bent poſture moſt advantageous in the broken tibia and femur, viz. the relaxation of the muſcles and tendons attached to the fractured bone.

Whoever will for a moment attend to the diſpoſition of the pieces in a patella which has been broken tranſverſely, will ſee how little neceſſary or uſeful the many contrivances of bandages, ſtraps, compreſſes, buckles, buttons, &c. to be found in writers are, eſpecially all that part of them which are applied to the inferior fragment.

By the action of the united tendons of the extenſores muſcles of the leg, the ſuperior fragment is pulled upward and

218 Why a fracture of the patella frequently produces a ſtiffneſs of the joint.

nion has long and generally prevailed, which ſeems to have no foundation in truth, or even in probability: it is, that the great degree of ſtiffneſs in the joint of the knee, which is ſometimes found to be the conſequence of this kind of fracture, is owing to or produced by a quantity of callus falling into it from the edges of the broken bone; and that the nearer the broken pieces are brought to each other, the more likely ſuch conſequence is. But, in the firſt place, the fractured bone is by no means capable of ſupplying ſuch a quantity of callus as to produce this effect; in the ſecond place, if this was the caſe, the moſt likely, and indeed the only probable way of preventing the depoſition of ſuch juice, muſt be by bringing the broken pieces into cloſe contact; and, in the third place, there is no authority from the appearance of ſuch joints after death, to ſuppoſe this to be the caſe, or to countenance ſuch opinion. The cauſe, therefore, of this rigidity, which is now and then found to attend the broken patella, muſt be ſought for elſewhere, *viz.* in the long reſt and confinement of the joint, as a means uſed by many to procure exact union; in miſchief done to the ligament, which is formed by the united tendons of the four extenſor muſcles of the leg, at the time of and by the fracture; and in the nature of the fracture itſelf, that is, the manner in which the bone ſhall happen to be broken.

219 What caſes of this fracture are moſt favourable.

But, be all this as it may, the fact undoubtedly is, that they walk beſt after ſuch accident whoſe patella has been broken tranſverſely, and that into two nearly equal fragments; whoſe confinement to the bed has been ſhort, that is, no longer than while the inflammation laſted; whoſe knee, after ſuch period, has been daily and moderately moved; and in whom the broken pieces are not brought into exact contact, but lie at ſome ſmall diſtance from each other.

220 Of the riſing end of the broken bone.

We cannot take leave of this ſubject of ſimple fractures without mentioning a circumſtance relative to them, which, although, when rightly underſtood, is of little or no importance, yet, by being miſunderſtood, becomes frequently of conſiderable conſequence, *viz.* the uſe of the term *riſing end of a broken bone.*

By the expreſſion, any one unacquainted with theſe things would be inclined to think, that the prominent part of a broken bone roſe or was elevated from its natural place, and became by ſuch riſing ſuperior to the other part or extremity of the fracture. This would certainly be the idea of an ignorant perſon, and as ſuch would be of little conſequence: but by the practice of many ſurgeons, it is as certainly their idea alſo; and this renders it a matter of great conſequence. The truth is, that there is really no riſing end to a broken bone, when applied, as the term uſually is, to the leg, thigh, and clavicle. There is indeed a ſuperior or prominent end or part, and an inferior or depreſſed one: but the former of theſe is in its proper place, from which it cannot by art be moved; and the latter, which is not in its proper place, is very capable by art of being put into it.

221 The term improper.

When a collar-bone, os femoris, or tibia and fibula, are broken by the action of the muſcles, by the motions of the patient, and by the mere weight of the inferior part of the arm, thigh, or leg, the fractured ends of ſuch bones are diſplaced, and always diſplaced in ſuch manner, that the inequality occaſioned neceſſarily by ſuch diſplacement, proceeds from the inferior end of the fractured bone being retracted or drawn under the ſuperior. This produces a tumefaction or unequal riſing; and the upper extremity of the fracture is therefore called *the riſing end of it.* Now the man who regards this riſing end as that part of the fracture which has by ſuch riſing got out of its place, and not as having accidentally become the prominent part merely by the inſinuation or retraction of the other part underneath it, will go to work with bolſter, compreſs, and bandage, in order to bring and keep ſuch end down: by which means he will give his patient conſiderable pain; and, while he depends on ſuch means alone, will moſt certainly be fruſtrated in his intention and expectation, the means not being adequate to the propoſed end. But the man who looks on this in the true light, that is, who looks on the ſuperior part as being in its proper place, and the inferior as being diſplaced by the weight of the limb and the action of the muſcles, will know, that by the mere poſition of ſuch limb, he ſhall be able to remedy all the inconvenience and deformity, as far as they are by art capable of remedy, without the parade or the fatigue of uſeleſs apparatus.

222 We muſt not attempt to depreſs the prominent part.

He will, for example, know, that the prominent part of a broken clavicle, that part of it which is next to the ſternum, is juſt where it ſhould be; and that the inferior part, that which is connected with the ſcapula, is out of its place, by being drawn down by the weight of the arm; and therefore, inſtead of loading, as is uſual, the prominent part with quantities of compreſs, which never can do any ſervice, he, by a proper elevation of the arm, will bring the lower end upward into contact with the other, and thereby with very little trouble eaſily accompliſh what he never can do in any other manner, however operoſe.

The ſame thing will happen, from the ſame principles, in the leg and thigh. A prominence, or a riſing end, there always will be; but that riſing end is never to be brought down by any preſſure from compreſs or bandage; the fallen or inferior one muſt always be brought up to it by the proper poſition of the reſt of the limb: this will always remove the inequality as far as it is removeable; and nothing elſe can.

223 Of compound fractures.

We come now to ſpeak of *compound* fractures, or thoſe in which the breaking of a bone is complicated with a wound. In this caſe, the firſt object is whether the limb can be preſerved or not. Many circumſtances concur to make this doubtful. For inſtance, the bone or bones being broken into many different pieces for a conſiderable extent, as when a perſon's limbs are cruſhed by the wheels of heavy carriages paſſing over them; the ſkin, muſcles, tendons, &c. being ſo much lacerated and deſtroyed, as to render gangrene and mortification the moſt probable conſequence;

224 In what caſes it is doubtful whether the limbs can be preſerved.

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and ſeparated from the inferior; but the latter remains nearly, if not abſolutely, where it was before the accident; there is nothing to act upon it; and therefore it cannot, nor does it move.

The extenſion of the leg puts the muſcles attached to the upper part of the broken bone into a ſtate of relaxation, and prevents their acting; and though a ſmall compreſs juſt above this piece, with a moderate bandage, may be uſeful toward retaining it, yet it is the poſition of the leg which muſt keep the broken piece down, and effect the cure.

quence; the extremities forming a joint being cruſhed, or, as it were, comminuted, and the ligaments connecting ſuch bonds being torn and ſpoiled, with other circumſtances of the ſome kind, are, by very eminent practitioners, reckoned ſufficient reaſons for performing immediate amputation. On the other hand, there are not wanting men, whoſe knowledge in their profeſſion can by no means be doubted, that abſolutely deny the uſefulneſs of immediate amputation almoſt in any caſe, unleſs the limb is already torn off and hanging almoſt by the ſkin. Mr Boucher, of the Royal Academy of Surgery, gives twelve remarkable inſtances of deſperate fractures in which the limbs were preſerved. The firſt was a ſhot through the thigh, with a conſiderable fracture of the os femoris near the condyles. The patient refuſed to ſubmit to the operation, and was completely cured, but with one thigh ſhorter than the other, in ten months, notwithſtanding the frequent inciſions, fever, and large ſplinters of bone that came away from time to time. The ſecond had a fracture of the lower extremity of the arm, and was alſo cured without amputation. The third was ſhot in the fore-arm by a piſtol ball, which wounded the internal condyle of the humerus and olecranum; yet the patient not only was cured of the wound in the ſpace of 12 months, but recovered of the anchyloſis alſo. The fourth and fifth were ſimilar. In the ſixth, the ſhot penetrated the lower part of the femur, in which the inner condyle was engaged; yet, notwithſtanding a variety of bad ſymptoms, he obtained a cure in the ſpace of 11 months. In the ſeventh caſe, the inferior part of the radius was fractured, with conſiderable laceration of the tendons; nevertheleſs this patient alſo was cured, but with a ſtiffneſs in the joint. In the eighth, the ball paſſed from the malleolus internus through the malleolus externus; yet the patient was completely cured in nine weeks. The ninth patient had received a ball which tore through the deltoid muſcle, fractured the head of the humerus, and part of the clavicula. The extirpation of the humerus was judged abſolutely neceſſary, which yet the patient reſolutely oppoſed; and by that means ſaved his arm, being diſcharged only with a ſmall fiſtula, which the warm bath ſoon cured. The tenth was a ſoldier, wounded by a muſket-ball in the upper part of the humerus, with a fracture of this bone; yet he alſo got a cure without amputation. In the eleventh, a muſket-ball fractured the head of the bone at the elbow. In the twelfth, a ball was lodged in the calcaneum; yet, after extraction, the wound was cured without any bad accident.

225
Inſtances by M. Boucher of very bad fractures in which the limbs were preſerved.

Notwithſtanding this great ſucceſs, however, M. Boucher is of opinion, that there are certain accidents which nothing but amputation can remove. Such, for inſtance, are fractures of the larger extremities, where numbers of ſplints ſtick out, and cannot be removed; when the ſame bone is fractured in ſeveral different places; when the extremity of one of theſe bones is ſeparated from its body, and ſhattered in many places; when the wounded parts are ſeized with violent convulſions which cannot be cured; where the bone is ſurrounded with looſe flabby fleſh, and a ſanious diſcharge with acute pain, which indicate the bone to be diſordered; and where a ſphacelus is formed. Where theſe ſymptoms indicate amputation, he thinks that the ſooner it is performed the better; for when it is deferred, he ſays, the violent irritation of the nervous and vaſcular ſyſtems, which in a ſhort time ſucceeds the accident, puts the whole animal œconomy and maſs of fluids into ſuch diſorder, that the pus requiſite for the cure is defective, and the recovery becomes doubtful. And he attributes this want of ſucceſs where the operation is delayed, not to the firſt cauſe, but to the alteration cauſed by the delay.

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In what caſes he thinks amputation ought to take place.

227
His reaſons for performing it immediately.

On the other hand, M. Faure, in a paper preſented to the Academy, attempts to prove, that where amputation is neceſſary, it ought always to be deferred till the bad ſymptoms occaſioned by the wound have abated. The reaſon he gives for this practice is, that nature having already ſuſtained a violent ſhock, is unable to bear the ſucceeding one ariſing from amputation: and for the truth of this he appeals to the caſes of about 300 perſons, who underwent the operation after the battle of Fontenoy, of whom ſcarce one in ten eſcaped. Convinced, by this ſad example, that amputation had been too haſtily performed, he ſelected ten patients on whom the operation was judged unavoidable, and directed them to be let alone for a month; after which he performed the operation with ſucceſs on them all. The caſes were the worſt that can almoſt be imagined. The firſt had the head of the os humeri fractured by a cannon-ball, while a complicated fracture of the leg was made by a muſket-ball. The others were a complicated fracture of the thigh; a fracture in the articulation of the knee, thro' which the ball paſſed; a complete fracture of the fore-arm, which extended to the os humeri; a wound of the inferior part of the fore-arm, with ſhivering of the bones of the carpus; a wound at the upper part of the humerus, with a fracture above an inch broad; a fracture of the bones of the carpus; the os calcis ſhivered, and the tendo Achillis torn; a complicated fracture of the tibia; a fracture of the tibia in which the tarſus was engaged.—From all theſe caſes, M. Faure ſtrongly contends, that where amputation is unavoidable, it ſhould always be delayed till the fever and other bad ſymptoms ceaſe; and he exclaims againſt the contrary method; adding, that "we might even ſay, the ſooner the limbs were amputated, the ſooner were the patients condemned to death."

228
Mr Faure's reaſons for delaying the operation.

M. Boucher preſented a ſecond paper to the Academy, in which he adhered to his former opinion, and gave his reaſons for immediate amputation. Theſe were, that at the time of the hurt, or ſoon after it, the body muſt be in the beſt ſtate for enduring the operation; and by neglecting this time, the efforts of nature are uſeleſs, and ſhe becomes weaker; the melancholy effects of which, he ſays, he has been witneſs of. "For how can we expect (ſays he) that a body extenuated with pain and miſery for five or ſix weeks, ſhould then be in a better condition to ſupport a terrible operation, than when in full vigour, as muſt be the caſe at the time of the accident?" Several inſtances are adduced in favour of his doctrine; but Mr O'Halloran, from whom we have taken this account, is of opinion, that his reaſoning is quite unſatisfactory. "The great point," ſays he, "for which M. Boucher contends, is the advantage ariſing to the patient by having his limb taken off in the firſt period, or before the fever, inflammation, &c. come on, which in

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M. Boucher's reply to Mr Faure.

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Shown to be inſufficient by Mr O'Halloran.

in themſelves endanger the life of the party. But it is highly probable this gentleman never once recollected, that this fever, and all other alarming ſymptoms, tho' they do not immediately appear, are nevertheleſs the effect of the derangement in the conſtitution on receiving the accident: that on this account it is certainly very bad practice to amputate till at leaſt part of theſe ſymptoms are abated, for three exceſſive ſtrong and clear reaſons. Firſt, ſo much depends upon the habit of body, that we cannot be too cautious in our prognoſtics: for if the ſlighteſt hurts, happening in conſtitutions ſeemingly ſound, are often attended with the moſt fatal ſymptoms, in ſpite of the earlieſt and beſt reſources of art; how then can we, with any degree of certainty, immediately promiſe ourſelves ſucceſs, by performing a terrible operation, till we firſt know if the very juices themſelves will not be the greateſt obſtacle to a re-union? Secondly, how often does it happen, in the beſt conſtitutions, that the terrible ſhock which the whole frame ſuſtains on a violent gunſhot wound, nay, even in a fall, without any fracture or viſible hurt, that the parts can never recover their tone, and the patient in ſome days expires? What elſe are concuſſions of the brain, violent leaps, where, though the party comes down on his legs, and has no viſible hurt, yet dies with all the appearance of a concuſſion of the brain? What elſe but the velocity of the circumambient air of a diſcharged cannon-ball, which, by deranging the whole animal-ſyſtem, kills the party without ſign of hurt? If theſe account for the death of the patient, will not this be a ſtrong reaſon for delaying amputation, till we know whether nature is ſtrong enough to recover from this ſhock, without adding to his miſery that of a cruel and terrible operation? Thirdly, let us ſuppoſe, to give this gentleman and his partiſans argument their utmoſt force, that happily for the patient, though unknown, or never reflected on by the ſurgeon, firſt, that the juices are balſamic and kind; and, ſecondly, that nature is ſtrong enough to recover from the ſhock which every accident, more or leſs, ſubjects the conſtitution to: how can we poſſibly foreſee, or at leaſt is not the preſumption very ſtrong, that by an immediate amputation, after ſuch a terrible violence as abſolutely indicates it, we expoſe the conſtitution to the ſevereſt trials and the greateſt danger poſſible? If in anchyloſis of the tarſus, with great pain, which has reduced the patient very low, we find a ſevere fever and inflammation enſue, the conſequence of the pain and the ſhock the human frame has ſuſtained by an amputation, how much more is it to be dreaded after a terrible gunſhot wound or complicated fracture; which accidents alone bring on all theſe ſymptoms in an higher degree? Juſtly then does M. Faure exclaim, "That the ſooner their limbs were taken off, the ſooner were they condemned to death!"

231 Why M. Boucher's caſes are inſufficient to prove the truth of his doctrine.

232 Mr O'Halloran's directions.

"The few inſtances advanced by M. Boucher, of the ſucceſs of immediate amputation, for the reaſons I have above aſſigned, can prove nothing for him. If any thing can be granted, it is, that, happily for the patients, their conſtitutions ſurmounted the raſhneſs of their ſurgeons, as well as the ſevere trials of nature. Amputation, then, ſhould never be practiſed after ſudden accidents, till at leaſt the violence of the ſymptoms proceeding from it are abated, for the reaſons aſſigned, and which I again inculcate; namely, firſt, till by laudable ſuppuration we are aſſured that the juices are balſamic, and which becomes manifeſt in eight or ten days. Secondly, till we are certain that nature recovers from the ſhock; which we will alſo be certain of, by reaſon's becoming reſtored if loſt, or by the ſtate of the pulſes and nervous ſyſtem: this alſo becomes apparent about the eighth or ninth day. And, thirdly, till it becomes manifeſt, that the pain, fever, and inflammation, will not terminate in gangrene, ſphacelus, or death. This the ſtate of the pulſe and ſpirits, and the nature of the ſuppuration, will determine.

"But beſides theſe advantages, at leaſt theſe points of knowledge gained by the delay, another and a greater alſo follows; namely, that the abatement of the fever, and the laudableneſs of the ſuppuration, are the higheſt preparations, and the moſt uſeful, the patient can poſſibly have previous to the operation: he is, at the time of amputation, in the ſame ſtate that we could wiſh a patient to be in who is to ſuffer inoculation; and a great degree of certainty attends the recovery of the patient, eſpecially in our method. I ſhall juſt ſingle out one obſervation, which firſt threw me into this chain of thinking.

233 Examples in confirmation of his doctrine.

"A girl about 16, of a good conſtitution, ſome few years paſt, on Pennywell road, adjoining this city, was accidentally ſhot in the thigh. The ſwan-ſhot fractured the femur at the lower condyles, and the rotula anteriorly, and paſſed through the parts with a very large wound. In this ſituation ſhe lay extended on a table for about two hours, when aſſiſtance came. Her pulſe was regular, ſhe ſpoke ſenſibly, and ſeemed more alarmed than pained. We judged amputation abſolutely unavoidable; and her thigh was taken off directly, but ſhe died in about four hours after. Here the death of this girl was viſibly haſtened, by adding amputation before nature had time to recover from the firſt accident.

"The truth of this reaſoning will appear ſtill ſtronger by the following obſervations:

"John Quinlon, a ſedan-chairman of this city, in a diſpute with another chairman, received a fall by a trip, ſo that the tibia tore through the fleſh at its articulation with the aſtragal, and reached down a little below the os calcis, and the fibula was conſequently terribly fractured. This accident happened the latter end of Auguſt 1760. To reduce theſe parts was abſolutely impoſſible; becauſe a leſs force than was neceſſary for this muſt ſeparate the foot from the leg. Amputation was the only reſource left. The man was ſtrong, and about 35 years of age; ſo that every thing might be expected from the conſtitution. However, on mature deliberation, though amputation was abſolutely unavoidable, I was determined to defer it for ſome days. Accordingly I laid open the fleſh below the protruded bone, and formed an eighteen-tailed bandage, in which, after a gentle extenſion, I laid the leg, bled the man, and had the parts often wet in brandy. In a few days the inflammation became violent; which was ſomewhat allayed by bleeding, fomentations, and poultices. In 12 days from the accident, finding the foot gangrened, I determined to amputate. The next morning I performed the operation;

tion; and though, after taking off the limb, ſome real pus (the remains of the inflammation) flowed from the ſtump ſpontaneouſly, yet did the cure go on as happily as could be wiſhed; and in about ten weeks he was completely cured.

"Allice Blachall, about 15 years old, ſubject to epileptic fits, and paralytic in the right ſide, leg, and arm, in one of theſe fell into the fire, and had the diſeaſed leg ſo miſerably burnt, that the bones of the toes and metatarſus ſpontaneouſly dropped off, and thoſe of the tarſus were uncovered and ready to ſeparate. In this condition ſhe was left at our hoſpital-door July 17th 1762; but with an hectic, lax, and a large diſcharge from the leg, which was alſo burnt. This accident happened about 10 days before: The ſores, which were filthy, I had carefully ſtuped, and waſhed with a decoction of wormwood; and finding amputation abſolutely unavoidable, I performed it; and ſhe was diſcharged, completely cured, in the latter end of the following month, with a firm coat of fleſh to cover the extremity of the ſtump, notwithſtanding that this whole ſide was completely paralytic, and of courſe the balſamic juices were greatly deficient.

"John Deelan, a poor man, received the fire from a muſket, charged with ſmall ſhot, in his right hand, and ſo near, that the wadding reſted in the ſore. Being recommended to our hoſpital by the reverend dean Maſſy the day after the accident, he was immediately admitted. The little and ring fingers were quite tore off, and hanging by a little fleſh; the two metacarpal bones that ſupported them were alſo fractured and terribly tore; and the ſhot was promiſcuouſly thrown into every part of the hand. It was judged impoſſible to preſerve the hand; but, for the reaſons already ſpecified, I was determined to defer amputation till the inflammatory ſtate was over. However, I ſeparated the two fingers from the hand; dilated the ſores; and extracted a great deal of ſhot, tow, broken bones, &c. The inflammation which followed was very violent, and extended very high up the arm; but was relieved by profuſe bleedings, emollient embrocations, poultices of flummery half-boiled, nitrous medicines, &c. In about 12 days this orgaſm was greatly abated; and willing to preſerve part of his hand if poſſible, I extracted the entire remains of the two metatarſal bones, and by this means a great deal more ſhot, ſplints, &c.; and, contrary to expectation, this man was diſcharged with two fingers and part of his hand, with which he has been able to ſupport his poor family ſince by day-labour.

"One O'Neal, returning from town much in liquor, fell into a ſand-pit on the high road near this city, and a very large ſtone fell on his right leg with ſuch a force, as to fracture the tibia for above three inches in a moſt dreadful manner, with a wound of a larger ſurface. Indeed the bone was broke into numberleſs bits; inſomuch that, conſidering the length of the fracture, it may be ſafely affirmed, that a quarter of an inch of it was not entire. He was carried to the turnpike-houſe, and I was ſent for. On the ſpot I prepared an eighteen-tailed bandage, dilated the wound, extracted a great many looſe bits of bone, dreſſed with ſoft lint, and bled him. Next morning he was brought to town on a door, and dreſſed lightly for ſome days, till the ſtate of inflammation was ſomewhat abated; when I determined to take off his leg, which was judged impoſſible to be ſaved: and I dare ſay, from this ſlight deſcription of the caſe, every ſurgeon would conclude the ſame. Nevertheleſs, ſo bountiful was nature in this caſe, and ſo ſtrong in her reſources, that in four months from the accident, this man could uſe this leg, and is now a living witneſs of this truth. So that, beſides the reaſons already advanced, we have a chance for one more, and that the greateſt, advantage to the patient, namely, the chance of ſaving the entire limb by delaying the operation.

"But as M. Faure does not abſolutely determine the preciſe time of performing the operation after the accident, and that by the delay of ſix weeks, or till the ſymptoms ceaſe, numbers of lives muſt be loſt, I obſerve, that this is very vague and uncertain; becauſe, by the nature of the accident, many ſymptoms muſt ſubſiſt, even after the general inflammation is paſſed. Such are extraneous bodies conſtantly irritating, ſplints of bones, too abundant ſuppuration, &c. In ſuch caſes, it will be in vain to expect an abatement of ſymptoms till the cauſe of them is removed, namely, the limb taken off. Upon maturely, then, conſidering the whole affair, I boldly affirm, that the ſhock from the general inflammation, the patient's ſtate of blood and habit of body, &c. will be thoroughly known in about 20 days from the accident; and every ſymptom that continues ſubſequent to this muſt take its riſe from the ſore itſelf, and that where amputation is abſolutely unavoidable. Suppoſing the patient to be treated all the time preceding this according to the rules of art, it ſhould not be deferred longer, leſt the patient ſink under it. By this means, inſtead of about one in three amputated patients recovering, we ſhould ſcarce loſe, almoſt to a certainty, one in twenty."

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Mr Pott's opinion.

Mr Pott ſeems to be an advocate for immediate amputation, or at leaſt to dread none of thoſe fatal conſequences from amputation which we have juſt now mentioned. His words are, "When a ſurgeon ſays that a limb, which has juſt ſuffered a particular kind of compound fracture, ought rather to be immediately cut off, than that any attempt ſhould be made for its preſervation, he does not mean by ſo ſaying, that it is abſolutely impoſſible for ſuch limb to be preſerved at all events; he is not to be ſuppoſed to mean ſo much in general, though ſometimes even that will be obvious: all that he can truly and juſtly mean is, that from the experience of all time it has been found, that the attempts to preſerve limbs ſo circumſtanced, have moſt frequently been fruſtrated by the death of the patients in conſequence of ſuch injury; and that from the ſame experience it has been found, that the chance of death from amputation is by no means equal to that ariſing from ſuch kind of fracture.

"Every man knows, that, apparently, deſperate caſes are ſometimes cured; and that limbs ſo ſhattered and wounded as to render amputation the only probable means for the preſervation of life, are now and then ſaved. This is an uncontroverted fact, but a fact which proves very little againſt the common opinion; becauſe every man of experience alſo knows, that ſuch eſcapes are very rare, much too rare to admit of be-

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ing made precedents, and that the majority of ſuch attempts fail (B).

"This conſideration, relative to amputation, is of the more importance, becauſe it moſt frequently requires immediate determination; every minute of delay is, in many inſtances, to the patient's diſadvantage; and a very ſhort ſpace of time indeed frequently makes all the difference between probable ſafety and fatality. If theſe caſes in general would admit of deliberation for two or three days, and during that time ſuch circumſtances might be expected to ariſe as ought neceſſarily to determine the ſurgeon in his conduct, without adding to the patient's hazard, the difference would be conſiderable: the former would not ſeem to be ſo precipitate in his determination as he is frequently thought to be; and the latter, being more convinced of the neceſſity, would ſubmit to it with leſs reluctance. But, unhappily for both parties, this is ſeldom the caſe; and the firſt opportunity having been neglected, or not embraced, we are very frequently denied another. Here therefore the whole exertion of a man's judgment is required, that he may neither raſhly and unneceſſarily deprive his patient of a limb; nor, through a falſe tenderneſs or timidity, ſuffer him to periſh, by endeavouring to preſerve ſuch limb. Some degree of addreſs is alſo neceſſary upon ſuch occaſion, in order to convince the patient, that what ſeems to be determined upon haſtily and with precipitation, will not ſafely admit of longer deliberation."

235 Of reducing a compound fracture.

The limb being thought capable of preſervation, the next conſideration is the reduction of the fracture. The eaſe or difficulty attending this depends not only on the general nature of the caſe, but on the particular diſpoſition of the bone with regard to the wound.

If the bone be not protruded forth, the trouble of reducing and of placing the fracture in a good poſition, will be much leſs than if the caſe be otherwiſe; and in the caſe of protruſion or thruſting forth of the bone or bones, the difficulty is always in proportion to the comparative ſize of the wound through which ſuch bone has paſſed. In a compound fracture of the leg or thigh, it is always the upper part of the broken bone which is thruſt forth. If the fracture be of the tranſverſe kind, and the wound large, a moderate degree of extenſion will in general eaſily reduce it; but if the fracture be oblique, and terminates, as it often does, in a long ſharp point, this point very often makes its way through a wound no larger than juſt to permit ſuch extenſion. In this caſe, the very placing the leg in a ſtraight poſition, in order to make extenſion, obliges the wound or orifice to gird the bone tight, and make all that part of it which is out of ſuch wound preſs hard on the ſkin of the leg underneath it. In theſe circumſtances, all attempts for reduction in this manner will be found to be impracticable; the more the leg is ſtretched out, the tighter the bone will be begirt by the wound, and the more it will preſs on the ſkin underneath.

236 Of ſawing off the end of a broken bone.

Upon this occaſion, it is not very unuſual to have recourſe to the ſaw, and by that means to remove a portion of the protruded bone; but this practice is frequently erroneous.

In ſome few inſtances, and in the caſe of extreme ſharp-pointedneſs of the extremity of the bone, it may be, and undoubtedly is, right, but in many inſtances it is totally unneceſſary.

The two moſt proper means of overcoming this difficulty are, change of poſture of the limb, and enlargement of the wound. In many caſes, the former of theſe, under proper conduct, will be found fully ſufficient; and where it fails, the latter ſhould always be made uſe of. Whoever will attend to the effect which putting the leg or thigh (having a compound fracture and protruded bone) into a ſtraight poſition always produces, that is, to the manner in which the wound in ſuch poſition girds the bone, and to the increaſed difficulty of reduction thereby induced, and will then, by changing the poſture of ſuch limb from an extended one to one moderately bent, obſerve the alteration thereby made in both the juſt-mentioned circumſtances, will be ſatisfied of the truth of what has been ſaid, and of the much greater degree of eaſe and practicability of reduction in the bent than in the extended poſition; that is, in the relaxed, than in the ſtretched ſtate of the muſcles.

237 Of enlarging the wound in the integuments.

Reduction being found impracticable either by extenſion or change of poſture, the obvious and neceſſary remedy for this difficulty is enlargement of the wound. This, to ſome practitioners who have not ſeen much of this buſineſs, appears a diſagreeable circumſtance: but here there there is neither difficulty nor danger; it is the ſkin only which can require diviſion; and in making ſuch wound there can be no poſſible hazard. It is needleſs to ſay, that the diviſion ſhould be ſuch as to render reduction eaſy; or to remind the practitioner, that ſuch enlarged opening may ſerve very good future purpoſes, by making way for the extraction of fragments, and the diſcharge of matter, ſloughs, &c.

If the bone be broken into ſeveral pieces, and any of them be either totally ſeparated ſo as to lie looſe in the wound, or if they be ſo looſened and detached as to render their union highly improbable, all ſuch pieces ought to be taken away; but they ſhould be removed

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"(B) The baron Van Swieten, writing as many others have done, that is, theoretically, on ſurgery, adviſes us, in the caſe of very bad compound fractures, which may moſt probably require amputation, to defer the operation until we have tried the force of antiſeptic fomentations, and applications of like kind, for two or three days; and this opinion and advice he builds, in ſome meaſure, on the remarkable ſucceſs of La Motte, in a ſeemingly deſperate caſe, of a man's leg maſhed by the wheel of a heavy carriage.

"That De La Motte's patient eſcaped I make no doubt, becauſe he has ſaid ſo: but the ſurgeon ſhowed much more raſhneſs in attempting to ſave ſuch a limb, than he would have done in the amputation of it; the operation would have been the more juſtifiable practice.—With regard to the baron's advice, to ſtay two or three days, I take the liberty to add, that if you do that, ſtay ſeveral more; for at the end of that time (I mean two or three days) the patient will have very little chance indeed from the operation, much leſs than he would have had at the time of the accident.

"I ſhould be very ſorry to be thought a patron or an adviſer of raſhneſs or cruelty; but in what I have here ſaid, I believe I ſhall have every man in the profeſſion, who has either true humanity, or ſound judgment founded on experience, on my ſide."

removed with all poſſible gentleneſs, without pain, violence, or laceration; without the riſk of hæmorrhagy; and with as little poking into the wound as poſſible. If the extremities of the bone be broken into ſharp points, which points wound and irritate the ſurrounding parts, they muſt be removed alſo. But the whole of this part of the treatment of a compound fracture ſhould be executed with great caution. The objects of fear and apprehenſion in a compound fracture (that is, in the firſt or early ſtate of it) are, pain, irritation, and inflammation: theſe are to be avoided, prevented, and appeaſed, by all poſſible means, let every thing elſe be as it may: and altho' certain things are always recited as neceſſary to be done, ſuch as removal of fragments of bone, of foreign bodies, &c. &c. yet it is always to be underſtood, that ſuch acts may be performed without prejudicial or great violence, and without adding at all to the riſk or hazard neceſſarily incurred by the diſeaſe.

238 Of diſlocations.

In diſlocations of the joints, as well as in fractures of the bones, our great attention ought to be paid to the muſcles belonging to the part affected. Tho' their action is regular and juſt, when the bone to which they are attached comes to be diſplaced, they pull and diſtort the limb in many different ways; and from them only ariſes the great difficulty in reducing luxated joints. From this conſideration, Mr Pott lays down the following maxims with regard to luxated joints:

"1. Although a joint may have been luxated by means of conſiderable violence, it does by no means follow that the ſame degree of violence is neceſſary for its reduction.

"2. When a joint has been luxated, at leaſt one of the bones of which it is compoſed is detained in that its unnatural ſituation, by the action of ſome of the muſcular parts in connection with it; which action, by the immobility of the joint, becomes as it were tonic, and is not under the direction of the will of the patient.

"3. That the mere burſal ligaments of ſome of the joints, endued with great mobility, are weak, diſtractile, and conſtantly moiſtened: that, for theſe reaſons, they are capable of ſuffering conſiderable violence without being lacerated; but that they are alſo ſometimes moſt certainly torn.

"4. That did the laceration of the ſaid ligaments happen much more frequently than I believe it does, yet it cannot be a matter of very great conſequence, as it neither totally prevents reduction, when timely and properly attempted, nor a conſequent cure (c).

"5. That ſuppoſing ſuch accident to be frequent, yet as it is impoſſible to know, with any kind of certainty, whether it has happened or not, or in what part of the ligament, it cannot be admitted as a rule for our conduct, nor ought ſuch mere conjecture to produce any deviation from what we ought to do were there no ſuch ſuppoſition. Could we know with certainty when and where this had happened, very uſeful information might indeed be drawn from it.

"6. That all the force uſed in reducing a luxated bone, be it more or leſs, be it by hands, towels, ligatures, or machines, ought always to be applied to the other extremity of the ſaid bone, and as much as poſſible to that only.

"7. That in the reduction of ſuch joints as are compoſed of a round head received into a ſocket, ſuch as thoſe of the ſhoulder and hip, the whole body ſhould be kept as ſteady as poſſible, for the ſame reaſon as in the foregoing.

"8. That in order to make uſe of an extending force with all poſſible advantage, and to excite thereby the leaſt pain and inconvenience, it is neceſſary that all parts ſerving to the motion of the diſlocated joint, or in any degree connected with it, be put into ſuch a ſtate as to give the ſmalleſt poſſible degree of reſiſtance.

"9. That in the reduction of ſuch joints as conſiſt of a round head moving in an acetabulum or ſocket, no attempt ought to be made for replacing the ſaid head until it has by extenſion been brought forth from the place where it is, and nearly to a level with the ſaid ſocket.

"10. The laſt principle which I ſhall take the liberty to mention, and which I would inculcate very ſeriouſly, is, that whatever kind or degree of force may be found neceſſary for the reduction of a luxated joint, that ſuch force be employed gradually; that the leſſer degree be always firſt tried, and that it be increaſed gradatim."

SECT. IV. *Of Abſceſſes and large Suppurations.*

Under the article MEDICINE, n° 154. it has been obſerved, that one of the ways in which inflammation terminates is by ſuppuration; in which caſe an *abſceſs* is formed. This takes place in conſequence of that part of the body which was inflamed being rendered impervious to the circulating fluids; whence they are at laſt melted down, and converted into what is called *pus* or *matter*.—That an inflammation will terminate in an abſceſs, may be known from the length of time it has continued, from the remiſſion of the pain and hardneſs, the greater elevation of the ſkin in the middle part, a change of colour from red to bluiſh or livid, a ſlight fever with ſhivering, and from a fluctuation of matter perceived on handling the part.

239 In what caſes we might attempt the reſolution of an inflammatio

During the firſt ſtage of the inflammation, however, we ought, for the moſt part, to endeavour to reſolve it, or prevent the formation of an abſceſs. Yet ſome caſes muſt be excepted. For inſtance, thoſe inflammatory ſwellings which ſometimes occur in fevers, or ſucceed to them, ought always to be brought to ſuppuration; and it might be very dangerous to attempt a reſolution of them. In ſwellings of a ſcrophulous nature, it is perhaps beſt to do nothing at all, either with a view to reſolve or ſuppurate. Thus it might be dangerous to make uſe of repellent applications, at the ſame time that it is by no means adviſeable to promote their ſuppuration; the cure of ſuch ſwellings, when opened, proving always very troubleſome; while at the ſame time it is known, that ſuch ſwellings may remain for a very long time without any riſk to the patient. In the lues venerea, too, as we are poſſeſſed of a certain antidote for the diſorder, it is beſt not to attempt the ſuppuration of any buboes which may appear; as the cure of them, when opened, very often proves extremely troubleſome; and as their being opened cannot contribute any thing towards their cure.

(c) In the accident of a diſlocated tibia from a broken fibula, the ſtrong, inelaſtic, tendinous ligaments, which faſten the end of the former bone to the aſtragalus and os calcis, are frequently torn; and as theſe, by proper care, almoſt always do well, and recover all their ſtrength, there is the greateſt reaſon to expect, that the more weak diſtractile ones do the ſame. The only miſchief which ſeems moſt likely to follow from a laceration of the latter, is from an effuſion of the ſynovia; of which, Mr Pott thinks, he has ſeen an inſtance in the joint of the ankle. That the laceration of the burſal ligament of the ſhoulder cannot be a frequent or general impediment to reduction, appears from his never having, in more than 20 years care of an hoſpital, met with a ſingle inſtance of its impracticability, when attempted in time.

Where the inflammation is but beginning, and the ſymptoms are not ſo violent as to affect the general ſyſtem, topical remedies, with a due attention to regimen, often anſwer in reſolving them. But when the inflammation runs high, with general ſymptoms of fever, it then becomes neceſſary to pay attention to theſe at the ſame time. Warm fomentations and cataplaſms have generally been recommended for all inflamed parts: but theſe have a great tendency to promote ſuppuration, and are therefore very improper while the inflammation may be ſuppoſed capable of reſolution. The firſt thing, therefore, to be attended to in the caſe of every inflammation, is the removal of the exciting cauſes, which either have brought it on originally, or which may continue it after it is begun. Such are extraneous bodies in wounds, pieces of fractured bones, luxations, &c. with whatever elſe may have had a tendency to foment and keep up the diſeaſe. Of all the various applications for an inflamed part, thoſe of a ſedative nature are chiefly to be depended upon; and, next to theſe, emollients. Of the former kind we may conſider all the different preparations of lead diſſolved in vinegar; together with the vegetable acid itſelf, which generally acts alſo as a ſedative. Among the latter we may place, in the firſt claſs, the mild expreſſed oils, as alſo the ſoft ointments made with theſe oils and pure wax.

240
The applications proper for an inflammation.

When we ſpeak of ſedative medicines, however, it muſt not be underſtood that all of that claſs are to be uſed indiſcriminately. Thus opium, though one of the moſt powerful of all ſedatives, yet as its application, externally, to the human body, is always attended with ſome degree of irritation, however uſeful it may at times be found in ſome particular ſpecies of inflammatory diſorders, will never, probably, as an external application, become of general uſe in theſe caſes. Warm emollient fomentations, too, though powerful ſedatives, as tending more effectually to remove tenſion and pain than perhaps any other remedy, yet are conſtantly found to be improper where a reſolution is to be wiſhed for, as we have already obſerved. Their conſtant effect is, either to bring the ſwelling to a ſuppuration, or to relax the parts in ſuch a manner as to render the removal of the diſorder always exceedingly tedious.

241
Of the preparations of lead.

Mr Bell recommends the preparations of lead as proper applications, in caſes of external inflammation, where we wiſh for a reſolution. Theſe medicines have lately drawn the attention of the public by the great encomiums paſſed upon them by M. Goulard, who thus endeavoured to paſs off one of his own compoſitions under the very improper name of *extract of lead*. This medicine, which at beſt can only be a ſaturated ſolution of lead in ſtrong vinegar, Mr Bell juſtly obſerves, has not the advantages of ſaccharum ſaturni. "For (ſays he) although in the *Extrait de Saturn* of Goulard, as likewiſe in the *Acetum Lithargirites* of our diſpenſatories, which are both, it may be obſerved, very nearly the ſame, we may be very certain of the quantity of lead employed to the vinegar; yet we can never, but by cryſtallization, know exactly, or even nearly, how much of the former the menſtruum may have diſſolved, as that muſt depend on a variety of accidents; and particularly on the ſtrength of the acid and exact degree of heat employed; which are circumſtances we have not always in our power exactly to regulate. For theſe reaſons, therefore, the ſalt or ſugar of lead, as it is called, ſhould, for external uſe, be always preferred." The beſt method of applying it, he ſays, is in the form of a watery ſolution; and he gives the following formula: "℞. Sacchar. ſaturn. ℥ſs.; ſolve in acet. pur. ℥iv.; et adde aq. fontan. deſtillat. ℔ij."

The addition of vinegar renders the ſolution much more complete than it otherwiſe would be; and without it, indeed, a very conſiderable proportion of the lead generally ſeparates and falls to the bottom.

In making uſe of this ſolution in caſes of inflammation, as it is of conſequence to have the parts affected kept conſtantly moiſt with it, cataplaſms prepared with it and crumb of bread, in general anſwer that intention exceedingly well. But when the inflamed part is ſo tender and painful as not eaſily to bear the weight of a poultice, which is frequently the caſe, pieces of ſoft linen moiſtened with the ſolution anſwer the purpoſe tolerably well: although, when there is not that objection to the uſe of cataplaſms, as they retain the moiſture longer, they ſhould always be preferred. But whichever of the two are had recourſe to, they ſhould always be applied cold, or at leaſt with no greater warmth than is merely neceſſary for preventing pain or uneaſineſs to the patient: they ſhould be kept almoſt conſtantly at the part, and renewed always before turning ſtiff or hard.

242
Of emollients.

Among the remedies recommended for external uſe, in caſes of inflammation, were mentioned emollients. Theſe, when the tenſion and irritation on the ſkin are conſiderable, are often attended with very great advantage: the parts affected being, in ſuch a ſtate of the diſorder, gently rubbed over with any of the mild expreſſed oils two or three times a-day, the tenſion, irritation, and pain, are often very much relieved, and the diſcuſſion of the tumour thereby greatly promoted.

In every caſe of inflammation, indeed, emollient applications would afford ſome relief. But as the preparations of lead, already recommended, prove, in all ſuch diſorders, ſtill more advantageous; and as unguents of every kind tend conſiderably to blunt the action of lead; theſe two ſets of remedies ſhould as ſeldom as poſſible be allowed to interfere with one another: and emollients ſhould accordingly never be preſcribed, but when the circumſtances already mentioned, of irritation, tenſion, and pain, are ſo conſiderable as to render their application altogether neceſſary.

Unctuous ſubſtances have, too, been condemned in ſuch caſes upon a different principle, as tending to ſtop the pores, and conſequently to obſtruct the perſpiration of thoſe parts to which they are applied. It is not, however, probable, that in this way they could prove very hurtful in preventing the reſolution of inflammation; which muſt always, it is imagined, be effected in a very different manner than by perſpiration.

243 Of the method of uſing the vegetable acid.

When the part affected with inflammation is not very tender, or lies deep, applications of the vegetable acid are then often had recourſe to with conſiderable advantage; and the moſt effectual form of uſing it ſeems to be by way of cataplaſm, made with the ſtrongeſt vinegar and crumb of bread. In ſuch caſes, too, an alternate uſe of this remedy, with the ſaturnine ſolution, has produced more beneficial effects than are commonly obſerved from a continued courſe of any one of them.

At the ſame time that theſe applications are continued, blooding with leeches, or cupping and ſcarifying, as near as poſſible to the part affected, is generally of very great ſervice; and in no caſe of local inflammation ſhould ever be omitted. In all ſuch caſes, the whole body, but more eſpecially the diſeaſed part, ſhould be preſerved as free as poſſible from every kind of motion; and, for the ſame reaſon, the neceſſity of a low cooling diet, in every inflammatory diſorder, appears obvious, as does alſo a total abſtinence from ſpirituous and fermented liquors.

244 Of blood-letting and other evacuations.

In ſlight caſes of inflammation, a due perſeverance in the ſeveral articles taken notice of, will, in general, be found ſufficient for every purpoſe. But when there is likewiſe a full, hard, or quick pulſe, with other ſymptoms of fever, general blood-letting becomes then always neceſſary; the quantity of blood taken away being always to be determined by the violence of the diſorder, and by the age and ſtrength of the patient. The uſe of gentle laxatives, too, together with cooling diaphoretic medicines, are always attended with very good effects.

Theſe different evacuations being premiſed, the next object of conſequence is to procure eaſe and quietneſs to the patient; which is often, in inflammatory caſes, of more real ſervice than any other circumſtance whatever. The moſt effectual remedy for this purpoſe is opium; which, when pain and irritation are conſiderable, as in extenſive inflammations very frequently happens, ſhould never be omitted. In large wounds, eſpecially after amputations and other capital operations, in punctures of all kinds, too, large doſes of opium are always attended with remarkable good effects. In all ſuch caſes, however, opium, in order to have a proper influence, ſhould, as was obſerved, be adminiſtered in very large doſes: otherwiſe, inſtead of proving ſerviceable, it ſeems rather to have the contrary effect; a circumſtance which is, perhaps, the chief reaſon for opiates in general having been very unjuſtly condemned in every caſe of inflammation.

By a proper attention to the different circumſtances taken notice of, in the courſe of three or four days, and ſometimes in a ſhorter ſpace of time, reſolution of the tumour will in general begin to take place; at leaſt before the end of that period, it may, for the moſt part, be known how the diſorder is to terminate. If the heat, pain, and other attending ſymptoms, abate, and eſpecially if the tumour begins to decreaſe, without the occurrence of any gangrenous appearances, we may then be almoſt certain that by a continuance of the ſame plan a total reſolution will in time be effected.

But, on the contrary, if all the different ſymptoms rather increaſe; and eſpecially, if the tumour turns larger, and ſomewhat ſoft, with an increaſe of throbbing pain; we may then, with tolerable certainty, conclude that ſuppuration will take place; and ſhould therefore immediately deſiſt from ſuch applications as were judged proper while a cure was thought practicable by reſolution, and endeavour to aſſiſt nature as much as poſſible in the formation of pus, or what is called *maturation* of the tumour.

For this reaſon, in every caſe of inflammation, the different evacuations, eſpecially that of blood-letting, which may have been adviſable while the ſwelling was attempted to be diſcuſſed, ſhould never be carried a greater length than may be merely neceſſary for moderating the ſeveral febrile ſymptoms: for by reducing the ſyſtem too much, and a ſuppuration afterwards taking place, its progreſs in that caſe becomes always much more ſlow and uncertain than it would have been had a due attention been paid to theſe evacuations; nor will the patient be afterwards ſo able to bear, eſpecially if it is conſiderable, the diſcharge that muſt neceſſarily enſue from opening the abſceſs.

Although it was remarked above, that if in general, in the courſe of three or four days, there does not ſome appearances of reſolution occur, that ſuppuration will moſt probably take place, and that conſequently a change of treatment becomes neceſſary; yet this, it muſt be obſerved, is only to be taken in a limited ſenſe: for the time of deſiſting from one mode of treatment and commencing the other, muſt always depend very much on the ſeat of the inflammation; ſuch diſorders being, in ſome parts, much more apt to terminate in a ſpeedy ſuppuration than in others.

Thus, in the cellular membrane, and in different ſoft parts, inflammatory diſorders of all kinds terminate much more readily and quickly than when any of the tough membranous parts are affected. Hence, in the coats of the eye and of the teſticles, very violent inflammations often continue for many days, nay, even for weeks, without either abating in the ſymptoms or ending in ſuppuration. In ſuch caſes, therefore, which go on even to a very conſiderable length, we need not be afraid of continuing the diſcutient applications for a much longer time than would in general be otherwiſe proper: we ſhould never therefore be deterred from uſing them, unleſs either an evident ſuppuration has taken place, or there appears, from the violence of the ſymptoms, a certain riſk either of gangrene or of ſome incurable obſtruction; in which event, we are, no doubt, always to endeavour to procure the ſuppuration of the tumour.

245 Of bringing a tumour to ſuppuration.

When the means uſed for diſcuſſing or reſolving an inflamed tumour have proved ineffectual, the next attempt of the ſurgeon ought to be to bring it to maturity as ſoon as poſſible; and for this purpoſe there is nothing better than to preſerve a proper degree of heat in the parts. The method commonly had recourſe to for the application of heat to an inflamed part, is by the means of warm fomentations and cataplaſms; and when theſe are regularly and frequently renewed, nothing, it is probable, could more effectually anſwer the purpoſe. But in the ordinary manner in which they are applied, by the cataplaſms being renewed only once, or at moſt twice a-day, they muſt always, it is imagined, do more harm than good. For ſo ſoon as the degree of heat they were at firſt poſſeſſed of is diſſipated, the moiſture kept up by them, with the conſequent evaporation that enſues, muſt always render the part a great deal colder than if it had been merely wrapped in flannel without the uſe of any ſuch application.

246 Common method of applying cataplaſms improper.

In order to receive all the advantages of ſuch remedies, the part affected ſhould be well fomented with flannels preſſed out of any warm emollient decoction, applied as warm as the patient can eaſily bear them, continued at leaſt half an hour at once, and repeated four times a-day.

Immediately after the fomentation is over, a large emollient poultice ſhould likewiſe be applied warm, and renewed every ſecond or third hour at fartheſt. Of all the forms recommended for emollient cataplaſms, a common milk-and-bread poultice, with a proportion of butter or oil, is perhaps the moſt eligible; as it not only poſſeſſes all the advantages of the others, but can at all times be more eaſily obtained.

Roaſted onions, garlick, and other acrid ſubſtances, are frequently made uſe of as additions to maturating cataplaſms. When there is not a due degree of inflammation in the tumour, and when it appears probable that the ſuppuration would be quickened by having the inflammatory ſymptoms ſomewhat increaſed, the addition of ſuch ſubſtances may then be of ſervice; but when ſtimulants are neceſſary in ſuch caſes, a ſmall proportion of ſtrained galbanum, or of any of the warm gums, diſſolved in the yolk of an egg, and added to the poultices, is not only a more elegant, but a more certain form of applying them.

Whenever the inflammation, however, takes place to a proper degree, ſuch ſtimulating ſubſtances never can be neceſſary; and, in many caſes, it is apprehended, they may even do miſchief.

In ſuch tumours as, from their being poſſeſſed of little or no inflammation, are commonly ſaid to be of a cold nature, as they are generally indolent, and proceed very ſlowly to ſuppuration, plaſters compoſed of the warm gums are often had recourſe to with conſiderable advantage. In ſuch caſes, they are not only of uſe by the ſtimulus and irritation they occaſion, but by the heat which they tend to preſerve in the part. They become particularly neceſſary when the patient, by being obliged to go abroad, cannot have cataplaſms frequently enough renewed, or ſo conveniently applied; but when ſome ſuch objection does not occur, the latter, for very obvious reaſons, ſhould always be preferred.

Dry cupping, as it is termed, that is, cupping without the uſe of the ſcarificator, upon or as near as poſſible to the part affected, is frequently had recourſe to with advantage in promoting the ſuppuration of tumours. It is only, however, in ſuch as theſe laſt mentioned, where there ſeems to be a deficiency of inflammation, that it can ever either be neceſſary or uſeful; but in all tumours of a real indolent nature, and where there is ſtill ſome probability of a ſuppuration being effected, I have ſeldom obſerved ſuch effects from any other remedy.

Theſe different applications, under the reſtrictions taken notice of, being continued for a longer or ſhorter time, according to the ſize of the tumour, its ſituation, and other circumſtances, a thorough ſuppuration may in general at laſt be expected.

247 Signs of an abſceſs already formed.

Matter being fully formed in a tumour, is known by a remiſſion of all the ſymptoms taking place: the dolor pulſatilis, that before was frequent, now goes off, and the patient complains of a more dull, conſtant, heavy pain: the tumour points at ſome particular part, generally near to its middle; where, if the matter is not encyſted, or deep ſeated, a whitiſh yellow appearance is obſerved, inſtead of a deep red that formerly took place; and a fluctuation of a fluid underneath, is, upon preſſure, very evidently diſcovered. Sometimes, indeed, when an abſceſs is thickly covered with muſcular and other parts; and when, from concurring circumſtances, there can be little doubt of there being even a very conſiderable collection of matter; yet the fluctuation cannot be readily diſtinguiſhed: but it does not often happen, that matter is ſo very deeply lodged as not to be diſcovered upon proper examination.

This, however, is a circumſtance of the greateſt conſequence in practice; and deſerves, it may be remarked, more attention than is commonly given to it. In no part of the ſurgeon's employment, is experience in former ſimilar caſes of greater uſe to him than in the preſent; and however ſimple it may appear, yet nothing, it is certain, more readily diſtinguiſhes a man of obſervation and extenſive practice, than his being able eaſily to detect collections of deep-ſeated matter; whilſt nothing, on the contrary, ſo materially affects the character of a ſurgeon, as his having, in ſuch caſes, given an inaccurate or unjuſt prognoſis; as the event, in diſorders of that nature, comes generally at laſt to be clearly demonſtrated to all concerned.

Together with the ſeveral local ſymptoms of the preſence of pus, already enumerated, may be mentioned the frequent ſhiverings that patients are liable to on its firſt formation: theſe, however, ſeldom occur ſo as to be diſtinctly obſerved, unleſs the collection is conſiderable, or ſeated internally in ſome of the viſcera.

248 Of opening abſceſſes.

After the matter is fully formed, and the abſceſs brought to maturity, the only remedy is to open it, and give vent to the pus it contains. In many caſes, indeed, nature will do the work, and abſceſſes when ſuperficially ſeated will certainly burſt of themſelves: but where the matter lies deep, we are by no means to wait for this ſpontaneous opening; as the pus will acquire an acrimony, before it can break through the integuments, which may prove very prejudicial to health. However, it is a general rule not to open abſceſſes till a thorough ſuppuration has taken place; for, when laid open long before that period, and while any conſiderable hardneſs remains, they commonly prove more troubleſome, and ſeldom heal ſo kindly.

In ſome caſes, however, it is neceſſary to deviate from this general rule, and to open them a good deal ſooner; particularly in all ſuch critical abſceſſes as occur in malignant fevers. In the plague, too, we are commonly adviſed to open ſuch tumours, ſo ſoon as they are at all tolerably advanced, and not to wait till they are fully maturated; as, from experience in theſe diſorders, it is found to be of more conſequence, for the removal of the original diſeaſe, to have a quick diſcharge of matter produced, than any harm the patient can ever ſuffer from having a ſwelling ſomewhat prematurely laid open.

In abſceſſes, too, ſituated on any of the joints, or upon either of the large cavities of the breaſt and abdomen, and more eſpecially when they ſeem to run deep, they ſhould always be opened as ſoon as the leaſt fluctuation of matter is diſcovered. For, when the reſiſtance is on every ſide equal, they juſt as readily point internally as outwardly: and the conſequence of a large abſceſs burſting into either of the large cavities eſpecially, is well known moſt frequently to prove fatal: An inſtance of which, in the following caſe, with very little attention, might have been prevented.

249 Caſe of an abſceſs breaking inwardly.

A ſurgeon of eminence, and of very extenſive practice, was applied to by a young healthy-looking man, with a large abſceſs upon the left ſide of his cheſt. A fluctuation of a fluid was, upon preſſure, very evidently diſcovered; and it was agreed, by other two practitioners that were preſent, that an opening ſhould be made to give vent to the matter. But the operator, being much engaged in buſineſs, could not fix on an earlier period for doing it than the the third day from the patient's applying to him: unluckily, however, the patient died ſuddenly in his bed the night before the abſceſs was to have been opened.

On examining the body, the tumour had diſappeared entirely, without any external opening being obſervable; and, on opening the thorax, it was found to have burſt inwardly upon the lungs, and ſo had produced immediate ſuffocation.

In every other circumſtance, however, except in the caſes alluded to, the rule in opening abſceſſes, is, as was already remarked, To allow a thorough ſuppuration to take place, before any vent whatever be given to the matter; and it being then determined to lay the collection open, the next queſtion that occurs, is with reſpect to the manner of doing it. But the conſideration of this belongs to the next Part.

250 Of white ſwelling.

251 Of the rheumatic white ſwelling.

Under the head of *abſceſſes*, we may reckon thoſe tumours of the joints uſually called *white ſwellings*; for though they never ſuppurate in ſuch a kindly manner as the common abſceſs, yet they certainly contain collections of a kind of pus as much as the former.—The only regular treatiſe which has yet appeared on white-ſwellings is that of Mr Bell ſurgeon in Edinburgh. He obſerves, that there are two ſpecies of the diſeaſe; the one of a mild nature, and frequently admitting of a cure; which the other never does. The former, named by our author the *rheumatic* ſpecies of white ſwelling, begins with an acute pain, ſeemingly diffuſed over the whole joint, and frequently extending along the tendinous aponeuroſes of the muſcles which communicate with it. There is, from the beginning, an uniform ſwelling of the whole ſurrounding integuments; which in different patients is in different degrees, but always ſufficient to occaſion an evident diſparity between the ſize of the diſeaſed joint and the other. Great tenſion generally prevails; but in this period of the diſorder there is ſeldom any external change of colour. From the commencement of the diſeaſe, the motion of the joint is attended with exquiſite pain, and the patient keeps it conſtantly in a relaxed poſture, finding that the eaſieſt. Hence the tendons become extremely ſtiff and rigid, till at laſt the joints have the appearance of complete and real anchyloſes. The ſwelling now begins to augment, till the joint has acquired three or four times its natural ſize: the cuticular veins become turgid and varicoſe; at the ſame time that the muſcular ſubſtance of the limb below decays, though it frequently acquires an equality in ſize by becoming œdematous: the pain becomes intolerable, eſpecially when the perſon is warm in bed or otherwiſe heated: abſceſſes form in different parts, which, either breaking of themſelves, or by being laid open, diſcharge conſiderable quantities of matter, but without any remarkable effect in reducing the ſize of the ſwelling. The pus diſcharged from theſe is at firſt of a tolerably good conſiſtence, but ſoon degenerates into a thin ill-conditioned ſanies. However, the orifices from whence it flows ſoon heal up, unleſs they are kept open by art; and new collections breaking out, they burſt and heal up as before;] ſo that in long-continued diſorders of this kind, the ſurrounding integuments are often entirely covered with cicatrices.

In the mean time the health of the patient gradually declines; firſt from the violence of the pain, which often deprives him of ſleep and appetite; and then from the abſorption of matter into the ſyſtem, which always certainly takes place in ſome degree from its firſt formation in the different abſceſſes; but which indeed never appear ſo evidently till the different abſceſſes have been laid open; after which a quick pulſe, night-ſweats, and a weakening diarrhœa, are ſure to occur, and which generally carry off the patient, if the member is not either amputated, or the diſeaſe cured ſome other way.

252 Appearances on diſſecting the limbs amputated for this ſpecies of white ſwelling.

On diſſecting limbs which have been amputated for white ſwellings, the original diſeaſe appears to have been a morbid thickening of the ſurrounding ligaments, without any other affection of the joint whatever; the bones and cartilages always remaining perfectly ſound, as likewiſe the ſynovia both in quantity and conſiſtence. In ſome inſtances where the diſeaſe has been very violent, this thickneſs of the ligaments appears to have increaſed much more than in others where it was more mild. But in the more advanced ſtages of the diſorder, when abſceſſes have formed in different parts, when the pain has been long very violent, with great addition of ſwelling, the thickneſs of the ligaments is then more conſiderable, and is generally, if not always, attended with an effuſion, into the ſurrounding cellular ſubſtance, of a thick glairy matter, which gives to ſwellings of this kind an elaſtic ſpringy feel, independent of the collections of matter above-mentioned, the fluctuation of which may alſo be perceived. Through this glairy matter the collections of pus are found to run in various directions, without ſeeming, however, to mix with it. In ſome inſtances a great many ſmall hydatides are obſerved along with the collections of matter; all which form a confuſed maſs, incapable of further diſſection.

All the above-mentioned appearances have been obſerved

ſerved without any affection of the bones or cartilages, But when, by a very long continuance of the diſorder the ligaments come to be corroded by the different collections of matter, the cartilages then, and in conſequence thereof the bones, ſoon begin to ſuffer. The tendons of the flexor muſcles, though very ſtiff and contracted, do not, upon diſſection, ſhow any ſigns of diſeaſe.

253 Of the ſcrophulous white ſwelling.

The above is an hiſtory of the moſt mild ſpecies of white-ſwelling; the more inveterate kind our author names the *ſcrophulous white ſwelling*. In this the pain is commonly very violent; more acute than in the former; and, inſtead of being diffuſed, is confined to a particular ſpot, commonly the very middle of the joint; ſo that patients will ſometimes ſay they could cover the whole pained part with a crown-piece or leſs. The ſwelling alſo is commonly inconſiderable at firſt; inſomuch that, on ſome occaſions, even when the pain has been very violent, little difference in point of ſize could be obſerved between the diſeaſed joint and the ſound one of the oppoſite ſide. Here alſo the motion of the joint is attended with very great pain, and the tendons become ſtiff, for the ſame reaſon as in the former. As the diſorder advances, the pain becomes more violent, and the ſwelling increaſes, with an evident enlargement of the ends of the bones compoſing the joints. The ſame elaſtic feel, together with ſimilar abſceſſes, occur in this as in the laſt: but upon opening them they commonly diſcharge a thin fetid ſtuff; the bones are found to be carious, and pieces of them are frequently diſcharged at the openings.

On the farther continuance of the diſorder, the conſtitution comes here likewiſe to ſuffer as in the firſt ſpecies of the diſeaſe; and a diarrhœa with night-ſweats commencing, the patient is ſoon reduced, from perhaps the fulleſt habit, to little more than ſkin and bone.

254 Appearances on diſſecting the amputated limbs.

Upon ſuch joints being diſſected, either after death, or after amputation of the member in the firſt ſtages of the diſorder, the ſoft parts ſeem very little affected: but in all, even the very ſlighteſt caſes, there is conſtantly obſerved an enlargement either of the whole ends of the bones, or of their epiphyſes; frequently of thoſe on one ſide of the joint only; in others, again, the bones on both ſides have been affected.

This enlargement ſometimes occurs without any other evident diſeaſe: but in general, and always in a more advanced ſtate of the complaint, the ſoft ſpongy parts of ſuch bones appear diſſolved into a thin, fluid, fetid matter; and that too, in ſome caſes, without the cartilages which ſurround them ſeeming much affected. In proceſs of time, however, the cartilages come likewiſe to be diſſolved; and then the different matter, viz. that of the bones and ſofter parts, all mixing together, ſuch ſwellings being in that ſtate laid open, exhibit a ſtill more confuſed collection than is generally obſerved even in the worſt ſtages of the other ſpecies of the diſorder.

Although it was remarked, that in the early periods of the complaint, the ſurrounding ſoft parts do not always appear much affected; yet, in its farther progreſs, they likewiſe are always brought to ſuffer. The ligaments become thickened, and the contiguous cellular membrane ſtuffed with that viſcid glairy kind of matter as obſerved in the other ſpecies of the diſorder.

255 Cauſes of white ſwelling.

Having thus given a paticular account of the different appearances generally obſerved in both ſpecies of white ſwelling, we come now, in courſe, to the conſideration of the different cauſes which tend to produce them. That the ligaments of the joints only are firſt affected in this diſorder, is from the hiſtory of the diſſections rendered evident; they, in the firſt ſtages of the complaint, being almoſt the only parts that are found diſeaſed. The effuſions, into the cellular membrane, of that thick glairy matter taken notice of, are probably occaſioned by an exſudation from the veſſels of thoſe ligaments that have been originally inflamed, it being known that ſuch parts never furniſh a proper fluid for the formation of purulent matter: In the courſe of the diſeaſe, indeed, abſceſſes containing real pus do always appear; but never till inflammation has been communicated to the ſurrounding parts, which more readily afford a fluid proper for that purpoſe.

Upon the whole, therefore, we may conclude, that the firſt ſpecies of white ſwelling is always occaſioned by an *inflammatory* or *rheumatic affection* of the ligaments of ſuch joints as it attacks, and that too from whatever cauſe ſuch inflammation may originally have proceeded.

The other ſpecies of the diſorder, from all the ſymptoms enumerated, and from the appearances on diſſection, ſeems evidently to be originally an affection of the bones; the ſurrounding ſoft parts coming only to ſuffer in the progreſs of the diſeaſe, from their connection with and vincinity to theſe.

This laſt ſpecies of white ſwelling very ſeldom occurs as the conſequence of any external accident; generally beginning without the patient being in the leaſt able to account for it: And from the effects which it uſually produces on the bones attacked, it would appear to be a ſpecies of the real *ſpina ventoſa*; and which again is very probably a diſeaſe of the ſame nature in the bones, as ſcrophula is of the ſoft parts. Indeed, the appearances of the two diſorders, after making allowance for their different ſituations, are exceedingly ſimilar: they both begin with conſiderable enlargements or ſwellings of the parts they invade; which afterwards in both, too, generally end in evident ulcerations; and they both likewiſe frequently occur in the ſame perſon and at the ſame time.

It is likewiſe obſerved, that this ſpecies of white ſwelling is generally either attended with other evident ſymptoms of ſcrophula ſubſiſting at the time; or that the patient in an early period of life has been ſubject to that diſeaſe; or, what is nearly the ſame, that he is deſcended from ſcrophulous parents, and conſequently moſt probably has the ſeeds of that diſeaſe lurking in his conſtitution.

From all theſe circumſtances, it may with probability be concluded, that this ſpecies of white ſwelling is commonly, if not always, of a ſcrophulous nature: and it having already been ſhown, that the other ſpecies of the diſorder is to be conſidered as an inflammatory, or what we have termed a *rheumatic*, affection; and a thorough diſtinction of the two different ſpecies being, in the treatment, a matter of very great importance; it will not here be improper to give a ſhort enumeration of the ſeveral diagnoſtic or moſt characteriſtic ſymptoms of each.

256 Diagnoſtics of the different ſpecies of the diſeaſe.

The pain in the white ſwelling from a rheumatic diſpoſition is, as was formerly remarked, always, from the beginning, diffuſed over the whole joint, and on ſome occaſions extends even a conſiderable way along the muſcles that are attached to it: whereas, in the other ſpecies of the diſorder, the pain is not only always at firſt, but ſometimes even when the complaint has been of conſiderable ſtanding, confined to a very ſmall circumſcribed ſpace.

In the former, the ſwelling is always confined to the ſoft parts, and is from the beginning exceedingly evident: but in the latter, there is ſeldom for ſome time any perceptible ſwelling; and when it does more ſenſibly appear, the bones are found evidently to be the parts chiefly affected, the ſurrounding teguments coming only to ſuffer on a farther progreſs of the diſeaſe.

Theſe are the chief local differences of the two ſpecies of this diſorder; but ſome aſſiſtance in the diſtinction may likewiſe be obtained, from the general habit of the patient, and from the manner in which the complaint may ſeem to have been produced.

Thus, when ſuch ſwellings occur in young, ſtrong, plethoric people, eſpecially in ſuch as have formerly been ſubject to rheumatiſm, and that whether in conſequence of an immediate external accident or not, ſuch, moſt probably, will always prove to be of the mildeſt or rheumatic ſpecies of the diſorder.

Whereas, when ſwellings of this nature appear in ſuch patients as are otherwiſe evidently of ſcrophulous diſpoſitions; where, together with a fine ſkin and delicate complexion, there are either, on examination, found hardened glands in the neck, arm-pits, or inguina; or it is diſcovered that the patient has, from his anceſtors, a title to ſuch complaints; when either any or all of theſe circumſtances occur, and if the diſorder has begun in the manner formerly deſcribed, without any evident external cauſe, we need be under very little doubt in concluding it to be of a ſcrophulous nature.

The great utility of properly diſtinguiſhing the two different ſpecies of white ſwellings, appears in no circumſtance ſo evident as in the treatment. In the one, there being ſome chance, by proper remedies, of being ſerviceable to the patient; whereas in the other, *viz.* the ſcrophulous, it is not probable that art will ever be able to afford much aſſiſtance.

In the rheumatic white ſwelling, as it is always at firſt evidently of an inflammatory nature, conſiderable advantages are commonly obtained by a due attention to a proper antiphlogiſtic courſe.

257 Method of cure in the rheumatic white ſwelling.

The firſt remedy which, with this view, ſhould be put in practice, is blood-letting; but inſtead of general evacuations from the arm or elſewhere, it proves always more effectual to take the blood immediately from the part affected. Cupping and ſcarifying is here a principal remedy. The inſtrument ſhould be applied to each ſide of the diſeaſed joint; on each ſide of the rotula, for inſtance, when the knee is the part affected, and at leaſt eight or ten ounces of blood diſcharged; and this to be repeated at proper intervals, once, twice, or oftener, according to the violence of the ſymptoms and ſtate of the patient's ſtrength at the time.

In the ordinary way of diſcharging only an ounce or two of blood by this operation, it has in general very little or no influence; but in the quantities mentioned, and which, by thoſe accuſtomed to the practice, is commonly eaſily obtained, it moſt frequently is attended with very conſiderable effects.

It muſt here be obſerved, that cupping is, in theſe caſes, much ſuperior to leeches; which is not only a more tedious method of getting the ſame quantity of blood, but the ſwelling occaſioned by the application of any conſiderable number of theſe animals proves frequently very troubleſome; and, what is often of worſe conſequences, gives ſometimes an interruption, for a time, to the uſe of other remedies.

Upon the anterior part of the joint, where the cupping-glaſſes have not been placed, a ſmall bliſter ſhould be directly applied, and the part kept open with iſſue-ointment, till the wounds from the ſcarificator are ſo far healed, that a veſicatory may likewiſe be laid on one ſide of the joint; and ſo ſoon as that is nearly healed, the other ſide ſhould be alſo bliſtered.

By thus alternately applying them, firſt to the one ſide, and then to the other, almoſt a conſtant ſtimulus is kept up; which, in deep-ſeated inflammations, ſeems to have fully a greater influence than all the diſcharge occaſioned by bliſters.

Gentle cooling laxatives at proper intervals are here of uſe too; and the patient ſhould, in every reſpect, be kept upon a ſtrict antiphlogiſtic courſe, both as to diet and every other circumſtance. From a due attention to which, with a continuance of the topical treatment already recommended, conſiderable advantages have frequently been obſerved, more indeed than from any other remedies ever uſed in this complaint.

It is in the firſt ſtages only, however, of the diſeaſe, that ſuch a courſe can probably be of much ſervice; and in ſuch it has frequently been a means of curing diſorders, which otherwiſe would probably have proceeded to the laſt ſtages of white ſwellings.

The original inflammatory affection being once over, theſe ſort of drains ſeem to have little or no influence, and ought not then to be long perſiſted in, as tending to prevent the uſe of other remedies, which, in an advanced ſtate of the diſeaſe, prove commonly more efficacious.

258 When mercury is uſeful.

The inflammation being moſtly gone, and while there are yet no appearances of the formation of matter, mercury, in theſe circumſtances, has ſometimes been known of uſe; not given ſo as to ſalivate, but merely to affect the mouth gently, and to keep it ſomewhat ſore for a few weeks.

The beſt form of uſing mercury, in ſuch caſes, is certainly by way of unction; as it allows, at the ſame time, of the application of friction; which, in all ſuch ſwellings, may of itſelf be in ſome meaſure conſidered as a remedy. For this purpoſe, an ointment of quickſilver and hog's lard ſhould be prepared; but with ſo ſmall a proportion of the former, that the patient may admit of two drams of the ointment being rubbed in three times a-day. In order to rub that quantity of the medicine in with gentle friction, an hour each time is at leaſt neceſſary, and which is as little as ſhould ever be given in order to receive all the advantages that attend the practice: for however uſeful friction, in ſuch caſes, may be, when properly applied, in the ordinary way of continuing the remedy for a few minutes only, it is not probable it can ever have much influence.

Gentle mercurials, given internally, are here ſometimes of ſervice too; but as all the advantages to be derived from them in that form are obtained from the unction, together with that of the friction neceſſary for its application, the latter, in all ſuch caſes, ſhould certainly be preferred.

By Le Dran, and other French writers, falls of warm water on ſwellings of this nature are much recommended; and there is no ſort of doubt, but a long-continued and reiterated application of that remedy may, in the firſt ſtages of ſuch complaints, be often attended with very good effects.

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A ſtiffneſs of the joint ſometimes remains after white-ſwelling.

By a proper uſe of theſe different applications, *viz.* of the ſeveral topical remedies in the firſt or inflammatory ſtate of the diſeaſe, and afterwards (ſtill, however, before the formation of matter) of mercurials, friction, &c. many affections of this nature have been entirely removed. But in many inſtances, when, either by the uſe of medicines, or by an effort of nature, the ſwelling and pain are almoſt entirely, or even wholly removed, it frequently happens, by the bent poſition the limb has been for a long time kept in, that the uſe of the joint comes to be entirely loſt, having often acquired ſuch a degree of ſtiffneſs, that any attempts to move it are commonly attended with very great pain.

260
Miſtakes concerning ſtiffneſſes of the joints.

Unluckily, in all ſuch caſes, theſe affections of the joints have been conſtantly attributed to one or other of two different cauſes, which are both in their nature incurable, *viz.* either to the ends of ſuch bones as compoſe the joints having run into one another, ſo as to become firmly conjoined in conſequence of the ſurrounding cartilages being abraded; or to the inſpiſſation, as it is termed, of the ſynovia of the joints, whereby their cavities are ſuppoſed to be entirely filled up, and no ſpace thereby left for the future motion of the different bones.

261
Mr Bell's opinion.

"Both theſe opinions, however, (ſays Mr Bell), I can, from a great number of facts, aſſert to be in general at leaſt very ill founded: for although, by an abraſion of the cartilages which ſurround the different bones at the joints, an union of their extremities may very readily be occaſioned, and is no doubt on ſome occaſions the cauſe of ſuch affections; yet from a variety of diſſections, I am convinced that it is an exceeding rare occurrence, and, in caſes of white ſwelling, never happens but in the moſt advanced ſtages of the diſorder: the only cauſes almoſt of the ſtiffneſs of the joints, in ſuch caſes, being that contracted ſtate of the flexor tendons, formerly taken notice of in the deſcription; at leaſt, in nineteen caſes out of twenty, it probably is ſo.

"There is nothing indeed more deceiving than the feel on ſuch occaſions: for when the diſorder has been of long ſtanding, the ſtiffneſs and immobility are generally ſo conſiderable, as, at firſt ſight, always to appear as if a real conjunction of the bones certainly ſubſiſted; many inſtances of which I have known, that had been all along conſidered as real anchyloſes of the worſt kind; but which, on diſſection, were conſtantly found to proceed merely from a contracted ſtate of the flexor muſcles and tendons.

"With reſpect to the other opinion, which did formerly ſo univerſally, and with many ſtill does, prevail, of ſuch affections generally proceeding from an inſpiſſated ſtate of the ſynovial fluid, it has for ſome time, by many anatomiſts, been much doubted if it ever occurs; and from all the opportunities I have had of diſſecting ſuch diſeaſed joints, I am pretty much convinced, that it either never does take place, or at leaſt that it is an exceeding rare occurrence: for in every caſe of this kind, even when the diſeaſe had been of very long continuance, if the capſular ligament of the joint remained undivided, ſo that no matter from the ſurrounding ſoft parts got admittance, and when the ends of the bones were not become carious, the ſynovia always retained its natural appearances both in colour and conſiſtence. So that it is very probable, the many cauſes of diſeaſed joints, attributed to affections of that fluid, have been more founded on mere hypotheſes than on facts and experience.

"This ſtiffneſs of the joint, therefore, which to a certain degree always occurs in white ſwellings, proceeding ſeldom or never from either of the cauſes mentioned, which might probably both be conſidered as incurable, but merely from a preternatural contraction of the muſcles and tendons, we have from that circumſtance great reaſon to expect, that in many ſituations a good deal may be done towards its removal. And in fact, there is no ſort of doubt but complaints of this kind, which often remain after every other ſymptom of white ſwelling has diſappeared, may, on many occaſions, be got the better of, merely by a long-continued uſe of emollients: ſeveral inſtances, indeed, of this I have ſeen, ſome of which had been thought to be of the worſt ſpecies of anchyloſis.

262
Oil olive the beſt emollient.

"The beſt, and probably leaſt offenſive, emollient that can be uſed, is pure olive oil applied warm; as much of it as can be eaſily rubbed in by an hour's gentle friction ſhould be regularly done at leaſt three times a-day; and inſtead of confining the friction altogether to the rigid tendons, as is commonly done, it ſhould be extended over the whole muſcles, even to the inſertions of their other extremities; but more eſpecially on their fleſhy muſcular parts, where the principal cauſe of the continuance of ſuch complaints is probably ſeated; theſe parts being chiefly, if not altogether, poſſeſſed of the contractile, and conſequently of the reſiſting, powers.

263
Neat's-foot oil ſomewhat inferior.

"I have known uſed, too, in this complaint, as an emollient, and often with advantage, an oil extracted from animal-ſubſtances, known by the name of *neats-foot oil:* but as it is more apt to turn rancid than olive oil, it is not therefore ſuch a pleaſant application; and not being poſſeſſed of any ſuperior relaxing properties, the other will probably, for that reaſon, be commonly preferred.

"The diſorder now under conſideration, *viz.* a ſtiff joint, is ſo evidently one of thoſe which particularly require the uſe of emollients, that almoſt every old woman has ſome particular form or other of recommending them; one of which I cannot avoid mentioning, as I have frequently known it uſed, and in two caſes particularly, with very evident advantages, *viz.* the web or omentum of a new-killed ſheep, or of any other animal, to be applied over all the diſeaſed parts directly on being cut out of the animal.

264
Omentum of a new-killed animal recommended

“ In the two caſes alluded to, one was in the knee, and the other in the hand; and the joints, from having been totally uſeleſs, were almoſt perfectly reſtored. The application ſhould be renewed as frequently as poſſible, once a-day at leaſt, or oftener when it can be done; for on being more than four or five hours applied it becomes diſagreeable; and after that time, indeed, as it commonly turns ſtiff, it cannot then probably be of much ſervice. The ſame kind of remedy, uſed in ſomewhat a different manner, I find recommended by Lieutaud, a celebrated French practitioner.

“ I have been the more particular on this part of the ſubject, as I have often thought, with a little attention, the uſe of many joints might be recovered, which, from a miſtaken notion concerning their cauſes, have generally from the firſt been conſidered as incurable.

265
Treatment of a white ſwelling when matter is formed in it.

“ The diſorder has hitherto been ſuppoſed not to be ſo far advanced as to have occaſioned the formation of matter; for when come that length, no conſiderable advantages can be expected from any of the remedies as yet recommended: but even in that ſtate of the complaint, if the patient's health does not abſolutely require it, amputation of the member ſhould by no means be immediately had recourſe to, as it moſt frequently is. For by paying attention to open the different abſceſſes ſoon after their formation, the matter may in that way be pretty certainly prevented from deſtroying the capſular ligaments of the joints, which, if once effected, would no doubt in time render that operation neceſſary.

266
Of the proper period for amputating limbs affected with white ſwellings.

“ It may be here obſerved too, with reſpect to the moſt proper period of the diſeaſe for amputating ſuch limbs, that, even in point of ſucceſs from the operation, it ought never to be adviſed till the complaint is pretty far advanced: for though, *à priori*, it might be imagined, that the more early in the diſeaſe amputation of the member is had recourſe to, the more ſucceſsful it ſhould prove; and although this, indeed, has been made a common argument for amputating very early in every caſe of white ſwelling, yet, however plauſible the obſervation may appear, it will not, from experience, I am certain, be found to hold good. For in this diſorder eſpecially, I have conſtantly obſerved, that amputation has more frequently ſucceeded, that is, a greater proportion of ſuch patients have recovered from it, who have previouſly been conſiderably reduced by diarrhœas and other weakening ſymptoms, than of ſuch as have ſtill remained in a full plethoric habit of body.

“ In the former, when the conſtitution has not been too much broken, and which practitioners have always in their power to guard againſt, the ſeveral ſymptoms of hectic which previouſly took place, are commonly removed in a very few days after the limb is taken off. No high inflammatory affections are ever produced; the patient daily mends in his health; and a complete cure, if the patient has not been too much reduced, is generally very ſoon obtained. In the latter, again, the very reverſe of all theſe circumſtances occur: the patient, from being in high health at the time of the operation, is generally thrown into a ſmart inflammatory fever; which is no doubt very often got the better of, but which frequently either carries off the patient immediately, or produces ſuch effects as he never thoroughly recovers from.

“ So that in no caſe whatever ſhould amputation be had recourſe to, until every probable means for ſaving the limb has been tried in vain.

“ All the different obſervations hitherto made upon the treatment, relate particularly to the rheumatic ſpecies of the diſorder; and when had recourſe to in time, and duly perſiſted in, they will frequently be found of ſervice: but when the diſeaſe is ſo far advanced as to have deſtroyed the capſular ligaments of the joint, and perhaps even the cartilages and bones themſelves, amputation of the member is then no doubt the only reſource.

267
A ſcrophulous white-ſwelling not to be cured but by amputation, and even that not to be depended on.

“ In the more fatal ſpecies of white ſwelling, *viz.* the ſcrophulous, as I know no certain remedy for ſcrophula, even in its milder form in the ſoft parts of the body, I cannot here pretend to offer any thing ſatisfactory upon the ſubject.

“ In the ſmall joints, when the diſeaſed parts of the bone begin to caſt off, a cure may in that way, by aſſiſting the efforts of nature, be ſometimes obtained; but in all the large joints, as the knee, ankle, &c. it is not probable that any other reſource than amputation will ever afford much relief. And even the effects of that operation can ſeldom be depended on as laſting; for when the general ſcrophulous taint ſtill ſubſiſts in the conſtitution, the diſorder will moſt probably appear again in ſome other part; which, however, in the advanced ſtages of the diſeaſe, it is ſometimes neceſſary to run the riſk of, the pain being often ſo tormenting as to make it more eligible to ſubmit to any hazard rather than to bear it longer.

268
When palliatives are to be uſed.

When, however, for ſome reaſon or other, amputation is determined againſt, as there being almoſt a certainty of the complaint ſoon returning, from the ſcrophulous diſpoſition appearing very ſtrong in the ſyſtem, it then becomes neceſſary to have recourſe to palliatives, ſo as to render the complaint as tolerable as poſſible; and with this view, opiates in large doſes, by moderating the pain and procuring reſt to the patient, will in general be found the principal remedy. In other reſpects, all ſuch medicines and articles of regimen as are found beneficial in ſcrophula, may be had recourſe to.”

269
Of encyſted tumours.

To the head of abſceſſes we may likewiſe refer thoſe tumours which are contained in cyſts, and which ſometimes increaſe to an extraordinary ſize. Theſe appear on the head, the eyebrows, or other parts of the body, and are at firſt but of a ſmall ſize. They are ſeated in the adipoſe and cellular membrane; whence it not unfrequently happens that they take place in the viſcera themſelves, where they are almoſt always mortal. The contents of theſe tumours are very different in conſiſtence. Sometimes they are filled with a ſubſtance of the conſiſtence of honey, and are thence called *meliceratous* tumours; ſometimes they are filled with an harder ſubſtance, and are then called *atheromatous* tumours; at other times they are filled with a ſubſtance of the conſiſtence of fat, and are then called

270
Different kinds of them.

called *ſteatomatous*. Sometimes, however, they are found to be repleniſhed with a fluid lymph coagulable by fire, and are then called *hydatids*.

Tumours of this kind are eaſily diſtinguiſhed from all others, as having neither heat, pain, nor pulſation, as is to be obſerved in thoſe which incline to ſuppurate. Sometimes, however, they will burſt like abſceſſes, and the matter which is in them will flow out; but unleſs the whole cyſt which contained it be removed, the ulcer refuſes to heal, and even ſometimes degenerates into a cancer.

271 Cauſes of theſe tumours.

Encyſted tumours are often the conſequence of an itch, tinea capitis, or other cutaneous diſorder; and ſometimes they ariſe after ulcers have been haſtily dried up: but it alſo frequently happens that people are born with them, or that they ariſe ſpontaneouſly without any apparent cauſe.—When they are recent, and neither very large nor hard, they may ſometimes be diſcuſſed by the application of the common topical remedies made uſe of for reſolving inflammations. But if theſe ſhould not ſucceed, the only method is to diſſect off the bag from the parts to which it adheres, preſerving it as much as poſſible from being wounded; becauſe then the operation becomes more difficult. If this cannot be done, they muſt be conſumed by cauſtic; and where this operation is performed in time, there is ſeldom any danger, though Platner inſtances a young man who died in conſequence of a very large tumour of this kind on the ſcapula, which had ariſen after a tinea capitis.

272 Tumours in the eye-lids.

Tumours akin to theſe frequently are met with in the eye-lids. Sometimes they are of a ſoft conſiſtence, and ſometimes harder: but the cure is the ſame in both, namely exciſion; carefully obſerving to take off all the roots, either by cauſtic or the knife, leſt the diſtemper ſhould return.

273 Of ganglions in the tendons.

Ganglions of the tendons may alſo be taken notice of here; which though they never come to ſuppuration, yet ſometimes break, and diſcharge a fetid ſanies. Theſe ariſe in the tendons which are moſt employed in the common offices of life; and hence are frequently to be met with in the tendons of thoſe muſcles which move the fingers. Platner gives an inſtance of a ganglion which deſtroyed the patient. It was ſituated on the *tendo Achillis;* and took its riſe from the perſon's jumping out of a carriage, at which time he felt an acute pain in that part. A tumour began to ariſe on the inſide of the tendon; which being thus compreſſed, ſwelled out on each ſide of it. Being ſituated in ſuch a place, ſurrounded with membranous parts, the wounding of which would have been very dangerous, ſurgeons of character declined the performing of any operation upon it; but the patient having applied to ſome empirics, the tumour, by means of their applications, increaſed to the ſize of the man's head, and at laſt began to diſcharge an ichor, at the ſame time that he was ſeized with an hectic. Amputation was now propoſed: but as the patient refuſed to ſubmit to the operation, an incredible quantity of putrid ſanies diſcharged itſelf daily from the place; which increaſing the fever, ſoon deſtroyed him. All this time the tumour, though grown hollow by the diſcharge, yet increaſed in its circumference at the bottom; ſo that the two oppoſite ſides of it almoſt met on the fore-part of the leg.

274 They can only be cured by diſcuſſion or exciſion.

In the cure of ganglions, we are never to attempt to bring them to ſuppuration: for of this they are incapable; and if unfortunately they ſhould increaſe in ſize and burſt, they will only diſcharge ſuch an ill-conditioned ſanies as that above-mentioned. The only method, therefore, is to attempt diſcuſſion. This is frequently accompliſhed by friction, and keeping a piece of lead on the part. Some commend plaſters of different kinds; but as all of theſe are of a relaxing nature, there is great danger of their increaſing the bulk of the tumour, at the ſame time that they render it ſofter. If, however, diſcuſſion ſhall be found impracticable, theſe tumours may be extirpated with the knife; but in ſuch operations, great care is to be taken not to wound the tendon, leſt the miſchiefs already enumerated, ariſing from ſuch wounds, ſhould enſue.

275 Of cancers.

The only other kind of tumours which can be referred to the head of abſceſſes, are thoſe very malignant ones called *cancers*.—Theſe moſt commonly ariſe in the glandular parts of the body, where they are occaſioned by any bruiſe or contuſion, ſometimes a very ſlight one: and hence they are more common in the lips, and in the breaſts of women, than in any other parts of the body.—Cancers have been generally diſtinguiſhed into *occult* and *open*. By the former are meant ſuch hard ſcirrhous ſwellings as are attended with frequent ſhooting pains, and which at laſt generally terminate in the latter.

276 How diſtinguiſhed.

277 Symptoms of an ulcerated cancer.

By the *open cancerous ulcer*, is underſtood that ſpecies of ſore which commonly ſucceeds to hard ſwellings of the glands; although in ſome inſtances it occurs without any previous hardneſs. The edges of the ulcer are hard, ragged, and unequal, very painful, and reverſed in different ways, being ſometimes turned upwards and backwards, and on other occaſions inwards. The whole ſurface of the ſore is commonly very unequal, there being in ſome parts conſiderable riſings, and in others deep excavations. The diſcharge, for the moſt part, is a thin dark-coloured fetid ichor; and is often poſſeſſed of ſuch a degree of acrimony as to excoriate, and even deſtroy, the neighbouring parts. In the more advanced ſtages of the diſeaſe, too, by the eroſion of blood-veſſels which occurs, conſiderable quantities of pure blood are ſometimes diſcharged.

Patients labouring under real cancerous affections, univerſally complain of what they term a *burning* heat over the whole ulcerated ſurface; which in general, it may be remarked, is the moſt tormenting ſymptom that attends the diſorder; and thoſe ſhooting lancinating pains, which were troubleſome in the more occult ſtate of the complaint, become now a great deal more ſo.

Theſe are the moſt frequent ſymptoms which attend an ulcerated cancer; but the appearances of ſuch ſores are ſo various, that it is almoſt impoſſible in any deſcription to comprehend every one. When two, three, or more, however, of thoſe enumerated, concur together in the ſame ulcer, we may always be pretty certain of its being of the cancerous kind.

278 Of the cauſes of cancer.

Concerning the cauſes of cancers, there have been a great many conjectures, but without any ſolid foundation. It is of ſome moment, however, to determine whether they ariſe from ſome general diſorder in the

279 Opinion of Dr Monro ſenior.

280 Extirpation the only cure for cancers.

ſyſtem, or whether they are only to be acounted local diſeaſes. Many of the moſt eminent practitioners have been of opinion that they ariſe from a general diſorder of the ſyſtem; and hence conſider them as totally incurable even by extirpation, as the latent ſeeds of the diſeaſe, in their opinion, will not fail to bring on a return of it ſomewhere or other. Of this opinion the late Dr Monro appears to have been; and in a paper on this ſubject in the Edinburgh Medical Eſſays, declares, that "of near 60 cancers which he had been preſent at the extirpation of, only four patients remained free of the diſeaſe at the end of two years." From this bad ſucceſs, and the violent progreſs of the diſeaſe, he finally concludes againſt the extirpation of cancers, and propoſes only the palliative method of cure. But later practitioners have been a great deal more ſucceſsful; and a late publication by Mr Hill ſurgeon at Dumfries has put the uſefulneſs of extirpation beyond a doubt, when the operation is performed in time: though, after the diſeaſe has continued long, and the virus been abſorbed, the whole ſyſtem acquires a cancerous diſpoſition, and the diſeaſe almoſt certainly recurs in ſome other part. From internal medicines we can expect little or nothing in the cure of cancers; and external applications can do no more than palliate. Great expectations were formed from the powder and extract of cicuta; but it has ſo univerſally failed, that few put much confidence in it at preſent. However, it has ſometimes been of ſervice in caſes of a ſimple indurated gland; and even where the diſeaſe has been farther advanced, it has produced a better diſcharge, and diminiſhed the fœtor of the ſore; but as it cannot be depended upon for a radical cure, a delay of the operation is never to be recommended.

Sect. V. *Of Herniæ.*

281 Definition of an hernia.

The name of *Hernia* might with propriety be applied to every ſwelling occaſioned by the diſlodgment of parts from thoſe boundaries within which, in a ſtate of health, they are contained; but the general acceptation of the term implies a tumour produced by the protruſion of ſome part or parts from the cavity of the abdomen.

282 Situation and contents of herniæ.

The parts in which theſe ſwellings uſually appear, are the groin, ſcrotum, labia pudendi, the upper and fore part of the thigh, the umbilicus, and in different points between the interſtices of the abdominal muſcles.

If the ſituation of ſuch tumours be various, the viſcera which produce them are ſtill more ſo; inſtances having occurred of the ſtomach, uterus, liver, ſpleen, and bladder, being found to form their contents. But a part of the inteſtinal canal, or a portion of the omentum, are from experience known to be the moſt frequent cauſe of their formation.

283 Their different appellations.

From theſe circumſtances of ſituation and contents, all the different appellations are derived by which herniæ are diſtinguiſhed. Thus they are termed *inguinal, ſcrotal, femoral, umbilical,* and *ventral;* from their appearing in the groin, ſcrotum, thigh, navel, or belly. When the tumour is confined to the groin, the hernia is ſaid to be incomplete, and is termed *bubonocele;* but when the ſwelling reaches down to the bottom of the ſcrotum, the rupture is then ſuppoſed to be complete, and the diſeaſe obtains the name of *ſcrotal rupture,* or *oſchiocele.*

When a portion of gut alone forms the tumour, it is called an *enterocele,* or *inteſtinal hernia;* when a piece of omentum only has got down, it is termed *epiplocele,* or *omental hernia;* and if both inteſtine and omentum are down, it is called an *entero-epiplocele,* or *compound rupture.*

284 Of the hernia congenita of infants.

A portion of ſome of the abdominal viſcera getting into the tunica vaginalis teſtis, forms that ſpecies of hernia to which new-born infants are liable, termed by Haller the *hernia congenita.* The teſticle and protruded inteſtine being here in contact with one another, the tunica vaginalis teſtis forms the hernial ſac.

If the gut, or other parts which have fallen down, be again puſhed into the abdomen, and are retained there by proper bandages, or any other means, in that caſe the paſſage is ſoon cloſed up, and no return of the diſorder is obſerved. But this being neglected, and the gut being allowed to remain long down, the parts forming the paſſage ſeem thereby in a great meaſure to loſe that power of adheſion which naturally they are known to poſſeſs: inſtances of ſuch caſes having occurred where no art has been able to produce this wiſhed-for obliteration of the opening.

285 How produced.

The hernia congenita is uſually produced in the manner now deſcribed: it is probable, however, that the ſame diſorder may, and frequently does, occur from this paſſage between the abdomen and teſticle, after having been once cloſed, being again rendered pervious, in conſequence of the parts being overſtretched by thoſe violent fits of coughing, crying, and other convulſive affections to which children ſoon after birth are now and then liable. The inteſtinal canal and other viſcera being on ſuch occaſions puſhed with violence againſt all the containing parts, theſe will moſt eaſily give way where the leaſt degree of firmneſs occurs; and this we may readily ſuppoſe will moſt probably happen in ſuch parts as have been moſt recently united. In this manner, it is probable that the greateſt proportion of thoſe caſes of hernia are produced which occur in the early months of infancy; and it is probable, that in ſome occaſions, in more advanced periods of life, the ſame ſpecies of hernia may likewiſe occur from the ſame cauſe.

286 Of the cauſes of hernia in its uſual form.

The cauſes which tend to the production of hernia in its more uſual form, are as follows:

I. The containing parts of the abdomen we know to be elaſtic and compreſſible; whatever, therefore, tends to produce a diminution of capacity in the cavity of the abdomen, muſt occaſion a proportional degree of riſk of ſome of the contained parts being puſhed from their natural ſituations. Violent coughing, crying, laughter, or great bodily exertion, are attended with more or leſs contraction of the abdominal muſcles, and particularly of the diaphragm; and as the contraction of theſe muſcles muſt always diminiſh the abdominal cavity, theſe cauſes therefore are frequently found to be productive of hernia.

II. Falls, in conſequence of the derangement they produce in the abominal viſcera, from the ſudden and violent ſhock with which they are often attended, are not unfrequently the immediate cauſes of hernia.

III. Perſons of a preternatural laxity of frame are very liable to herniæ. The containing parts of the abdomen

men, from the want of a ſufficient tone and firmneſs, are unable in ſuch people to reſiſt on all occaſions the weight of the different viſcera; and they are therefore more particularly expoſed to diſorders of this kind on the ſlighteſt application of any of the cauſes already mentioned.

IV. Sprains are apt to induce a laxity of the part injured; and have therefore a ſimilar influence in inducing herniæ with general laxity.

V. It has been obſerved, that the people of thoſe countries where oil is much uſed as an article of diet, are particularly liable to herniæ.

In whatever parts the parietes of the abdomen happen to be weakeſt, theſe various cauſes will moſt readily operate in producing herniæ; and accordingly we find, that deſcents of the bowels uſually occur only in ſuch parts.

The parts which from anatomy we would *à priori* ſuſpect to be moſt liable to ſuch protruſions, are the openings in the external oblique muſcles; the arch formed by Poupart's ligament for the paſſage of the great blood-veſſels of the thigh; and the umbilicus, where the ſame degree of firmneſs does not take place as is met with in the reſt of the tendinous expanſion of the abdominal muſcles. Sometimes, however, it happens, that parts of the viſcera are protruded between the interſtices of the different muſcles of the abdomen; but theſe are not frequent occurrences.

287 Of the hernial ſac.

In whichever of theſe ſituations a protruſion of any portion of the inteſtines occurs, except in the caſe of the hernia congenita, as all the viſcera are contained within the peritonæum, a portion of that membrane, it is evident, muſt be carried down together with the parts protruded; and in every ſuch inſtance, it is this portion of the peritonæum, which goes down along with the gut, that is termed the *hernial ſac.* The ſize of this ſac is various in different ſubjects, and in different ſtages of the ſame diſorder.

288 An hernia of long ſtanding becomes enlarged in bulk, and has its ſac thickened.

On the firſt appearance of the diſeaſe, the ſac is commonly of no very conſiderable ſize, as ſuch ſwellings ſeldom acquire any great bulk at once: but by repeated deſcents of the bowels, the ſac comes to be puſhed lower and lower, till in ſome inſtances its bulk becomes very conſiderable indeed; and when in this advanced period of the diſorder the ſac happens to be laid open, it is found to contain either large quantities of omentum or inteſtine, and frequently large portions of each.

As the peritonæum has this property in common with many other parts of the body, of thickening according to the degree of any gradual extenſion applied to it, ſo in many inſtances the thickneſs and firmneſs of the hernial ſac are often really aſtoniſhing.

Although every inſtance of a bowel protruded from its natural ſituation is to be conſidered as a derangement, and as ſuch ought to excite our attention for its reduction; yet daily inſtances occur both of recent herniæ, and of thoſe of longer ſtanding, in which no bad ſymptoms are produced from ſuch protruſions of the viſcera. Thus it is well known, that hernial ſwellings of every kind very frequently happen, without the patient ſuffering in any other manner than from the inconvenience ariſing from the bulk of the tumours. But in general the caſe is otherwiſe; troubleſome ſymptoms moſt frequently occur; and at all events, when the reduction of a hernia can be accompliſhed with any kind of propriety, it ought always to be effected as quick as poſſible.

289 Cauſes of the bad ſymptoms attending herniæ.

All the bad ſymptoms which are found to occur in herniæ, proceed, as may be readily ſuppoſed, either from obſtruction to the paſſage of the fæces when the inteſtinal canal forms the tumour, or from a ſtoppage of circulation occaſioned by ſtricture on the prolapſed parts; ſo that the attending ſymptoms, it is evident, will be always more or leſs hazardous, according to the nature of the parts ſo protruded.

290 An omental hernia the leaſt dangerous.

Thus, when omentum alone forms the ſubſtance of hernial ſwellings, as that organ does not appear to be ſo immediately neceſſary for life as many of the other viſcera, ſuch tumours accordingly are not ſo frequently productive of bad conſequences, at leaſt they are ſeldom in any degree ſo hazardous as when a part of the alimentary canal is either protruded by itſelf or along with omentum.

291 Yet may ſometimes bring on a mortification.

Although this, however, is in general the caſe; yet it does ſometimes happen, that even an omental rupture is productive of no ſmall degree of danger. When a ſtricture ſo complete upon it occurs as to occaſion a ſtoppage of circulation in the protruded part, mortification with all its bad conſequences muſt be the certain event: And beſides, the connection between the omentum, ſtomach, and other viſcera, is ſuch, that a ſudden deſcent of any conſiderable portion of the former ſometimes brings on vomiting, hickup, and other troubleſome ſymptoms: And laſtly, although a rupture containing omentum only, might not of itſelf produce any thing bad; yet as the paſſage through which the omentum has ſlipped, muſt of neceſſity continue open ſo long as that viſcus remains protruded, and as that circumſtance alone muſt ſo long as it continues render it more eaſy for a portion of gut likewiſe to get down, this of itſelf is a ſufficient reaſon for even this ſpecies of hernia deſerving the ſerious attention of practitioners.

But whatever the contents of ſuch ſwellings may be, as their remaining in ſome inſtances for a conſiderable length of time without being productive of any bad ſymptoms, muſt proceed entirely from the circulation continuing to go freely on, notwithſtanding the derangement of parts; ſo, whenever a ſtricture occurs upon the protruded viſcera, ſufficient to produce either a ſtoppage of the circulation, or of the fæcal contents of the alimentary canal when a portion of gut forms the diſeaſe, the following in general are the ſymptoms which accrue.

292 Enumeration of the ſymptoms attending an hernia with ſtricture.

An elaſtic colourleſs ſwelling is obſerved at the part affected. A ſlight pain is felt not only in the ſwelling itſelf, but, if part of the alimentary canal is down, an univerſal uneaſineſs is perceived over the whole abdomen; and this pain is always rendered worſe by coughing, ſneezing, or any violent exertion. The patient complains of nauſea; frequent retching; can get no diſcharge by ſtool; becomes hot and reſtleſs; and the pulſe is commonly found quick and hard. When the ſwelling is entirely formed by a portion of gut, if no fæces be contained in it, it has a ſmooth, equal ſurface; and is eaſily compreſſible, but inſtantly returns to its former ſize on the preſſure being removed: but, in gut-ruptures of long ſtanding, where hard fæces have collected in the protruded bowels, conſiderable

able inequalities are detected. When again the tumour is compoſed both of gut and omentum, its appearance is always unequal, it feels ſoft and ſomewhat like dough, and of courſe is not ſo elaſtic as when part of the inteſtinal tube only is down; for although, like the other, it is compreſſible, it does not ſo readily regain its former dimenſions on the preſſure being taken off.

It has been a received opinion, that in caſes of ſtrangulated hernia the ſymptoms ſhould be leſs violent when the inteſtine is accompanied by a portion of omentum, than when gut alone is down. Little or no difference, however, is produced by this circumſtance; for when a gut becomes obſtructed and inflamed, the ſymptoms thereby induced are nearly the ſame whether the omentum be down with it or not.

293 Theſe ſymptoms cannot be occaſioned by the mere deſcent of the omentum.

It will be readily ſuppoſed, however, that the ſymptoms we have deſcribed never can happen from the preſence of omentum *only:* For although ſtricture produced on a portion of omentum, even when no part of the inteſtinal tube is down, does now and then occaſion a good deal of diſtreſs, ſuch as pain in the part, ſickneſs, vomiting, and twitching pains through the whole belly; yet no obſtruction of the gut ever occurs from this, and of courſe none of the ſymptoms ever prove ſo alarming as when any part of the gut is affected. If theſe ſymptoms we have deſcribed as being produced by a ſtrangulated gut, are not now obviated by a removal of the ſtricture which produced them, the nauſea and retching terminate in frequent vomitings, firſt of a bilious, and afterwards of a more fetid matter; the belly becomes tenſe; the pain turns more violent; a diſtreſſing convulſive hickup comes on; the fever, which before was not apparently of much conſequence, now becomes very formidable; and a total want of reſt, with a very diſagreeable ſtate of anxiety, continues through the whole courſe of the complaint.—

294 Signs of a mortification of the inteſtine.

Theſe ſymptoms having gone on with violence for ſome time, the patient is at laſt commonly ſuddenly relieved from all manner of pain; when he flatters himſelf every riſk is for certain over. But inſtead of that, the pulſe, from having been hard and frequent, becomes languid and interrupted; cold ſweats break out over the whole body, but eſpecially on the extremities; the eyes acquire a kind of languor; the tenſeneſs of the abdomen ſubſides, and the ſwelling of the part affected diſappears; the teguments covering the parts, which before were either of a natural appearance, or had ſomewhat of a reddiſh inflamed caſt, now acquire a livid hue, and a windy crepitous feel is diſtinguiſhable all over the courſe of the ſwelling. If the protruded parts have not of themſelves gone entirely up, their return is now in general eaſily effected by a ſmall degree of preſſure, and the patient then diſcharges freely by ſtool; but the cold ſweats increaſing, the hickup turns more violent, and death itſelf is at laſt uſhered in by its uſual forerunners, ſubſultus tendinum, and other convulſive twitchings.

Theſe are the ordinary ſymptoms of what is termed a *ſtrangulated* or *incarcerated gut-hernia:* that is, when the parts protruded become ſo affected by ſtricture as to produce pain; and do not either return to their natural ſituations on the patient's getting into a horizontal poſture, or cannot even be immediately replaced by the hands of a practitioner.

295 Method of cure.

In whatever ſituation a ſtrangulated hernia occurs, the only rational method of cure, it is evident, muſt conſiſt in the removal of that ſtricture which prevents the return of the protruded parts. It is that ſtricture which ought to be conſidered as the cauſe of all the miſchief; and unleſs it be removed, nothing effectual can be done for the relief of the patient.

Various methods have been attempted by practitioners for the removal of ſtricture in theſe diſorders; all of them, however, may be comprehended under two general heads.

I. Such as effect a reduction of the protruded parts, without the interpoſition of inciſion or any chirurgical operation properly ſo called; and,

II. A diviſion of the parts producing the ſtricture, ſo as to admit of a replacement of the deranged viſcera, conſtituting what is termed the *operation for the hernia.*

The remedies to be employed for accompliſhing the firſt of theſe, are, a proper poſture of the patient, with the manual aſſiſtance of a practitioner; blood-letting, ſtimulating glyſters, opiates, the warm bath, and proper applications to the tumour itſelf.—If theſe fail, there is then no other means of cure left but the operation of dividing the integuments, and replacing the viſcera in the manner afterwards to be deſcribed.

SECT. VI. *Of an Eryſipelas, Gangrene, and Mortification.*

296 Eryſipelas produced by an inflammation of the membranes.

It has been already obſerved, that inflammation of a membrane produces an eryſipelas, as the inflammation of a muſcular or fleſhy part produces a tumour and abſceſs. The diſeaſe is attended with a much greater fever than a common inflammation, and it is much more dangerous. The internal medicines proper in theſe caſes have been taken notice of under the article MEDICINE, n° 324. It remains therefore to treat only of the external applications; and here we find, that till very lately there have been ſuch ſtrong prejudices againſt applying any thing cooling or emollient to parts afflicted with an eryſipelas, that the moſt abſurd practices have been adopted.

297 Abſurd preſcriptions concerning this diſeaſe.

Thoſe who maintain the chimerical opinion that a volatile acid was the cauſe of the diſeaſe, adviſe chalk to be ſtrewed upon the inflamed part: ſome uſed fomentations of ſoap; others medicated bags filled with elder-flowers, moiſtened with wine and water or vinegar: ſome a decoction of ſheeps dung in wine; while others employed epithems compoſed of Venice treacle and ſpirit of wine. Some thought lixivium and oil a better remedy, while others preferred a poultice made of oatmeal and water made without boiling.—Hoffman adhered to the method of applying dry medicated powders; and modern phyſicians have followed him, though they have thought proper to ſubſtitute wheat-flour, or Peruvian bark in powder, as preferable to the remedies recommended by him. Amidſt all this variety of preſcriptions, however, the uſe of cooling and emollient applications has been almoſt univerſally reprobated, from a notion of their checking perſpiration and repelling the diſeaſe:

298 Emollients recommended by Dr Kirkland.

but Dr Kirkland, who has treated this matter at great length, is entirely of opinion that emollients are the only remedies to be depended upon; and recommends a cataplaſm compoſed of four ounces of the ſoft crumb of bread, a quart of milk, and four ounces of hog's lard, boiled ſlowly together till the poultice acquire ſuch a conſiſtence that it will not ſtick to the fingers. Poultices, he ſays, can never be good without long boiling; but as they are at any rate inconvenient when the diſeaſe is ſeated in the head and face, he recommends cooling emollient ointments.

299 Internal cauſes of gangrene, according to Mr O'Halloran.

It is not very uncommon for an inflammation, whether of the common or eryſipelatous kind, to terminate in a gangrene and mortification: nor is it uncommon for this diſeaſe to ariſe in different parts of the body from internal cauſes, without any external tumour appearing; or at leaſt the tendency to gangrene is ſo ſtrong, that it may be ſaid to take place almoſt inſtantaneouſly. The internal cauſes of gangrene, according to Mr O'Halloran, are,

I. An highly vitiated diſpoſition both of ſolids and fluids; and of this our author reckons four claſſes. 1. When the ſolids and fluids are ſo much vitiated, that all attempts to reſtrain the diſeaſe are vain, and only hurry on death the ſooner. 2. When the whole body is vitiated, yet in a leſs degree than the former; in which caſe, by ſtrong ſtimulants and cordials, the patient may ſurvive by means of nature throwing the general vice to ſome particular part, by the loſs of which life is preſerved. 3. Where the malignity is much leſs, ſo that the patient may be cured without the loſs of a limb. And, 4. Where the blood, though not highly vitiated, is yet deprived of its balſamic properties, ſo that all ſores are healed with great difficulty and very conſiderable length of time.

II. Gangrene may ariſe from an hot, bilious, and inflammatory ſtate of the blood; in which caſe the parts are endowed with a great degree of ſenſibility, and a ſlight hurt will frequently bring on the moſt alarming ſymptoms.

III. Where there is a groſſneſs of the humours, with no great degree of activity in the blood itſelf, and a wound or hurt ſupervenes. Here the ſyſtem has not ſufficient power to raiſe the degree of inflammation neceſſary for producing pus; nor often, by the aſſiſtance of art, to diſcuſs the tumour.

IV. A concerous diſpoſition of the juices often brings on the moſt dreadful ſpecies of gangrene. In this, from the hurting of a wart, a ſlight itching, &c. a ſharp humour will gradually form, by which the muſcles, ligaments, blood-veſſels, and bones, are gradually conſumed; nor will it ceaſe its advances till the injured parts are totally ſeparated from the body.

V. Another ſpecies of gangrene, Mr O'Halloran ſays, is endemic to the poor of Ireland; and conſiſts in an anchyloſis and caries of the bones of the tarſus, coming with or without hurt. The cauſe of this he ſuppoſes to proceed either from the extreme poverty of theſe people, or from their working continually in bogs and marſhy lands.

300 Signs of an approaching gangrene.

A gangrene is known to be approaching, when the pain, redneſs, and tenſion of the inflamed part, together with the concomitant fever, increaſe, at the ſame time that little change is made in the ſize of the tumour. Mortification or ſphacelus firſt appears by a change of colour in the part, from a bright red to a leaden or livid caſt, with ſmall veſicles containing a thin acrid ſerum diſperſed over its ſurface. In the mean time the pain abates; the pulſe ſinks, but continues frequent; the tumour at laſt loſes its tenſeneſs, and turns quite black and flaccid. This blackneſs is the ſign of the mortification becoming complete; the part, meanwhile, loſing all ſenſation, at the ſame time that it emits a conſiderable fetor; at laſt, too, a ſoftneſs or flaccidity in general takes place, together with an entire diſſolution of the different parts of which the organ is compoſed. There are, however, ſome inſtances of what is called *dry gangrene*, in which the parts continue totally mortified for a great length of time, without either turning very flaccid, or running into diſſolution. But ſuch caſes never occur from inflammation; they happen commonly from the flow of blood to ſuch parts being put a ſtop to by compreſſion of one kind or another, as tumours, ligatures, or other ſimilar cauſes, obſtructing the principal arteries that uſed to ſupply them; which, when the ſtoppage of the circulation is complete, always occaſion a very ſlow, tedious, mortification; and as the parts in ſuch inſtances are no longer ſupplied with freſh quantities of fluids, while a conſiderable evaporation muſt ſtill be going on, ſuch a degree of humidity cannot, therefore, poſſibly occur as does in other caſes of gangrene. So that ſpecies of the diſorder has, perhaps, with propriety enough, been termed the *dry gangrene*.

301 Of a dry gangrene.

302 Of the white gangrene.

There are many other varieties of the diſeaſe enumerated by authors, as the *white gangrene*; in which the parts ſuppoſed mortified do not turn black, but retain nearly their former colour, &c. Whether ſuch complaints, however, can with propriety be denominated *gangrene* or not, may properly be doubted: but as it is chiefly that ſpecies of the diſorder which ſucceeds to inflammation that is now particularly to be treated of, and in which no ſuch varieties are ever obſerved, it is not here neceſſary to carry the inquiry farther; and that eſpecially as nearly the whole mode of treatment, afterwards to be pointed out, applies with almoſt equal propriety to every variety of the diſeaſe.

303 Eryſipelas moſt liable to end in gangrene.

Of all the inflammatory complaints to which the ſyſtem is liable, that ſpecies of the diſorder termed *eryſipelas* is obſerved moſt frequently to terminate in gangrene; and whenever phlegmon is in any degree conjoined with an eryſipelatous affection, which it not unfrequently is, it ſeems thereby to have acquired the ſame tendency, by being, as was already remarked, more difficult to bring to ſuppuration than the true phlegmon, and by going on more frequently to the mortified ſtate.

304 Means of preventing the diſeaſe.

The beſt and moſt effectual means of preventing mortification in every caſe of inflammation, is to endeavour either to obtain its reſolution or ſuppuration; the different remedies for both which purpoſes have already been fully pointed out. But in ſome caſes, the diſorder is far advanced, and gangrene already begun, before the ſurgeon's aſſiſtance is called in: in others, the inflammation runs ſo high, and proceeds ſo quickly, that gangrene occurs notwithſtanding the uſe of all the remedies that can be applied; in ſome inſtances, as we have already obſerved, ſo quickly, even that the inflammatory ſtate is ſcarcely thoroughly diſcerned till mortification appears to be beginning.

305 Of carbuncles.

This is moſt remarkably the caſe in carbuncles, what by the French are termed *charbons;* in which the inflammation proceeds ſo rapidly to mortification, that there is ſeldom any evident tumour raiſed, the parts turning black, and ending in real gangrene, often in the courſe of 24 hours from the firſt attack.

The quick progreſs uſually made by this diſorder renders it the worſt, and perhaps the moſt dangerous, ſpecies of inflammation. For when it occurs internally upon any of the viſcera, as it ſometimes does, it muſt, probably in every inſtance, prove fatal, as no remedies we are acquainted with can ever prevent its progreſs towards the laſt ſtage of mortification. Externally, indeed, when not very extenſive, and not ſeated on any of the large blood-veſſels and nerves, carbuncles are frequently got the better of; that is, with the loſs of the affected parts.

306 They almoſt always occur from a putrid ſtate of the juices.

As carbuncles always appear without any evident external cauſe, they are in general moſt probably owing to a ſcorbutic or putrid ſtate of the fluids; for when putreſcency prevails in the ſyſtem, every inflammatory affection that occurs, proceeds much more readily to the mortified ſtate than inflammation in other circumſtances ever does. This opinion with reſpect to the cauſe of carbuncles depending upon a putreſcent ſtate of the ſyſtem, is particularly confirmed by their occurring moſt frequently as a ſymptom in peſtilential diſorders; for although they are ſometimes met with even in this country, where the plague is now never known, yet the real carbuncle is far from being a common occurrence.

307 Of external applications to gangrenous parts.

The internal remedies proper for preventing gangrene have been already mentioned under the article Medicine, n° 281. In the way of external application, a variety of remedies have been pointed out, and particularly thoſe of the antiſeptic kind; ſuch as all the warm gums and balſams, ardent ſpirits, and even alcohol: and to admit of their nearer application to the ſound parts, with a view to the preſervation of theſe from putrefaction, deep ſcarifications through the diſeaſed and into the ſound parts have been generally recommended. But although ſuch articles may be of uſe in preſerving dead animal-ſubſtances from corruption; yet that they will always prove ſerviceable in the ſame manner in living bodies, is probably very much to be doubted. And it is even apprehended, by the ſtrong irritation they always occaſion when applied to a living fibre, that, in ſuch caſes as the preſent, they may rather do miſchief; it being only a very ſlight degree of inflammation that is required to bring on a ſuppuration. The inciſions, too, when carried into the ſound parts, with a view to facilitate the operation of ſuch remedies, may likewiſe do harm; not only from the riſk of wounding the blood-veſſels, nerves, and tendons, that lie in the way, but alſo by allowing a free and farther entrance of the putreſcent fluids into the parts not yet affected: and unleſs they are carried ſo deep as freely to reach the ſound parts, applications of the antiſeptic kind can never have any effect in anſwering the purpoſe for which they were intended.

308 Little to be depended on.

309 Scarifications of no advantage.

For theſe reaſons, and from never having obſerved any advantage to accrue from ſcarifications in mortification, the beſt practitioners are of opinion that they may be entirely laid aſide. Theriac was in former times, and ſtill is with ſome practitioners, a very common application in every caſe of gangrene; but, from the beſt experience, it ſeems never to produce any evident good effects.

310 An embrocation recommended by Mr Bell.

All the advantages commonly obſerved from the great variety of applications recommended for gangrene, are obtained with more eaſe, and generally too with more certainty, from the uſe of any gentle ſtimulating embrocation; which, by exciting a ſlight irritation upon the ſurface, and eſpecially when aſſiſted by a free uſe of the bark, at laſt commonly produces ſuch a degree of inflammation as is wiſhed for. With this view, a weak ſolution of ſal ammoniac in vinegar and water has been known to anſwer exceedingly well; a dram of the ſalt to two ounces of vinegar and ſix of water, forms a mixture of a very proper ſtrength for every purpoſe of this kind; but the degree of ſtimulus can be eaſily either increaſed or diminiſhed, according to circumſtances, by uſing a larger or ſmaller proportion of the ſalt.

Although, for the reaſons formerly advanced, inciſions may not in general be proper; yet in ſuch caſes where the mortification runs very deep, it is ſometimes of ſervice to make ſcarifications into the diſeaſed parts, ſo as to remove part of them; which by taking off a conſiderable load perhaps of putrid dead fleſh, not only leſſens the fetor, which in ſuch caſes is always conſiderable, but often renders it more eaſy for the ſound parts to free themſelves from the remainder. When with this view, however, inciſions are had recourſe to, care ſhould always be taken that they be not carried the length of the ſound parts.

311 Signs of a ſeparation of the mortified parts.

Whenever, either by the means recommended, or by the effects of a natural exertion of the ſyſtem, a ſlight inflammation appears between the diſeaſed and ſound parts, we may in general, with tolerable certainty, expect, that in due time a thorough ſeparation will take place; and when a full ſuppuration is once fairly eſtabliſhed, there can then be little doubt but that the mortified parts will be very ſoon and eaſily removed.

A ſeparation being altogether effected, the remaining ſore being then to be conſidered merely as a ſimple purulent ulcer, may be treated in the ſame manner as ſuch ſores generally are, with very ſlight eaſy dreſſings; at the ſame time that proper attention muſt always be paid to the ſupport of the general ſyſtem, by the continuance of a nouriſhing diet, the bark, and ſuch quantities of wine as may ſeem neceſſary.

312 In what caſes amputation is neceſſary, and when it ſhould be performed.

Although, however, ſuch ulcers as remain after gangrenous affections that have not been very extenſive, may in general be healed in the manner now mentioned; yet in mortifications ſeated on the extremities, and that have penetrated to the bones, it ſometimes happens that the whole ſurrounding ſoft parts come to be deſtroyed, ſo that amputation of the member is thereby rendered neceſſary. Amputation, however, ſhould never be had recourſe to, till a full and thorough ſeparation of the mortified parts has taken place: for it is now, in every caſe of gangrene, from undoubted experience, an eſtabliſhed maxim in ſurgery, That though the parts immediately contiguous to thoſe evidently diſeaſed may outwardly appear ſound; yet as there can be no certainty of thoſe even directly below remaining ſo, till a full ſtop, or even till a complete ſeparation, of the mortification has been

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been produced ; ſo, till that has evidently taken place, it is in ſuch caſes a general rule never to amputate a member ; there being no other ſecurity for the diſorder not returning, and that immediately too upon the remaining ſtump.

It muſt be obſerved, however, that ſo ſoon as an entire ſeparation of the gangrene has occurred, no time ſhould be unneceſſarily loſt in having recourſe to the operation ; for ſo long as any of the corrupted parts remain in contact with the ſound, the ſyſtem muſt ſtill be ſuffering conſiderably by the conſtant abſorption of putreſcent particles, that ſo long will undoubtedly take place.

Sect. VII. *Of Diſeaſes of the Bones.*

313 Of exoſtoſis

The bones, as well as the ſofter parts, are liable to be ſwelled, either thoughout their whole length, or to have tumours formed on particular parts of them.

Exoſtoſis is one ſpecies of tumour of the bone; but, according to Mr Bromefield, in ſtrictneſs of definition, no ſwelling ſhould be called ſo, but an excreſcence continued from a bone, like a branch from the trunk of a tree. Under this head, therefore, is ranked the *node;* which may be produced by external injury, ſuch as contuſions and fractures : but in both theſe caſes, the tumour has had the epithet of *benign* affixed, and can hardly be called a diſeaſe, as pain is ſeldom conſequent to ſuch riſings from the bone ; but it rather ſhould be termed a deformity

314 Tophus.

There are riſings or tumours obſervable on the bones which are often the conſequents of venereal virus, and are termed *tophi*, *gummi*, or *nodes*.—Tophus, is a ſoft tumour in the bone; and ſeems to be formed of a chalky ſubſtance, that is intermediate between the oſſeous fibres. Theſe cretaceous extravaſations ſometimes are found on the ligaments and tendons, as well as on the bone ; and when collected into a toph, may ſometimes be taken out by the knife. We have many inſtances, where chalk ſtones in gouty people make their way out through the ſkin of the fingers and toes.

315 Gummi.

Gummi is likewiſe a ſoft tumour; but is on the ſurface of the bone, between it and the perioſteum ; and its contents reſemble gum ſoftened, from whence it has taken it name. Poſſibly, by obſtruction in the nutrient veſſels of the bone, a rupture of ſome of them occaſions the ſerous liquor to eſcape, which, by making its way between the fibres of the bone, arrives at its ſurface; and being detained by the reſiſtance of the perioſteum, its moſt liquid parts being evaporated, and the remainder condenſed by the inflammation, and conſequently this inelaſtic covering being ſtretched, it becomes inſpiſſated, and forms this ſpecies of *exoſtoſis*, as it is generally called. When this is the cauſe, and the indiſpoſition of the habit in general got the better of, preſſure by a ſteel inſtrument, adapted to the part affected, is the proper cure.

316 Nodes.

The confirmed venereal node has the appearance of a divarication of the oſſeous fibres, probably from ſome inſpiſſated humour obſtructing the nutrient veſſels, but not extravaſated ; this occaſioning an extenſion of the perioſteum, produces a violent pain, which, when nocturnal, is the characteriſtic of a venereal cauſe. When only the perioſteum is thickened, but the bone not affected, a courſe of mercury, by attenuating the obſtructed humour, and fitting it to be carried out of the body by the proper outlets, will often produce a perfect cure : but when the bone itſelf is diſeaſed, this method will fail. But here the diviſion of the extended perioſteum has been known to give perfect eaſe.

The uſual method, formerly, was to apply a cauſtic equal to the extent of the node, which being laid bare, required exfoliation before it could be cicatrized. If the inciſion is made early, that is, before matter be formed under the inveſting membrane, it ſeldom requires exfoliation ; and, as we often find that the bone itſelf is not affected, but only the perioſteum thickened, we may be deceived even after a careful examination: it is therefore proper that the patient ſhould be pretty far advanced in a courſe of mercurial unction, before even the inciſion is made ; for, ſhould the tumour decreaſe and the pain abate during the courſe, chirurgical aſſiſtance, with the knife, moſt likely may become unneceſſary.

317 Of a ſpina ventoſa.

The name *exoſtoſis* may not be improper to thoſe excreſcences that are found on the ſurface of a bone in a ſpina ventoſa, or in conſequence of a caries from other cauſes; and it is not unfrequent for the oſſific matter, being let looſe by the ſeparation of a caries, to flow in ſuch quantity as even to incruſt, and ſometimes to form a caſe to a diſeaſed bone. But where a bone is enlarged throughout its whole length, or its epiphyſes become ſwelled, as in ſcrophulous caſes, particularly in children, which caſe is in them called *pœdarthrocace*, ſuch ſwellings cannot with propriety be ranked in this claſs; and whether ſcorbutic, ſcrophulous, or venereal leaven gives riſe to theſe tumours of the bone, the habit of the body in general muſt be corrected, to give any chance of a cure.

A bone may become carious firſt in its internal parts; and that from external injury, as well as from a vitiated ſtate of the animal-fluids. Authors ſeem not to agree as to the technical term for this kind of diſeaſe of the bones ; ſome calling it *cancer* or *gangræna oſſis;* others, *ſpina ventoſa*, from the pointed extuberances uſually attendant on this diſorder of the bone; and ſome again, *teredo*, from the appearance of the carious bone, like wood that is worm-eaten.

318 Symptoms of this diſtemper.

It is univerſally allowed, that this diſeaſe takes its riſe from matter being formed either in the diploë, or in the marrow: whenever obſtruction is begun in the veſſels expanded on, or terminating in, the medullary cyſts, the conſequence will be inflammation, and, if not early removed, will form matter ; for this reaſon, this caſe may be called *abſceſſus in medulla*. Whenever, then, a patient complains of dull, heavy pain, deeply ſituated in the bone, poſſibly conſequent to a violent blow received on the part ſome time before, and though at the time the patient complains of this uneaſineſs, within the bone, the integuments ſhall appear perfectly ſound, and the bone itſelf not in the leaſt injured, we have great reaſon to ſuſpect an abſceſſus in the medulla. Children of a bad habit of body, though they have not ſuffered any external injury, will often become lame, and complain of the limb being remarkably heavy; and though not attended with acute pain, yet the dull throbbing uneaſineſs is conſtant. If rigors happen during the time the patient labours under this indiſpoſition, it generally implies that matter will be formed within the ſubſtance of the bone. On the age of the patient, and the

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ſolidity of the bone, will in a great meaſure depend the next alarming ſymptoms, to thoſe who are not acquainted thoroughly with the caſe and the conſtition of the patient. As mothers and nurſes are often inattentive to children on the firſt complaining of pain and heavineſs in a limb, if, after rubbing it with their hand a few minutes, the child, amuſed by ſome new toy or play-fellow, think himſelf eaſier, the good women, as they cannot ſee any thing wrong, determine it a growing-pain, as they call it; but, ſoon after, the extremities of the bone formerly complained of begin to ſwell, or, poſſibly throughout its whole extent, it becomes inlarged; a ſurgeon is then ſent for, who, if a man of experience, will know this to be an abſceſſus in medulla, or true ſpina ventoſa, as it is called: if neither of theſe ſymptoms ſhould be conſequent to the firſt complaint, the great inſenſibility of the bone in ſome ſubjects will prevent that acuteneſs of pain uſual in other parts where matter is formed, though the acrid matter is eroding the bone during the whole time it is contained within it. This matter at length having made its way through, arrives at the perioſteum, where it creates moſt violent pain, as well from its ſharpneſs as from its increaſed quantity, occaſioning an extenſion of the perioſteum. The integuments then become ſwelled and inflamed, and have a ſort of emphyſematous feel. On being examined by preſſure, the tumour will ſometimes be leſſened, from part of the matter retiring into the bone: from this appearance to the touch, moſt likely the name of *ventoſa* was added to the term *ſpina*. When we are aſſured of matter being under the perioſteum, we cannot be too early in letting it out, as it will ſave a conſiderable deal of pain to the patient, though probable it may not be of any conſiderable advantage in reſpect to the carious bone; for, where the fluids in general are vitiated, no chance of cure can be expected from topical remedies; but where the conſtitution is mended, nature will ſometimes aſtoniſh us in her part; as the carious bone will be thrown off from the epiphyſes, or the teredines will be filled up by the oſſific matter that flows from the parts of the bone where ſome of the ſpinæ have come away.

319
Of the method of cure.

If proper medicines are given, the childern well ſupported, and the parts kept clean and dry, patience and perſeverance will frequently give great credit to the ſurgeon. In caſe it ſhould have been thought adviſable to apply the hand of a trephine at the upper and lower extremities of the tibia, to give free diſcharge to the matter, the waſhing it away, as well as the ſmall crumblings of the carious bone, by means of deterſive and drying injections, has been known to contribute greatly to the curing this kind of caries, after the habit of body in general had been mended.

320
Of the friableneſs and ſhortneſs of the bones.

Beſides thoſe above-mentioned, the bones are liable to two oppoſite diſeaſes; the one termed *friabilitas*, the other *mollities*: the former peculiar to adults, the latter more frequent in infants, though ſometimes ſeen in adults, from a vitiated ſtate of their juices.

The bones, when deprived of their cementing liquor, by paſſing through fire, become friable. From repeated ſalivations, and in old people, they have been rendered extremely brittle; inſomuch that in many ſubjects they have been fractured merely from their weight and the action of the muſcles: but in ſuch caſes, this is not owing to the friability of the bones, but to the loſs of ſubſtance, from the eroſion of the bone by an acrimonious humour thrown on it; to which cauſe perhaps may be attributed the diſeaſe called *rickets* in children. The effects of ſcorbutic humour in rendering the bones ſoft in many inſtances, have often been remarked.

321
Of the rickets.

From the obſervations we daily make, that the bones of rickety children become ſoft and flexible, in different parts of the ſame bones, though their ſhape is preſerved; that the known effect on bones when ſoaked in an acid menſtruum, is, that the cretaceous particles being deſtroyed, they become membranous; from theſe remarks, we are induced to attribute the ſpecies of the diſorder to an acrimonious humour thrown on the bones, and obſtructed in their internal veſſels. By proper diet, gentle friction with coarſe cloths, exerciſe, and cold bathing, theſe invalids will frequently get their conſtitution ſo much changed, as that by the time they arrive at the age of twenty years there ſhall not remain the leaſt veſtige of their former diſeaſe. The epiphſes are generally moſt affected in this ſpecies of the diſorder.

For want of early attention to invalids of this ſort, we find that their bones not only become ſoft, and yield to the powers of the muſcles, but remain diſtorted the reſt of their lives, though they have acquired a perfect degree of ſolidity. In ſuch caſes, correcting the vitiated juices only will not reſtore the bones to their natural ſtate; therefore the aſſiſtance of a ſkilful mechanic is neceſſary both to ſupport the parts improperly acted on, and to alter the line of direction of the diſtorted oſſeous fibres.

322
Symptoms indicating the approaching deformity in rickety children.

Though the curvature of the extremities, or thickneſs of the ends of the bones near their articulations, may give the firſt alarm to thoſe who are conſtantly with children, yet there are other ſymptoms that give earlier notice than theſe, which, had they been timely diſcovered by proper judges, it is highly probable that the curvature of the limbs in many children might not have happened. The belly generally becomes larger in this diſeaſe, from the increaſed ſize of the contained bowels, as it is not unlikely but that the meſenteric glands are the firſt parts obſtructed; obſtructions of the liver, ſpleen, and pancreas ſoon follow; the head then becomes enlarged; then a difficulty of breathing, which is generally ſuppoſed to be the effects of taking cold, ſucceeds; the ſternum is elevated and ſharp, and the thorax becomes contracted; the ſpine is protruded in ſeveral parts; the pelvis altered, according to the preſſure of the parts within, and habitual inclination of the patient, at times, to obtain that line of direction in which the perpendicular from the centre of gravity may fall within the common baſe of the body, the extremities of the cylindrical bones, and the ends of the ribs, next the ſternum, become enlarged; ſoon after this the bones in general become ſoft and flexible, yielding in ſuch directions as the ſtrongeſt muſcles determine by their actions.

323
Appearance of the bones after death.

The bones of children who die of this diſorder, we obſerve, are not only rendered ſoft, but the veſſels within their ſubſtance are replete with blood, whoſe texture is totally broken, and has more the appearance of thin chocolate than blood: the perioſteum in many places is ſeparated, and the intermediate ſpace between it and the bone filled with extravaſated fluid; and caries is almoſt as frequent as the ſeparation of the perioſteum. The muſcles in ſuch bodies generally appear pale and flabby.

315 Mr Bromfield's method of cure.

Where the affection of the meſenteric glands is evident, Mr Bromfield aſſerts, that after a doſe or two of the pulvis baſilicus to empty the inteſtines thoroughly, the purified crude quickſilver is by much the moſt efficacious medicine to remove obſtructions in thoſe glands. When the belly begins to ſoften and ſubſide, the chyle paſſes without interruption, and the child begins to get fleſh; then the cold bath becomes truly ſerviceable, and the decoction or cold infuſion of the Peruvian bark is a proper reſtorative; but the cold bath uſed too early, or the bark given before there is a free circulation of chyle through the lacteals, would be very injurious.

The mollities oſſium, in ſome caſes, may be produced from a redundancy of the oleaginous parts of the blood, or from a laxity of the ſolids, by which the fluids are not ſufficiently attenuated, nor properly blended and mixed: the conſequence of which will be obſtructed perſpiration, the habit in general loaded with groſs, phlegmatic, and ſerous humours, and the oſſific matter not united or condenſed as in an healthy ſtate.

From this debility and laxity of the ſolids, and conſequent viſcidity and lentor of the fluids, the rickets are produced; and, from what has been remarked, we may account for the largeneſs of the brain, liver, and ſpleen, and the ſwelled belly, the diſtortion of the vertebræ and pelvis, contracted thorax, and curvature of the extremities.

The method of cure confirms us likewiſe in the cauſe of theſe ſymptoms; for, by ſtrengthening the fibrous ſyſtem, by uſing gentle exerciſe, a dry diet, good air, aromatics, and cold bathing, this kind of invalids are generally reſtored to health.

316 Of the palſy of the lower extremities with curvature of the ſpine.

Among the diſeaſes of the bones we may likewiſe take notice of that *palſy of the lower extremities* which takes place, as is generally ſuppoſed, in conſequence of a curvature in ſome part of the ſpine. To this diſtemper both ſexes and all ages are equally liable. When it attacks an infant of only a year or two old or under, the true cauſe of it is ſeldom diſcovered until ſome time after the effect has taken place. The child is ſaid to be uncommonly backward in the uſe of his legs, or it is thought to have received ſome hurt in the birth. When the child is of an age ſufficient to have already walked, and who has been able to walk, the loſs of the uſe of his legs is gradual, though in general not very ſlow. He at firſt complains of being very ſoon tired, is languid, liſtleſs, and unwilling to move much or at all briſkly. Soon after this he may be obſerved frequently to trip and ſtumble, though there be no impediment in his way; and whenever he attempts to move briſkly, he finds that his legs involuntarily croſs each other, by which he is frequently thrown down without ſtumbling; and when he endeavours to ſtand ſtill in an erect poſture without ſupport, even for a few minutes, his knees give way and bend forward. As the diſtemper advances, it will be found that he cannot, without much difficulty and deliberation, direct either of his feet exactly to any one point; and very ſoon after this, both legs and thighs loſe a good deal of their natural ſenſibility, and become quite uſeleſs. In adults, the progreſs of the diſeaſe is much quicker, but the ſymptoms nearly the ſame.

Until the curvature of the ſpine is diſcovered, the complaint generally paſſes for a nervous one; but when the ſtate of the back-bone is adverted to, recourſe is almoſt always had to ſome previous violence to account for it. That this might have been the caſe in ſome few inſtances, might be admitted; but in by far the greateſt number ſome prediſpoſing cauſe muſt be looked for.

317 Differences between this and a common palſy.

Mr Pott, who has written a treatiſe upon this diſeaſe, recommends it to our obſervation, that though the lower limbs are rendered almoſt uſeleſs, or even entirely ſo, yet there are ſome circumſtances in which it differs from a common nervous palſy. The legs and thighs, though ſo much affected, have neither the flabby feel of a truly paralytic limb; nor have they that ſeeming looſeneſs at the joints, nor the total incapacity of reſiſtance which allows the latter to be twiſted almoſt in all directions: on the contrary, the joints have frequently a conſiderable degree of ſtiffneſs, particularly the ankles; by which ſtiffneſs the feet of children are generally pointed downward, and they are prevented from ſetting them flat upon the ground.

318 Of the curvation of the ſpine in this diſeaſe.

The curvature of the ſpine, which is ſuppoſed to be the cauſe of the complaint, and with which it is always accompanied, is various in ſituation, extent, and degree, being either in the neck or back, and ſometimes, though very ſeldom, in the upper part of the loins. Sometimes it comprehends only two vertebræ, ſometimes three or more, by which the extent of the curve neceſſarily becomes more or leſs; but whatever may be the number of the vertebræ concerned, or whatever may be the degree of curvature, our author never ſaw the arms affected.

When a weak infant is the ſubject of this diſorder, and the curvature is ſituated in the vertebræ of the back, it is not uncommon for the whole back to become what is called *humped*, at the ſame time that the bones of the thorax are conſiderably altered; whence ſuch perſons are juſtly ſaid to be ſhortened in their ſtature; but in all caſes where this effect has been gradually produced, the curvature of the ſpine is always the firſt of theſe deformities which makes its appearance.

Before the curvature of the ſpine is diſcovered, or while no attention is paid to it, the complaint is, as we have already ſaid, looked upon to be nervous; ſuch internals as are ſuppoſed to be proper in nervous caſes are given, together with warm liniments, embrocations, and bliſters, to the part affected: and when the true cauſe is known, recourſe is always had to ſteel ſtays, the ſwing, ſcrew-chair, and other pieces of machinery. But all theſe are productive of no real or permanent good; the patient becomes unhealthy, and, languiſhing for ſome time under a variety of complaints, dies in an emaciated ſtate, or drags on a miſerable exiſtence, confined to a great chair or bed, totally deprived of the power of locomotion, and uſeleſs both to himſelf and others.

At firſt the general health of the patient ſeems not to be at all, or at leaſt not materially, affected; but when the diſeaſe has continued for ſome time, and the curvature is thereby increaſed, many inconveniences and complaints come on; ſuch as difficulty in reſpiration, indigeſtion, pain, and what they call *tightneſs at the ſtomach*, obſtinate conſtipations, purgings, involuntary flux of urine and fæces, &c. with the addition of ſome nervous complaints, which are partly cauſed by the alterations made in the form of the cavity of the thorax, and partly by impreſſions made on the abdominal viſcera.

319
Not the original cauſe of the diſorder.

Mr Pott was led to a knowledge of the true cauſe and cure of this diſtemper, from obſerving the caſe of a youth of 14, who was reſtored to the uſe of his limbs immediately after a ſeemingly accidental abſceſs near the part. From this he was inclined to think, that the curvature of the ſpine was not the original cauſe of the diſorder, but that the ſurrounding parts were prediſpoſed towards it by ſome affection of the ſolids and fluids there. For theſe ſuſpicions he had the following reaſons:

1. That he had never ſeen this paralytic effect on the legs from a mal-formation of the ſpine, however crooked ſuch mal-formation might have rendered it, or whether ſuch crookedneſs had been from the time of birth, or had come on at any time afterwards during infancy.

2. That none of thoſe ſtrange twiſts and deviations, which the majority of European women get in their ſhapes from the very abſurd cuſtom of dreſſing them in ſtays during their infancy, and which put them into all directions but the right, ever cauſed any thing of this kind, however great the deformity might be.

3. That the curvature of the ſpine, which is accompanied by this affection of the limbs, whatever may be its degree or extent, is at firſt almoſt always the ſame, that is, it is always from within, outward, and ſeldom or never to either ſide.

4. That ſince he had been particularly attentive to the diſorder, he had remarked, that neither the degree nor the extent of the curve made any alteration in the nature or degree of the ſymptoms at firſt, nor for ſome time after the appearance; or, in other words, that the ſmalleſt curvature, in which only two or three of the vertebræ were concerned, was always at firſt attended by the ſame ſymptoms as the largeſt.

5. That although it ſometimes happened that a ſmart blow, or a violent ſtrain, had immediately preceded the appearance of the curve, and might be ſuppoſed to have given riſe to it; yet in many more adults it happened that no ſuch cauſe was fairly aſſignable, and that they began to ſtoop and to faulter in their walking, before they thought at all of their back, or of any violence offered to it.

6. That exactly the ſame ſymptoms are found in infants, and in young children, who have not exerted themſelves, nor have been injured by others, as in the adult who has ſtrained himſelf or received a blow; and that the caſe was ſtill the ſame in thoſe grown people who have neither done nor ſuffered any act of violence.

7. That although it muſt be allowed that a diſlocation of any of the vertebræ would moſt probably be attended with the ſame kind of ſymptoms from the preſſure it muſt make on the ſpinal marrow, yet it is alſo moſt probable, that ſuch ſymptoms would be immediate, and attended with great pain in the part; neither of which is in general the caſe here.

330
Appearances after death in thoſe afflicted with this diſorder.

"Theſe conſiderations (ſays he) appeared to me to have much force; but what confirmed me in my opinion was the ſtate of the parts forming the curvature, and which I had ſeveral fair opportunities of examining after death. By theſe examinations I found, in infants, in young children, and in thoſe who had been afflicted with the diſorder but a ſmall ſpace of time, that the ligaments connecting the vertebræ which formed the curve, were in ſome degree altered from a natural ſtate, by being ſomewhat thickened and relaxed; and that what are called the bodies of thoſe bones, were palpably ſpread and enlarged in their texture, juſt as the bones forming the articulations are in children who are called *rickety*. That in thoſe who had long laboured under the diſtemper, and in whom the ſymptoms were aggravated, whatever might be their age, the ligaments were ſtill more thickened, relaxed, and altered; the bodies of the bones more ſpread, more enlarged, and more inclining to become carious; and the cartilages between the bodies of the vertebræ much compreſſed and leſſened in ſize: and that in all thoſe who had ſo long laboured under the diſeaſe, as to have been deſtroyed by it or by its conſequences, the corpora vertebrarum were completely carious, the intervening cartilages totally deſtroyed, and a quantity of ſanies lodged between the rotten bones and the membranes inveſting the ſpinal marrow (A).

"All theſe circumſtances put together, induced me, as I have already ſaid, to ſuſpect, that when we attribute the whole of this miſchief to the mere accidental curvature of the ſpine, in conſequence of violence, we miſtake an effect for a cauſe; and that previous both to the paralytic ſtate of the legs, and to the alteration of the figure of the back-bone, there is a prediſpoſing cauſe of both, conſiſting in a diſtempered ſtate of the ligaments and bones, where the curve ſoon after makes its appearance.

"While the ſubject was freſh in my mind, I happened to be at Worceſter; and in a converſation on it with the late Dr Cameron of that place, I mentioned to him my opinion and my doubts. The doctor concurred with me; and at the ſame time mentioned a circumſtance which made a ſtrong impreſſion on me. He ſaid, that he remembered, ſome years ago, to have noted a paſſage in Hippocrates, in which he ſpeaks of a paralyſis of the lower limbs being cured by an abſceſs in the back or loins; and that, taking the hint from this, he, Dr Cameron, had, in a caſe of a palſy of the legs and thighs, attended by a curvature of the back-bone, endeavoured to imitate this act of nature, by exciting a diſcharge near the part; and that it had proved very advantageous. He alſo referred me to Mr Jeffrys, a ſurgeon of eminence at Worceſter, for a farther account of the ſame kind of attempt. This gentleman confirmed what Dr Cameron had told me; and aſſured me that he had found the method equally ſucceſsful.

It

(A) In the body of a man who died not long ſince of this diſorder in its laſt and worſt ſtate, the bodies of three of the vertebræ were not only quite carious, but completely ſeparated from all connection with the other parts of the ſame vertebræ.

Theory.

It may eaſily be ſuppoſed, that theſe accounts, from gentlemen of veracity, and of reputation in their profeſſion, ſtill added to my deſire of knowing more on this ſubject, and determined me to loſe no opportunity of getting information.

331 Caſes of the diſtemper, by Mr Pott

"The firſt that offered was an infant, whoſe curvature was in the middle of the neck, and who had loſt the uſe of its legs for about two or three months. I made an iſſue by inciſion on one ſide of the projection, and gave ſtrict charge to the mother to take care that the pea was kept in: the woman, who had no faith in the remedy, did not take the proper care; and conſequently the diſcharge was not equal to what it ſhould and might have been: but notwithſtanding this neglect, at the end of about three weeks or a month the child was manifeſtly better, and began to make uſe of its legs; it was then ſeized with the ſmall-pox, and died. The bodies of the vertebræ concerned in the curve were larger than they ſhould be, and than thoſe above and below were, and their texture much more open and ſpongy; which difference appeared immediately, before the parts covering them were diſſected off.

"Some time paſſed before I had another opportunity. My next patient was a tall thin man, about 35 years old, who thought that he had hurt himſelf by lifting a heavy weight. His legs and thighs were cold, and what he called *nummy*, but not abſolutely uſeleſs: he could with difficulty go about the room with the help of a pair of crutches; but he could neither riſe from his chair, nor get on his crutches, without the aſſiſtance of another perſon, nor could he without them walk at all.

"I made a ſeton on each ſide of the curve which was in his back, about the middle; and having given his wife directions how to dreſs them, I called on him once in three or four days. At the end of ſix weeks he had recovered the due degree of ſenſation in his limbs, and found much leſs neceſſity for the uſe of his crutches. He could riſe from his bed and from his chair without aſſiſtance: and, by means of one crutch and an underhand ſtick, could walk for an hour or more without reſting and without fatigue. The ſetons had now, from not having been properly managed, worn their way out; and I would have converted each of them into an iſſue: but as neither the patient nor his wife had ever believed that the diſcharge had had any ſhare in his amendment, but, on the contrary, that he would have been better without it, he would not ſubmit to what I propoſed, and I left him. At the diſtance of about three weeks from the time of my leaving him, I met him in the ſtreet walking very ſtoutly with a common cane, of which he made little or no uſe. I aſked him what he had done: He told me that the ſores had continued to diſcharge till within a few days; but that he had drank a great deal of comfrey-root tea with iſinglaſs; and he ſuppoſed that had cured him.

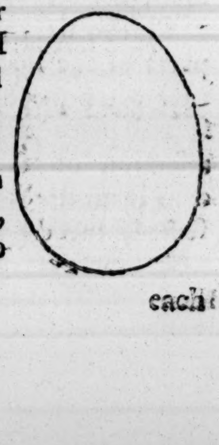
"I believe that the cure of this man will, by all who know any thing of medicine, be thought to be ſo unlikely to have been effected by the comfrey and iſinglaſs, that my inference in favour of the ſeton will not be thought unreaſonable, and that my determination to proſecute the method, from what I had heard and ſeen, was well founded.

"Within the courſe of the laſt ten or twelve months, I have had ſeveral fair opportunities of doing this, both in St Bartholomew's hoſpital and out of it; and am very happy to be able to ſay, that it has not only always anſwered, but in moſt inſtances greatly exceeded, my moſt ſanguine expectations, by reſtoring ſeveral moſt miſerable and totally helpleſs people to the uſe of their limbs, and to a capacity of enjoying life themſelves, as well as of being uſeful to others.

"I have now in the hoſpital a boy about 12 years old, whoſe caſe was ſo truly deplorable, that I made the experiment merely to avoid the appearance of inhumanity by diſcharging him as incurable without trying ſomething. The curvature was in his back, and conſiſted of three or four vertebræ; but by means of the weakneſs thereby induced, the whole ſet of dorſal ones had ſo univerſally and gradually given way, that he was exceedingly deformed both behind and before: he was ſo abſolutely incapable of motion, that he could neither turn himſelf nor ſit up in his bed: his feet were pointed downwards, and his ankles ſo ſtiff, that, when he was held up under the arms, the extremities of his great toes touched the floor, nor could his feet be brought flat to the ground by any means or force whatever. In ſhort, he was as perfectly and as totally helpleſs as can be ſuppoſed; and at the ſame time in an exceeding general bad ſtate of health, from diſorders of the thoracic and abdominal viſcera. In this ſtate he had been more than a year. It is now about three months ſince the cauſtics were applied: he is become healthy, and free from moſt of his general complaints: has the moſt perfect uſe of his legs while he is in bed; can walk without the aſſiſtance of any body, or any thing to hold by; and from his manner of executing this, will, I make no doubt, in a very ſhort ſpace, recover perfectly the uſe of his legs. To this I ought to add, that notwithſtanding a conſiderable degree of deformity does, and I ſuppoſe will remain, yet the ſpine in general is ſo much ſtrengthened, that he is ſome inches taller than he was four months ago.

332 His method of cure.

"The remedy for this moſt dreadful diſeaſe conſiſts merely in procuring a large diſcharge of matter, by ſuppuration, from underneath the membrana adipoſa on each ſide of the curvature, and in maintaining ſuch diſcharge until the patient ſhall have perfectly recovered the uſe of his legs. To accompliſh this purpoſe, I have made uſe of different means, ſuch as ſetons, iſſues made by inciſion, and iſſues made by cauſtic; and although there be no very material difference, I do upon the whole prefer the laſt. A ſeton is a painful and a naſty thing; beſides which, it frequently wears through the ſkin before the end for which it was made can be accompliſhed. Iſſues made by inciſion, if they be large enough for the intended purpoſe, are apt to become inflamed, and to be very troubleſome before they come to ſuppuration; but openings made by cauſtic are not in general liable to any of theſe inconveniences, at leaſt not ſo frequently nor in the ſame degree: they are neither ſo troubleſome to make or maintain. I make the eſchars about this ſize and ſhape on each ſide the curve, taking care to leave a ſufficient portion of ſkin between them. In a few days, when the eſchar begins to looſen and ſeparate, I cut out all the middle, and put into



each a large kidney-bean: when the bottoms of the ſores are become clean by ſuppuration, I ſprinkle, every third or fourth day, a ſmall quantity of finely-powdered cantharides on them, by which the ſores are prevented from contracting, the diſcharge increaſed, and poſſibly other benefit obtained. The iſſues I keep open until the cure is complete; that is, until the patient recovers perfectly the uſe of his legs, or even for ſome time longer: and I ſhould think that it would be more prudent to heal only one of them firſt, keeping the other open for ſome time; that is, not only until the patient can walk, but until he can walk firmly, briſkly, and without the aſſiſtance of a ſtick; until he can ſtand quite upright, and has recovered all the height which the habit, or rather the neceſſity, of ſtooping, occaſioned by the diſtemper, had made him loſe."

SECT. VIII. *Of the different Operations in Surgery, and in what Caſes they are proper.*

333 In what caſes bleeding is proper.

THE moſt ſimple operations are thoſe in which there are neither arteries to tie up, fractures to reduce, nor any divided parts to conjoin by ſuture. They are chiefly phlebotomy or blood-letting; ſimple inciſions into abſceſſes in order to diſcharge the matter; and drawing of teeth.——Phlebotomy is uſeful in all caſes where there is a great tendency to inflammation, or where one particular part of the body has been accidentally ſo much weakened that it cannot bear the impetus of the fluids moving through it with their uſual velocity. Hence it is uſeful in all large wounds, fractures, or contuſions, becauſe the impetus of the blood and other fluids, in ſuch caſes, is too great to be borne by the weakened and diſtracted veſſels; and if they are entirely divided, it would keep them perpetually bleeding. Hence phlebotomy is alſo of uſe in reſtraining profuſe hæmorrhagies from any part of the body. On the other hand, it is exceedingly hurtful where the craſis of the fluids tends to a diſſolution, or where the vital powers are ſo weakened that they cannot propel the humours with their uſual degree of force. In caſes of ſcurvy, therefore, bleeding is prejudicial; in mortifications, or in large ſuppurations; becauſe thus the vital powers, which are already reduced, become ſtill more weak, the ſcorbutic diſpoſition is increaſed, or the pus cannot be formed as it ought to be. For the ſame reaſon, in the lues venerea, however it might ſeem to be indicated by the pain and ſwellings, it is entirely improper. The ſame may be ſaid of all other eruptive diſorders, even the itch: for though ſome have a notion of the good effects of bleeding in this diſeaſe, it is always evidently the worſe for it; and it will conſtantly be found, that even this diſeaſe proceeds from ſuch cauſes as weaken the vital powers, ſuch as naſtineſs, damp, and poor low diet; while, on the other hand, thoſe who keep themſelves clean, and live on wholeſome ſtrengthening food, are ſeldom or never troubled with it.

Phlebotomy may be performed in many different parts of the body; and it is found to be more effectual when performed in the neighbourhood of an affected place than at a diſtance from it. Where the affection of the ſyſtem is general, bleeding in the arm is moſt eligible; but if the head or throat are affected, bleeding in the jugular vein is preferable. In ſwellings and inflammations of the throat, it will alſo be of ſervice to open the ſublingual veins: in ſuppreſſions of the menſes, bleeding in the ankle is recommended: and it has been found in ſome caſes neceſſary to perform the operation even on the veins of the penis and eyes.

334 Cupping and leeches.

Cupping, with or without ſcarification, is a kind of partial phlebotomy. Dry-cupping brings a flux of all the humours towards that part on which the cupping-glaſs is applied; and hence is uſeful in bringing the milk towards the breaſts of women, in haſtening ſuppuration, &c. If ſcarification is uſed, it diſcharges the blood not only from the ſmall cutaneous veins, but alſo from the arteries. Hence it is of ſervice in local inflammations.—In the ſame caſes alſo the application of leeches is uſeful.

335 Inciſion.

Inciſion, or ſomething equivalent to it, is always neceſſary in the caſe of abſceſſes, or large collections of matter which cannot otherwiſe be diſcharged: tho' large inciſions are to be avoided as much as poſſible; both on account of their evident cruelty, and becauſe they are apt to produce an abſorption of matter, and occaſion an hectic. In caſes of white ſwellings and cancerous tumours, they ought always to be avoided as much as poſſible, unleſs with a view totally to extirpate the diſeaſed parts. On the other hand, in caſes of punctured nerves and tendons, inciſion is not only neceſſary, but frequently the only means of preſerving the patient from death.

336 Iſſues and ſetons.

Under the head of inciſion we may likewiſe reckon the putting in of iſſues and ſetons, though the former are more commonly put in by cauſtic. They are uſeful in drawing off collections of matter, when ſituated in ſuch places that they cannot be opened. They are alſo of uſe in the caſe of palſy of the lower extremities with curvature of the ſpines, as has been already explained, n° 332. In apoplexies, palſies, and other diſorders of the head, they are alſo frequently of eminent ſervice.

337 Tooth drawing.

Under the article MEDICINE, n° 314. it is obſerved, that where the teeth are carious, the only remedy is to draw them out. However, we are not therefore to imagine, that in all caſes of toothach, even when the pain is very ſevere, that we are to have recourſe to this remedy. The teeth are never known to exfoliate, and grow up again, as other bones will do; and therefore the preſervation of them is well worthy our attention. But when, by the gradual putrefaction of a tooth, the patient is kept in continual pain, und there is danger of a caries, by means of the affection of the tooth, taking place in the jaw-bone, tooth-drawing then becomes abſolutely neceſſary, and is generally attended with little pain to the patient, as in ſuch caſes the teeth are generally looſened in their ſockets. It muſt be remembered, however, that the upper teeth are much worſe to draw that the under ones, being not only much faſter in their ſockets, but connected in ſuch a manner with the nerves of the eyes, eſpecially thoſe called the *eye-teeth*, as makes the drawing of them very dangerous.

338 Of ſutures.

Of the more difficult operations in ſurgery, the firſt is ſuture; which neceſſarily takes place in all caſes where we deſire the union of parts that would otherwiſe remain at too great a diſtance, or where we want to form an adheſion which would not take place naturally. Hence it is neceſſary in all wounds made in the fleſhy parts, and attended with conſiderable gaping of the lips. It is alſo neceſſary in wounds of the abdominal viſcera, where they are protruded ; in wounds of the aſpera arteria, of the œſophagus ; in mortifications of the inteſtines, in order to make the edge of the inteſtine adhere to the wound ; in the hare-lip, &c.

339 Ligature of arteries. Under this article likewiſe we may include the ligature of arteries, which muſt neceſſarily take place in all caſes where theſe veſſels are wounded, either accidentally or by deſign, as in the amputation of limbs ; and to the ſame we may refer the operation for aneuriſms to be afterwards deſcribed, and which ſeems to be the only method of treating theſe tumours with any probability of ſucceſs.

340 Reduction of fractures, &c. Reduction of fractured and diſlocated bones ought always to be attempted in caſe of ſuch accidents, unleſs where the bones are broken into ſuch ſmall pieces that there can be no hope either of their uniting or of preſerving the limb.

341 Amputation. Amputation is neceſſary only in ſuch caſes as thoſe already mentioned, namely, where, either by external accident, or from ſome internal cauſe, the limbs cannot by any means be preſerved. Hence it is uſeful only in thoſe diſeaſes which are plainly deſtructive of life by the infectious matter abſorbed, or where the parts are entirely mortified and uſeleſs.

342 Trepanning. Trepanning of the cranium ought to take place in all caſes where there are ſymptoms of an oppreſſed brain, provided we have any indication of the place under which the miſchief lies, as has already been explained, n° 131. An operation of a ſimilar kind may alſo upon ſome occaſions be neceſſary on other bones, in order to remove a part of their carious ſubſtance.

343 Of the paracenteſis. In caſes of dropſy, of hydrocele, empyema, and hydrothorax, the operation called *paracenteſis*, or tapping, ought to take place, if the water can be diſſipated by no other means. Some collections of water, however, there are, in which this operation is highly improper, and indeed fatal; ſuch as the hydrocephalus and hydrorachitis, ſpina bifida, or collection of aqueous fluid in the cavity of the ſpine. In this laſt caſe the ſpinal marrow is compreſſed, and all the lower parts of the body become paralytic. The evacuation of this water is certain death; and if any hope remains, it muſt be by making uſe of ſuch internal remedies as are mentioned under the article Medicine, n° 370, for the hydrocephalus.

344 Operation for the hernia. The operation for the bubonocele, or ſtrangulated hernia, is not to be performed on patients until after every method of reducing the gut has been attempted in vain. It is very fatal, in this country, but much leſs ſo in France; but whether owing to any peculiarity in the climate of that country, or to the ſuperior dexterity of the French ſurgeons, is unknown. An operation of the ſame nature is ſometimes performed in caſe of a volvulus of the inteſtines : and it has even been recommended in caſe of indurated fæces, or balls choaking up their cavity ; though, as the ſigns of theſe are at leaſt but equivocal, we have not heard of any operators ſo bold as to attempt them.

345 Of lithotomy, &c. One of the moſt capital operations in ſurgery is that of lithotomy, or cutting for the ſtone. This has been practiſed from the early ages of medicine, but has received great improvements in modern times. Before it is attempted, all poſſible means ſhould be uſed for diſſolving the ſtone by the ſolvents propoſed under the article Medicine, n° 486. However, the operation may be ſafely performed on perſons of all ages ; and though many have died under it, many have alſo ſurvived, and been by it recovered from the moſt miſerable ſtate imaginable to perfect health.

Beſides theſe, there are ſeveral other operations in ſurgery which are connected with particular diſeaſes, and without which theſe diſtempers cannot be cured ; ſuch as the operation for the fiſtula lachrymalis, for the cataract, for the fiſtula in ano, for the phymoſis, paraphymoſis, &c. all of which ſhall be deſcribed under their proper heads.

PART III. PRACTICE OF SURGERY.

Practice.

THIS conſiſts in performing of the different operations in ſurgery, in ſuch caſes and with ſuch intentions as are moſt proper ; for which laſt the directions of a phyſician are often thought neceſſary ; though, as before obſerved, it were much better that ſurgeons were themſelves acquainted with the caſes where manual operations are neceſſary, and when they are not.—We ſhall begin with theſe operations which are moſt ſimple and eaſily performed.

Sect. I. *Of Blood-letting.*

346 General rules reſpecting phlebotomy. There are ſome general rules and obſervations which relate equally to this operation in whatever part of the body it is practiſed ; theſe we ſhall in the firſt place enumerate with as much accuracy as poſſible, and ſhall afterwards proceed to treat particularly of blood letting in the arm and other parts.

I. In this, as in every other operation, the ſituation of the patient, and of the operator likewiſe, ought to be preciſely fixed. As the ſituation of a patient during the operation of blood-letting, has a conſiderable influence on the effects produced by the evacuation upon the ſyſtem, this circumſtance therefore merits our particular attention. In ſome diſorders, it is the object of this remedy, to evacuate a conſiderable quantity of blood without inducing fainting : When this is the caſe, and when from former experience it is known that the patient to be operated upon is liable during the evacuation to fall into a faintiſh ſtate, a horizontal poſture, either upon a bed or on a couch, ought to be preferred to every other; for every practitioner is now well acquainted with this fact, that fainting is not near ſo ready to occur in a horizontal as in an erect poſture.

347 Of the different purpoſes to be anſwered by bleeding. It now and then happens, however, that one material advantage expected from the operation of blood-letting, is the production of a ſtate of deliquium ; as, for inſtance, in caſes of ſtrangulated hernia, where a general relaxation of the ſyſtem is ſometimes deſirable. In all ſuch circumſtances, inſtead of a horizontal poſture, the more erect the patient is kept, the more readily will a ſtate of fainting be induced : So that

the particular object in view from the operation muſt at all times determine this matter.

While we thus, however, attend particularly to the poſture of the body at large, the particular poſition of the limb or part to be operated upon muſt not be neglected. In every operation it is a matter of much importance to have the patient ſeated in a proper light, but in none is it more material than in blood-letting. The beſt general rule that can be given upon this point is, that the patient ought to be ſo placed, as that the principal light of the apartment ſhall fall directly upon the part to be operated upon, ſo that the vein to be opened may be made as apparent as poſſible.

348 Of the poſture of the operator.

But, whatever may be the poſition of the part to be operated upon, and whether the patient is to be placed on a bed or on a chair, according to Mr Bell, the ſurgeon ought always to be ſeated. The operation may, no doubt, be done while the ſurgeon is ſtanding; and it is moſt frequently indeed performed in this manner: But it can never be done either with ſuch ſteadineſs or neatneſs, as when the operator is firmly ſeated on a chair.

II. From the coats of veins being more flaccid than thoſe of arteries, and from the blood not proceeding with ſuch rapidity in the former as in the latter, an opening made in one of theſe will ſeldom diſcharge blood freely, unleſs the vein is either cut entirely acroſs, which in general would be productive of diſagreeable conſequences, or that the blood be prevented from returning to the heart, by means of a ligature placed between the heart and that part of the vein in which the opening is to be made.

349 Of compreſſing the vein.

The patient being properly ſeated, the next ſtep, in every operation of this kind, muſt therefore be, by means of a proper bandage, ſo to compreſs the vein intended to be opened, as to prevent the blood from returning to the heart; and, for the ſame reaſon, an equal degree of preſſure, it is obvious, ought to be applied to all the other veins of the part: for if this circumſtance ſhould not be attended to, the communication preſerved by the collateral correſponding branches would render the preſſure upon any one particular vein of very little importance. But, independent of its producing a more free diſcharge of blood than could be otherwiſe obtained, this preſſure upon the veins, by inducing an accumulation of their contents, tends to bring them more evidently into view, and conſequently renders it eaſier for the operator to to effect a proper opening than he would otherwiſe find it.

Although compreſſion, however, to a certain extent, is neceſſary for this purpoſe of accumulating a quantity of blood in the veins, and for afterwards diſcharging it at an opening made by the lancet, it is at the ſame time perfectly evident, that any conſiderable degree of preſſure, inſtead of forwarding theſe purpoſes, muſt obſtruct them entirely: for if the preſſure intended to be applied to the veins only, ſhould accidentally be carried ſo far as to reſt materially upon the arteries connected with them, all farther acceſs of blood to the veins would be thereby cut off, ſo that no evacuation of importance could take place at any opening to be made in them. Whenever it is intended, therefore, to evacuate blood in this manner, a good deal of nicety is requiſite in applying this preſſure upon the veins: it ought always to be carried ſo far as effectually to compreſs the veins of the part, but never to ſuch a degree as to obſtruct the circulation in the correſponding arteries. When we ſee that the preſſure applied has the effect of raiſing the veins, and if at the ſame time the pulſation of the artery is diſtinctly felt in the inferior part of the member, we may then be certain that it is to a very proper degree, and that it ought not to be carried farther: for by the ſwelling of the veins we are ſure that they are ſufficiently compreſſed; and by the arteries continuing to beat, it is evident that a continued flow of blood may be expected.

350 Of making the opening.

III. The reflux of blood to the heart being in this manner prevented, the next queſtion to be determined is, the beſt method of making an opening into the vein. Different inſtruments have been invented for this purpoſe; but there are two only which have been retained in uſe, and which are all, therefore, that here require to be mentioned. Theſe are the lancet and the phlegm. This laſt, on being placed immediately on the part to be cut, is, by means of a ſpring, puſhed ſuddenly into the vein, and produces an opening of the exact ſize of the inſtrument employed.

251 The phlegm deſcribed.

The phlegm, in many parts of Germany, has acquired ſome reputation, particularly in taking blood from the jugular vein: but there are various objections to the uſe of this inſtrument, which muſt undoubtedly prevent it from ever coming into general uſe; and theſe particularly are, that we are obliged, from the nature of the inſtrument, to regulate the deepneſs to which it is to go before it is applied. Now we know well, that in blood-letting this is a circumſtance we are never by any means certain of: for we frequently, after the introduction of a lancet, find it neceſſary to go much deeper than was at firſt expected; ſo that when a phlegm is uſed, unleſs we employ one on every occaſion of a length which cannot be frequently required, we muſt often meet with diſappointments.

But the moſt material objection to this inſtrument is, that where there are arteries or other parts lying below the veins, and in any danger of being hurt by the operation of blood-letting, the riſk is much greater with the phlegm than with the lancet. For when the lancet is uſed, after the vein is once opened, the orifice may be enlarged at pleaſure without any additional riſk, merely by carrying the inſtrument forward along the courſe of the vein in the ſame depth to which it was at firſt introduced: whereas with the phlegm, ſo ſoon as it enters the vein, it muſt for certain paſs directly downwards to its full length; a circumſtance which adds greatly to the riſk of wounding the parts underneath.

Independent of this, too, by the uſe of the lancet, we have it much more in our power to command an orifice of a determined ſize than when the phlegm is uſed: So that, without heſitation, we may ventnre to pronounce the phlegm to be an inſtrument in no degree neceſſary.

352 Of the proper form of lancets.

The broad-ſhouldered lancet in ordinary uſe, is an inſtrument which ought to be laid entirely aſide. For opening abſceſſes it is very well calculated; but for the operation of blood-letting, it ought never to be uſed. The capital objection to this kind of lancet is, that the broadneſs of its ſhoulders produces always a wound in the external teguments of perhaps three times the ſize of the opening made in the vein; a circumſtance which adds no advantage whatever to the operation; on the contrary, it produces much unneceſſary pain in the firſt inſtance; it renders it frequently a very difficult matter to command a ſtoppage of the blood; and the wounds produced by it are commonly ſo extenſive, as to render them very liable to terminate in partial ſuppurations; an occurrence which always proves painful and diſagreeable to the patient.

The ſpear-pointed lancet, on the contrary, is an inſtrument in every reſpect well calculated for the purpoſe of venæſection. From the acuteneſs of its point, it enters the teguments and vein with very little pain; which, we may here obſerve, is with many patients a circumſtance of no ſmall importance. We are ſure of making the opening in the vein equal, or nearly ſo, to the orifice in the external teguments; and the diſcharge of blood produced by an opening made with one of theſe lancets, is commonly put a ſtop to with great eaſe, immediately on removing the ligature upon the vein.

353
Spear-pointed lancet preferable to the other.

"For theſe reaſons, therefore, (ſays Mr Bell), the ſpear-pointed lancet is highly preferable to every other. And although, with timid practitioners, the acute point of this inſtrument may appear to require more dexterity in uſing it than the broad-ſhouldered lancet; yet the difference in this reſpect is ſo inconſiderable, that a very little experience of its excellency muſt, with every practitioner who gives it a fair trial, ſoon counterbalance all ſuch objections. Indeed, no ſurgeon ought to be truſted in letting blood with the one, whoſe ſteadineſs and dexterity would be in any degree doubted with the other."

354
Method of performing the operation.

IV. The form of lancet being thus fixed upon, we come now to ſpeak of the method of uſing it. The ſurgeon and patient being both properly ſeated, and the ligature having been applied for a ſhort ſpace of time in order to produce ſome degree of ſwelling in the veins, that vein is to be made choice of which, at the ſame time that it appears conſpicuouſly enough, is found to roll leſs than the others on being preſſed upon by the fingers. There are ſome veins which roll ſo much, from being looſe and unconnected with the cellular ſubſtance of the part, that although they may riſe ſufficiently, yet are much worſe to operate upon than others which lie at a much greater depth. That vein therefore is to be preferred, which not only riſes ſo as to become perfectly evident, but which appears to be connected with ſome degree of firmneſs to the contiguous parts. It is ſcarcely thought neceſſary to obſerve here, that when a vein appears to be ſo immediately connected with a contiguous artery or tendon, as evidently to produce ſome riſk of wounding theſe parts in the operation, another vein not liable to ſuch hazard, if it can be procured, ought undoubtedly to be preferred.

355
Dangers attending it.

Veins may lie directly above both arteries and tendons, and yet no manner of riſk be incurred by opening them, provided the operator is ſufficiently ſteady and attentive; but it does now and then happen, that veins are ſo nearly and intimately connected with theſe parts, as to render it hazardous even for the moſt dexterous ſurgeon to attempt this operation.

The vein being at laſt made choice of, the ſurgeon, if he is to uſe his right-~~hand in~~ the operation, takes a firm hold of the member from whence the blood is to be drawn with his left, and, with the thumb of the ſame hand, he is now to make ſuch a degree of preſſure upon the vein, about an inch and half below the ligature, as not only to render the ſkin and teguments ſomewhat tenſe, but at the ſame time to interrupt for a little all communication between the under part of the vein and that portion of it lying between the ligature and the thumb placed as thus directed.

The lancet being bent to ſomewhat more than right angles, the operator now takes it between the finger and thumb of his right-hand; and leaving at leaſt one half of the blade uncovered, he reſts his hand on the middle finger, ring-finger, and little finger, all placed as conveniently as poſſible in the neighbourhood of the vein from whence the blood is to be taken; and having puſhed the point of the inſtrument freely through the ſkin and teguments into the vein, he now carries it forward in an oblique direction, till the orifice is of the ſize he inclines to have it; taking care, during the time of puſhing on the lancet, that its point be kept in as ſtraight a direction as poſſible, for fear of dipping into the parts below.

The inſtrument is now to be withdrawn; and the ſurgeon, removing the thumb of his left hand, is to allow the vein to empty itſelf freely into the different cups previouſly provided for the purpoſe.

356
Of the poſture of the limb.

It is here of importance to obſerve, that during the time the blood is diſcharging, the member ought to be kept in exactly the ſame poſture it was in when the lancet was firſt introduced: otherwiſe the orifice in the ſkin is apt to ſlip over the opening in the vein; a circumſtance which always proves inconvenient, and on ſome occaſions produces a good deal of trouble by the blood from the vein inſinuating itſelf into the ſurrounding cellular ſubſtance.

In taking hold of the lancet, we have directed the ſcales to form rather an oblique angle with the blade of the inſtrument. It will anſwer when they are even at right angles; but a farther ſeparation proves always troubleſome, by throwing the ſcales too much out upon the operator's hand. The length of inſtrument left out from between the finger and thumb is another circumſtance requiring our attention; for unleſs a ſufficient quantity of it is left uncovered, the operator cannot act with freedom. In lancets of an ordinary length, one half of the blade, or very nearly that quantity, ought always to be left out.

The entry of the lancet into the vein is the next circumſtance we have deſired to be attended to. By very little attention, the entrance of the inſtrument into the vein may be diſtinctly perceived: for ſo ſoon as its point has entered the cavity of the veſſel, the reſiſtance to its farther progreſs is evidently found to be much diminiſhed; and immediately on the opening being in any degree enlarged, the blood begins to ruſh out; which is the cleareſt proof of the operation being ſo far complete. On being thus rendered ſure that the lancet has got into the vein, we have alſo deſired that it may be carried forward in an oblique direction, taking care to keep the point of the inſtrument in the ſame degree of elevation from the inſtant it has paſſed fairly through the coats of the vein; and to this part of the operation the moſt particular attention ought to be given. To the want of neceſſary caution in this matter, or rather to the improper regulations held forth upon it by every writer on this ſubject, much of the riſk attending this operation ought to be attributed.

357 Why the Orifice ſhould be oblique.

The propriety of an oblique direction for the courſe of the orifice is very obvious: for when made altogether longitudinal, the ſides of the wound are apt to fall immediately together, ſo as not to admit of a free diſcharge of blood; and, on the other hand, when the vein is cut entirely acroſs, troubleſome conſequences commonly enſue from the wound being very difficult to heal. An orifice ſomewhat oblique with reſpect to the courſe of the vein, is therefore preferable to either. But the material circumſtance to be kept in view, is the direction of the point of the lancet after it has got fairly into the vein.

The reaſon of this laſt precaution is, that the internal orifice of the vein may not be farther extended upwards than the external wound in the ſkin and other teguments, as ecchymoſes, or effuſions of blood into the cellular ſubſtance, have, with the broad-ſhouldered lancet, been found frequently to occur from a contrary management. But when the ſpear-pointed lancet is uſed, this is an occurrence which need never happen; as, from the narrow point of the inſtrument, it may with ſafety be carried on in the cavity of the vein as far as is neceſſary. The orifice produced by it in the vein muſt, when the operation is properly done, be always of very nearly the ſame extent as the external wound in the teguments: and, by the ſame management, we avoid that capital riſk which it is evident muſt always occur from an implicit obedience to the direction alluded to; for one certain effect of raiſing the heel or back-part of the lancet, is, that the point of the inſtrument muſt in the ſame proportion be depreſſed; and the conſequence of lowering the point of the lancet, already perhaps ſliding along the under ſide of the vein, muſt at once appear to be very hazardous: for, in ſuch circumſtances, if the point of the inſtrument be depreſſed, which muſt undoubtedly happen if the back-part of it be elevated, it muſt for certain paſs through the back-part of the vein; ſo that if either an artery, nerve, or tendon, lie contiguous, they muſt of neceſſity be wounded: and we are perfectly convinced, that this cauſe alone has frequently been the origin both of wounded arteries and of pricks in the nerves and tendons. So that as the hazard of the practice, whenever it is attentively conſidered, muſt at once appear evident; and as the ſuppoſed inconvenience, ariſing from a contrary mode of operating, is effectually prevented by the uſe of the ſpear-pointed lancet, all ſuch riſks therefore ſhould be carefully avoided.

358 Of the ſize of the orifice.

With reſpect to the ſize of orifice in caſes of bloodletting, this circumſtance muſt at all times be determined by the nature of the diſorder for which the evacuation is preſcribed. When a ſudden loſs of a conſiderable quantity of blood is intended, either with a view to produce a ſtate of fainting, or for any other reaſon, a free large orifice is abſolutely neceſſary; but in ordinary practice, no neceſſity occurs for this.

In uſing a ſpear-pointed lancet, an orifice of about an eighth part of an inch in length will in general anſwer every purpoſe: but when a lancet with broad ſhoulders is uſed, an opening of twice that ſize is little enough; for, with ſuch an inſtrument, the orifice in the vein can ſeldom be above half the extent of the external opening.

After withdrawing the lancet from the orifice, we have directed the thumb of the left-hand to be removed from the place it was made to occupy. One material uſe of the thumb placed below the part where the lancet was directed to enter, is to keep the teguments and vein firm, ſo as to prevent the latter from rolling. But another advantage occurring from it is, that, by making a ſufficient degree of preſſure upon the vein, it thereby prevents any conſiderable quantity of blood from eſcaping between the time of removing the lancet, and the application of one of the cups for receiving the blood from the orifice in the vein. During this period, it frequently happens that a good deal of blood is diſcharged, to the great annoyance both of the patient, the operator, and byſtanders; a circumſtance which, with a little attention, may be always effectually prevented.

359 Of too ſmall a flux of blood.

V. When the vein is properly cut, and the orifice is made ſufficiently large, it rarely occurs that any difficulty is experienced in procuring all the blood that is wanted. But it now and then happens otherwiſe, either from the orifice of the ſkin and other parts having receded from the opening in the vein, or from the patient having become faintiſh; a ſituation always unfavourable to a free diſcharge of blood. When this laſt circumſtance occurs, a ſtream of freſh air ought to be admitted to the apartment, wine or ſome other cordial ſhould be adminiſtered, and the patient ought to be laid into a horizontal poſture. By theſe means the faintiſhneſs will in general be ſoon removed: but if ſtill the blood ſhould not flow freely, the member ought to be put into all the variety of poſitions that can probably aſſiſt in bringing the openings of the ſkin and other teguments to correſpond with that of the vein; which will ſoon be known to have happened by the blood beginning inſtantly to flow. Throwing the muſcles of the part into conſtant action, by giving the patient a cane or any other firm ſubſtance to turn frequently round in his hand when the operation is done in the arm, will often anſwer in producing a conſtant flow of blood from a vein, when every other means has failed: And, laſtly, when the pulſe in the inferior part of the member is felt very feeble, or eſpecially if it cannot be diſtinguiſhed at all, we may be thereby rendered certain that the ligature is too tight, and may in general have it in our power to produce an immediate flow of blood, by removing the compreſſion thus improperly made upon the arteries of the part.

360 Of ſtopping too great a flux.

VI. A quantity of blood proportioned to the nature of the diſorder being thus diſcharged, the preſſure upon the ſuperior part of the vein ſhould be immediately removed; and this being done, if the ſpear-pointed lancet has been uſed, all farther loſs of blood will in general ſtop immediately. The contrary of this, however, ſometimes occurs, and blood continues to flow freely even after the ligature is removed. When this is the caſe, the operator ought to compreſs the vein both above and below the orifice, by means of the finger and thumb of one hand, ſo as to prevent any farther loſs of blood: And this being done, the limb ought to be waſhed, and entirely cleared of any blood that may have fallen upon it; and the orifice being alſo cleared of every particle of blood, the ſides of it ſhould be laid as exactly together as poſſible; and a piece of court or any other adheſive plaſter being ſo applied as to retain them, it will ſeldom happen that any kind of bandage is neceſſary: but when the blood has iſſued with uncommon violence during the operation, and has been difficult to command after the removal of the ligature, in ſuch inſtances it will be prudent to apply a ſmall compreſs of linen over the plaſter, and to ſecure the whole with a linen roller properly applied round the member.

§ 1. *Of Venæſection in the Arm.*

In applying the ligature for the ſtoppage of the circulation, it ought to be placed about an inch or an inch and half above the joint of the elbow; and in order to prevent the ends of it from interfering with the lancet, the knot ſhould be made on the outſide of the arm. In general, one knot might anſwer; but a ſlip-knot being made above the firſt, renders it more ſecure, and it is very eaſily done.

361
Median baſilic vein ought to be choſen in preference to others.

In forming the choice of a vein from whence blood is to be taken, the general rules we have already laid down upon this point muſt be here particularly attended to. That vein which appears moſt conſpicuous, at the ſame time that it rolls leaſt under the ſkin, ſhould in general be fixed upon; but when an artery is found to lie immediately below, and quite contiguous to ſuch a vein, the operator, if he is not perfectly ſatisfied with his own ſteadineſs, ought rather to take ſome other. In general, however, the artery lies ſo low in this place, that the median baſilic vein, under which it commonly runs, may be opened with perfect ſafety; and as this vein in general appears more conſpicuous than any of the others, probably from the continued pulſation of the artery below obſtructing in ſome meaſure the paſſage of its contents, it is in this reſpect, therefore, more properly calculated for this operation than any of the others. Other circumſtances occur, too, which render the median baſilic preferable to the cephalic or median cephalic veins for the operation of blood-letting. The former, viz. the median baſilic, is leſs deeply covered with cellular ſubſtance; and by lying towards the inner part of the arm, it is more thinly covered with the tendinous expanſion of the biceps muſcle than either of the others. From theſe circumſtances, the operation is always attended with leſs pain when done in this vein than in any of the others.

In blood-letting at this part of the arm, although the operation may be done with the right-hand either upon the right or left arm of the patient, yet it is much more neatly done by performing with the right-hand upon the right-arm, and with the left-hand upon the left-arm of the patient.

In very corpulent people, it ſometimes happens that all the larger veins lie ſo deep as not to be diſcovered by the eye; but when they are ſenſibly felt by the fingers, even although they cannot be ſeen, they may be always opened with freedom. In a few inſtances, however, they can neither be diſtinguiſhed by the eye nor by the finger: in ſuch a ſituation, as they may in general be met with about the wriſt, or on the back-part of the hand, the ligature ſhould be removed from the upper part of the arm; and being applied about half-way between the elbow and wriſt, the veins below will thereby be brought into view; and wherever a vein can be evidently obſerved, there can be no danger in having recourſe to the operation.

§ 2. *Of Blood-letting in the jugular Vein.*

362
Of compreſſing the jugular vein.

There is only one ramification of this vein, viz. its principal poſterior branch, which can eaſily be brought ſo much into view as to be with propriety opened; and even this lies deeply covered with parts, not only with the ſkin and cellular ſubſtance, but with the fibres of the platiſma myoides muſcle; ſo that a conſiderable degree of preſſure becomes neceſſary in order to raiſe it to any height. With a view to produce this, the operator's thumb is commonly adviſed to be placed upon the vein, ſo as to compreſs it effectually about an inch or inch and half below where the opening is to be made. This, however, ſeldom proves ſufficient for the purpoſe, as the blood, on being ſtopped in its progreſs through this branch, eaſily finds a paſſage to the other veins; ſo that unleſs the principal vein on the other ſide of the neck is alſo compreſſed, the vein to be opened can never be fully diſtended. In order to effect this, a firm compreſs of linen ſhould be applied on the largeſt vein on the oppoſite ſide of the neck; and an ordinary garter, or any other proper ligature, being laid directly over it, ſhould be tied with a firm knot below the oppoſite arm-pit; taking care to make ſuch a degree of preſſure, as to put an entire ſtop to the circulation in the vein, which in this way may be eaſily effected without producing any obſtruction to the patient's breathing.

This being done, and the patient's head properly ſupported, the operator, with the thumb of his left-hand, is now to make a ſufficient preſſure upon the vein to be opened; and with the lancet in his right-hand is to penetrate at once into the vein; and, before withdrawing the inſtrument, an orifice ſhould be made large enough for the intended evacuation. It may be proper to obſerve, that a more extenſive opening ought always to be made here than is neceſſary in the arm, otherwiſe the quantity of blood is generally procured with difficulty: and beſides, there is not the ſame neceſſity for caution on this point here that there is in the arm; for it ſeldom or never happens, that any difficulty occurs, in this ſituation, in putting a ſtop to the blood after the preſſure is removed from the veins, all that is commonly neceſſary for this purpoſe being a ſlip of adheſive plaſter without any bandage whatever.

363
The integuments and vein ought always to be divided at once.

In order to bring the vein more clearly into view, ſo as afterwards to be able to open it with more exactneſs, it has been recommended, that the ſkin, cellular ſubſtance, and muſcular fibres covering the vein, ſhould be previouſly divided with a ſcalpel before attempting to puſh the lancet into it. There is not, however, any neceſſity for this precaution, as it rarely happens that any difficulty is experienced in procuring a free diſcharge of blood by opening the vein and teguments at once in the manner directed. And it is here, as in every inſtance where it is neceſſary to take blood by a lancet, if it is not done at once, the patient is much diſappointed, and is ſure to attribute the failure entirely to a fault in the operator.

364 § 3. *Of Venæſection in the Ankles and Feet.*

When blood is to be diſcharged from the veins of theſe parts, it will be readily underſtood, that the firſt ſtep to be taken is a proper compreſſion of the veins, ſo as to produce an accumulation of their contents. The ligature for this purpoſe being applied with a ſufficient degree of tightneſs a little above the ankle-joint, all the branches of the vena ſaphena, both in the inſide and outſide of the foot, come at once into view; and as this vein lies every where very ſuperficial, being in general covered with ſkin only, wherever a proper vein appears conſpicuouſly it may with ſafety be opened.

With a view to encourage the diſcharge of blood, it has been a conſtant practice in blood-letting in theſe veins, to dip the feet into warm-water immediately on the orifice being made. But this is a very inaccurate method of proceeding, as the quantity of blood taken in this manner can never be aſcertained with preciſion; for the blood being all mixed with the water, the operator can never be in any degree certain as to this point: and beſides, there does not appear to be any neceſſity for this aſſiſtance; for when the compreſſion of the ſuperior part of the veins is made effectual, and the orifice is of a proper ſize, there is ſeldom more difficulty in obtaining a full diſcharge of blood from the veins of theſe parts than from any other veins of the body.

On removing the ligature, the diſcharge is generally ſtopped at once; ſo that a piece of adheſive plaſter applied over the orifice, anſwers all the purpoſe of a bandage.

365 § 4. *Of blood-letting in the Veins of the Forehead, Temples, and Occiput.*

Before proceeding to cut the veins, an handkerchief or neckcloth ought to be drawn tight round the neck; that, by compreſſing the jugular vein, thoſe branches of it may become more turgid and conſpicuous. The vein being opened, the patient muſt hold down his head, that the blood may not trickle from his forehead into his eyes or mouth, when the ſtream does not ſpin out with ſufficient force. If the blood does not ſtop of itſelf after a due quantity is diſcharged, you muſt compreſs the orifice with your finger; and, after wiping the forehead and face, apply a compreſs or two, and then your bandage.

366 § 5. *Of Blood-letting in the Veins called* Ranulæ, *under the Tongue.*

To bleed in theſe veins, a ſtricture being made upon the neck as before, you then elevate the apex of the tongue with your left-hand, while with the lancet in your right you circumſpectly open firſt one and then the other on each ſide, becauſe the apertion of one only will hardly ever diſcharge blood enough to give any conſiderable relief. When you judge a ſufficient quantity of blood has run out of the mouth into your veſſel, remove the ligature from the neck; upon which the flux uſually ſtops of itſelf: but if it ſhould ſtill continue, let the patient take a little vinegar or Frontiniac wine in his mouth; or elſe you may apply a bit of vitriol or alum, or a compreſs dipped in ſome ſtyptic liquor, till the hæmorrhage ceaſes; which can never be dangerous even without ſuch topicals.

§ 6. *Of Venæſection in the Penis.* 367

Bleeding in the vena dorſalis penis uſually ſurpaſſes the benefit of all remedies whatever in abating inflammatory diſorders of this member. This large vein, which runs along the back or upper ſide of the penis, being generally pretty much diſtended, and conſpicuous in an inflammation of this part, may be inciſed about the middle or back part of the penis; and kept bleeding till the member becomes flaccid, and a ſufficient quantity of blood be diſcharged proportionable to the urgency of the ſymptoms. This done, you muſt apply a compreſs, and the bandage proper for the penis. But you muſt carefully endeavour to avoid injuring the arteries or nerves which enter the penis near this vein; as alſo not to make your bandage too ſtrict; for by theſe means the inflammation and ſymptoms may turn out worſe than before.

When it is found neceſſary to diſcharge blood in this manner from the penis, the veins can be eaſily brought into view, by producing an accumulation of their contents in the ſame manner as in other parts of the body, through the intervention of a ligature: but in the tongue, in the hæmorrhoidal veins about the anus, and other parts where compreſſion cannot be applied, all that the ſurgeon can do, is to make an orifice of a proper ſize in that part of the vein which ſhows itſelf moſt evidently; and if a ſufficient diſcharge of blood is not thus produced, as there is no other method of effecting it, immerſing the parts in warm water may in ſuch circumſtances be a very neceſſary meaſure.

§ 7. *Of Venæſection in the Eyes.* 368

There are ſeveral ways of performing this operation, of which we ſhall here only relate the chief. Firſt, the patient is to be ſeated conveniently on the bed-ſide or on a chair, with his head held in a proper poſture by an aſſiſtant; which done, the ſurgeon makes a tranſverſe inciſion with a lancet upon the turgid ſmall veins in the corners of the eye, ſo as to open them or cut them quite aſunder. Some uſe a ſmall pair of ſciſſars, inſtead of a lancet, to divide the veſſels; but in uſing either of them, the eye-lids muſt be held apart from each other by the fingers of one hand, while the veſſels are inciſed by thoſe of the other. Some, again, elevate the ſmall turgid veins with a crooked needle before they divide them, the eye-lids being in the mean time held aſunder by an aſſiſtant. But it would be ſtill better to have theſe crooked needles made thin and double-edged, ſo that they may divide the veſſels of themſelves in the elevation, without the uſe of lancet or ſciſſars. The ſmall veins being thus inciſed or divided, their diſcharge of blood ſhould be promoted by fomentations of warm water frequently applied to the eye by means of a ſponge or ſoft linen rags.

Among other methods that have been propoſed for
ſcarifying

ſcarifying the blood-veſſels of the eye, the beards of rough barley were at one period much extolled, and are ſtill employed by ſome individuals. By drawing them over the ſurface of the eye, in a direction contrary to the ſharp ſpiculæ with which they are furniſhed, a conſiderable diſcharge of blood is thereby produced: But the pain attending this operation is exquiſite; and as it does not poſſeſs any ſuperior advantage to the method with the lancet, it is now falling into general diſuſe.

§ 8. *Of Arteriotomy.*

WHATEVER particular advantages may in theory have been expected from arteriotomy, and however ſome of its ſupporters may have recommended it, not only as being in many inſtances preferable to vænefection, but as an operation perfectly ſafe even in veſſels of conſiderable ſize; yet the moſt ſtrenuous friends to the practice have ſhrunk from any real attempt of this kind on the larger arteries. Inſtances have no doubt occurred of large arteries having been opened without any danger enſuing; but theſe are ſo exceedingly rare, that no practitioner of experience will, from that conſideration, be induced coolly to proceed to open any artery of importance. The ſmaller branches of arteries may indeed be opened with great ſafety when they are not deeply covered, and eſpecially when they lie contiguous to bones; as in ſuch ſituations, ſo ſoon as the quantity of blood intended to be taken is diſcharged, all further loſs of blood may be very eaſily prevented by compreſſion: but in any of the larger arteries, the attempt muſt be always attended with ſo much hazard, and the advantages to be expected from it in preference to vænefection are apparently ſo trifling, as muſt in all probability prevent it from ever being carried into execution.

369
Few arteries can be opened with propriety.

There are very few arteries, therefore, which with any propriety can be opened: the different branches of the temporal are the only arteries indeed from whence blood in ordinary practice is ever taken; but if a fanciful practitioner ſhould at any time incline to take blood in this manner from a different part, it may be done with great ſafety from one of the arteries running on each ſide of the fingers. About the middle of the laſt phalanx, this artery is ſufficiently large for diſcharging a conſiderable quantity of blood: in moſt caſes it lies very ſuperficial; and in this ſituation there can ſeldom much difficulty occur in putting a ſtop to the evacuation. In performing this operation on any of the temporal branches, if the artery lies ſuperficial, it may be done with one puſh of the lancet, in the ſame manner as was directed for vænefection; but when the artery lies deeply covered with cellular ſubſtance, it is always neceſſary to lay it fairly open to view, before making the orifice with the lancet: for in all the ſmaller arteries, when they are cut entirely acroſs, there is little chance of being able to procure any conſiderable quantity of blood from them; as, when divided in this manner, they are ſure to retract conſiderably within the ſurrounding parts, which commonly puts a ſtop to all farther evacuation.

Some degree of nicety is alſo neceſſary in making the opening into the artery of a proper oblique direction, neither quite acroſs nor directly longitudinal; for a longitudinal opening never bleeds ſo freely, either in an artery or in a vein, as when its direction is ſomewhat oblique.

If the opening has been properly made, and if the artery is of any tolerable ſize, it will at once diſcharge very freely without any compreſſion; but when the evacuation does not go on ſo well as could be wiſhed, the diſcharge may be always aſſiſted by compreſſing the artery immediately above the orifice, between it and the correſponding veins. The quantity of blood being thus diſcharged, it will commonly happen, that a very ſlight compreſſion on theſe ſmaller arteries will ſuffice for putting a ſtop to the evacuation: and whatever preſſure is found neceſſary, may be here applied in the ſame manner as was directed in venæſection; firſt, by clearing the orifice entirely of blood; and having covered it properly with a piece of adheſive plaſter, if that ſhould not be found to anſwer, a compreſs of linen ſhould be applied over it, the whole being then to be ſecured with a roller.

It happens, however, in ſome inſtances, that this does not ſucceed, the orifice continuing to burſt out from time to time, ſo as to be productive of much diſtreſs and inconvenience.

370
Method of ſtopping the blood.

In this ſituation there are three different methods by which we may with tolerable certainty put a ſtop to the farther diſcharge of blood. 1ſt, If the artery is ſmall, as all the branches of the temporal arteries commonly are, the cutting it entirely acroſs, exactly at the orifice made with the lancet, by allowing it to retract within the ſurrounding parts, generally puts an immediate ſtop to the diſcharge. 2d, When that is not conſented to, we have it always in our power to ſecure the bleeding veſſel with a ligature, as we would do an artery accidentally divided in any part of the body. And, laſtly, if neither of theſe methods is agreed to by the patient, we can, by means of a conſtant regular preſſure, obliterate the cavity of the artery at the place where the operation has been performed, by producing the accretion of its ſides. Different bandages have been contrived for compreſſing the temporal artery; but none of them anſwer the purpoſe ſo eaſily and ſo effectually as the one figured in the Plate.

As ſome time, however, is required to obliterate the cavity of the artery, this method is accordingly more tedious; but to timid patients it generally proves more acceptable than either of the other two.

§ 9. *Of Topical Blood-letting.*

371
Scarificator deſcribed.

WHEN, either from the ſeverity of a local fixed pain, or from any other cauſe, it is wiſhed to evacuate blood directly from the ſmall veſſels of the part affected, inſtead of opening any of the larger arteries or veins, the following are the different modes propoſed for effecting it, viz. by means of leeches; by ſlight ſcarifications with the ſhoulder or edge of a lancet; and, laſtly, by means of an inſtrument termed a *ſcarificator*, in which any number of lancets, from one to twenty or upwards, may be placed, and are fixed in ſuch a manner, that, when the inſtrument is applied to the part affected, the whole number of lancets contained in it are, by means of a ſtrong ſpring, puſhed ſuddenly into it, to the depth at which the inſtrument has been previouſly regulated. This being done, as the ſmaller blood-veſſels only by this operation are ever intended to be cut, and as theſe do not commonly diſcharge freely, ſome means or other become neceſſary for promoting the evacuation.

372 Of cupping-glaſſes. Various methods have been propoſed for this purpoſe. Glaſſes fitted to the form of the affected parts, with a ſmall hole in the bottom of each, were long ago contrived; and theſe being placed upon the ſcarified parts, a degree of ſuction was produced by a perſon's mouth ſufficient for nearly exhauſting the air contained in the glaſs: and this accordingly was a ſure enough method of increaſing the evacuation of blood to a certain extent. But as this was attended with a good deal of trouble, and beſides did not on every occaſion prove altogether effectual, an exhauſting ſyringe was at laſt adapted to the glaſs: which did indeed anſwer as a very certain method of extracting the air contained in it; but the application of this inſtrument for any length of time is very troubleſome, and it is difficult to preſerve the ſyringe always air-tight.

The application of heat to the *cupping-glaſſes*, as they are termed, has been found to rarify the air contained in them to a degree ſufficient for producing a very conſiderable ſuction. And as the inſtrument in this ſimple form anſwers the purpoſe in view with very little trouble to the operator, and as it is at all times eaſily obtained, the uſe of the ſyringe has therefore been laid aſide.

There are different methods adopted for thus applying heat to the cavity of the glaſs. By ſupporting the mouth of it for a few ſeconds above the flame of a taper, the air may be ſufficiently rarified; but if the flame is not kept exactly in the middle, but is allowed to touch either the ſides or bottom of the glaſs, it is very apt to make it crack. A more certain, as well as an eaſier, method of applying the heat, is to dip a piece of ſoft bibulous paper in ſpirit of wine; and having ſet it on fire, to put it into the bottom of the glaſs, and, on its being nearly extinguiſhed, to apply the mouth of the inſtrument directly upon the ſcarified part. This degree of heat, which may be always regulated by the ſize of the piece of paper, and which it is evident ought to be always in proportion to the ſize of the glaſs, if long enough applied, proves always ſufficient for rarifying the air very effectually, and at the ſame time, if done with any manner of caution, never injures the glaſs in the leaſt.

The glaſs having been thus applied, if the ſcarifications have been properly made, they inſtantly begin to diſcharge freely: and ſo ſoon as the inſtrument is nearly full of blood, it ſhould be taken away; which may be always eaſily done by raiſing one ſide of it, ſo as to give acceſs to the external air. When more blood is wiſhed to be taken, the parts ſhould be bathed with warm water; and being made perfectly dry, another glaſs, exactly of the ſize of the former, ſhould be inſtantly applied in the very ſame manner: and thus, if the ſcarificator has been made to puſh to a ſufficient depth, ſo as to have cut all the cutaneous veſſels of the part, almoſt any neceſſary quantity of blood may be obtained. It ſometimes happens, however, that the full quantity intended to be diſcharged cannot be got at one place. In ſuch a caſe, the ſcarificator muſt be again applied on a part as contiguous to the other as poſſible; and this being done, the application of the glaſſes muſt alſo be renewed as before.

When it is wiſhed to diſcharge the quantity of blood as quickly as poſſible, two or more glaſſes may be applied at once on contiguous parts previouſly ſcarified; and, on ſome occaſions, the quantity of blood is more quickly obtained by the cupping-glaſſes being applied for a few ſeconds upon the parts to be afterwards ſcarified. The ſuction produced by the glaſſes may poſſibly have ſome influence in bringing the more deep-ſeated veſſels into nearer contact with the ſkin, ſo that more of them will be cut by the ſcarificator.

A ſufficient quantity of blood being procured, the wounds made by the different lancets ſhould be all perfectly cleared of blood; and a bit of ſoft linen or charpie, dipped in a little milk or cream, applied over the whole, is the only dreſſing that is neceſſary. When dry linen is applied, it not only creates more uneaſineſs to the patient, but renders the wounds more apt to feſter than when it has been previouſly wetted in the manner directed.

Although this operation is by no means difficult in the execution, yet a good deal of practice is neceſſary to perform it in a neat and ſucceſsful manner; but, with a little attention, any operator may ſoon become ſo expert, as to be able to take any quantity of blood that it can ever be neceſſary to evacuate.

373 Dry cupping. Dry cupping conſiſts in the application of the cupping-glaſſes directly to the parts affected, without the uſe of the ſcarificator. By this means a tumour is produced upon the part; and where any advantage is to be expected from a determination of blood to a particular ſpot, it may probably be more eaſily accompliſhed by this means than by any other.

When the part from which it is intended to produce a local evacuation of this kind is ſo ſituated, that a ſcarificator and cupping-glaſſes can be applied, this method is greatly preferable to every other; but it now and then happens, that parts are ſo ſituated as not to admit of their application. Thus, in inflammatory affections of the eye, of the noſe, and of other parts of the face, the ſcarificator cannot be properly applied directly to the parts affected. In ſuch inſtances, leeches are commonly had recourſe to, as they can be placed upon almoſt any ſpot from whence we would wiſh to diſcharge blood.

374 Of the application of leeches. In the application of theſe animals, the moſt effectual method of making them fix upon a particular ſpot, is to confine them to the part by means of a ſmall wine-glaſs. Allowing them to creep upon a dry cloth, or upon a dry board, for a few minutes before application, makes them fix more readily; and moiſtening the parts on which they are intended to fix, either with milk, cream, or blood, tends alſo to cauſe them adhere much more ſpeedily than they otherwiſe would do. So ſoon as the leeches have ſeparated, the ordinary method of promoting the diſcharge of blood, is to cover the parts with linen cloths wet in warm water. In ſome ſituations, this may probably be as effectual a method as any other; but wherever the cupping-glaſſes can be applied over the wounds, they anſwer the purpoſe much more effectually: wherever the figure of the part, therefore, will admit of their application, they ought undoubtedly to be employed.

SECT.

SECT. II. *Of Inciſion, Iſſues, and Setons.*

§ 1. *Of opening Abſceſſes.*

375 Inciſion preferable to cauſtic.

THERE are two ways of opening an abſceſs; either by inciſion or cauſtic; but inciſion is preferable in moſt caſes. In ſmall abſceſſes, there is ſeldom a neceſſity for greater dilatation than a little orifice made with the point of a lancet; and in large ones, where there is not a great quantity of ſkin diſcoloured and become thin, an inciſion to their utmoſt extent will uſually anſwer the purpoſe; or if there be much thin diſcoloured ſkin, a circular or oval piece of it muſt be cut away: which operation, if done dexterouſly with a knife, is much leſs painful than by cauſtic, and at once lays open a great ſpace of the abſceſs, which may be dreſſed down to the bottom, and the matter of it be freely diſcharged: whereas, after a cauſtic, though we make inciſions through the eſchar, yet the matter will be under ſome confinement; and we cannot have the advantage of dreſſing properly till the ſeparation of the ſlough, which often requires a conſiderable time, ſo that the cure muſt be neceſſarily delayed: beſides that the pain of burning continuing two or three hours, which a cauſtic uſually requires in doing its office, draws ſuch a fluxion upon the ſkin round the eſchar, as ſometimes to indiſpoſe it very much for healing afterwards. In the uſe of cauſtics, it is but too much a practice to lay a ſmall one on the moſt prominent part of a large tumour, which not giving ſufficient vent to the matter, and perhaps the orifice ſoon after growing narrow, leads on to the neceſſity of employing tents; which two circumſtances more frequently make fiſtulas after an abſceſs, than any malignity in the nature of the abſceſs itſelf. The event would more certainly be the ſame after a ſmall inciſion: but ſurgeons, not depending ſo much on ſmall openings by inciſion as by cauſtic, do, when they uſe the knife, generally dilate ſufficiently; whereas, in the other way, a little opening in the moſt depending part of the tumour uſually ſatisfies them.

376 Advantages of uſing cauſtic in ſome caſes.

From this account of the method of opening abſceſſes, it does not appear often neceſſary to apply cauſtics; yet they have their advantages in ſome reſpects, and are ſeldom ſo terrible to patients as the knife, though in fact they are frequently more painful to bear. They are of moſt uſe in caſes where the ſkin is thin and inflamed, and we have reaſon to think the maliginity of the abſceſs is of that nature as to prevent a quickneſs of incarning; in which circumſtance, if an inciſion only were made through the ſkin, little ſinuſes would often form underneath, and the lips of it, lying looſe and flabby, would become callous, and retard the cure, though the malignity of the wound were corrected. Of this kind are venereal buboes; which notwithſtanding they often do well by mere inciſion, yet, when the ſkin is in the ſtate we have ſuppoſed, the cauſtic is always preferable: but this method ſhould be confined to *venereal* buboes; for thoſe which follow a fever or the ſmall-pox, for the moſt part are curable by inciſion only. There are many ſcrophulous tumours, where the reaſoning is the ſame as in the venereal; and even in great ſwellings, if the patient will not ſubmit to cutting, and the ſurgeon is apprehenſive of any danger in wounding a large veſſel, which is often done with the knife, but is avoided by cauſtic, it may on ſuch an occaſion be made uſe of; however, in ſcrophulous ſwellings of the neck and face, unleſs they are very large, cauſtics are not adviſable, ſince in that part of the body, with length of time, they heal after inciſion.

377 Of dilating the wounds in abſceſſes.

When an abſceſs is ready burſt, we are to be guided by the probe where to dilate, obſerving the ſame rules with regard to the degree of dilatation as in the other caſe. The uſual method of dilating, is with the probe-ſciſſars; and indeed, in all abſceſſes, the generality of ſurgeons uſe the ſciſſars, after having firſt made a puncture with a lancet: but as the knife operates much more quickly, and with leſs violence to the parts, than ſciſſars, which ſqueeze at the ſame time that they wound, it will be ſparing the patient a great deal of pain to uſe the knife, wherever it is practicable; which it is in almoſt all caſes, except ſome fiſtulas *in ano*, where the ſciſſars are more convenient. The manner of opening with a knife, is by ſliding it on a director, the groove of which prevents its being miſguided. If the orifice of the abſceſs be ſo ſmall as not to admit the director or the blade of the ſciſſars, it muſt be enlarged by a piece of ſponge-tent; which is made by dipping a dry bit of ſponge in melted wax, and immediately ſqueezing as much out of it again as poſſible, between two pieces of tile or marble; the effect of which is, that the looſe ſponge being compreſſed into a ſmall compaſs, if any of it be introduced into an abſceſs, the heat of the part melts down the remaining wax that holds it together, and the ſponge ſucking up the moiſture of the abſceſs, expands, and in expanding opens the orifice wider, and by degrees, ſo as to give very little pain.

378 Of the dreſſing of abſceſſes when opened.

The uſual method of dreſſing an abſceſs, the firſt time, is with dry lint only; or, if there be no flux of blood, with ſoft digeſtives ſpread on lint. If there be no danger of the upper part of the wound reuniting too ſoon, the doſſils muſt be laid in looſe. But if the abſceſs be deep, and the wound narrow, as is the caſe ſometimes of abſceſſes *in ano*, the lint muſt be crammed in pretty tightly, that we may have afterwards the advantage of dreſſing down to the bottom without the uſe of tents, which, by reſiſting the growth of the little granulations of fleſh, in proceſs of time harden them, and in that manner produce a fiſtula: ſo that, inſtead of being uſed for the cure of an abſceſs, they never ſhould be employed but where we mean to retard the healing of the external wound, except in ſome little narrow abſceſſes, where, if they be not crammed in too large, they become as doſſils, admitting of incarnation at the bottom; but care ſhould be taken not to inſinuate them much deeper than the ſkin in this caſe, and that they be repeated twice a-day to give vent to the matter they confine. But tents do moſt good in little deep abſceſſes, whence any extraneous body is to be evacuated, ſuch as ſmall ſplinters of bones, &c.

The uſe of vulnerary injections into abſceſſes has been thought to bear ſo near reſemblance to the uſe of tents, that they both fell into diſrepute almoſt at the ſame time.

Over the doſſils of lint may be laid a large pledgit of tow ſpread with baſilicon, which will lie ſofter than a defenſive plaſter; for this, though deſigned to defend the circumference of wounds againſt inflammation.

tion or a fluxion of humours, is often the very cauſe of them: ſo that the dreſſings of large wounds ſhould never be kept on by theſe plaſters, where there is danger of ſuch accidents. In this manner, the dreſſings may be continued till the cavity is incarned; and then it may be cicatriſed with dry lint or ſome of the cicatriſing ointments, obſerving to keep the fungus down, as directed before.

In the courſe of dreſſing, it will be proper to have regard to the ſituation of the abſceſs, and as much as poſſible to make the patient favour the diſcharge by his ordinary poſture: and to this end alſo, the diſcharge muſt be aſſiſted by compreſs and bandage: the compreſs may be made of rags or plaſter; though the latter is ſometimes preferable, as it remains immoveable on the part it is applied to. The frequency of dreſſing will depend on the quantity of diſcharge: once in 24 hours is ordinarily ſufficient; but ſometimes twice, or perhaps three times, is neceſſary.

379 § 2. *Of making the Inciſion in caſes of punctured Nerves and Tendons.*

As, in ſuch caſes, all the contiguous parts are ſuppoſed to be much ſwelled and in a ſtate of high inflammation, it is impoſſible to get proper acceſs either to the nerve or tendon, but by means of a large and extenſive inciſion; and as this cannot be effected without ſome riſk of opening at leaſt ſome large branches of arteries, the firſt ſtep to be taken in this operation is, to ſecure the parts againſt the effects of ſuch an occurrence, by the application of the tourniquet on the ſuperior part of the member. This precaution is neceſſary, not only for guarding againſt the loſs of blood which would enſue from a diviſion of any of the large arteries, but for preventing interruption during the operation, which would otherwiſe occur from a conſtant diſcharge of blood from the ſmaller veſſels. The tourniquet indeed is more particularly requiſite with a view to the prevention of this laſt inconvenience, than for any other reaſon; for although it is proper by means of it to guard againſt the effects to be expected from a diviſion of any of the large arteries, yet, with proper caution, ſuch an occurrence may in moſt caſes be very eaſily avoided.

The tourniquet then being properly applied, a tranſverſe inciſion ſhould be made with a common ſcalpel upon the parts chiefly affected; and it ought to run in a direction exactly acroſs the original orifice in the vein.

In no operation whatever is it more neceſſary than in this, to act with freedom in laying the parts ſufficiently open by the external inciſion. A ſmall inciſion puts the patient to nearly the ſame degree of pain as a larger cut; and it has this material inconvenience, that the ſurgeon cannot go on with the future ſteps of the operation with ſo much eaſe and expedition as when an extenſive opening is made at firſt.

The external teguments being thus freely divided, the operator is now to proceed in a gradual manner, making one ſlight inciſion after another, taking care, if poſſible, to avoid wounding either the larger arteries or veins: and he is to go on in this way to endeavour to detect the wounded nerve; or if there is no poſſibility of doing ſo, even by great caution and nicety in wiping away with a ſponge every particle of blood as he goes along, he muſt ſtill continue to proceed in this ſlow gradual manner, till he has divided every part between the ſkin and perioſteum; the tendons, larger arteries and veins, excepted.

At this time the tourniquet ſhould be looſened; and in all probability the patient will be found to expreſs much ſatisfaction at what has been done: for if the part is thus divided which originally had been pricked by the lancet, and from whence all the ſubſequent diſtreſs proceeded, an immediate relief will now be obtained; but, on the contrary, if the pain ſtill continues violent, we are thereby rendered almoſt certain of the miſchief lying altogether in one or other of the tendons. An accurate examination, therefore, muſt now be made, by clearing the parts effectually with a ſponge; and that tendon lying moſt contiguous to the vein in which the orifice was made, will in all probability be found either wounded, or in an evident ſtate of inflammation: but at all events, whether any ſuch appearance are detected or not, no heſitation whatever ſhould occur as to the propriety of dividing that tendon which lies moſt contiguous to the vein; or if two or even three tendinous extremities ſhould happen to lie in the way, and to be all therefore equally liable to ſuſpicion, they ought all undoubtedly to be cut entirely acroſs. This being properly effected, it will ſeldom occur that much relief is not immediately derived from it: and at any rate, this being done, every attempt will have been made from which we could expect any benefit to ariſe.

The parts having been thus freely divided, the tourniquet muſt now be made as ſlack as poſſible; and whatever arteries have been wounded, muſt be properly ſecured. The parts are then to be covered with ſoft eaſy dreſſings, and to be afterwards treated in the ſame manner as a wound from any other cauſe.

§ 3. *Of Iſſues and Setons.* 380

Both theſe are ſometimes made by the knife; tho' the former are more frequently, and indeed more conveniently, put in by cauſtic. When inciſion is uſed, nothing more is neceſſary than with a lancet to make a ſmall wound through the ſkin and cellular membranes. Into this is thruſt a pea rubbed over with baſilicon or ſome other ointment, which muſt be kept from ſlipping out of the wound by means of a proper bandage. By this extraneous body the wound is kept from healing, at the ſame time that, as the pea ſwells by the abſorption of the juices of the body, the orifice is gradually enlarged, and the quantity of matter diſcharged from it is ſoon increaſed. This method, however, has an inconvenience, namely, that by thruſting the pea into a newly inciſed wound, the inflammation conſequent upon even this ſmall diviſion of the ſolids is ſo great as to give a very conſiderable degree of pain.—The method of making iſſues by cauſtic is therefore preferred. The beſt cauſtic for this purpoſe is the *cauſticum commune* or *lapis infernalis* of the diſpenſatories, prepared from ſoap lees. A ſmall bit of this is to be put upon the ſkin, the ſurrounding parts of which are to be defended from its action by a bit of adheſive plaſter ſpread on leather. In a few hours a deep eſchar is formed, part of which being im-

immediately cut out, and the opening filled with peaſe, the reſt ſoon ſeparates, and is kept running with very little difficulty.

Setons are made in any part of the body by taking up the ſkin and ſubjacent cellular membrane between the fingers, then piercing through the fold with a lancet, and drawing through a ſoft cotton cord dipped in ointment. By this extraneous body the wound is kept in a conſtant ſtate of ſuppuration, and the cord is every day drawn a little farther through, in order to diſcharge the matter, and prevent putrefaction.

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Sect. III. *Of Tooth-drawing.*

Tooth-drawing, according to Cicero, (*De Natura Deorum*, lib. 3. cap. 22.) was firſt invented by Æſculapius; in whoſe temple the ancients hung up a pair of leaden pincers, to ſignify that it would be dangerous and improper to extract any teeth but ſuch as might be removed with leaden forceps, that is, ſuch as are looſe, and almoſt ready to fall out: for they do not conſult their own welfare who imprudently remove their teeth, without abſolute neceſſity, whilſt they are ſound and entire. For evulſion of the teeth is not only a dangerous and painful operation, but has even ſometimes hazarded the patient's life: at leaſt they impede the ſpeech, and impair the act of maſtication by this means; more eſpecially in adults, in which we can have no hopes of others growing up in their room. However, it is ſometimes abſolutely neceſſary to draw teeth, 1. In infants, for removing thoſe deciduous or lacteal teeth, which, being looſened by the fingers, may be extracted with a thread, or a pair of crow's-bill forceps; for when theſe teeth are left too long in the ſockets, they may diſplace and turn the new ones awry. 2. It will be proper to extract thoſe teeth in infants which grow out of the palate, or ſome other improper part of the mouth, which both hinder their ſpeech and ſucking. 3. Extraction is often the only method of relieving the toothach, which is very intenſe, proceeding from a caries in the teeth, and incapable of being eaſed by any medicines. 4. Thoſe teeth ought to be drawn which, by their irregular figure and poſition, wound and lacerate the tongue, lips, and cheeks. 5. It is often abſolutely neceſſary to draw a tooth for curing a fiſtula or ulceration of the gums next the teeth. The method of drawing them is as follows: If the tooth to be drawn is in the lower jaw, the patient muſt be ſeated on a low ſeat or on the floor; but when in the upper jaw, he muſt be ſeated on a high ſtool: after which, the ſurgeon takes his inſtrument beſt adapted to the caſe, and therewith draws out the tooth, as if extracting a nail out of a piece of wood, drawing the upper teeth downward, and the lower teeth upward; yet there is a particular ſleight to be uſed, to avoid breaking the teath. We ſhall conclude this ſection with obſerving, that though it is often abſolutely neceſſary to remove or extract the teeth, yet you ought not to perform the operation while the patient's gums and parts adjacent remain inflamed and tumified.

Sect. IV. *Of Ulcers.*

When a wound or abſceſs degenerates into ſo bad a ſtate as to reſiſt the method of cure deſcribed in treating of wounds, n° 64, &c. and loſes that complexion which belongs to a healing wound, it is called an *ulcer;* and as the name is generally borrowed from the ill habit of the ſore, it is a cuſtom to apply it to all ſores that have any degree of malignity, though they be immediately formed without any previous abſceſs or wound; ſuch are the venereal ulcers of the tonſils, &c.

382 Diſtinction of ulcers into different kinds.

Ulcers are diſtinguiſhed by their particular diſorders, though it ſeldom happens that the affections are not complicated; and when we lay down rules for the management of one ſpecies of ulcer, it is generally requiſite to apply then to almoſt all others. However, the characters of moſt eminence are, the callous ulcer, the ſinuous ulcer, and the ulcer with caries of the adjacent bone: though there be abundance more known to ſurgeons, ſuch as the putrid, the corroſive, the varicoſe, &c.; but as they have acquired their names from ſome particular affection, we ſhall ſpeak of the treatment of them under the general head of ulcers.

383 Internal medicines neceſſary.

It will be often in vain to purſue the beſt means of cure by topical application, unleſs we are aſſiſted by internal remedies: for as many ulcers are the effects of a particular indiſpoſition of body, it will be difficult to bring them into order, while the cauſe of them remains with any violence; though they are ſometimes in a great degree the diſcharge of the indiſpoſition itſelf, as in the plague, ſmall-pox, &c. But we ſee it generally neceſſary in the pox, the ſcurvy, obſtructions of the menſes, dropſies, and many other diſtempers, to give internals of great efficacy; and indeed, there are hardly any conſtitutions where ulcers are not aſſiſted by ſome phyſical regimen. Thoſe that are cancerous and ſcrophulous ſeem to gain the leaſt advantage from phyſic: for if in their beginnings they have ſometimes been very much relieved, or cured, by ſalivation, or any other evacuation, they are alſo often irritated and made worſe by them; ſo that there is nothing very certain in the effects of violent medicines in theſe diſtempers.

384 Of a callous ulcer.

1. When an ulcer becomes foul, and diſcharges a naſty thin ichor, the edges of it, in proceſs of time, tuck in, and, growing ſkinned and hard, give it the name of a *callous ulcer*; which, as long as the edges continue in that ſtate, muſt neceſſarily be prevented from healing. But we are not immediately to deſtroy the lips of it, in expectation of a ſudden cure; for while the malignity of the ulcer remains which was the occaſion of the calloſity, the new lips will be ſubject to a relapſe of the ſame kind, however often the external ſurface of them be deſtroyed: ſo that, in this caſe, we are to endeavour to bring the body of the ulcer into a diſpoſition to recover by other methods. It ſometimes happens to poor laborious people, who have not been able to afford themſelves reſt, that lying a-bed will in a ſhort time give a diverſion to the humours of the part, and the callous edges, ſoftening, will without any great aſſiſtance ſhoot out a cicatrix, when the ulcer is grown clean and filled with good fleſh. The effect of a ſalivation is generally the ſame; and even an iſſue does not ſometimes diſpoſe a neighbouring ulcer to heal. But though calloſities be frequently ſoftened by theſe means, yet when the ſurface of the ulcer begins to yield thick matter, and little granulations of red fleſh ſhoot up, it will be proper to quicken nature by deſtroying the edges of it, if they remain hard. The manner of doing this, is by touching

ing them a few days with the lunar cauſtic, or *lapis infernalis;* and ſome chooſe to cut them off with a knife: but this laſt method is very painful, and not more efficacious; though, when the lips do not tuck down cloſe to the ulcer, but hang looſe over it, as in ſome venereal buboes, where the matter lies a great way under the edges of the ſkin, the eaſieſt method is cutting them off with the ſciſſars.

385 Of producing good matter.

To digeſt the ulcer, or to procure good matter from it when in a putrid ſtate, there are an infinity of ointments invented; but the baſilicon flavum alone, or ſoftened down ſometimes with turpentines, and ſometimes mixed up with different proportions of red precipitate, ſeems to ſerve the purpoſe of bringing an ulcer on to cicatriſation as well as any of the others. When the ulcer is incarned, the cure may be finiſhed as in other wounds; or if it do not cicatriſe kindly, it may be waſhed with aq. calcis, or aq. phag. or dreſſed with a pledgit dipt it tinct. myhrræ: and if excoriations are ſpread round the ulcer, they may be anointed with ſperm. cet. ointment, or any other ſoft ointment.

The red precipitate has of late years acquired the credit it deſerves for the cure of ulcers; but, by falling into general uſe, is very often unſkillfuly applied: when mixed with the baſilicon, or, what is nearer, a cerate of wax and oil, it is moſt certainly a digeſtive, ſince it hardly ever fails to make the ulcer yield a thick matter in 24 hours, which diſcharged a thin one before the application of it.

386 Of deſtroying fungous fleſh.

If the ulcer ſhould be of ſuch a nature as to produce a ſpongy fleſh, ſprouting very high above the ſurface, it will be neceſſary to deſtroy it by ſome of the eſcharotics, or the knife. This fungus differs very much from that belonging to healing wounds, being more eminent and lax, and generally in one maſs; whereas the other is in little diſtinct protuberances. It approaches often towards a cancerous complexion, and when it riſes upon ſome glands does actually degenerate ſometimes into a cancer. When theſe excreſcences have ariſen in venereal ulcers, eſcharotics ſhould be applied. Thoſe in uſe, are the vitriol, the lunar cauſtic, the lapis infernalis, and more generally the red precipitate powder.

It is but ſeldom that theſe inveterate funguſes appear on an ulcer; but it is very uſual for thoſe of a milder kind to riſe, which may often be made to ſubſide by preſſure and the uſe of mild eſcharotics: however, if the aſpect of the ſore be white and ſmooth, as happens in ulcers accompanied with a dropſy, and often in young women with obſtructions, it will anſwer no purpoſe to waſte the excreſcences until the conſtitution is repaired, when moſt probably they will ſink without any aſſiſtance. In ulcers alſo, where the ſubjacent bone is carious, great quantities of looſe flabby fleſh will grow up above the level of the ſkin: but as the caries is the cauſe of the diſorder, it will be in vain to expect a cure of the excreſcence until the rotten part of the bone be removed; and every attempt with eſcharotics will be only a repetition of pain to the patient, without any advantage.

387 Of the poſture of the body, &c.

When the pain and inflammation are exceſſive, bleeding and other evacuations will often be ſerviceable; and above all things, reſt and a horizontal poſition; which laſt circumſtance is of ſo great importance to the cure of ulcers of the legs, that unleſs the patient will conform to it ſtrictly, the ſkill of the ſurgeon will often avail nothing: for as the indiſpoſition of theſe ſores is in ſome meaſure owing to the gravitation of the humours downwards, it will be much more beneficial to lie along than ſit upright, though the leg be laid on a chair; ſince even in this poſture they will deſcend with more force than if the body was reclined.

388 Of ulcers of the legs with varices.

1. In ulcers of the legs, accompanied with varices or dilatations of the veins, the method of treatment will depend upon the other circumſtances of the ſore; for the varix can only be aſſiſted by the application of bandage, which muſt be continued a conſiderable time after the cure. The neateſt bandage is the laced ſtocking, which is particularly ſerviceable in this caſe; though alſo, if the legs be œdematous, or if, after the healing of the ulcers, they ſwell when the patient quits his bed, it may be worn with ſafety and advantage. There are inſtances of one vein only being varicous; which, when it happens, may be deſtroyed by tying it above and below the dilatation, as in an aneuriſm; but this operation ſhould only be practiſed where the varix is large and painful.

389 Drying up of ulcers ſometimes dangerous.

Ulcers of many years ſtanding are very difficult of cure; and in old people the cure is often dangerous, frequently exciting an aſthma, a diarrhœa, or a fever, which deſtroys the patient, unleſs the ſore break out again: ſo that it is not altogether adviſable to attempt the abſolute cure in ſuch caſes; but only the reduction of them into better order, and leſs compaſs, which, if they be not malignant, is generally done with reſt and proper care. The cure of thoſe in young people may be undertaken with more ſafety; and in all caſes of ſtubborn ulcers, the bark, very copiouſly given, will be found of the utmoſt ſervice.

390 Of ſinuous ulcers.

2. When an ulcer or abſceſs has any ſinuſes or channels opening and diſcharging themſelves into the ſore, they are called *ſinuous ulcers*. Theſe ſinuſes, if they continue to drain a great while, grow hard in the ſurface of their cavity; and then are termed *fiſtulæ*, and the ulcer a *fiſtulous ulcer*; alſo, if matter be diſcharged from any cavity, as thoſe of the joints, abdomen, &c. the opening is called a *ſinuous ulcer* or a *fiſtula*.

The treatment of theſe ulcers depends upon a variety of circumſtances. If the matter of the ſinus be thick, ſtrict bandage and compreſs will ſometimes bring the oppoſite ſides of the ſinus to a reunion: if the ſinus grow turgid in any part, and the ſkin thinner, ſhowing a diſpoſition to break, the matter muſt be made to puſh more againſt that part, by plugging it up with a tent; and then a counter opening muſt be made, which proves often ſufficient for the whole abſceſs, if it be not afterwards too much tented, which locks up the matter and prevents the healing; or too little, which will have the ſame effect: for dreſſing quite ſuperficially, does ſometimes prove as miſchievous as tents, and for nearly the ſame reaſon; ſince ſuffering the external wound to contract into a narrow orifice before the internal one be incarned, does almoſt as effectually lock up the matter as a tent. To preſerve, then, a medium in theſe caſes, a hollow tent of lead or ſilver may be kept in the orifice, which, at the ſame time that it keeps it open, gives vent to the matter. The abſceſs where the counter opening is made moſt frequently, are thoſe of compound fractures, and the breaſt: but the latter do oftener well without dilatation than the former; though it muſt be performed in both, if practicable, the whole length of the abſceſs, when after ſome trial the matter does not leſſen in quantity, and the ſides of it grow thinner; and if the ſinuſes be fiſtulous, there is no expectation of cure without dilatation. There are alſo a great many ſcrophulous abſceſſes of the neck, that ſometimes communicate by ſinuſes running under large indurations; in which inſtances, counter openings are adviſable, and generally anſwer without the neceſſity of dilating the whole length; and indeed there are few abſceſſes in this diſtemper which ſhould be opened beyond the thinneſs of the ſkin. When abſceſſes of the joints diſcharge themſelves, there is no other method of treating the fiſtula, but by keeping it open, with the cautions already laid down, till the cartilages of the extremities of the bones being corroded, the two bones ſhoot into one another, and form an anchyloſis of the joint, which is the moſt uſual cure of ulcers in that part.

391 Of ſcrophulous abſceſſes in the neck.

392 Of gunſhot wounds degenerating into ſinuous ulcers.

Gunſhot wounds often become ſinuous ulcers, and then are to be conſidered in the ſame light as thoſe already deſcribed: though ſurgeons have been always inclined to conceive there is ſomething more myſterious in theſe wounds than any others: but their terribleneſs is owing to the violent contuſion and laceration of of the parts, and often to the admiſſion of extraneous bodies into them, as the bullet, ſplinters, bits of cloth, &c. and were any other force to do the ſame thing, the effect would be exactly the ſame as when done by fire-arms. The treatment of theſe wounds conſiſts in removing the extraneous body as ſoon as poſſible; to which end the patient muſt be put into the ſame poſture as when he received the wound: if it cannot be extracted by cutting upon it, which ſhould always be practiſed when the ſituation of the blood-veſſels, &c. does not forbid, it muſt be left to nature to work out, and the wound dreſſed ſuperficially: for we muſt not expect that if it be kept open with tents, the bullet, &c. will return that way; and there is hardly any caſe where tents are more pernicious than here, becauſe of the violent tenſion and diſpoſition to gangrene which preſently enſue. For diſſolving of bullets, it has been recommended to inject mercury into the places where they are lodged; but this has never been known to anſwer any good purpoſe.

393 Of carious ulcers.

3. When an ulcer with looſe rotten fleſh diſcharges more than the ſize of it ſhould yield, and the diſcharge is oily and ſtinking, in all probability the bone is carious; which may eaſily be diſtinguiſhed by running the probe through the fleſh: and if ſo, it is called a *carious ulcer*. The cure of theſe ulcers depends principally upon the removal of the rotten part of the bone, without which it will be impoſſible to heal; as we ſee ſometimes even in little ſores of the lower jaw, which taking their riſe from a rotten tooth, will not admit of cure till the tooth be drawn. Thoſe caries which happen from the matter of abſceſſes lying too long upon the bone, are moſt likely to recover: thoſe of the pox very often do well, becauſe that diſtemper fixes ordinarily upon the middle and outſide of the denſeſt bones, which admit of exfoliation; but thoſe produced by the evil, where the whole extremities of ſpongy parts of the bone are affected, are exceedingly dangerous: though all enlarged bones be not neceſſarily carious; and there are ulcers ſometimes on the ſkin that covers them, which do not communicate with the bone, and conſequently do well without exfoliation: nay, it ſometimes happens, though the caſe be rare, that, in young ſubjects particularly, the bones will be carious to ſuch a degree, as to admit a probe almoſt through the whole ſubſtance of them; and yet afterwards admit of a cure, without any notable exfoliation.

394 The actual cautery of no ſervice in theſe ulcers.

The method of treating an ulcer with caries, is by applying a cauſtic of the ſize of the ſcale of the bone that is to be exfoliated; and after having laid it bare, to wait till ſuch time as the carious part can without violence be ſeparated, and then heal the wound. In order to quicken the exfoliation, there have been ſeveral applications deviſed; but that which has been moſt uſed in all ages, is the actual cautery, with which ſurgeons burn the naked bone every day, or every other day, to dry up, as the ſay, the moiſture, and by that means procure the ſeparation: but as this practice is never of great ſervice, and always cruel and painful, it is now pretty much exploded. Indeed, from conſidering the appearance of a wound, when a ſcale of bone is taken out of it, there is hardly any queſtion to be made, but that burning retards rather than haſtens the ſeparation; for as every ſcale of a carious bone is flung off by new fleſh generated between it and the ſound bone, whatever would prevent the growth of theſe granulations would alſo in a degree prevent the exfoliation; which muſt certainly be the effect of a red-hot iron applied ſo cloſe to it: though the circumſtances of carious bones, and their diſpoſition to ſeparate, are ſo different from one another, that it is hardly to be gathered from experience, whether they will ſooner exfoliate with or without the aſſiſtance of fire; for ſometimes, in both methods, an exfoliation is not procured in a twelvemonth, and at other times it happens in three weeks or a month: however, if it be only uncertain whether the actual cautery be beneficial or not, the cruelty that attends the uſe of it ſhould entirely baniſh it out of practice. It is often likewiſe, in theſe caſes, employed to keep down the fungous lips that ſpread upon the bone: but it is much more painful than the eſcharotic medicines; though there will be no need of either, if a regular compreſs be kept on the dreſſings; or at worſt, if a flat piece of the prepared ſponge, of the ſize of the ulcer, be rolled on with a tight bandage, it will ſwell on on every ſide, and dilate the ulcer without any pain.

395 Of ſcraping and perforating the bone, amputation, &c.

Some caries of the bones are ſo very ſhallow, that they crumble inſenſibly away, and the wound fills up; but when the bone will neither exfoliate nor admit of granulations, it will be proper to ſcrape it with a rugine, or perforate it in many points with a convenient inſtrument down to the quick. In ſcrophulous caſes, the bones of the carpus and tarſus are often affected; but their ſpongineſs is the reaſon that they are ſeldom cured: ſo that when theſe, or indeed the extremities of any of the bones, are carious through their ſubſtance, it is adviſable to amputate; though there are inſtances in the evil, but more eſpecially in critical abſceſſes, where, after long dreſſing down, the ſplinters, and ſometimes the whole ſubſtance, of the ſmall bones, have worked away, and, a healthy habit of body coming on, the ulcer has healed; but theſe are ſo rare, that no great dependence is to be laid on ſuch an event. The dreſſings of carious bones, if they are ſtinking, may be doſſils dipped in the tincture of myrrh; otherwiſe thoſe of dry lint are eaſieſt, and keep down the edges of the ulcer better than any other gentle applications.

396 Of burns. Burns are generally eſteemed a diſtinct kind of ulcers, and have been treated with a greater variety of applications than any other ſpecies of ſore. When burns are very ſuperficial, not raiſing ſuddenly any veſication, ſpirits of wine are ſaid to be the quickeſt relief; but whether they be more ſerviceable than embrocations with linſeed oil, is uncertain, though they are uſed very much by ſome perſons whoſe trade ſubjects them often to this misfortune. If the burn excoriates, it is eaſieſt to roll the part up gently with bandages dipped in ſweet oil, or a mixture of unguent. flor. ſambu. with the oil. When the excoriations are very tender, dropping warm milk upon them every dreſſing is very comfortable; or if the patient can bear to have flannels wrung out of it, applied hot, it may be ſtill better. If the burn have formed eſchars, they may be dreſſed with baſilicon, though generally oil alone is eaſier; and, in theſe ſores, whatever is the eaſieſt medicine will be the beſt digeſtive. There is great care neceſſary to keep down the fungus of burns, and heal the wounds ſmooth: to which end, the edges ſhould be dreſſed with lint dipped in aqua vitriol. and dried afterwards; or they may be touched with the vitriol ſtone, and the dreſſings be repeated twice a-day. There is alſo a greater danger of contractions from burns after the cure than from other wounds: to obviate which, embrocations of neats-foot oil, and bandage with paſteboards to keep the part extended, are abſolutely neceſſary where they can be applied.

Sect. V. *Of Sutures.*

§ 1. *The Interrupted Suture.*

397 The method of making the bloody-ſuture is as follows. The wound being emptied of the grumous blood, and your aſſiſtant having brought the lips of it together that they may lie quite even, you carefully carry your needle from without, inwards to the bottom, and ſo on from within, outwards; uſing the caution of making the puncture far enough from the edge of the wound, which will not only facilitate the paſſing the ligature, but will alſo prevent it from eating through the ſkin and fleſh; this diſtance may be three or four tenths of an inch: as many more ſtitches as you ſhall make, will be only repetitions of the ſame proceſs. The threads being all paſſed, you begin tying thoſe in the middle of the wound; though, if the lips are held carefully together all the while, as they ſhould be, it will be of no great conſequence which is done firſt. The moſt uſeful kind of knot in large wounds is a ſingle one firſt; over this a little linen compreſs, on which is to be made another ſingle knot; and then a ſlip-knot, which may be looſened upon any inflammation: but in ſmall wounds, there is no danger from the double knot alone, without any compreſs to tie it upon; and this is moſt generally practiſed. If a violent inflammation ſhould ſucceed, looſening the ligature only will not ſuffice; it muſt be cut through and drawn away, and the wound be treated afterwards without any ſuture. When the wound is ſmall, the leſs it is diſturbed by dreſſing the better; but in large ones, there will ſometimes be a conſiderable diſcharge; and if the threads be not cautiouſly carried through the bottom of it, abſceſſes will frequently enſue from the matter being pent up underneath, and not finding iſſue. If no accident happen, you muſt, after the lips are firmly agglutinated, take away the ligatures, and dreſs the orifices which they leave.

It muſt be remembered, that during the cure the ſuture muſt be always aſſiſted by the application of bandage, if poſſible, which is frequently of the greateſt importance; and that ſort of bandage with two heads, and a ſlit in the middle, which is by much the beſt, will in moſt caſes be found practicable.

§ 2. *Suture of Tendons.*

398 Wounds of the tendons are not only known to heal again, but even to admit of ſewing up like thoſe of the fleſhy parts, though they do not reunite in ſo ſhort a time.

As the wound of the ſkin will be nearly tranſverſe, it ſhould not be raiſed to expoſe more of the tendon, but rather ſewed up with it, which will conduce to the ſtrength of the ſuture. The knot of the ligature is to be made as in other wounds, and the dreſſings are to be the ſame: there is a ſort of thin crooked needle that cuts on its concave and convex ſides, which is very handy in the ſuture of large tendons, and to be preferred to the ſtraight one. During the cure, the dreſſings muſt be ſuperficial, and the parts kept ſteady with paſteboard and bandage: the ſmall tendons reunite in three weeks, but the tendo Achillis requires ſix at leaſt.

§ 3. *Quilled Suture.*

399 In deep wounds, attended with much retraction, it is always a neceſſary precaution, to aſſiſt the operation of the ligatures by means of bandages, ſo applied as to afford as much ſupport as poſſible to the divided parts: But, even with every aſſiſtance of this nature, it now and then happens, that the divided parts cannot be kept together, retraction occurs to a greater or leſſer degree, and the ligatures of courſe cut aſunder the ſoft parts they were at firſt made to ſurround.

With a view to prevent this receding of the teguments and other parts, it was long ago propoſed to add to the interrupted ſuture what was ſuppoſed would afford an additional ſupport, viz. quills, or pieces of plaſter rolled up into the form of quills; one of which being placed on each ſide of the wound, the double of the ligature is made to include the one, and the knot to preſs directly upon the other, inſtead of being made immediately on the edges of the ſore, as was directed for interrupted ſutures.

It is at once evident, however, that the ligatures muſt here make the ſame degree of preſſure on the parts through which they paſs as they do in the interrupted ſuture; and this being the caſe, it is equally obvious, that the interpoſition of theſe ſubſtances cannot be of any uſe. This ſuture is accordingly now very rarely practiſed, and it is probable that it will be ſoon laid entirely aſide.

400

§ 4. *The Glover's Suture.*

This ſuture is termed the *glover's*, from being the one in common uſe among that ſet of people. As it is exceedingly ſimple, and very univerſally known, it does not here merit much deſcription: we ſhall, therefore, juſt ſhortly obſerve, that it conſiſts in a ſeries of ſtitches all connected with one another, and continued in an oblique ſpiral direction along the courſe of the divided parts intended by it to be kept together.

This ſuture has hitherto been univerſally employed for reuniting ſuch parts of the inteſtines as have been divided by wounds: but, according to Mr Bell, the ſame end may be more perfectly attained, and probably with leſs danger, by means of the interrupted ſuture; ſo that as this ſuture has almoſt never been applied to any other purpoſe, it will likewiſe, in all probability, ſoon fall into diſuſe.

§ 5. *Twiſted Suture.*

By the term *twiſted ſuture*, is meant that ſpecies of ligature by which parts, either naturally or artificially ſeparated, are united together, by means of ſtrong threads properly twiſted round pins or needles puſhed through the edges of the divided parts.

401 The twiſted ſuture may be uſed in a variety of other caſes beſides the hare-lip.

This ſuture is commonly employed for the purpoſe of uniting the parts in caſes of hare-lip; and this indeed is almoſt the only uſe to which it has been hitherto applied: But we may here remark, that it may with great advantage be put in practice in a variety of other caſes, particularly in all artificial or accidental diviſions either of the lips or cheeks; and in every wound in other parts that does not run deep, and in which ſutures are neceſſary, this ſuture is preferable to the interrupted or any other.

In very deep wounds, for inſtance in all wounds extending to a greater depth than an inch and half, the interrupted ſuture is the only one that is admiſſible; for in all ſuch deep cuts, the pins neceſſary in the twiſted ſuture cannot with propriety be employed, as they cannot be introduced to ſuch a depth, and afterwards ſo twiſted with ligatures as to reunite the divided parts, but with great pain to the patient. In ſuch wounds, therefore, we muſt of neceſſity have recourſe to the interrupted ſuture. But it may be here remarked, that wounds of this depth, requiring the aid of ſutures, are very rarely met with: ſo that, in by much the greateſt proportion of wounds where ſutures are adviſable, the twiſted ſuture will be found practicable; and whenever it is ſo, it ought certainly to be preferred to every other, as being obviouſly better calculated, even than the interrupted ſuture, for the retention of divided parts. The pins made uſe of for twiſting the threads upon ought to be made of a flat form, ſo as not to cut the parts through which they paſs ſo readily as the ligatures employed in the interrupted ſuture. And thus one great objection to the latter is very effectually obviated: for every practitioner muſt be ſenſible of this being the moſt faulty part of the interrupted ſuture, that when muſcular parts are divided ſo as to produce much retraction, the ligatures employed for retaining them almoſt conſtantly cut them through before a reunion is accompliſhed; whereas the flatneſs of the pins uſed in the twiſted ſuture, and upon which, it may be remarked, the whole preſſure produced by the ligatures is made to reſt, proves in general a very effectual preventative againſt all ſuch occurrences.

402 Gold pins recommended for this ſuture.

The pins uſed in this operation have commonly been made of ſilver; and in order to make them paſs with greater eaſe, ſteel points have been added to them. As gold pins, however, are capable of receiving a ſufficient degree of ſharpneſs, which renders the intervention of ſteel points quite unneceſſary; and as gold is fully more cleanly than ſilver, from its not acquiring ſo readily that kind of cruſt which immerſion in fluids is apt to produce upon the other; pins of this metal are therefore preferable.

403 Manner of performing the operation.

The manner of performing this operation is as follows. The divided parts intended to be reunited, muſt, by the hands of an aſſiſtant, be brought nearly into contact; leaving juſt as much ſpace between the edges of the ſore as to allow the ſurgeon to ſee that the pins are carried to a proper depth. This being done, one of the pins muſt be introduced through both ſides of the wound, by entering it on one ſide externally, puſhing it forwards and inwards to within a little of the bottom of the wound, and afterwards carrying it outwardly through the oppoſite ſide, to the ſame diſtance from the edge of the ſore that it was made to enter at on the other.

The diſtance at which the needle ought to enter from the edge of the ſore, muſt be determined by the depth of the wound, and by the degree of retraction produced in the divided parts. In general, however, it is a proper regulation, in deep wounds, to carry the pins nearly to the ſame diſtance from the ſide of the ſore as they are made to penetrate in depth: And it may be alſo remarked, that whatever the deepneſs of the wound may be, the pins ought to paſs within a very little of its bottom; otherwiſe the parts which lie deep will run a riſk of not being united, a circumſtance which muſt always give riſe to troubleſome collections of matter.

In paſſing the pins through the different ſides of the wound, if the ſkin and other teguments are not more firm than ordinary, it may commonly be done by the fingers alone, and particularly if the pins are made with ſmall heads or knobs for the fingers to preſs upon; but when, from firmneſs of parts and other circumſtances, much difficulty is expected to the entrance of the pins, the inſtrument termed *Porteaguille* very effectually removes this inconvenience.

The firſt pin being paſſed in this manner very near to one end of the ſore, and the parts being ſtill ſupported by an aſſiſtant, the ſurgeon, by means of a firm waxed ligature, paſſed three or four times round and acroſs the pin, ſo as nearly to deſcribe the figure of 8, is to draw the parts through which it has paſſed into immediate and cloſe contact: and the thread being now ſecured with a looſe knot, another pin muſt be introduced in the ſame manner at a proper diſtance from the former; and the thread with which the other was fixed being looſed, and in the ſame manner carried round this pin, others muſt be introduced at proper diſtances along the whole courſe of the wound;

and the ſame ligature ought to be of a ſufficient length for ſecuring the whole.

The number of pins to be uſed muſt be determined entirely by the extent of the wound. Whenever this ſuture, however, is practiſed, whether the wound be large or of very ſmall extent, a pin ought to be introduced very near to each end of it, otherwiſe the extremities of the ſore are apt to ſeparate ſo as not to be afterwards eaſily reunited. In large wounds, if the pins are introduced at the diſtance of three quarters of an inch from one another, it will in general be found ſufficient; but in cuts of ſmaller extent, a greater number of pins become neceſſary in proportion to the dimenſions of the ſores.

Thus in a wound of an inch and half in length, three pins are abſolutely requiſite; one near to each end, and another in the middle of the ſore: whereas five pins will always be found fully ſufficient for a wound of three inches and a half in extent, allowing one to be within a quarter of an inch of each extremity of the wound, and the others to be placed along the courſe of the ſore at the diſtance of three quarters of an inch from one another.

The pins being all introduced and ſecured in the manner directed, nothing remains to be done, but to apply a piece of lint wet with mucilage all along the courſe of the wound, with a view to exclude, as effectually as poſſible, every acceſs to the external air.

In order to prevent the ends of the pins from preſſing upon and hurting the ſkin below, it is uſual to apply a ſmall bolſter of linen or charpie under each of them; but as this always does miſchief, by tending to preſs upon the pins, ſo as to force them to act upon the ſoft parts through which they have paſſed, every thing of this kind ought to be omitted. When, however, the patient happens to complain of being hurt by the ends of the pins, this may be eaſily prevented, by introducing between them and the ſkin pieces of thin linen ſpread with any adheſive plaſter.

404
Preſſure on the united parts to be avoided.

In order to give every chance of ſucceſs to this operation, it has been commonly adviſed, immediately after the pins are ſecured, to apply the uniting bandage over the whole, ſo as to afford as much ſupport as poſſible to the contiguous parts. The leaſt reflection, however, renders it evident, that every degree of preſſure made in this manner muſt do miſchief; for the bandage being made to reſt immediately upon the pins, a conſiderable degree of pain and conſequent inflammation muſt of courſe be produced by it: And in fact this is ſo much the caſe, that in every inſtance in which we have ſeen this bandage applied, it either did harm, by exciting inflammation in conſequence of too much preſſure upon the pins; or, if that effect was not produced, no advantage was received from it, from the bandage not being applied with ſuch tightneſs as to afford any ſupport whatever to the parts below.

405
Of the time the pins ought to remain.

The next point to be determined, is the time the pins ſhould be allowed to remain. When they remain long, they generally do harm, by the unneceſſary irritation and conſequent retraction of parts with which they are always attended; and again, if they are not continued for a ſufficient length of time, that degree of adheſion is not produced between the divided parts that is neceſſary for their future retention; ſo that the effect of the operation comes to be in a great meaſure, if not entirely, loſt.

In wounds of no great depth, for inſtance of three quarters of an inch or ſo, a ſufficient degree of adheſion always takes place in the ſpace of five days; and ſix, or at moſt ſeven days, will generally be found ſufficient for wounds of the greateſt depth. But with reſpect to this circumſtance, it muſt always be underſtood, that the patient's ſtate of health muſt have a conſiderable influence on the time neceſſary for producing adheſion between divided parts. In ſpecifying the time neceſſary for this purpoſe, the operation is ſuppoſed to have been done on a conſtitution in a ſtate of perfect health. When the patient labours under ſcurvy, or any diſorder which affects the general ſyſtem, it is impoſſible to aſcertain this circumſtance with preciſion: in ſuch caſes we muſt be determined by the nature and ſtate of the diſeaſe preſent at the time.

406
Of ſupporting the parts when the pins are withdrawn.

So ſoon as the pins are withdrawn, the uniting bandage may be then applied with great advantage, in order to ſerve as a ſupport to the parts newly united; but as ſlips of leather ſpread with ordinary glue, when applied to each ſide of the cicatrix, may, by means of ligatures properly connected with them, be made to anſwer this purpoſe in a more effectual manner, this mode of ſupporting the parts ought of courſe to be preferred.

SECT. VI. *Of the Ligature of Arteries.*

A ſurgeon being called to a perſon loſing much blood from the diviſion of any of the larger veſſels, the firſt ſtep to be taken is, by means of ſtrong compreſſion, to effect a temporary ſtoppage of the diſcharge, till, by the application of ligatures, a more effectual remedy is obtained.

When accidents of this nature occur in any of the extremities, and where preſſure can be made with eaſe on the ſuperior parts of arteries, for ſuch caſes we are in poſſeſſion of a remedy, which, when ſkilfully applied, never fails of producing an immediate ſtop to all farther loſs of blood. What is here meant is the tourniquet.

407
Of the tourniquet.

Till the invention of this inſtrument, no operation of importance could be undertaken on any of the extremities but with great hazard to the patient; and large wounds muſt have frequently proved mortal from the want of this aſſiſtance, which otherwiſe might not have been in any degree hazardous.

408
Deſcription of the inſtrument.

As the invention of the tourniquet is claimed by different people, and even by different nations, we ſhall not here pretend to ſay from whence it originally came: but whoever had the merit of it, the firſt inſtrument of this kind with which the world was made acquainted was exceedingly ſimple; ſo much indeed, that we now reflect with aſtoniſhment at the diſcovery having been reſerved to ſuch a very late period. A ſmall cuſhion being placed upon the courſe of the principal artery of a limb, a circular rope or bandage was made to paſs twice ronnd it; and a ſmall wooden handle being then introduced between one of the folds of the bandage, for the purpoſe of twiſting it, the cuſhion by theſe means was preſſed with ſo much force upon the artery, as to put an effectual ſtop to the courſe of the blood through the under part of the limb.

Mr Petit, an eminent ſurgeon of Paris, was the firſt who propoſed a conſiderable improvement on this inſtrument, by connecting the circular bandage with a ſcrew, which was ſo contrived as to produce the preſſure chiefly on the principal arteries, without materially affecting the reſt of the limb. It had this advantage over the other inſtrument, that the operator himſelf could manage it, without being under the neceſſity of employing an aſſiſtant: but it was liable to one great inconvenience, from the very circumſtance which by the inventor was conſidered as an improvement. This inſtrument of Mr Petit being made to act upon the principal arteries only, the ſmaller veſſels communicating with theſe, by not being properly compreſſed, diſcharge blood freely from the inſtant they are cut; and as this proves a very troubleſome circumſtance in the courſe of operations, different improvements have of late been made upon it.

409
Improvements by Mr Pott.

By means of this inſtrument in its now improved ſtate, the blood in any limb is very eaſily and effectually commanded; and as it graſps the whole member equally, all the collateral branches, as well as the principal arteries, are equally compreſſed by it. It has this material advantage, too, over every other inſtrument of this kind, that, when properly applied, a ſingle turn, or even half a turn, of the ſcrew, is ſufficient for producing either a flow of blood, or for putting a total ſtop to it. The manner of uſing it is as follows.

410
Manner of uſing it.

Let a cuſhion of three inches in length by one inch and half in diameter, be prepared of a linen roller, and be made tolerably firm, but yet not ſo hard as to render preſſure produced by it very painful. This being placed upon the courſe of the principal artery of the limb, is to be firmly ſecured in that ſituation by one or two turns of a circular roller, of the ſame breadth with the cuſhion itſelf.

The inſtrument, with the ſtrap connected with it, being now placed upon the limb, with the handle of the ſcrew on the oppoſite ſide of the member to the cuſhion upon the artery, the ſtrap is to be carried round the limb directly over the cuſhion, and to be firmly connected on the other ſide to the buckle. In thus connecting the ſtrap and buckle together, particular attention is neceſſary in doing it with great firmneſs, ſo as that the ſcrew may afterwarde operate with as much advantage as poſſible in producing a ſufficient degree of preſſure. When proper attention is paid to this circumſtance, a ſingle turn of the ſcrew proves ſufficient for putting an entire ſtop to the circulation of blood in the limb: but when the ſtrap has not originally been made very tight, ſeveral turns of the ſcrew become neceſſary; an occurrence which may be always very eaſily prevented, and which, when not attended to, frequently proves very embarraſſing in the courſe of an operation.

411
Of ſecuring arteries by means of the curved needle.

Various methods have been invented for ſecuring arteries by means of ligatures. The practice lately in ordinary uſe was, by means of a curved needle, to paſs a ligature of ſufficient ſtrength round the mouth of the bleeding veſſel, including a quarter of an inch all round of the ſurrounding parts, and afterwards to form a knot of a proper tightneſs upon the veſſel and other parts comprehended in the nooſe. But this method has been found to give ſo much pain, that the beſt practitioners have thought proper to reject it, and to tie up the blood-veſſels by themſelves.

In order to detect the arteries to be tied, the tourniquet, with which they are ſecured, muſt be ſlackened a little by a turn or two of the ſcrew; and the moment the largeſt artery of the ſore is diſcovered, the ſurgeon fixes his eye upon it, and immediately reſtrains the blood again by means of the tourniquet. An aſſiſtant now forms a nooſe on the ligature to be made uſe of; and this nooſe being placed immediately over the end of the artery, ſo as to include it with certainty, the operator then puſhes the ſharp point of the tenaculum through the ſides of the veſſel, and at the ſame time pulls ſo much of it out, over the ſurface of the ſurrounding parts, as he thinks is ſufficient to be included in the knot which the aſſiſtant is now to make. In forming this ligature, the ſurgeon's knot, as it is termed, which conſiſts in paſſing the thread twice through the firſt nooſe, is certainly preferable to every other, from its being leſs liable to yield or ſlip. And as ſome additional ſecurity is obtained by forming a ſecond knot above the firſt, this precaution ought never to be omitted. It is eaſily done; and on ſecurity in this point the patient's life may in a great meaſure depend.

The degree of ſtrength of the ligature muſt always be proportioned to the ſize of the veſſels; but this is a circumſtance to be at all times determined by the judgment of the practitioner, as muſt alſo the force to be employed in forming the knots. To what was already ſaid upon this point, we ſhall juſt add, that a very ſmall force is fully ſufficient for ſecuring even the largeſt arteries; and that after ſuch a force has been applied as evidently reſtrains the farther loſs of blood, a very trifling additional compreſſion is all that is in any degree neceſſary.

412
Of the needles proper to be uſed.

The operator ought to be provided with needles of various ſizes, and of different forms. The needles in ordinary uſe are, for many purpoſes, quite too much crooked; for, in general, they are more eaſily managed when their curvatures are not ſo conſiderable.

The ſame kinds of needles as are found neceſſary for the interrupted ſuture, anſwer equally well for the ligature of arteries.

The needles in common uſe are made triangular, with three different edges, one on each ſide, and a third on the concave part of the needle. There is no real neceſſity, however, for more than two: indeed the needle enters fully more eaſily with two than with three edges; and as the third edge on the concave ſide renders them more liable to injure arteries and other parts in the courſe of their introduction, this addition ought therefore to be omitted.

413
Method of performing the operation.

A needle of this ſhape, armed with a ligature of a ſize proportioned to itſelf and to the veſſel to be taken up, is to be introduced at the diſtance of a ſixth or eighth part of an inch from the artery, and puſhed to a depth ſufficient for retaining it, at the ſame time that it is carried fully one-half round the blood-veſſel. It muſt now be drawn out; and being again puſhed forward till it has completely encircled the mouth of the artery, it is then to be pulled out, and a knot to be tied of a ſufficient firmneſs, as was already directed when the tenaculum is uſed.

Sect. VII. *Of the Treatment of Aneuriſms.*

In every caſe of aneuriſm, the uſe of preſſure has been indiſcriminately recommended, not only in the incipient period of the diſeaſe, but even in its more advanced ſtages.

414 Of the effects of preſſure in aneuriſms.

In the diffuſed or falſe aneuriſm, preſſure has been univerſally adviſed, not only with a view to diſſipate the ſwelling already induced, but in order to produce a reunion of the wound in the artery: however, as preſſure in ſuch caſes cannot be applied to the artery alone, without at the ſame time affecting the refluent veins; and as this circumſtance, by producing an increaſed reſiſtance to the arterial pulſations, muſt undoubtedly force an additional quantity of blood to the orifice in the artery; therefore no advantage is to be expected from it; but on the contrary, there is reaſon to ſuppoſe it has been on many occaſions productive of miſchief.

But although preſſure ought never to be attempted in any period of the diffuſed aneuriſm, yet in ſome ſtages of the other ſpecies of the diſeaſe, it may be often had recourſe to with advantage.

In the early ſtages of encyſted aneuriſm, while the blood can be yet preſſed entirely out of the ſac into the artery, it often happens, by the uſe of a bandage of ſoft and ſomewhat elaſtic materials, properly fitted to the part, that much may be done in preventing the ſwelling from receiving any degree of increaſe; and on ſome occaſions, by the continued ſupport thus given to the weakened artery, complete cures have been at laſt obtained. In all ſuch caſes, therefore, particularly in every inſtance of the varicoſe aneuriſm, much advantage may be expected from moderate preſſure.

But although preſſure to a certain degree has frequently, in caſes of encyſted aneuriſm, proved very uſeful, it ought never to be carried to any great length; for tight bandages in all ſuch affections, by producing an immoderate degree of reaction in the containing parts to which they are applied, inſtead of anſwering the purpoſe for which they were intended, have evidently the contrary effect. Moderate compreſſion, therefore, is more eligible than a great degree of it; and indeed the greateſt length to which preſſure in ſuch caſes ought to go, ſhould be to ſerve as an eaſy ſupport to the parts affected, and no farther.

415 Of performing the operation for an aneuriſm.

The firſt ſtep in this operation ought to be to obtain a full command of the circulation in the inferior part of the member by means of the tourniquet applied above. This being done, the patient ſhould be ſo placed, that the diſeaſed limb, on being ſtretched on a table, is found to be of a proper height for the ſurgeon; who, as the operation is generally tedious, ought to be ſeated. The limb being in this ſituation properly ſecured by an aſſiſtant, the operator is now with a ſcalpel to make an inciſion through the ſkin and cellular ſubſtance along the whole courſe of the tumour; and as freedom in the remaining parts of the operation is here a matter of much importance, it is even of uſe to carry this external inciſion half an inch or ſo both above and below the fartheſt extremities of the ſwelling.

This being done, the ordinary method is to proceed in a very ſlow cautious manner, diſſecting away one layer of the membrane after another, till the artery itſelf is laid bare. In this manner the operation is always rendered exceedingly tedious, as the thickneſs of parts with which the artery is found covered, is often really aſtoniſhing, by one layer of a membranous ſubſtance having been formed after another, from the coagulable lymph of the blood contained in the tumour. In reality, however, there is no neceſſity for this degree of caution, as the operation may, in the following manner, be equally well performed in a much ſhorter ſpace of time, and with much leſs pain to the patient.

So ſoon as the external inciſion has been made in the manner directed, ſo as to divide the ſkin and cellular ſubſtance, all the effuſed blood ought to be wiped off by means of a ſpunge; and the ſofteſt part of the tumour being diſcovered, an opening ought there to be made into it with a lancet, large enough for admitting a finger of the operator's left hand. This being done, and the finger introduced into the cavity of the tumour, it is now to be laid open from one extremity to the other, by running a blunt-pointed biſtoury along the finger from below upwards, and afterwards from above downwards, ſo as to lay the whole cavity fairly open.

The cavity of the tumour being thus laid freely open, all the coagulated blood is now to be taken out. For this purpoſe a number of inſtruments, particularly ſcoops, have been invented by different operators: but no inſtrument anſwers this intention ſo effectually, and with ſo much eaſe to the patient, as the fingers of the operator; who having in this manner removed all the coagulated blood, together with a number of tough membranous filaments commonly found here, the cavity of the tumour is now to be rendered quite dry, and free from the blood which, on the firſt opening of the ſwelling, is diſcharged into it from the veins in the inferior part of the member: and this being effectually accompliſhed, the tourniquet muſt be made perfectly ſlack and eaſy, in order to diſcover, not only the artery itſelf, but the opening into it, from whence the blood collected in the tumour has been all along diſcharged. This being done, the next point to be determined, is the manner of ſecuring this opening into the artery, ſo as to prevent in future any farther effuſion of blood. Various means have been propoſed for accompliſhing this; but the effects of all of them may be comprehended under the three following heads.

416 Means of preventing an hæmorrhagy.

I. The effects of ligature upon a large artery having on ſome occaſions proved fatal to the inferior part of the member, it was long ago propoſed, that ſo ſoon as the opening into the artery has been diſcovered, inſtead of applying a ligature round it, which for certain is to obliterate its cavity entirely, a piece of agaric, vitriol, alum, or any other aſtringent ſubſtance, ſhould be applied to the orifice, in order, if poſſible, to produce r reunion of its ſides.

417 Mr Lambert's pro- poſal of ſtitching the woun of thearte

II. Upon the ſame principle with the preceding, viz. that of ſtill preſerving the circulation in the artery, it was ſeveral years ago propoſed by an eminent ſurgeon of Newcaſtle, Mr Lambert, that the orifice in the artery ſhould be ſecured by means of the twiſted ſuture. A ſmall needle being puſhed through the edges of the wound, they are then directed to be drawn together by a thread properly twiſted round the needle, as was formerly directed when treating of ſutures.

Strong objections, however, occur to both of theſe methods. In the firſt place, no aſtringent application with which we are acquainted is poſſeſſed of ſuch powers as to deſerve much confidence; for although different articles of this kind have on various occaſions proved a means of putting a temporary ſtop to hæmorrhagies, yet there are very few inſtances properly authenticated of their having produced any permanent advantage. In almoſt every inſtance in which they have been uſed, the hæmorrhagy has recurred again and again, ſo as to prove very diſtreſſing, not only to the patient, but to the practitioner in attendance; ſo that, from this want of ſucceſs, little or no attention is now paid to remedies of this kind in ordinary practice.

418
Objections to Mr Lambert's method.

With regard to Mr Lambert's method of ſtitching the orifice in the artery, it is certainly a very ingenious propoſal; and would in all probability, at leaſt in moſt inſtances, prove an effectual ſtop to all farther diſcharge of blood: but as we have yet only one inſtance of its ſucceſs, little can yet be ſaid about it. Two material objections, however, ſeem to occur to this practice. One is, that in the operation for the aneuriſm, in almoſt every inſtance, a very few only excepted, the artery lies at the back-part of the tumour; ſo that when all the collected blood is removed, there is ſuch a depth of wound, that it muſt be always a very difficult matter, and on many occaſions quite impracticable, to perform this nice operation upon the artery with that attention and exactneſs which, in order to enſure ſucceſs, it certainly requires. It has now and then happened, indeed, that in this operation the artery has been found to be on the anterior part of the tumour; and in ſuch a ſituation the wound in it would no doubt prove acceſſible enough. This, however, is a very rare occurrence, as in almoſt every inſtance of diffuſed aneuriſm, the artery lies at the very bottom of the tumour, by the blood being collected between it and the common teguments; and accordingly, in ſeveral inſtances of this diſorder, in which, after the tumour was laid freely open, the artery has been found to lie ſo deep, as would have rendered it quite impoſſible to perform this operation.

But there is another very material objection which *à priori* evidently occurs to the practice recommended by Mr Lambert. By introducing a needle through the ſides of the orifice, and drawing theſe together by a ligature, the cavity of the artery muſt undoubtedly be at that point much diminiſhed. Indeed Mr Lambert, in his account of the caſe in which this operation was performed, acknowledges that the diameter of the artery was thereby diminiſhed. Now the paſſage of the blood being thus contracted at one point, the impulſe upon that particular part muſt be very conſiderable: So that the very remedy employed for the cure of one ſpecies of aneuriſm, will in all probability prove a very powerful agent in inducing another; for the blood being thus obſtructed in its uſual courſe, there will be no ſmall danger incurred of a dilatation being produced immediately above this preternatural ſtricture.

III. Neither of the methods we have yet been conſidering being found eligible for ſecuring the orifice in the artery, we ſhall now proceed to deſcribe the ordinary manner of performing this operation; which conſiſts in obliterating the arterial cavity entirely by means of ligatures.

419
Method of performing the operation for the aneuriſm.

The artery being laid bare in the manner directed, and all the coagulated blood being carefully removed from the cavity of the tumour, on the tourniquet being now ſlackened ſo as to bring the orifice in the artery into view, a ſmall probe is to be introduced at the opening, in order to raiſe the artery from the neighbouring parts, ſo as that the ſurgeon may be enabled with certainty to paſs a ligature round it, without comprehending the contiguous nerves, which in general run very near to the large blood-veſſels of a limb. By this precaution the nerves may be always avoided; and by doing ſo, a great deal of miſchief may be prevented, which otherwiſe in all probability might ſupervene. When the diſorder is ſituated either in the ham, or in the uſual part of blood-letting in the arm, bending the joints of the knee or of the elbow, as it relaxes the artery a little, renders this part of the operation more eaſily effected than when the limbs are kept fully ſtretched out.

The artery being thus gently ſeparated from the contiguous parts, a firm, broad, waxed ligature muſt be paſſed round it, about the eighth part of an inch or ſo above the orifice, and another muſt in the ſame manner be introduced at the ſame diſtance below it. Much harm, in all probability, has been done by paſſing the ligature ſo far diſtant from the orifice as is commonly practiſed; for the riſk of loſing the benefit of anaſtomiſing branches will be always increaſed in proportion to the extent of artery included between the ligatures.

The eaſieſt method of introducing the ligatures is by means of a blunt-curved needle. An ordinary ſharp needle is commonly made uſe of for this purpoſe; but it does not anſwer the intention ſo well as the one here recommended: by the ſharpneſs of its points it is apt to injure the contiguous parts; and when the common crooked needle is uſed with a ſharp edge on its concave ſide, there muſt even be ſome riſk of its wounding the under part of the artery, as in this ſituation it cannot be introduced without making this part of the needle paſs quite in contact with the coats of the artery. The blunt needle is not liable to either of theſe objections; and beſides is more eaſily introduced than any of the ordinary aneuriſmal needles.

420
Of tying the ligature.

The ligatures being both paſſed in the manner directed, the upper one is now to be tied with a firmneſs ſufficient for compreſſing the ſides of the artery. The directions formerly given for forming the knot upon bleeding-veſſels in other parts, will apply with equal propriety here: the ends of the ligature ought by all means to be twice paſſed through the firſt nooſe, and this ſhould again be farther ſecured by a ſingle knot made above it. By many writers on this ſubject, a ſmall bolſter of linen is ordered to be inſerted between the artery and the knot, in order to prevent the artery from being cut by it. This, however, is a very unneceſſary precaution; for if the whole artery is not ſurrounded with the bolſter, it will be juſt as much expoſed to be cut by the ligature at any other part as where the knot is fixed: and, beſides, as we have already remarked, there is no occaſion whatever for making the ligature ſo tight on arteries as to run any riſk of dividing them; a much leſs degree of preſſure than is either commonly applied, or than conld have any influence in hurting them, being fully ſufficient for compreſſing them in the moſt effectual manner.

The upper ligature being thus finiſhed, before the knot is paſſed upon the other below the orifice, the tourniquet ought to be untwiſted, in order to ſee whether any blood is now diſcharged by the wound in the artery or not. If blood flows in any conſiderable quantity, it affords a proſpect of ſucceſs, as it clearly ſhows, that the anaſtamoſing branches from the ſuperior part of the artery are conſiderable enough for carrying on at leaſt a tolerable degree of circulation in the under part of the member. At the ſame time, however, although blood ſhould not be diſcharged at this time by the orifice, we are by no means, from this circumſtance alone, to deſpair of ſucceſs; for it frequently happens, that the operation ſucceeds in a very effectual manner, although no blood whatever is diſcharged on the trial now recommended.

But whether any blood ſhould be diſcharged by this trial or not, we are not to reſt ſatisfied with one ligature; for unleſs the ligature below the orifice be alſo tied, there is always a riſk, on the return of circulation to the under part of the artery, of blood paſſing out at the orifice. This precaution, therefore, ſhould never be omitted; it is eaſily done, and it renders the patient quite ſecure againſt all farther evacuation of blood by the orifice. After the knots have been put upon the ligatures, theſe ſhould be cut of ſuch a length, that their ends may lie fully out over the edges of the wound; ſo that when neceſſary they may be more eaſily withdrawn.

By way of greater ſecurity in this operation, it has been adviſed to inſert other two ligatures quite contiguous to the former, and to leave them untied; ſo that if any of the others miſgive, its place may be immediately ſupplied.

There is not, however, any neceſſity for this precaution: for if the firſt ligatures are properly applied, there can be no doubt of their anſwering the purpoſe; and in caſe either one or both of them ſhould happen to fail, they can be very eaſily renewed. In the mean time, too, the patient is rendered ſafe againſt any ſudden loſs of blood, by the tourniquet being left looſe upon the upper part of the member; which it ought by all means to be for ſeveral days after the operation, ſo that, in the event of blood burſting from the wound, it may be ſecured by means of it, much more readily than if it depended on the tying of a ligature.

The ligatures being both finiſhed in the manner directed, the tourniquet is now to be made quite looſe; and if no blood is diſcharged at the orifice in the artery, we may then reſt ſatisfied that the operation is ſo far properly completed.

421 Of dreſſing the wound.

The wound is now to be lightly covered with ſoft lint, with a pledget of any emollient ointment over the whole; and a compreſs of linen being applied over the dreſſings, all the bandage in any degree requiſite, is, two or three turns of a roller above, and as many below the centre of the wound, making it preſs with no more tightneſs than is abſolutely neceſſary for retaining the applications we have juſt now mentioned.

The patient being now put into bed, the member ſhould be laid in a relaxed poſture upon a pillow, and ought to be ſo placed as to create the leaſt poſſible uneaſineſs from the poſture in which it is laid.

412 Treatment of the patient after the operation.

As the operation for the aneuriſm is always tedious, and produces much pain and irritation, a full doſe of laudanum ſhould be given immediately on the patient being got into bed. In order to diminiſh ſenſibility during ſome of the more capital operations, different trials have been made of opiates given an hour or ſo before the operation. On ſome occaſions, this proved evidently very uſeful; but in others it ſeemed to have the contrary effect; particularly in weak nervous conſtitutions, in which with any doſes, however ſmall, they appeared to be rendered more irritable and more ſuſceptible of pain, than if no opiate had been given. Immediately after this operation, however, an opiate ought to be exhibited, to be repeated occaſionally according to the degrees of pain and reſtleſſneſs.

413 Of the ſtate of the limb in which the operation has been performed.

In ſome few caſes of aneuriſm it has happened, that the pulſe in the under part of the member has been diſcovered immediately after the operation. This, however, is a very rare occurrence: For as this diſorder is ſeldom met with in any other part than at the joint of the elbow as a conſequence of blood-letting, and as it rarely happens that the brachial artery divides till it paſſes an inch or two below that place, the trunk of this artery is therefore moſt frequently wounded; and when, accordingly, the ligature in this operation is made to obliterate the paſſage of almoſt the whole blood that went to the under part of the arm, there cannot be the leaſt reaſon to expect any pulſation at the wriſt, till in a gradual manner the anaſtomoſing branches of the artery have become ſo much enlarged, as to tranſmit ſuch a quantity of blood to the inferior part of the member as is ſufficient for acting as a ſtimulus to the larger branches of the artery.

Immediately after the operation, the patient complains of an unuſual numbneſs or want of feeling in the whole member; and as it generally for a few hours becomes cold, it is therefere right to keep it properly covered with warm ſoft flannel; and in order to ſerve as a gentle ſtimulus to the parts below, moderate frictions appear to be of uſe. In the ſpace of ten or twelve hours from the operation, although the numbneſs ſtill continues, the heat of the parts generally begins to return; and it frequently happens, in the courſe of a few hours more, that all the inferior part of the member becomes even preternaturally warm.

Immediately after this operation, the want of feeling in the parts is often very great; and in proportion as the circulation in the under part of the member becomes more conſiderable, the degree of feeling alſo augments. If we could ſuppoſe the nerves of the parts below to be always included in the ligature with the artery, that numbneſs which ſucceeds immediately to the operation might be eaſily accounted for; but it has been alſo known to happen when nothing but the artery was ſecured by the ligature.

In the mean time the patient being properly attended to as to regimen, by giving him cordials and nouriſhing diet when low and reduced, and confining him to a low diet if his conſtitution is plethoric, the limb being ſtill kept in an eaſy relaxed poſture, towards the end of the fourth or fifth day, ſometimes much ſooner, a very weak feeble pulſe is diſcovered in the under part of the member, which becoming ſtronger in a gradual manner, the patient in the ſame proportion recovers the uſe and feeling of the parts.

414 Of taking away the ligatures. So ſoon as there is an appearance of matter having formed freely about the ſore, which will ſeldom happen before the fifth or ſixth day, an emollient poultice ſhould be applied over it for a few hours, in order to ſoften the dreſſings, which may be then removed. At this time, too, the ligatures might be taken away; but as their continuance for a day or two longer can do no harm, it is better to allow them to remain till the ſecond or third dreſſing, when they either drop off themſelves, or may be taken away with perfect ſafety. The dreſſings, which ſhould always be of the ſofteſt materials, being renewed every ſecond or third day according to the quantity of matter produced, the ſore is in general found to heal very eaſily; and although the patient may for a conſiderable time complain of great numbneſs and want of ſtrength in the whole courſe of the diſeaſed limb, yet in moſt inſtances a very free uſe of it is at laſt obtained.

415 In what caſes a mortification will happen. It will be readily ſuppoſed, that the termination of this operation, as we have here deſcribed it, is the moſt favourable that can poſſibly happen. In ſome inſtances, the ſucceſs attending it is far from being ſo complete: Inſtead of a return of circulation, and of the feeling and uſe of the parts, they remain cold and inſenſible, and no marks of returning life are perceived. From a mere want of blood, therefore, mortification at laſt commences; and as nature is here deprived of one of her principal agents for the removal or ſeparation of gangrenous parts, viz. the efforts of the ſanguiferous ſyſtem, whenever the parts in ſuch circumſtances begin to mortify, nothing can prevent their progreſs to the ultimate ſtage of that malady.

Whenever mortification enſues, therefore, as a conſequence of this operation, if the patient ſurvives the immediate effects of it till a ſeparation occurs between the healthy and diſeaſed parts, amputation of the member will then be the only reſource.

SECT. VIII. *Of Fractures and Diſlocations.*

416 Of the bandages moſt proper for fractures. The beſt and moſt uſeful bandage for a ſimple fracture of the leg or thigh, is what is commonly known by the name of the *eighteen-tailed bandage;* or rather one made on the ſame principle, but with a little difference in the diſpoſition of the pieces. The common method is to make it ſo, that the parts which are to ſurround the limb make a right angle with that which runs lengthwiſe under it; inſtead of which, if they are tacked on ſo as to make an acute angle, they will fold over each other in an oblique direction, and thereby fit more neatly and more ſecurely, as the parts will thereby have more connection with, and more dependence on, each other.

427 Of the ſplints. The parts of the general apparatus for a ſimple fracture, which come next in order, are the ſplints. Theſe are generally made of paſteboard, wood, or ſome reſiſting kind of ſtuff, and are ordered to be applied lengthwiſe on the broken limb; in ſome caſes three, in others four, for the more ſteady and quiet detention of the fracture. That ſplints properly made and judiciouſly applied are very ſerviceable, is beyond all doubt; but their utility depends much on their ſize, and the manner in which they are applied. In general practice, they are made of ſuch length as not to reach either upward or downward, ſo far as the roller extends; not to comprehend either the upper or the lower joint of the broken bone, and to exceed the fracture either way not many inches: They do not, for example, in the broken leg, comprehend either the joint of the knee or the joint of the ankle, and act only on the fracture.

In this manner of application, and of this ſize, they are in fact neither more nor leſs than compreſſes, and compreſſes made of very bad materials. All the good that ever is, or that can be, done by them, when of ſuch length, and ſo applied, might certainly be done in a better manner by a more proper kind of compreſs; and every diſadvantage which a hard reſiſting compreſs, injudiciouſly applied, is capable of producing, is probable to reſult from them thus uſed.

The true and proper uſe of ſplints is to preſerve ſteadineſs in the whole limb, without compreſſing the fracture at all. By the former, they become very aſſiſtant to the curative intention; by the latter, they are very capable of cauſing pain and other inconveniences; at the ſame time that they cannot, in the nature of things, contribute to the ſteadineſs of the limb.

In order to be of any real uſe at all, ſplints ſhould, in the caſe of a broken leg, reach above the knee and below the ankle; ſhould be only two in number; and ſhould be ſo guarded with tow, rag, or cotton, that they ſhould preſs only on the joints, and not at all on the fracture. By this they become really ſerviceable; but a ſhort ſplint, which extends only a little above and a little below the fracture, and does not take in the two joints, is an abſurdity. By preſſing on both joints, they keep not only them but the foot ſteady; by preſſing on the fracture only, they cannot retain it in its place, if the foot be in the ſmalleſt degree diſplaced; but they may, and frequently do, occaſion miſchief, by rudely preſſing the parts covering the fracture againſt the edges and inequalities of it.

In the caſe of a fractured os femoris, if the limb be laid in an extended poſture, one ſplint ſhould certainly reach from the hip to the outer ankle, and another (ſomewhat ſhorter) ſhould extend from the groin to the inner ankle. In the caſe of a broken tibia and fibula, there never can be occaſion for more than two ſplints; one of which ſhould extend from above the knee to below the ankle on one ſide, and the other ſplint ſhould do the ſame on the other ſide.

428 Of the poſition of the limbs. The moſt eſſential article in the treatment of a fracture is the poſition of the limb. Upon the judicious or injudicious execution of this, depends the eaſe of the patient during his confinement, and the free uſe and natural appearance of his limb afterward.

"If I meant to deſcribe (ſays Mr Pott), or if I approved (pardon the phraſe), the common method of placing the broken leg and thigh in a ſtraight manner, this would be the place to mention the many very ingenious contrivances and pieces of machinery which practitioners, both ancient and modern, have invented for the purpoſe of keeping the whole limb ſtraight and ſteady; that is, of keeping all the muſcles ſurrounding the fractured bone conſtantly upon the ſtretch, and at the ſame time of preventing any inequality in the union of it, and any ſhortening of the limb in conſequence of ſuch inequality. But as it is my intention to inculcate another, and as it appears to me a better diſpoſition of the limb, in which ſuch boxes, cradles, and pieces of machinery are not wanted, nor can be uſed, it is needleſs for me to ſay any thing about them.

"According to this plan, the fractured leg and thigh ſhould be depoſited on the pillow in the very poſture in which the extenſion was made and the fracture-ſet; that is, with the knee bent.

"In the caſe of the fractured os humeri, the only poſition in which it can, with any tolerable convenience to the patient, be placed, is with the elbow bent; that very poſition which neceſſarily relaxes and removes all the reſiſtance of the ſurrounding muſcles. Daily experiences evinces the utility of this, by our very ſeldom meeting with lameneſs or deformity after it, notwithſtanding the prevailing apprehenſion of exuberant callus.

"The deformity frequently conſequent to the fracture of the bones of the cubit, particularly that of the radius only, will generally, if not always, be found to be in proportion as the muſcles concerned in the pronation and ſupination of the hand happen to be put more or leſs into a ſtate of action or tenſion by the poſition of the limb.

"In the thigh the caſe is ſtill more obvious, as the muſcles are more numerous and ſtronger. The ſtraight poſture puts the majority of them into action: by which action, that part of the broken bone which is next to the knee is pulled upward, and by paſſing more or leſs underneath that part which is next to the hip, makes an inequality or riſing in the broken part, and produces a ſhortneſs of the limb.

"In the fracture of both bones of the leg, the caſe is ſtill the ſame: a ſtraight poſition puts the muſcles upon endeavouring to act; a moderate flexion of the knee relaxes them, and takes off ſuch propenſity.

429
Of the fractured cubit.

"The diſpoſition, therefore, of the broken cubit ought to be that which, by putting the hand into a middle ſtate between pronation and ſupination, and by bending the fingers moderately, keeps the radius ſuperior to the ulna; or, in other words, the palm of the hand ſhould be applied to the breaſt, the thumb ſhould be ſuperior, the little finger inferior; and the hand ſhould be kept in this poſture conſtantly by means of two ſplints, which ſhould reach from the joint of the elbow on each ſide, and ſhould be extended below the fingers: or the ſame purpoſe may be ſtill better anſwered by a ſimple neat contrivance of the very ingenious Mr Gooch of Norfolk; of which he has given a draught, and which is preferable to a common ſplint, by its admitting the fingers to be more eaſily bent.

430
Of the os femoris.

"The poſition of the fractured os femoris ſhould be on its outſide, reſting on the great trochanter; the patient's whole body ſhould be inclined to the ſame ſide; the knee ſhould be in a middle ſtate, between perfect flexion and extenſion, or half-bent; the leg and foot, lying on their outſide alſo, ſhould be well ſupported by ſmooth pillows, and ſhould be rather higher in their level than the thigh: one very broad ſplint of deal, hollowed out, and well covered with wool, rag, or tow, ſhould be placed under the thigh, from above the trochanter quite below the knee; and another ſomewhat ſhorter ſhould extend from the groin below the knee on the inſide, or rather in this poſture on the upper ſide. The bandage ſhould be of the eighteen-tail kind; and when the bone has been ſet, and the thigh well placed on the pillow, it ſhould not, without neceſſity (which neceſſity in this method will ſeldom occur) be ever moved from it again until the fracture is united: and this union will always be accompliſhed in more or leſs time, in proportion as the limb ſhall have been more or leſs diſturbed.

431
Of the fractured fibula.

"In the fracture of the fibula only, the poſition is not of much conſequence; becauſe, by the tibia remaining entire, the figure of the leg is preſerved, and extenſion quite unneceſſary: but ſtill even here the laying the leg on its ſide, inſtead of on the calf, is attended with one very good conſequence, viz. that the confinement of the knee, in a moderately bent poſition, does not render it ſo incapable of flexion and uſe afterward, as the ſtraight or extended poſition of it does; and conſequently that the patient will be much ſooner able to walk, whoſe leg has been kept in the former poſture, than he whoſe leg has been confined in the latter.

432
Of the fractured tibia and fibula.

"In the fracture of both tibia and fibula, the knee ſhould be moderately bent; the thigh, body, and leg, in the ſame poſition as in the broken thigh. If common ſplints be uſed, one ſhould be placed underneath the leg, extending from above the knee to below the ankle, the foot being properly ſupported by pillows, bolſters, &c. and another ſplint of the ſame length ſhould be placed on the upper ſide, comprehending both joints in the ſame manner; which diſpoſition of ſplints ought always to be obſerved, as to their length, if the leg be laid extended in the common way; only changing the nominal poſition of them, as the poſture of the leg is changed, and calling what is inferior in one caſe exterior in the other, and what is ſuperior in one in the other interior."

433
Reduction of a compound fracture.

Reduction of, or ſetting a compound fracture, is the ſame as in the ſimple; that is, the intention in both is the ſame, viz. by means of a proper degree of extenſion, to obtain as apt a poſition of the ends of the fracture, with regard to each other, as the nature of the caſe will admit; and thereby to produce as perfect and as ſpeedy union as poſſible.

434
Dreſſings neceſſary in compound fractures.

The dreſſing neceſſary in a compound fracture is of two kinds, viz. that for the wound, and that for the limb. By the former, we mean to maintain a proper opening for the eaſy and free diſcharge of gleet, ſloughs, matter, extraneous bodies, or fragments of bone; and this in ſuch manner, and by ſuch means, as ſhall give the leaſt poſſible pain or fatigue, ſhall neither irritate by its qualities, nor oppreſs by its quantity; nor by any means contribute to the detention or lodgment of what ought to be diſcharged. By the latter, our aim ſhould be the prevention or removal

val of inflammation, in order, if the habit be good, and all other circumſtances fortunate, that the wound may be healed by what the ſurgeons call the *firſt intention;* that is, without ſuppuration or abſceſs; or, that not being practicable, that gangrene and mortification, or even very large ſuppuration, may be prevented, and ſuch a moderate and kindly degree of it eſtabliſhed as may beſt ſerve the purpoſe of a cure. The firſt, therefore, or the dreſſing for the wound, can conſiſt of nothing better, or indeed ſo good, as ſoft dry lint, laid on ſo lightly as juſt to abſorb the ſanies, but neither to diſtend the wound, nor be the ſmalleſt impediment or obſtruction to the diſcharge of matter. This lint ſhould be kept clear of the edges, and the whole of it ſhould be covered with a pledgit ſpread with a ſoft eaſy digeſtive. The times of dreſſing muſt be determined by the nature of the caſe; if the diſcharge be ſmall or moderate, once in 24 hours will be ſufficient; but if it be large, more frequent dreſſing will be neceſſary, as well to prevent offence as to remedy the inconveniences ariſing from a great diſcharge of an irritating ſharp ſanies.

435 Of preventing violent pain, inflammation, &c.

The method of treating the limb, with a view to the prevention of ſuch accidents and ſymptoms as pain, inflammation, and laceration of parts are likely to produce, is different with different practitioners; ſome uſing from the very firſt relaxing greaſy applications, others applying medicines of a very different nature. Both theſe may be right conditionally, that is, according to different circumſtances in the caſe; but they cannot be equally ſo in the ſame circumſtances.

436 Of applying relaxing cataplaſms, &c.

Many practitioners are accuſtomed to envelope compound fractures in a ſoft warm relaxing cataplaſm from the very firſt, whether the limb be in a tenſe ſwollen ſtate or not. This ſeems to be injudicious. When from neglect, from length of time paſſed without aſſiſtance, from miſconduct or drunkenneſs in the patient, from aukwardneſs and unhandineſs in the aſſiſtants, or from any other cauſe, a tenſion has taken poſſeſſion of the limb, and it is become tumid, ſwollen, and painful, a warm cataplaſm is certainly the beſt and moſt proper application that can be made; and that for very obvious reaſons: the ſtate of the parts under theſe circumſtances is ſuch, that immediate union is impoſſible, and nothing but a free and plentiful ſuppuration can diſſipate or remove impending miſchief: every thing, therefore, which can tend toward relaxing the tenſe, ſwollen, and irritable ſtate of the parts concerned, muſt neceſſarily be right; the one thing aimed at (plentiful ſuppuration) cannot be accompliſhed without it. But when the parts are not in this ſtate, the intention ſeems to be very different. To relax ſwollen parts, and to appeaſe pain and irritation by ſuch relaxation, is one thing; to prevent inflammatory defluxion and tumefaction is certainly another; and they ought to be aimed at by very different means. In the former, a large ſuppuration is a neceſſary circumſtance of relief, and the great means of cure; in the latter it is not, and a very moderate degree of it is all that is required. The warm cataplaſm, therefore, although it be the beſt application that can be made uſe of in the one caſe, is certainly not ſo proper in the other, as applications of a more diſcutient kind, ſuch as mixtures of ſpirit. vini, vinegar and water, with crude ſal ammoniac, ſpirit. Mindereri, acet. litharg. and medicines of this claſs, in whatever form the ſurgeon may chooſe. By theſe, in good habits, in fortunately-circumſtanced caſes, and with the aſſiſtance of what ſhould never be neglected, I mean phlebotomy and the general antiphlogiſtic regimen, inflammation may ſometimes be kept off, and a cure accompliſhed, without large collections or diſcharges of matter, or that conſiderable degree of ſuppuration which, though neceſſary in ſome caſes, and almoſt unavoidable in others, are, and muſt be, rather promoted and encouraged, than retarded or prevented, by warm relaxing applications of the poultice-kind.

437 Bandage and ſplints for compound fractures.

Compound fractures in general require to be dreſſed every day; and the wounded parts not admitting the ſmalleſt degree of motion without great pain, perfect quietude becomes as neceſſary as frequent dreſſing. The common bandage, therefore (the roller), has always in this caſe been laid aſide, and what is called the *eighteen-tailed bandage* ſubſtituted, very judiciouſly, in its place.

Splints, that is, ſuch ſhort ones as are moſt commonly made uſe of in ſimple fractures, are by all forbid in the compound; and that for the ſame reaſon which ought to have prevented them from having ever been uſed in the former, viz. becauſe the probable good to be derived from them can be but little, and the probable miſchief is obvious and conſiderable.

But although ſhort ſplints are, for many reaſons, palpably improper in both caſes, yet thoſe which reach from joint to joint comprehend them both; and, applied on each ſide of the leg only, are very uſeful both in the ſimple and in the compound fracture, as they may, thus applied, be made to keep the limb more conſtantly ſteady and quiet than it can be kept without them.

438 Of luxations.

With regard to luxations, many engines have been invented in order to make as ſtrong an extenſion as poſſible; but by attending to the principles laid down nº 238, it will be found that theſe extraordinary degrees of force can never be neceſſary. To give very particular directions concerning the reduction of luxations in all caſes, would not only be very tedious, but in a great meaſure unneceſſary; as, by comparing the joint ſuppoſed to be luxated with the ſound one, every intelligent operator muſt know whether it is ſo or not; and, it being remembered always to keep the muſcles of the part in as relaxed a ſtate as poſſible, the buſineſs of the ſurgeon is, 1. To reſtore the luxated bone to its place, firſt by extenſion, and then by reduction with his hands. 2. To preſerve and retain what is ſo replaced, in their natural poſition. And laſtly, 3. To prevent and cure the ſeveral ſymptoms which uſually attend. The reduction is uſed to be commodiouſly performed by placing the patient on a ſtool, table, bed, or the ground, as the ſurgeon ſhall think moſt ſuitable to the caſe. It is however to be obſerved here, that thoſe luxations are moſt readily reduced on a ſtool, which happen in the jaw, clavicle, arm, or hand; on a table, ſuch as happen in the vertebræ or thighs; on a bed, ſuch as happen in the legs or feet; and laſtly, thoſe diſlocations are moſt commodiouſly reduced on the floor which happen on the ſhoulder or vertebræ of the neck.

439 Of making the extenſion.

The extenſion is to be made much after the ſame manner as in fractures; viz. the outer or lower part of the diſlocated limb is to be extended by an aſſiſtant, till the head of the diſordered bone be found to correſpond exactly with the ſinus from whence it was luxated. This may be done by the hands: but, if they are not ſo convenient, the extenſion ſeldom fails of being ſo well made by a napkin, as to render the machinery delineated in ſuch an ample manner by Oribaſius, Parey, Andreas a Cruce, Scultetus, and others, generally unneceſſary; ſince they can effect ſcarce any thing more, unleſs it be to terrify and diſcourage the patient in the extenſion, by their formidable ſhow.

440 Of replacing the bone.

To replace the luxated bone again in its natural ſeat, the ſurgeon muſt regulate the aſſiſtant's extenſion, by ordering it to be ſtrong enough, and in a right direction; in the mean time he is to compreſs the articulation gently with his hands and fingers, till he find the elapſed bone recover its right place.

441 Signs of a luxation completely reduced.

An accurate reduction of a luxation is known to have been effected by the ſame ſigns which attend the reduction of fractures. It is a good ſign, 1. If the bone be heard to ſnap or crack in its reduction. 2. When the diſordered limb is found to be of the ſame length with the ſound one. 3. When the pains grow leſs. Or laſtly, 4. When the limb can perform its uſual motion.

In thoſe caſes where the luxation is accompanied with a fracture, the reduction muſt be put off till that is firſt ſet and joined; for the extenſion cannot be ſafely attempted till the fracture be well joined by a firm callus.

442 Of retaining the bones in their places.

After the bones have been puſhed into their places from whence they were forced out, the next buſineſs is carefully to retain them there. But bones that are entire are much eaſier retained than thoſe that have been broken: for the latter cannot be contained in their right poſture without ſtrict bandage and reſt; whereas there is in the firſt caſe ſeldom much occaſion for bandage, or any great reſt: for thus, in freſh diſlocations of the jaw, bones of the fingers, hands, cubitus, and humerus, the bone may be immediately reduced without further bandage or reſt; becauſe they are generally held firm enough by their proper ligaments and muſcles. It ſeems rather more neceſſary to bend, extend, and gently move the limb ſometimes, than to endanger its becoming ſtiff and immoveable by a long inactivity. But when the luxation happens in the lower extremities, it ſeems better to let the patient reſt a few days in his bed, moving the limb gently as ſoon as he finds it capable, and afterwards he may riſe and walk cautiouſly with it.

443 Of bandages, &c. for luxated joints.

On the other hand, when the ligaments have been much ſtretched by a violent and long-continued diſtention, or have been rendered infirm by any other means, it ſeems altogether neceſſary to make uſe of ſome proper bandage, and to recommend reſt to the patient, till the ligaments have regained their former ſtrength. But here it muſt be alſo carefully obſerved, to let the diſordered articulation ſometimes have a little gentle motion, by an eaſy flexion and extenſion of the limb, to prevent any ſtiffneſs or other bad conſequence from ſuch a continued reſt. In the mean time, it may not be improper to moiſten the bandages and bathe the part with ſp. vin. aq. hungar. or ſome other warm and ſtrengthening ſpirit, by which means the ligaments are uſed to become very firm and ſtrong. The bandages themſelves ſhould be neither too tight nor too looſe. As for the application of plaſters, which has been ſuch a prevailing cuſtom in theſe caſes, it ſeems rather to be prejudicial than otherwiſe.

SECT. IX. *Of the Reduction of Herniæ.*

THE cure of a rupture is either perfect (called alſo *radical*), or imperfect, which is called *palliative*.

This diſtinction, which is juſt and true, and founded both on reaſon and experience, has frequently been miſunderſtood by the generality of mankind, and has therefore been the cauſe of much undeſerved cenſure on the practitioners of ſurgery.

444 Uncertain events attending herniæ.

The truth is, that though the events are extremely different, yet the chirurgical means which are made uſe of in either caſe are exactly the ſame, viz. reduction of the protruded parts, and retention of them, when ſo reduced, by proper bandage. Theſe ſometimes, and in ſome circumſtances, produce a perfect cure; at other times, and under other circumſtances, prove only a palliative one: and this uncertainty of event being dependent on cauſes which a ſurgeon can neither foreſee nor direct with any tolerable degree of certainty, ſhould warn him againſt being too forward in making a promiſe.

445 Different claſſes of them.

The different treatment which ruptures may require being dependent on different circumſtances attending the diſeaſe, we ſhall divide them into four claſſes; under which may be comprehended, not only all the kinds of hernias, but every particularity alſo with which they may happen to be diſtinguiſhed.

1. Under the firſt, we reckon thoſe which are capable of eaſy and immediate reduction, and are not attended by any troubleſome or bad ſymptoms. 2. Under the ſecond, thoſe which have been ſo long down, that the contained parts are either ſo altered in form, or have contracted ſuch adheſions and connections, as to be abſolutely incapable of being reduced at all. 3. Under the third, we comprehend thoſe in which ſuch ſtricture has been made on the protruded parts, as to bring on pain, and produce ſuch an obſtruction in the inteſtinal canal, as to render immediate reduction neceſſary, but at the ſame time difficult. 4. And under the fourth, we ſhall place thoſe in which the return of the parts by the mere hand is abſolutely impracticable, and in which the patient's life can be ſaved only by a chirurgical operation.

446 Of the ruptures of infants.

I. The firſt is very frequently met with in infants, and ſometimes in adults, and is too often neglected in both. In the former, as the deſcent ſeldom happens but when the infant ſtrains to cry, and the gut is either eaſily put up or returns as ſoon as the child becomes quiet, it often is either totally unattended to, or an attempt made to reſtrain it only by a bandage made of cloth or dimity; and which, being ineffectual for ſuch purpoſe, lays the foundation of future trouble and miſchief.

447 A ſteel truſs may be worn at any age.

This is in great meaſure owing to a common opinion, that a young infant cannot wear a ſteel truſs; a generally prevailing error, and which ought to be corrected. There is no age at which ſuch truſs may not be worn, or ought not to be applied: it is, when well made, and properly put on, not only perfectly ſafe and eaſy, but the only kind of bandage that can be depended upon; and as a radical cure depends greatly on the thinneſs of the hernial ſac, and its being capable of being ſo compreſſed as poſſibly to unite, and thereby entirely cloſe the paſſage from the belly, it muſt therefore appear, that the fewer times the parts have made a deſcent, and the ſmaller and finer the elongation of the peritoneum is, the greater the probability of ſuch cure muſt be.

The ſame method of acting muſt, for the ſame reaſons, be good in every age in which a radical cure may reaſonably be expected; that is, the prolapſed parts cannot be too ſoon returned, nor too carefully prevented from falling down again; every new deſcent rendering a cure both more diſtant and more uncertain.

448 Treatment of the patient after the hernia is reduced.

As ſoon as the parts are returned, the truſs ſhould be immediately put on, and worn without remiſſion; care being taken, eſpecially if the patient be an infant, to keep the parts on which it preſſes conſtantly waſhed, to prevent galling.

It can hardly be neceſſary to ſay, that the ſurgeon ſhould be careful to ſee that the truſs fits, as his ſucceſs and reputation depend on ſuch care. A truſs which does not preſs enough is worſe than none at all, as it occaſions loſs of time, and deceives the patient or his friends; and one which preſſes too much, or on an improper part, gives pain and trouble, by producing an inflammation and ſwelling of the ſpermatic cord, and ſometimes of the teſticle.

449 Of the ruptures of adults.

In adults, whoſe ruptures are of long ſtanding, and accuſtomed to frequent deſcent, the hernial ſac is generally firm and thick, and the aperture in the tendon of the abdominal muſcle large. The freedom and eaſe with which the parts return into the belly, when the patient is in a ſupine poſture, and the little pain which attends a rupture of this kind, often render the perſons who labour under it careleſs: but all ſuch ſhould be informed, that they are in conſtant danger of ſuch alteration in their complaint, as may put them into great hazard, and perhaps deſtroy them. The paſſage from the belly being open, the quantity of inteſtine in the hernial ſac is always liable to be increaſed, and, when down, to be bound by a ſtricture. An inflammation of that portion of the gut which is down, or ſuch obſtruction in it as may diſtend and enlarge it, may at all times produce ſuch complaints as may put the life of the patient into imminent danger; and therefore, notwithſtanding this kind of hernia may have been borne for a great length of time, without having proved either troubleſome or hazardous, yet as it is always poſſible to become ſo, and that very ſuddenly, it can never be prudent or ſafe to neglect it.

Even though the rupture ſhould be of the omental kind (which, conſidered abſtractedly, is not ſubject to that degree or kind of danger to which the inteſtinal is liable), yet it may be ſecondarily, or by accident, the cauſe of all the ſame miſchief; for while it keeps the mouth of the hernial ſac open, it renders the deſcent of a piece of inteſtine always poſſible, and conſequently always likely to produce the miſchief which may proceed from thence.

They who labour under a hernia thus circumſtanced, that is, whoſe ruptures have been generally down while they have been in an erect poſture, and which have either gone up of themſelves or have been eaſily put up in a ſupine one, ſhould be particularly careful to have their truſs well made and properly fitted; for the mouth of the ſac, and the opening in the tendon, being both large and lax, and the parts having been uſed to deſcend through them, if the pad of the truſs be not placed right, and there be not a due degree of elaſticity in the ſpring, a piece of inteſtine will in ſome poſture ſlip down behind it, and render the truſs productive of that very kind of miſchief which it ought to prevent.

II. In the ſecond claſs we ranked thoſe caſes in which the parts conſtituting the hernia are found irreducible, but not in a ſtate of inflammation, nor producing any troubleſome or dangerous kind of ſymptoms.

450 Why ſome ruptures cannot be reduced.

This incapacity of reduction may be owing to ſeveral cauſes, but moſt frequently ariſes either from the largeneſs of the quantity of the contents, from an alteration made in their form and texture, or from connections and adheſions which they have contracted with each other, or with their containing bag.

Ruptures are ſometimes rendered difficult to be reduced, by that portion of the inteſtinal canal which is called the *cœcum*, or the beginning of the colon, being contained in the hernial ſac. When a hernia of this kind (viz. one containing a part of the inteſtinal tube) has been long neglected, and ſuffered to remain in the ſcrotum without any bandage at all to ſupport its weight, the hernial ſac being conſtantly dragged down, and kept in a ſtate of diſtention, neceſſarily becomes thick, hard, and tough: by this means the diameter of its neck is leſſened, and the return of the inteſtine back from the ſcrotum into the belly rendered more and more difficult, as the parts through which it is to paſs become harder and leſs capable of yielding. This will indeed, in time, prove an obſtruction ſufficient to hinder any part of the inteſtine, or even of the omentum, from being returned; but the more the difficulty is, which proceeds from the mere figure and ſize of the portion of gut, the greater will be the obſtruction when added to that ariſing from the juſt-mentioned cauſe.

An alteration produced by time, and conſtant, tho' gentle preſſure, in the form and conſiſtence or texture of the omentum, is alſo no infrequent cauſe why neglected omental ruptures become irreducible.

The cellular membrane, in all parts of the body, however looſe and light its natural texture may be, is capable of becoming hard, firm, and compact, by conſtant preſſure. Of this there are ſo many and ſo well known inſtances, that it is quite unneceſſary to produce any.

The omentum, from its texture, is liable to the ſame conſequence. When a portion of it has been ſuffered to remain for a great length of time in the ſcrotum, without having ever been returned into the belly, it often happens, that although that part of it which is in the lower part of the hernial ſac preſerves its natural ſoft, adipoſe, expanſile ſtate, yet all that part which paſſes through what is called the *neck of the ſac*, is, by conſtant preſſure, formed into a hard, firm, incompreſſible, carneous kind of body, incapable of being expanded, and taking the form of the paſſage in which it is confined, exactly filling that paſſage, and rendering it impoſſible to puſh up the looſe part which fills the ſcrotum.

The ſame reaſon for incapacity of reduction is alſo ſometimes met with in ruptures of the inteſtinal kind, from an alteration produced on that part of the meſentery which has been ſuffered to lie quiet for a great length of time in the neck of an old hernial ſac.

The other impediment to the return of old ruptures, is connection and adheſion of the parts, either with each other, or with the bag containing them. This is common to both the inteſtinal and omental hernia, and is produced by ſlight inflammations of the parts, which have been permitted to lie long in contact with each other, or perhaps, in many caſes, from the mere contact only. Theſe adheſions are more or leſs firm in different caſes; but even the ſlighteſt will almoſt always be found an invincible objection to the reduction of the adherent parts by the hand only.

Many, or perhaps moſt, of theſe irreducible ruptures, become ſo by mere time and neglect, and might at firſt have been returned; but when they are got into this ſtate, they are capable of no relief from ſurgery but the application of a ſuſpenſory bag, to take off or leſſen the inconvenience ariſing from the weight of the ſcrotum.

451 Directions to people who have irreducible ruptures.

People in this ſituation ſhould be particularly careful not to make any attempts beyond their ſtrength, nor aim at feats of agility; they ſhould take care to ſuſpend the loaded ſcrotum, and to keep it out of the way of all harm from preſſure, bruiſe, &c. When the tumour is very large, a ſoft quilted bolſter ſhould be worn at the bottom of the ſuſpenſory to prevent excoriation, and the ſcrotum ſhould be frequently waſhed for the ſame reaſon; a loſs of ſkin in this part, and in ſuch circumſtances, being ſometimes of the utmoſt importance. They ought alſo to be particularly attentive to the office of the inteſtinal canal, to ſee that they do not, by any irregularity of diet, diſorder it, and keep themſelves from being coſtive, for reaſons too obvious to need relating. By theſe means, and with theſe cautions, many people have paſſed their lives for many years free from diſeaſe or complaint, with very large irreducible ruptures.

On the other hand, it is fit that mankind ſhould be appriſed, that the quiet inoffenſive ſtate of this kind of hernia is by no means to be depended upon; many things may happen to it, by which it may be ſo altered, as to become hazardous and even fatal: an inflammation of that part of the gut which is down, any obſtruction to the paſſage of the aliment or fæces through it, a ſtricture made by the abdominal tendon, either on what has been long down or on a new portion which may at any time be added to it, are always capable of ſo altering the ſtate of the caſe, as to put the life of the patient into danger.

Indeed the hazard ariſing from a ſtricture made on a piece of inteſtine contained in the ſac of an old irreducible hernia, is, in one reſpect, greater than that attending one that has been found at times reducible; ſince, from the nature of the caſe, it will hardly admit of any attempt toward relief but the operation; and that, in theſe circumſtances, muſt neceſſarily be accompanied with additional difficulty.

Among the ruptures which have been thought not reducible, and treated as ſuch, there have been ſome which, upon more judicious and more patient attempts, have been found capable of reduction.

452 Method of attempting the reduction of an old hernia.

When this is ſuſpected to be the caſe, the proper method is by abſolute reſt, in a ſupine poſture, for a conſiderable length of time, and by great abſtinence and the uſe of evacuants, ſo to leſſen the ſize of the parts in the hernial ſac, as to render them capable of paſſing back again into the belly.

This method has now and then ſucceeded, and in ſome caſes is worth the trying: but, previous to the attempt, there ſhould be ſome circumſtances which makes ſucceſs probable; and there ſhould alſo be good reaſon to believe, that the habit and age of the patient will bear the neceſſary confinement and evacuation; otherwiſe, even though he ſhould get rid of his rupture, he may be much worſted by the experiment.

If ſuch attempt ſucceeds, a truſs ſhould be immediately put on, and worn conſtantly without remiſſion; for in theſe people, the largeneſs of the abdominal aperture, the thickneſs of the hernial ſac, and the relaxation of the meſentery, make a new deſcent always to be apprehended and guarded againſt.

An omental rupture, which has been ſo long in the ſcrotum as to have become irreducible, is very ſeldom attended with any bad ſymptoms, conſidered abſtractedly; but it is conſtantly capable of being the occaſion of an inteſtinal hernia and all its conſequences: neither is that all; for the omentum, either ſo altered in form and texture, or ſo connected as to be incapable of reduction, may by accident inflame, and either become gangrenous or ſuppurate, and be the occaſion of a great deal of trouble.

453 Of herniæ whoſe reduction is difficult.

III. Under the third diviſion, we reckon thoſe ruptures which are reducible, but whoſe reduction is difficult, and which are attended with pain, trouble, and hazard.

Difficulty of reduction may be owing to ſeveral cauſes. The ſize of the piece of omentum, or the inflamed ſtate of it; the quantity of inteſtine and meſentery, an inflammation of the gut, or its diſtention by fæces or wind; or the ſmallneſs of the aperture of the tendon through which the hernia paſſes. But to whatever cauſe it be owing, if the prolapſed body cannot be immediately replaced, and the patient ſuffers pain, or is prevented thereby from going to ſtool, it is called an *incarcerated hernia*, a *ſtrangulated hernia*, or a *hernia with ſtricture*.

Every ſymptom which attends an incarcerated rupture depends on this ſtricture, and is juſtly accountable for from it. The tumour, the pain, the tenſion of the belly, the nauſea, the vomiting, and the ſuppreſſion of ſtools, are ſo many effects produced by it, and removable only by removing it.

454 Method of attempting a reduction of ſtrangulated hernia.

In order to effect a reduction, the patient ſhould be laid in a ſupine poſture, with his trunk certainly as low, if not lower, than his thighs; the thigh on the diſeaſed ſide ſhould be ſo elevated as to contribute as much as poſſible to the relaxation of the abdominal aperture; and then the ſurgeon, graſping the lower part of the tumour gently with his hand, in ſuch a manner as to keep the teſticle from aſcending, and the inteſtine from deſcending, muſt endeavour to procure the return of the latter through the ring, as it is vulgarly called, by gentle continued preſſure toward that opening. If the caſe be a bubonocele, there will be no occaſion for endeavouring to graſp the tumour, but, by continued moderate preſſure on it with the fingers, to endeavour the return of the piece of gut.

This may ſerve for a general deſcription of the method of performing this operation; but the exact manner of executing it is one of thoſe manœuvres which can be learnt only by obſervation and practice, and of which no verbal deſcription can convey an adequate and perfect idea: knowledge of the ſtructure and ſituation of the parts will inſtruct any one how to go about it; and a little practice will ſoon make him adroit.

455 Of the poſture of the body. The poſture of the body, and the diſpoſition of the lower limbs, may be made very aſſiſtant in this operation when the difficulty is conſiderable: the nearer the poſture approaches to what is commonly called ſtanding on the head, the better, as it cauſes the whole packet of ſmall inteſtines to hang, as it were, by the ſtrangulated portion, and may thereby diſengage it. A little time and pains ſpent in this manner will frequently be attended with ſucceſs, and obtain a return of the part; but if it ſhould not, and the handling of it (which ſhould always be gentle) becomes painful and very fatiguing to the patient, we are adviſed to deſiſt a few hours, and try the effect of other means, viz. phlebotomy, glyſters, &c. But when all theſe have failed, there is then no other reſource than in a chirurgical operation: and perhaps there is not in the practice of ſurgery a point which requires more judgement, firmneſs, or delicacy, than to determine the preciſe time beyond which this operation ſhould not be deferred, and for a ſurgeon to conduct himſelf ſo as to induce a patient to ſubmit to it early enough for his preſervation. The time in which a piece of gut will become gangrenous from ſtricture, or get into a ſtate approaching to that of a gangrene, is extremely uncertain, and depends on circumſtances which no man can foreſee. There have been ſeveral inſtances of ruptures, attended by preſſing ſymptoms of ſtricture, which have been ſafely returned by the hand only, at the end of ſeveral days; or the operation having been performed at the ſame diſtance of time, the parts have been found ſound and unhurt: on the other hand, there are many inſtances producible, of the inteſtine having been with great difficulty replaced, or of its returning of its own accord, from being mortified, or (the operation having been ſubmitted to) of its having been found in ſuch ſtate by the operator at the end of not many hours.

456 Operation not to be very much dreaded. The two principal circumſtances which have moſt contributed to the infrequency of performing this operation, are, a dread of great hazard from the operation itſelf, conſidered abſtractedly; and a fear of bringing a diſgrace upon it, by having performed it too late. The firſt of theſe is vaſtly greater than it ought to be, and is moſt frequently the cauſe of the latter: ſo that if the one can juſtly be leſſened, the other will not be ſo likely to happen.

457 Of the time when it ſhould be performed. Mr Pott is of opinion, that the operation ought always to be performed as ſoon as poſſible, after it appears that all rational attempts, by large and free bleeding, the warm bath, glyſters, &c. are found to be ineffectual, or that the ſymptoms rather increaſe than decreaſe while ſuch means are made uſe of, and that the handling neceſſary for reduction becomes more and more painful: for if it be delayed until the inflammation has attained a certain height, though the parts, upon being laid open, are not found quite gangrenous, that is no proof that the want of ſucceſs muſt be ſet to the account of the operation merely. That ſtate of inflammation, either of the inteſtine or of the hernial ſac, which is juſt not gangrenous, is no ſtate of ſafety, nor are we ſure that removing the ſtricture will at this time appeaſe the ſymptoms or abate the hazard; far from it: ſuch an alteration may have already been made in the inteſtine that a mortification will enſue, though it be ſet free and returned into the belly. A ligature need not be continued around any part of a living animal, until it becomes quite gangrenous, in order to produce its deſtruction; there is a certain point of time in which the circulation is ſo prevented, that the ſame event will follow, though the ligature be then removed. It is indeed a nice, and no very eaſy matter, to find this preciſe time; but this difficulty and uncertainty are the ſtrongeſt reaſons for anticipating rather than waiting for it: for when, in the preſent caſe, ſuch time arrives, or is nearly arrived, the riſk of the operation becomes complicated with that ariſing from the diſeaſed ſtate of the parts within; and the chance of ſucceſs is thereby much leſſened.

458 Manner of performing it. When the operation ſhall be thought neceſſary, the manner of performing it is as follows.

The pubes and groin having been clean ſhaved, the patient muſt be laid on his back on a table of convenient height, with his legs hanging eaſily over the end of it; then with a ſtraight diſſecting knife an inciſion muſt be made through the ſkin and membrana adipoſa, beginning juſt above the place where the inteſtine paſſes out from the belly, and continuing it quite down to the lower part of the ſcrotum. Upon dividing the adipoſe membrane, there generally appear a few ſmall diſtinct tendinous kind of bands, which lie cloſe upon the hernial ſac, which muſt be divided alſo as well as the ſac: the ſame knife with which the inciſion through the ſkin was made will execute this; which ſhould be done with a ſteady hand and great caution, it being of very different degrees of thickneſs in different caſes. In the bubonocele, or that which is confined to the groin, the ſac is moſt frequently thin, conſequently more eaſily divided, and requires greater attention in the operator. In the oſcheoſcele, or ſcrotal hernia, if it be recent, the ſac is uſually thin alſo; if ancient, it is ſometimes of conſiderable thickneſs: but whatever be the ſtate of it, if the operator has any doubt, let him, as ſoon as he has made a ſmall puncture in what appears to him to be the hernial ſac, endeavour to introduce a probe into it: this will give him the neceſſary ſatisfaction; for if he has not pierced the ſac, the probe will be ſtopped by the cells of the common membrane; and if he has, it will paſs in without any obſtruction. The place to make the inciſion in the hernial ſac is about an inch and half below the ſtricture; and the opening need not be larger than juſt to admit the end of the operator's fore-finger; which, conſidering the great dilatability of theſe membranes, will be a very ſmall one. The fore-finger introduced into this aperture is the beſt of all directors; and upon that a narrow-bladed curved knife, with a bold probe point, will be the only inſtrument neceſſary to finiſh the operation. With this knife on the finger (the point of the former being always ſhort of the extremity of the latter) the ſac muſt be divided quite up to the opening in the tendon, and down to the bottom of the ſcrotum.

Upon the firſt diviſion of the ſac, a fluid generally ruſhes out; which fluid is different in quantity, colour, and conſiſtence, according to the date, ſize, and ſome other circumſtances attending the rupture.

This fluid has ſometimes been mentioned as a defence againſt an accident from the knife in the firſt diviſion of the hernial ſac, as if it kept the inteſtine at ſuch a diſtance as thereby to leſſen the hazard of its being wounded: but this is a very fallacious circumſtance, and never to be truſted: the ſecurity of this operation depends entirely on a competent knowledge of the parts, a ſteady hand, and an attentive eye.

Different operators, eſpecially among the French, have propoſed a number of different inſtruments for the ſafe performance of this inciſion; as the biſtouri cachée, the biſtouri herniare, the winged director, the blunt ſciſſars, &c. &c. all which are calculated for the defence and preſervation of the inteſtine in the diviſion of the ſac and tendon: but whoever will make uſe of the two knives juſt mentioned, will find, that he will never ſtand in need of any other inſtrument, and that he will with them be able to perform the operation with more eaſe to himſelf, with leſs hazard to his patient, and with more (A) apparent dexterity, than with any other whatever.

"The ſac being laid open, the inteſtine generally puſhes out immedialy (unleſs it is confined by being enveloped in the omentum), and appears to be much more in quantity than it ſeemed to be while it was confined within the ſcrotum.

459
Of dividing the tendon.

This is the time to try whether, by gently drawing out a little more of the gut, its bulk cannot be ſo reduced as to enable the ſurgeon to return it back into the belly without dividing the tendon. In the caſe of the protruſion of a very ſmall piece of inteſtine, it has been found practicable; the difficulty of returning a large portion ariſing principally from the quantity of meſentery engaged in the ſtricture: and indeed, tho' it may now and then happen that a ſmall piece of gut may be returnable without a diviſion of the tendon, yet if it cannot be very eaſily accompliſhed, it had better not be attempted, ſince, in the ſtate in which this part muſt neceſſarily be, to require the operation thus far, any degree of force uſed to it will moſt probably be more prejudicial and hazardous than the reſt of it, if performed properly with a knife.

An attention to the natural ſtructure, figure, and direction of the parts, will give us the beſt information how to make the diviſion of the ſtricture to the beſt purpoſe and with the leaſt hazard.

The tendon of the obliquus deſcendens muſcle runs in an oblique direction from above downward; and the natural opening which is always found in it, and through which the hernia paſſes, is made by a kind of ſeparation of the fibres from each other: the direction of this opening is the ſame as that of the tendon, that is, obliquely downward from the os ilion to the os pubis: the knife, therefore, ſhould be ſo managed, as rather to continue this ſeparation than to make any tranſverſe ſection: its edge ſhould be applied to the ſuperior and poſterior part of the oval, and carried upward and obliquely backward, until a ſufficient opening is made to ſerve the purpoſe. By this means, the fibres of the tendon will be rather ſeparated from each other than cut; and, in all probability, the riſk ariſing from the inciſion will be leſſened.

460
Of the ſize of the inciſion.

It is generally adviſed to make the diviſion of the ſtricture free and large, as well to admit the eaſy return of the parts, as to prevent the inconvenience which it is ſuppoſed will be more likely to attend a ſmall wound in a tendinous body than a large one. The firſt intention, the eaſy return of the inteſtine, ſhould certainly be fulfilled; and therefore the inciſion ought always to be large enough for that purpoſe, and to afford an opportunity of paſſing the end of the finger round on the inſide in caſe of any adheſion: but as too large an opening may be attended with very ill conſequence, it ought alſo to be guarded againſt. In the majority of caſes, a ſmall inciſion will be found ſufficient for the purpoſe of reduction; and where the parts are free from adheſion, and the ſafe return of them is the only object of attention, a ſmall diviſion, made in the manner already directed, is not liable to any more pain or trouble than a large one, and may therefore be ſafely truſted.

461
Of the ſtate of the inteſtines.

The ſac and ſtricture being laid open and divided, the contained parts come into view; and, according to the different circumſtances of the rupture and of the patient, will be found in different ſtates, and require different treatment.

Theſe ſtates are reducible to three general heads: that is, the contained parts will be found either in a ſound, healthy, looſe, unconnected ſtate, and fit for immediate reduction; or in a ſound ſtate, but, from ſome particular circumſtances, incapable of being immediately replaced; or in an unſound diſeaſed ſtate, and requiring to be treated accordingly.

If the rupture conſiſts of a piece of inteſtine only, and that neither mortified nor adherent, the ſooner it is

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(A) They who are not accuſtomed to perform operations of ſuch conſequence as this is, are apt, from timidity, to be too ſparing in making their external inciſion; by which means, they add conſiderably to their own embarraſſment, and to the fatigue of the patient. A free diviſion of the hernial ſac and ſcrotum downwards, gives room for the more eaſy admiſſion of the finger into the ſtricture in order to divide it, and affords an opportunity of handling the inteſtine or omentum more gently as well as more properly in order to return them into the belly; both which neceſſary parts of the operation are much impeded by a ſmall inciſion.

As therefore no poſſible advantage can ariſe from a ſmall wound, but on the contrary it may be attended with great inconvenience both to the patient and ſurgeon, Mr Pott adviſes, when ſuch an opening is made in the hernial ſac, as will admit the operator's fore-finger, and upon it his knife, that he immediately divide the ſac and ſcrotum down to the bottom. It is true, that, upon ſuch diviſion, the quantity of inteſtine will ſeem to be increaſed; and an ignorant byſtander may be alarmed at this fallacious appearance, which is produced merely by the confined compreſſed gut being ſet free, and not by the addition of any more. The advantage which will ariſe to the operator, and conſequently to the patient, from ſuch diviſion, is real and great; it will enable the former to finiſh his work with freedom, and ſpare the latter a great deal of pain.

is returned, the better; and the more gently it is handled for reduction, the better alſo.

If the inteſtine be accompanied with a portion of omentum, the latter (if in a proper ſtate) ſhould be returned firſt.

In returning the inteſtine, care ſhould be taken to endeavour to put in that part firſt which came out laſt, otherwiſe the gut will be doubled on itſelf, and the difficulty and trouble be thereby much increaſed; and in making the reduction, the fingers ſhould be applied to that part of the inteſtine which is connected with the meſentery, rather than its convex part, as it will both ſerve the purpoſe better, and be leſs likely to do miſchief.

While the reduction is making, the leg and thigh on the ruptured ſide ſhould be kept elevated; as ſuch poſition of the limb will much facilitate the return of the parts.

Long confinement in the ſcrotum will in ſome people produce ſlight adheſions by ſlender filaments, which are generally very eaſily ſeparated by the finger, or divided by a knife or ſciſſars, whether the adheſions be of the parts of the inteſtine *inter ſe*, or to the hernial ſac. If the adheſion be of the former kind, and ſuch as proves very difficult to ſeparate, it will be better to return the gut into the belly as it is, than to run the riſk of producing an inflammation by uſing force: if it be of the latter, that is, if the connection be with the ſac, there can be no hazard in wounding that; and therefore it may be made free with.

462 Sect. X. *Of the Fiſtula in Ano.*

The *fiſtula in ano* is an abſceſs running upon or into the inteſtinum rectum.

If the ſurgeon have the firſt management of the abſceſs, and there appear an external inflammation upon the one ſide of the buttock only; after having waited for the proper maturity, let him with a knife make an inciſion the whole length of it; and in all probability, even though the bladder be affected, the largeneſs of the wound, and the proper application of doſſils lightly preſſed in, will prevent the putrefaction of the inteſtine, and make the cavity fill up like impoſthumations of other parts.—If the ſinus be continued to the other buttock, almoſt ſurrounding the inteſtine, the whole courſe of it muſt be dilated in like manner; ſince, in ſuch ſpongy cavities, a generation of fleſh cannot be procured but by large openings; whence alſo, if the ſkin is very thin, lying looſe and flabby over the ſinus, it is abſolutely neceſſary to cut it quite away, or the patient will be apt to ſink under the diſcharge, which is ſometimes exceſſive.

Here we have conſidered the impoſthumation as poſſeſſing a great part of the buttock; but it more frequently happens, that the matter points with a ſmall extent of inflammation on the ſkin, and the direction of the ſinus is even with the gut: in this caſe, having made a puncture, you may with a probe learn if it has penetrated into the inteſtine, by preſſing your finger up it, and feeling the probe introduced through the wound into its cavity; though, for the moſt part, it may be known by a diſcharge of matter from the anus. When this is the ſtate of the fiſtula, there is no heſitation to be made; but immediately putting one blade of the ſciſſars up the gut, and the other up the wound, ſnip the whole length of it. This proceſs is as adviſable when the inteſtine is not perforated, if the ſinus is narrow, and runs upon or very near it; for if the abſceſs be tented, which is the only way of dreſſing it while the external orifice is ſmall, it will almoſt certainly grow callous: ſo that the ſureſt means of cure will be opening the gut, that proper applications may be laid to the bottom of the wound. However, it ſhould be well attended to, that ſome ſinuſes pretty near the inteſtine neither run into nor upon it; in which caſe, they muſt be opened, according to the courſe of their penetration. There are abundance of inſtances, where the inteſtine is ſo much ulcerated, as to give free iſſue to the matter of the abſceſs by the anus: but there are none where there is not, by the thinneſs and diſcoloration of the ſkin, or an induration to be perceived through the ſkin, ſome mark of its direction; which, if diſcovered, may be opened into with a lancet, and then it becomes the ſame caſe as if the matter had fairly pointed.

If the ſinuſes into and about the gut are not complicated with an induration, and you can follow their courſe, the mere opening with ſciſſars, or a knife guided on a director, will ſometimes ſuffice; but it is generally ſafer to cut the piece of fleſh ſurrounded by theſe inciſions quite away, and, when it is callous, abſolutely neceſſary, or the calloſities muſt be waſted afterwards by eſcharotic medicines, which is a tedious and cruel method of cure.

When the fiſtula is of a long ſtanding, and we have choice of time for opening it, a doſe of rhubarb the day before the operation will be very convenient, as it not only will empty the bowels, but alſo prove an aſtringent for a while, and prevent the miſchief of removing the dreſſings in order to go to ſtool.

It ſometimes happens, that the orifices are ſo ſmall, as not to admit the entrance of the ſciſſars; in which caſe, ſponge-tents muſt be employed for their dilatation.

In performing theſe operations on the anus, no inſtruments are ſo handy as the knife and ſciſſars; almoſt all the others which have been invented to facilitate the work are not only difficult to manage, but more painful to the patient: however, in thoſe inſtances where the fiſtula is very narrow, and opens into the inteſtines juſt within the verge of the anus, the ſyringotomy may be uſed with advantage; but where the opening into the gut is high, it cannot be employed without giving great pain.

The worſt ſpecies of fiſtula is that communicating with the urethra, and ſometimes (though the proſtate gland) with the bladder itſelf. This generally takes it riſe from a former gonorrhœa, and appears externally firſt *in pœrineo:* afterwards, increaſing more towards the anus, and even ſometimes into the groin, it burſts out in various orifices, through the ſkin, which ſoon becomes callous and rotten; and the urine paſſing partly through theſe orifices, will often excite as much pain, and of the ſame kind, as a ſtone in the bladder.

This ſpecies of fiſtula taking its riſe from ſtrictures of the urethra, is only manageable by the bougie: for ſo long as the urethra is obſtructed, the cure of the fiſtula will be imperfect; but if the canal be opened by this application, it is amazing what obſtinate indurations and foul ſinuſes will in conſequence diſappear;

though there are ſome ſo callous and rotten, as to demand the knife and ſkilful dreſſings, notwithſtanding the urethra ſhould be dilated by the uſe of bougies.

SECT. XI. *Bronchotomy, the Extirpation of the Tonſils, &c.*

§ 1. *Of Bronchotomy.*

463 THE operation of bronchotomy is an inciſion made in the aſpera arteria, to make way for the air into the lungs, when reſpiration is obſtructed by any tumour compreſſing the larynx, or ſome other diſorder of the glottis and aſpera arteria, without any apparent tumour.

The manner of doing it, is by making a longitudinal inciſion through the ſkin, three quarters of an inch long, oppoſite to the third and fourth ring of the trachea, if you have the choice of place; and when you cannot make it ſo high, the rule will be to wound a little below the tumour: it is always adviſed to pinch up the ſkin for this proceſs, which, however, may be left to the diſcretion of the ſurgeon. When the ſkin is cut through, you muſt make a ſmall tranſverſe inciſion into the wind-pipe, and immediately introduce a ſilver crooked canula near half an inch long, with a couple of little rings at the top of it, through which a ribband may be paſſed round the neck, to keep it fixed in the wound.

The method of dreſſing will be eaſily underſtood; ſince, after the patient can breathe by the natural paſſage, if you withdraw the hollow tent, the wound will become a ſimple one, and, notwithſtanding its penetration through a cartilage into a large cavity, require a ſuperficial application only.

§ 2. *Extirpation of the Tonſils, and large Piles.*

464 THE tonſils ſometimes grow ſo large and ſcirrhous as to become incurable, and even to threaten ſuffocation, if not extirpated. The manner of doing this operation formerly, was by cutting them off: but the almoſt conſtant conſequence of this wound was a violent hæmorrhagy which ſometimes proved mortal; on which account it is rejected in favour of the ligature, which is not only void of danger, but alſo ſeldom fails of cure.

If the baſis of the tonſil is ſmaller that the upper part, you may paſs the ligature by tying it to the end of a probe, bent into the form of an arch, and ſet into a handle; which being carried beyond the gland, and round it, is to be brought back again: this done, you may eaſily tie it by the means of an inſtrument of Mr Cheſelden's contrivance, which holds one end of the ſtring on the ſide of the tonſil next the throat, while you make the knot by pulling the other with the right-hand quite out of the mouth, as will be eaſily underſtood by the draught in the copper-plate. Should it happen that the tonſils are conical, ſo that the ligature will neceſſarily ſlip over its extremity when we attempt to tie; in this caſe, he has recommended an inſtrument like a crooked needle, ſet in a handle, with an eye near the point, threaded with a ligature, which is to be thruſt through the bottom of the gland, and being laid hold of with a hook, the inſtrument is to be withdrawn; then, pulling the double ligature forwards, it muſt be divided, and one part be tied above, and the other below the tumour; the knots are to be always double, and the ligature to be cut off pretty near them. If after four or five days they ſlip, or ſeem to have mortified the tonſil only in part, you muſt repeat the whole operation; and if it fail a ſecond time, you muſt even repeat it again.

This kind of extirpation is more practiſed in large piles that are eſteemed incurable. When the piles are withinſide of the inteſtine, you muſt place your patient over a fomentation in a cloſeſtool, and have a crooked needle with a double ligature ready to paſs through them, when by ſtraining they are puſhed out of the anus (for ſometimes the inteſtine will return ſuddenly), and tie above and below as in the inſtance of the tonſil. Sometimes the piles are of that ſhape as to admit a ſingle ligature to be tied round them without the help of a needle, which is leſs painful. If there are ſeveral, you muſt only tie one or two at a time; for the pain of the ligature is exceſſive, and would be intolerable if many were tied at once: however, every five or ſix days, the operation may be repeated till all are extirpated, and the parts muſt be kept ſupple by ſome emollient ointments.—When the piles are ſmall, they may ſafely and with much leſs pain be cut off.

The uvula is ſubject to ſo great a degree of relaxation ſometimes, that it almoſt choaks the patient: the readieſt cure is cutting off all but half an inch of it; which may be done at one ſnip with a pair of ſciſſars (particularly curved for that purpoſe), laying hold of it with a forceps, leſt it ſhould ſlip away.

§ 3. *Of the Polypus.* 465

THE polypus of the noſe is ſaid to be an excreſence of fleſh, ſpreading its branches amongſt the laminæ of the os ethmoides, and through the whole cavity of one or both noſtrils. It happens very often to both ſides of the noſe at once: and in that caſe is very troubleſome, almoſt ſuffocating the patient, at leaſt making reſpiration very difficult. The intent of the operation is the removal of this obſtacle.

Polypi ariſe from the membrane ſpread upon the laminæ ſpongioſæ, pretty nearly in the ſame manner as the hydatids of the abdomen, in one kind of dropſy, do from the ſurface of the liver; or as ganglions from the tendons, borrowing their coats from a production of its fibres and veſſels. If they appear ſoft, and of the colour of the ſerum of the blood, in all likelihood they are formed of ſuch a ſort of water contained in cyſts, which, upon breaking the membrane, leaves ſo little hold for the inſtrument, that but a ſmall part of it can be extracted afterwards. This polypus is to be left to harden, before the operation be undertaken, which in proceſs of time it generally will do. In the 466 next degree of conſiſtence, they retain pretty nearly the ſame colour, and are often partly watery, and partly of a viſcid texture, which, though not tenaceous enough to admit of drawing them out by the roots, may at ſeveral attempts be taken away by bits. The next degree of conſiſtence, is that which is neither ſo ſoft as to be ſqueezed to pieces, nor ſo hard and brittle as to crumble, or adhere to the membrane with that force as not to admit of ſeparation: this is the moſt favourable one. The laſt is hard and ſcirrhous, adhering ſo tight as to tear rather than ſeparate in the extraction, and ſometimes even tends to degenerate into a cancer. This polypus is very difficult of cure.

The polypus ſometimes dilates to that degree, as not only to extend beyond the os palati, and hang over the œſophagus and trachea; but alſo ſpreading into the ſinus maxillaris, ſo exactly fills up every interſtice of the noſe, as to obſtruct the lower orifice of the *ductus ad naſum*, and prevent the deſcent of the tears, which neceſſarily muſt return through the puncta lachrymalia: and ſometimes they grow ſo enormouſly large, as even to alter the ſhape of the bones of the face.

When the polypus appears in the throat, it is always adviſable to extract it that way; it being found, by experience, more ready to looſen when pulled in that direction, than by the noſe. To this end, it would be right, before undertaking the operation, to let your patient lie on his back two or three hours, which will bring it ſtill further down; for the body of the polypus does not univerſally adhere, and will by its weight ſtretch out the fibres by which it is connected to the noſe; nay, there are inſtances, where by a little effort, ſuch as hawking, they have dropt quite off.

The method of extracting it is by a pair of forceps, with a ſlit at their extremities for the better hold; which muſt be introduced into the noſtril about an inch and a half, to make more ſure of it towards the roots; then twiſting them a little from one ſide to the other, you muſt continue in that action, while you pull very gradually the body of the polypus. If it break, you muſt repeat the extraction as long as any remains, unleſs it is attended with a violent hæmorrhagy, which is an accident that ſometimes follows upon the operation, and ſeldom fails when the excreſcence is ſcirrhous. However, the ſurgeon is not to be alarmed at the appearance of an immoderate effuſion the moment after the ſeparation: for, generally ſpeaking, the veſſels collapſe very ſoon again; but if they do not, dry lint, or lint dipt in ſome ſtyptic, will readily ſtop it.

After the extirpation, it has been uſual, in order to prevent a relapſe, to dreſs with eſcharotic powders, and even to burn with the actual cautery; but neither the one or the other can be of great ſervice in this caſe, and both are painful and dangerous. If ever the uſe of corroſive medicines is adviſable, it ſhould be for deſtroying the remainder of a polypus which cannot all be taken away; and then the eſcharotics may be better conveyed to the part by a long tent, than a ſeton paſſed through the noſe and mouth, which is difficult to do without hurting the patient, and very naſty to bear.

466 § 4. *Of the Hare-lip.*

THIS is a fiſſure in the upper lip, with want of ſubſtance; and is a natural defect, the patient being always born with it, at leaſt that ſpecies of hare-lip which requires the following operation. The cure is to be performed by the twiſted ſuture. There are many lips where the loſe of ſubſtance is ſo great, that the edges of the fiſſure cannot be brought together, or at beſt where they can but juſt touch; in which caſe the attempt ſhould be forborn: it is likewiſe forbidden in infants, and with reaſon if they ſuck; but otherwiſe it may be undertaken with great ſafety, and even with more probability of ſucceſs than in others that are older. It is not uncommon for the roof of the mouth to be fiſſured likewiſe; but this is no objection to the operation, if the ſkin of the lip is looſe enough to admit of reunion: and it may be remarked, that the fiſſure of the palate, in length of years, cloſes ſurpriſingly in ſome caſes.

The manner of performing the operation is this. You firſt with a knife ſeparate the lip from the upper jaw, by dividing the frænulum between it and the gums; and if the dentes inciſorii project, as is uſual in infants, they muſt be cut out with the ſame knife: then with a thin pair of ſtraight ſciſſars take off the callous edges of the fiſſure the whole length of it; obſerving the rule of making the new wound in ſtraight lines, becauſe the ſides of it can never be made to correſpond without this caution. The two lips of the wound being brought exactly together, paſs a couple of pins, one pretty near the top, and the other as near the bottom, through the middle of both edges of it, and ſecure them in that ſituation by twiſting a piece of waxed thread croſs and round the pins ſeven or eight times; you muſt then cut off the points, and lay a ſmall bolſter of plaſter underneath them, to prevent their ſcratching; but when the lower part only of the hare-lip can be brought into contact, it will not be proper to uſe more than one pin.

The practice of bolſtering the cheeks forward does little or no ſervice to the wound, and is very uneaſy to the patient. The manner of dreſſing will be, to remove the applications, which are quite ſuperficial, as often only as is neceſſary for cleanlineſs. The method is to deſiſt the three firſt days, and afterwards to do it every day, or every other day: it is not at all requiſite to dreſs between the jaw and lip where the frænulum was wounded, there being no danger that an inconvenient adheſion ſhould enſue. In about eight or nine days the parts are uſually united, and in children much ſooner; when you muſt gently cut the threads, and draw out the pins, applying upon the orifices a piece of plaſter and dry lint. It will be proper, in order to withdraw the pins more eaſily, to daub the ligatures and pins with warm water, and alſo moiſten them with ſweet oil, two or three days before you remove them; which will waſh off the coagulated blood, that would otherwiſe faſten them ſo hard to the ligature as to make the extraction painful.

§ 5. *Of the Wry Neck.* 467

THE operation of cutting the wry neck is very uncommon, and is never to be practiſed but when the diſorder is owing to a contraction of the maſtoideus muſcle only; as it can anſwer no purpoſe to ſet that muſcle free by dividing it (which is all that is to be done) if the others in the neck are in the ſame ſtate; and more eſpecially if it has been of long ſtanding from infancy, becauſe the growth of the vertebræ will have been determined in that direction, and make it impoſſible to ſet the head upright.

When the caſe is fair, the operation is this. Having laid your patient on a table, make a tranſverſe inciſion through the ſkin and fat ſomething broader than the muſcle, and not above half an inch from the clavicle; then paſſing the probed razor with care underneath the muſcle, draw it out and cut the muſcle. The great veſſels of the neck lie underneath; but when we are aware of their ſituation, the danger of wounding them may be avoided. After the inciſion is made, the wound is to be crammed with dry lint, and always dreſſed ſo as to prevent the extremities of the muſcle from reuniting; to which end, they are to be ſeparated from each other as much as poſſible by the aſſiſtance of a ſupporting bandage for the head during the whole time of the cure, which will generally be about a month.

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§ 6. *Of the Phymoſis.*

The *phymoſis* ſignifies no more than ſuch a ſtraitneſs of the prepuce that the glans cannot be denuded; which if it becomes troubleſome, ſo as to prevent the egreſs of the urine, or conceal under it chancres or foul ulcers, quite out of the reach of application, is to be cut open. It ſometimes happens that children are born imperforate; in which caſe, a ſmall puncture, dreſſed afterwards with a tent, effects a cure. But this operation is chiefly practiſed in venereal caſes, in order to expoſe chancres either on the glans or withinſide the prepuce itſelf: And here, if the prepuce is not very callous and thick, a mere inciſion will anſwer; which may be made either with the ſciſſars, or by ſlipping a knife between the ſkin and glans to the very extremity, and cutting it up. The laſt method is more eaſy than that of the ſciſſars: but it is ſafer to make the wound on the ſide of the prepuce than upon the upper part, for ſometimes the great veſſels on the dorſum penis afford a terrible hæmorrhage; though as the prepuce remains better ſhaped after an inciſion made in the upper part, the upper inciſion is to be preferred by thoſe who underſtand how to take up the veſſels. In children, it ſometimes happens that the prepuce becomes very much contracted; and in that caſe, it is accidentally ſubject to ſlight inflammations, which bring on ſome ſymptoms of the ſtone; but the diſorder is always removed by the cure of the phymoſis.

If the prepuce be very large and indurated, the opening alone will not ſuffice: it is more adviſable to take away the calloſity by circumciſion, which muſt be performed with a knife; and if the artery bleed much, it muſt be taken up with a ſmall needle and ligature.

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§ 7. *Of the Paraphymoſis.*

The *paraphymoſis* is a diſeaſe of the penis, where the prepuce is fallen back from the glans, and cannot be brought forwards to cover it. There are many whoſe penis is naturally thus formed, but without any inconvenience; ſo that ſince the time of the Romans (ſome of whom thought it indecent to have the glans bare), it has not been uſual to perform any operation upon that account; but we read the ſeveral proceſſes of it deſcribed very particularly by Celſus, who does not ſpeak of it as an uncommon thing. Moſt of the inſtances of this diſtemper are owing to a venereal cauſe; but there are ſome where the prepuce is naturally very tight, which take their riſe from a ſudden retraction of it, and immediate enlargement of the glans preventing its return. Sometimes it happens that the ſurgeon ſucceeds in the reduction immediately, by compreſſing the extremity of the penis at the ſame time he is endeavouring to advance the prepuce; if he does not, let him keep it ſuſpended, and attempt again, after having fomented and uſed ſome emollient applications: but if, from the contraction below the corona glandis, there is ſo great a ſtricture as to threaten a gangrene, or even, if the penis is much enlarged by water in the membrana reticularis, forming tumours called *cryſtallines*, three or four ſmall inciſions muſt be made with the point of a lancet into the ſtricture and cryſtallines, according to the direction of the penis; which, in the firſt caſe, will ſet free the obſtruction, and in the other evacuate the water. The manner of dreſſing afterwards muſt be with fomentations, digeſtives, and the theriaca Londinenſis over the pledgits.

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§ 8. *Puncture of the Perinæum.*

This operation is performed, when the bladder is under ſuch a ſuppreſſion of urine as cannot be relieved by any gentler methods, nor, by reaſon of the obſtruction in its neck or the urethra, will admit of the introduction of a catheter. The manner of doing it, as deſcribed by moſt writers, is by puſhing a common trocar from the place where the external wound in the old way of cutting is made, into the cavity of the bladder, and ſo procuring the iſſue of the water through the canula: but others, refining upon this practice, have ordered an inciſion to be carried on from the ſame part into the bladder, and then to inſinuate the canula. But both the methods are to be rejected in favour of an opening a little above the os pubis: for beſides that it is not eaſy to guide the inſtrument through the proſtate gland into the bladder, the neceſſity of continuing it, in a part already very much inflamed and thickened, ſeldom fails to do miſchief, and even to produce a mortification.

There is another method ſtill more eaſy both to the patient and the operator; which conſiſts only in emptying the bladder with a common trocar, and ſtopping the canula with a little cork, which is afterwards to be taken out as often as the patient has occaſion to urine. The canula is to be continued in the bladder till ſuch time as the perſon finds he can void his urine by the natural paſſage.

In this operation the abdomen ought to be perforated about two inches above the os pubis; and if the patient be fat, the trocar ſhould penetrate two inches, otherwiſe an inch and a half will be ſufficient.

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§ 9. *Of ſearching for the Stone, or paſſing a Catheter into the Bladder for drawing off Urine in caſe of a Retention.*

The patient being laid on a horizontal table, with his thighs elevated and a little extended, paſs the ſound with the concave part towards you, until it meets with ſome reſiſtance *in perinæo*, a little above the anus: then turning it without much force, puſh it gently on into the bladder; and if it meets with an obſtruction at the neck, raiſe its extremity upwards, by inclining the handle of it towards you; or if it do not then ſlip in, withdraw it a quarter of an inch, and, introducing your fore-finger into the rectum, lift it up, and it will ſeldom fail to enter. There is ſome art in turning the ſound in the proper place of the urethra, which ſurgeons not verſed in this operation cannot ſo well execute; therefore they may paſs the inſtrument with the concave ſide always towards the abdomen of the patient, obſerving the ſame rule at the entrance into the bladder as in the other method. The cauſe of this obſtacle, beſides the rugæ of the urethra, and the reſiſtance of the verumontanum, is ſometimes a ſmall projection of the orifice of the bladder in the urethra, like that of the os tincæ in the vagina, which occaſions the end of the ſound to ſlip a little beyond it.

Sect. XII. *Of Lithotomy.*

472 Lithotomy reckoned exceedingly dangerous by the ancients.

The removal of the ſtone from the urinary bladder, by the operation called lithotomy, has been ever claſſed amongſt the moſt dangerous operations in ſurgery, and, till lately, was attempted but by very few, who were diſtinguiſhed by the title of *lithotomiſts*. And this appears probably to have been the caſe in the time of Hippocrates, if any thing may be concluded from the oath aſcribed to him; in which he declares, "He will not cut ſuch as have the ſtone, but leave that operation to thoſe who make it their peculiar practice."

473 Celſus's method.

The moſt ancient method of cutting for the ſtone with which we are acquainted, is deſcribed with great accuracy and elegance by Celſus, who makes an inciſion *in perinæo* immediately upon the ſtone, though not in the ſame direction with that which is now made in what is called the *lateral operation*. He ſays, "A lunated inciſion is to be made near the anus down to the neck of the bladder, ſo as the horns of the inciſion may point towards the coxæ; and from the bottom of the wound thus made, where it is narrower, a ſecond inciſion muſt be made tranſverſely; by which the neck of the bladder is to be opened, and a paſſage made for the urine, and the ſtone expoſed; and moreover, this wound is to be larger than the ſize of the ſtone," for reaſons which he gives. The operation deſcribed by Celſus is, in contradiſtinction to a more modern one invented by Johannes de Romanis, in which a greater number of inſtruments were employed, called *apparatus minor*.

474 Of the high operation.

Petrus Francus, finding a ſtone too large to be taken away through an opening *in perinæo*, boldly made an inciſion through the integuments and muſcles, above the oſſa pubis, into the bladder, and happily extracted it. This method has ſince been revived, and practiſed by ſome others, under the title of the *high operation*.

475 Of the lateral operation.

Modern practitioners have adopted that which is called the *lateral operation*. Frere Jaques was, without doubt, the firſt perſon who gave the hint: and though he was extremely ignorant, yet, from the knowledge of the parts concerned in the operation, many eminent ſurgeons were convinced of the great probability there was of its being made a very excellent method, by correcting his errors; among whom was profeſſor Rau in Holland, and Mr Cheſelden in England.

Heiſter ſeems to prefer Celſus's method (as he underſtands it) in lads under 14 years of age, and chiefly on account of fewer inſtruments being employed in this than in other methods.

476 Of the new method.

The new method, or *apparatus magnus*, ſeems to be projected merely from the obſervation made of the great dilatability of the cervix veſicæ, and parts adjacent, when the ſtone is extracted in women. Therefore, as by cutting under the ſcrotum, cloſe to the raphe on the left ſide, *in perinæo*, through the integuments and muſcles, as low down as the upper part of the anus, then carrying the knife deeper to divide the urethra, the parts divided by theſe openings are brought nearly into the ſtate of the urethra in women, thoſe who perform this operation muſt depend on the dilatation of the parts in one as well as the other for the paſſage of the ſtone, when it is extracted by this method.

When it is determined that the operation ſhall be performed, the manner of preparing the patient depends on various circumſtances. For example, if he is plethoric, a few ounces of blood ſhould be taken away; and, at proper diſtances of time, the bowels muſt be emptied; the patient's diet ſhould be chiefly milk and vegetables, or other light food; which regimen ſhould be obſerved for ſome days before the operation. The opening medicines ſhould be principally manna, or ſuch other lenients as will beſt anſwer the purpoſe: if the pain ſhould be violent, bleeding becomes as neceſſary ſometimes as in plethorics; but opium muſt be employed to abate the exceſs of pain: nevertheleſs it may be adviſable to try firſt the effect of keeping the patient on the bed with his hips raiſed, in order, if poſſible, to roll the ſtone from the neck of the bladder: he ſhould not, on any account, be permitted to ſit up or uſe motion during the preparation for this operation.

477 Mr Bromfield's method of operating.

It has been frequently remarked, on a diaphoreſis coming on after operations in general, that the pain abated, and other diſagreeable ſymptoms went off. "This (ſays Mr Bromfield), induced me to make uſe of the warm bath at proper diſtances of time, according to the ſtrength of the patients, as a part of the preparatory plan for this operation, and it always ſucceeded to my utmoſt expectations: for from the ſkin being well cleaned and ſoftened by the warm water, an anodyne ſeldom failed to produce a gentle perſpiration after the operation was performed, and generally prevented the uſual ſymptomatic fever conſequent to operations.

"If the patient is an adult, the perinæum ſhould be ſhaved and well cleaned. An hour or two before the operation is to be performed, a clyſter ſhould be given to empty the rectum; and a few minutes before he is to be cut, he ſhould make as much water as he can.

"The patient being laid on a table covered with blankets, pillows, &c. and properly ſecured by ligatures and aſſiſtants, I paſs the ſtaff into the bladder, and incline the handle towards the abdomen, and obliquely to the right groin, ſo as to feel the groove of the ſtaff in the perinæum on the left ſide of the raphe, which will be in the membranous part of the urethra. I then fix it, and deliver it to my aſſiſtant, and deſire him to preſs it gently in order to advance the ſulcus of the ſtaff in the direction in which I had given it to him; another aſſiſtant ſupports the ſcrotum. I then ſeat myſelf on a chair of a convenient height, and begin my inciſion of the external integuments about half an inch below the commiſſure of the oſſa pubis on the left ſide of the raphe, and purſue it by a quick ſtroke, obliquely outwards and downwards, between the anus and obtuſe proceſs of the iſchium, ending ſomewhat lower than the baſis of that proceſs. As ſoon as the integuments are thus divided, I introduce the fore and middle fingers of my left hand; with the laſt I keep back the lip of the wound next the raphe, and with the index preſs down the rectum. I then make a ſecond inciſion, almoſt in the ſame direction with the firſt, but rather nearer to the raphe and anus, and ſufficiently deep to divide the tranſverſalis penis, and as much of the levator ani and ligamentous membrane as will make the proſtate gland perceptible by my finger. I then with the index of my left-hand feel for the ſulcus of the ſtaff, which ſerves as a conductor to my knife for opening the membranous part of the urethra, and afterwards for dividing part of the proſtate: the rectum is likewiſe by my fingers kept out of the way of the knife in the next part of the operation, which I effect in the following manner. Hitherto I held the blade of my knife like a pen, between the fore-finger and thumb, and reſting on the middle finger of my right-hand, with the back of the blade uppermoſt; but now I take it between the fore-finger and thumb of my right, with the handle towards the palm of my hand on the inſide, the back of the blade facing the inſide of the index of the right hand: I then turn the back of this hand that holds the knife downwards, and convey the knife to the membranous part of the urethra, by gliding the under fingers of my right-hand on the index of my left-hand, which ſerves as a conductor of the knife to the gland. As ſoon as I perceive that, I feel for the groove of the ſtaff with the index of my left-hand, with which I convey the convex edge of the knife into the membranous part of the urethra, as much laterally as is poſſible, and as nigh to the proſtate. When I am clearly in the ſulcus of the ſtaff, I turn the back of my knife as much downwards as I can to avoid wounding the rectum, as I then puſh the blade of the knife along the groove of the ſtaff into the body of the gland, ſliding the knife on the convexity of its edge, till it has divided near half the length of that gland; and if I wiſh to cut a little more of it, I incline the handle of my knife a little downwards, and towards the left iſchium. The point of the knife will then drop into the groove of the ſtaff; and by drawing the knife in this ſituation towards me, I ſhall certainly make good the wound of the proſtate, ſo as near two-thirds of it may be divided in the operation. This laſt ſtroke of my knife is what is generally called *cutting from within outwards*. I then introduce the beak of the common gorgeret into the groove of the ſtaff, and preſs it on till it gets into the bladder, which is ſoon diſcovered by the flux of the urine. I order my aſſiſtant to withdraw the ſound, and I then turn the convex part of the gorgeret towards the wound made in the proſtate, and glide the fore-finger of my left-hand in the concave part of the gorgeret till it enters the bladder: by this means I eaſily and gradually dilate the neck of the bladder; which being done ſufficiently, I withdraw my finger, and introduce the forceps. If I do not readily feel the ſtone with my forceps ſhut, I give a gentle ſtroke with them on the part of the bladder near its neck, which is in contact with the rectum; by which means the ſtone will often drop down: if not, I reſt one cheek of the forceps on the part I had before given the ſtroke, and, by raiſing the other, open the forceps: the inferior blade then becomes the axis, on which I turn the upper branch, firſt to one ſide, and then to the other, making them gradually approach each other; by which means I generally can lay hold on the ſtone. When I attempt to extract it, I do it very gently, till I find reſiſtance from the adjacent parts. I then endeavour to prevent the forceps from preſſing too much on the ſtone, by placing the thumb of my left hand as near the joint of the forceps as I can, which, unleſs the ſtone is very ſoft, will prevent its breaking. If any veſſel of conſequence ſhould be wounded, I take it up by the needle and ligature or tenaculum; if ſmall, I only apply a piece of dry lint to the mouth of the bleeding veſſel.

"In caſe the bladder has not been duly emptied before the operation, great care ſhould be taken in extracting the ſtone, eſpecially if ſmall; for there not being time for the bladder to contract itſelf duly, it naturally will fall into wrinkles; theſe will be liable to be laid hold on together with the ſtone, which might prove fatal. If the ſtone is very large, I make uſe of a ſcrew I have contrived, which may be paſſed through a hole in one of the branches of the forceps, in which is a female ſcrew: by turning the male ſcrew, you may determine to the greateſt exactneſs the degree of preſſure you would chooſe to make to ſecure the ſtone in the forceps.

"Though I have given this rule to prevent the breaking of a ſtone, yet I think the hazard is greater, in reſpect to the patient's life, where the ſtone is large and hard and the inciſion ſmall, if it ſhould not break, than if it ſhould by the reſiſtance of parts undivided. But ſtill in this caſe there is danger from ſome fragments remaining behind (which will probably become nuclei for the formation of other ſtones), as well as from the forceps being ſo frequently introduced as may be neceſſary to their extraction. But I think that when the ſtone is very large, the beſt way will be, to bring it forward with your forceps, then ſecure them by your ſcrew from making too great compreſſion: you may then make your inciſion on the ſtone laterally through the proſtate gland; which is certainly preferable to riſking the laceration and contuſion of the parts, by extracting ſo large a body through an opening naturally ſo ſmall. I highly diſapprove of turning the ſtone from one ſide to the other when in the forceps, by way of dilating the neck of the bladder; as the points of the ſtone, particularly if it ſhould prove of the mulberry form, will probably lacerate the parts, and occaſion large ſloughs, and frequently cauſe a mortification. Andreas a Cruce is ſo apprehenſive of the ill conſequences of extracting a large ſtone through the neck of the bladder, that he has contrived forceps with large teeth in order to break the ſtone to pieces: he has likewiſe recommended a ſort of ſcoop or ſpoon in order to take out the broken pieces, as he ſeems extremely ſenſible of the ill conſequences attending the ſmalleſt pieces being left in the bladder. To inform himſelf whether the bladder be totally free from any fragments of the ſtone, he has contrived an inſtrument he calls *verriculum*, with which he examines carefully every part of the bladder: he ſays, that the moſt eminent operators of his time neither uſed dilators nor inſtruments to break the ſtone, but truſted to their fingers or the gooſe-bill forceps for the extraction. Should any ſmall branches of the pudica interna be wounded in the operation, in caſe a large ſtone has been extracted, the bleeding will rather be of ſervice than prejudicial; and I ſhould rather encourage it, by fomenting the wound and parts adjacent with ſome emollient fotus, in which there is a third or fourth part vinegar. A pledgit of ſoft digeſtive is to be laid on the ſurface of the wound, which ſhould be frequently renewed: for the dreſſing being preſſed down deep in the wound, with a view to obtain granulations from the bottom, is extremely likely to make the wound fiſtulous; which ſeldom happens by the ſuperficial method of dreſſing. Excoriations of the buttocks may be prevented by placing a ſheet under them ſeveral times doubled, ſo as to be in breadth about 18 or 20 inches: it muſt be rolled up all but as much as is neceſſary to be laid under the patient. At firſt the remainder of the roll is put by his ſide, which unrolls as the nurſe draws the wet part from under him: by this method he is almoſt conſtantly kept dry. If excoriations ſhould happen, or any other unfavourable ſymptom, ſurgery will direct what ſhould be done. I generally keep the patient on a low diet for a week or ten days, as occaſion may require.

"To obtain the firſt ſtool, a clyſter for the moſt part is neceſſary; which I greatly prefer to purging medicines given by the mouth, as they frequently occaſion more ſtools than one would wiſh. I think I have ſometimes gained time, after the urine had paſſed a day or two by the uſual channel, by applying compreſſes and ſlips of plaſter on the lips of the wound to keep them in contact, aſſiſted by the T bandage.

"Having frequently obſerved in ſeveral of my pupils, when they attempted to perform this operation on dead ſubjects, that they had great difficulty in getting at the proſtate gland, ſo as to divide it properly; and having repeatedly remarked the embarraſſment that ſeveral operators have had in effecting it on the living ſubject; I was induced, many years ſince, to ſhow, in my courſes of operations, the two following inſtruments: the firſt by the French is called *biſtourie caché*; the method of uſing which is as follows.

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Inſtruments uſed by Mr Bromfield in performing the operation.

"The inciſion of the external integuments being made as above directed, the membranous part of the urethra is then to be opened with the point of the knife laterally, as near to the proſtate gland as poſſible: through this opening of the urethra, the biſtourie caché is to be introduced by the groove of the ſtaff into the bladder; as ſoon as that is effected, the inſtrument ſhould be diſengaged from the ſtaff, which may then be withdrawn. You then place the inſtrument in ſuch direction, as, when you withdraw, it to make the wound of the gland on the left ſide, rather obliquely downwards and outwards than horizontally lateral. When you have placed your inſtrument to your mind, incline the handle towards your patient's left thigh; then preſs on the ſpring, which will bring out the blade of the knife that before was concealed in the groove, and withdraw it, obſerving that obliquity of the handle towards the left thigh during the whole time you are dividing the neck of the bladder. There is great nicety in making this drawing cut: for if the blade of the knife be not placed with ſome obliquity downwards, it will wound the erector penis, and that branch of the hypogaſtric artery called *pudica externa;* if placed quite perpendicular, it will wound the veſiculæ ſeminales and inteſtine. If you withdraw it in a ſtraight line towards you, the bladder will be wounded beyond its neck. Theſe hints obſerved, the inſtrument I think will be of uſe to thoſe who find a difficulty in dividing the gland with a knife.

"The other inſtrument I call the *double gorgeret*. The upper part on which the blade is fixed muſt be united with the under half, by means of the grooves in its upper edges receiving the lower edges of that part with the knife affixed; they then become one inſtrument, which, if the blade is taken off, ſomewhat reſembles the extreme part of a cow's horn. The manner of uſing this inſtrument is as follows: The inciſions of the integuments and urethra being made as directed for cutting with the biſtourie caché, the beak of the gorgeret is to be introduced into the groove of the ſtaff. I then take the ſtaff from my aſſiſtant with my left-hand, and incline the handle to the patient's left groin; in which ſituation, I can paſs the inſtrument with the blade pointing obliquely outwards and downwards, and then puſh it on quite into the bladder, of which I am informed by the urine running through the inſtrument, which ſerves as a direction how much farther the inſtrument ſhould be puſhed on, in order to divide about two-thirds of the length of the gland. I then withdraw the upper half of the inſtrument with the blade, the lower part that remains becoming the common gorgeret. I ſhould have remarked, that I take the inſtrument, when its parts are united, in my right hand, the wooden handle reſting in the palm againſt the ball of my thumb, and my thumb placed on the upper part of the handle: by this means the two parts of the inſtrument will be kept in contact when uſed, merely from the reſiſtance of the proſtate gland, &c. during its introduction. The remaining part of the operation is finiſhed as uſual in the lateral method, except that when you want to diſengage the forceps, it will be neceſſary to raiſe the left-hand that holds the gorgeret, at the ſame time that the right is depreſſed. It is poſſible I may be partial to my own contrivance; but I cannot ſay that I have ever ſeen any other inſtrument that has been ſince made, formed with the ſame intentions with mine. The common gorgeret, if it does not cut on its edge, and the membranous part of the urethra only be opened, will probably force off the proſtate gland and neck of the bladder from its continuation with the urethra; which Mr Cheſelden aſſured me has more than once been the caſe, from the ſhoulders near the beak not being able to dilate, unleſs the proſtate is in ſome meaſure divided at its connection with the membranous part of the urethra: therefore I find the double gorgeret, even without the blade, is more eaſily introduced than the common gorgeret, and without hazard, as by dilitation it prepares the parts for the introduction of the forceps; which preparatory dilatation is ſtill of greater ſervice when the gland is to be divided with the blade affixed; and the lower part of the gorgeret will defend the inteſtine and veſiculæ ſeminales from being wounded.

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Advantages of the double gorgeret.

“ Many who eſpouſe the lateral operation, as it is called, conclude, that the gland ſhould be wounded laterally and horizontally; and for that purpoſe have invented various inſtruments to cut it through its whole length, to facilitate the extraction of a large ſtone. The proſtate gland, I believe, is very rarely entirely divided in the preſent method of performing the operation, and I think never horizontally laterally, as is ſuppoſed; which indeed is obvious from the ſituation of the groove of the ſtaff, which muſt cauſe the opening to be in the under part of the gland, a little to the left ſide. When the common diſſecting knife only is employed, ſome, as ſoon as they have made an opening into the urethra, in that part where the groove of the ſtaff can be felt moſt ſenſibly, in order to avoid wounding the rectum, divide the gland obliquely upwards and outwards. From what I have ſeen of this method of operating, I am convinced there is not any advantage in it; but, on the contrary, that it is rather prejudicial where the ſtone is large: for the reſiſtance of the gland being taken away in the upper part by the inciſion, and the ligamentous and muſcular parts remaining undivided below, the ſtone is thrown up towards the ſymphyſis of the bones of the pubis, which is the ſmalleſt part of the angle of the pelvis, through which the ſtone is to paſs: the great force conſequently requiſite to extract it, under theſe circumſtances, frequently occaſions the ſtone to be broken, and the neighbouring parts very much contuſed and lacerated; which could not be the caſe, were all the reſiſtance taken away below where the diſtance between the iſchia is greateſt.

“ Though almoſt all operators would gladly wiſh (by what I underſtand) to divide the proſtate gland throughout its whole length, it is what I would always chooſe to avoid: about two-thirds of it neareſt to the membranous part of the urethra, I am convinced, will be ſufficient, and attended with more advantages than the cutting it entirely through; as the only obſtacle a ſtone meets with is in that part of the gland, and as the neck of the bladder beyond that will dilate ſufficiently in moſt caſes without laceration, and as the wounded parts will ſooner heal by the muſcular fibres, which act as a ſphincter, recovering their tone, than they would do if the urine were conſtantly running through them. By this method of operating, and proper treatment of the wound afterwards, I do not recollect a ſingle inſtance of a fiſtula remaining.”

Sect. XIII. *Of Caſtration, and the Extirpation of Encyſted and Cancerous Tumours.*

§ 1. *Of Caſtration.*

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In what caſes caſtration is adviſable.

This is one of the moſt melancholy operations in the practice of ſurgery, ſince it ſeldom takes place but in diſorders into which the patient is very apt to relapſe, viz. thoſe of a ſcirrhus or cancer: for under moſt of the ſymptoms deſcribed as rendering it neceſſary, it is abſolutely improper; ſuch as a hydrocele, abſceſs of the teſtes, an increaſing mortification, or what is ſometimes underſtood by a ſarcocele; of which laſt it may not be amiſs to ſay a word. In the utmoſt latitude of the meaning of this term, it is received as a fleſhy ſwelling of the teſticle itſelf, called likewiſe *hernia carnoſa*; or in ſome enlargements, ſuch as in a clap, more frequently *hernia humoralis*; but generally ſpeaking, is conſidered as a fleſhy excreſcence formed on the body of the teſtis, which becoming exceedingly hard and tumefied, for the moſt part is ſuppoſed to demand extirpation, either by cutting or burning away the induration, or amputating the teſticle. But this maxim too precipitately received, has very much miſguided the practitioners of ſurgery.

It ſometimes happens that the epidydymis is tumefied, independent of the teſticle; and, feeling like a large adventitious excreſcence, anſwers very well to the idea moſt ſurgeons form of a *ſarcocele*: but not being aware of the different nature and texture of the epididymis, they have frequently confounded its diſorders with thoſe of the teſticle itſelf, and equally recommended extirpation in the induration of one and the other. But all indurations of the glandular part of the teſticle not tending to inflammation and abſceſs, generally, if not always, lead on to ſcirrhus and cancers; whereas thoſe of the epididymis ſeldom or never do. It is true, in ſpite of internal or external means, theſe laſt often retain their hardneſs, and ſometimes ſuppurate, but, however, without much danger in either caſe.

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When the operation ought not to be performed.

Before caſtration, it is laid down as a rule to inquire whether the patient has any pain in his back; and in that caſe to reject the operation, upon the reaſonable preſumption of the ſpermatic veſſels being likewiſe diſeaſed: but we are not to be too haſty in this determination; for the mere weight of the tumour ſtretching the cord, will ſometimes create this complaint. To learn the cauſe, then, of this pain in the back, when the ſpermatic cord is not thickened, let your patient be kept in bed, and ſuſpend his ſcrotum in a bag-truſs, which will relieve him, if diſordered, by the weight only; but if the ſpermatic cord is thickened or indurated, which diſeaſe, when attended with a dilatation of the veſſels of the ſcrotum, is known by the Greek appellations *circocele* and *varicocele*, the caſe is deſperate, and not to be undertaken.

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Method of performing it.

But ſuppoſing no obſtacle in the way to the operation, the method of doing it may be this. Lay your patient on a ſquare-table of about three feet four inches high, letting his legs hang down, which, as well as the reſt of his body, muſt be held firm by the aſſiſtants. Then with a knife begin your wound above the rings of the abdominal muſcles, that you may have room afterwards to tie the veſſels, ſince for want of this caution operators will neceſſarily be embarraſſed in making the ligature: then carrying it through the membrana adipoſa, it muſt be continued downward, the length of it being in proportion to the ſize of the teſticle. If it is very ſmall, it may be diſſected away without taking any part of the ſcrotum. If the teſticle, for inſtance, weighs twenty ounces; having made one inciſion about five inches long, a little circularly, begin a ſecond in the ſame point as the firſt, bringing it with an oppoſite ſweep to meet the other in the inferior part, in ſuch a manner as to cut out the ſhape of an oval whoſe ſmalleſt diameter ſhall be two inches: after this diſſect away the body of the tumour, with the piece of ſkin on it, from the ſcrotum; firſt taking up ſome of the blood-veſſels, if the hæmorrhagy is dangerous. Then paſs a ligature round the cord, pretty near the abdomen; and, if you have ſpace between the ligature and teſticle, a ſecond about half an inch lower, to make the ſtoppage of blood ſtill more ſecure. The ligatures may be tied with what is called the *ſurgeon's knot*, where the thread is paſſed through the ring twice. This done, cut off the teſticle a little underneath the ſecond ligature, and paſs a needle from the ſkin at the lower part of the wound thro' the ſkin at the upper part, in ſuch a manner as to envelope in ſome degree the ſound teſticle, which will greatly facilitate and quicken the cure; or if one ſtitch will not anſwer the purpoſe, you may repeat it in ſuch part of the wound where the ſkin on each ſide lies moſt looſe.

In large tumours, it is adviſable to cut away great part of the ſkin; for beſides that the hæmorrhagy will be much leſs in this caſe, and the operation greatly ſhortened, the ſkin by the great diſtention having been rendered very thin, will great part of it, if not taken away, ſphacelate, and the reſt be more prone to degenerate into a cancerous ulcer.

§ 2. *Of Encyſted Tumours.*

483 [*] See nº 270

That called *ſteatoma*[*] is never painful until by its weight it grows troubleſome, nor is it a mark of general indiſpoſition of body; ſo that the extirpation ſeldom fails of ſucceſs. The ſize of ſome of them is very large, frequently weighing five or ſix pounds, and there have been inſtances of their weighing above forty.

When the ſteatoma is irregular in its ſurface, with eminences and depreſſions, it is ſuety; whereas the fat one has for the moſt part a uniform ſmooth outſide. The operation for the ſteatoma will be underſtood by the deſcription of that for the ſcirrhus.

[†] See nº 270
[‡] See nº 270

The *antheroma*[†] is much more common than the *meliceris*[‡]; at leaſt, if all encyſted tumours with matter not curdled, may, in compliance with cuſtom, be called ſo: Theſe are more frequent, and grow larger than thoſe where the matter is curdled, being often attendant on ſcrophulous indiſpoſitions, which makes them more difficult of cure.

The cyſts of theſe tumours, with the ſkin covering them, after a certain period of growth, reſiſting any further enlargement, do frequently inflame and break: but this opening is not ſo advantageous for the cure as extirpation by the knife, which ſhould be done in the infancy of the ſwelling. When the tumours are no bigger than a ſmall golden pippen, they may be diſſected away from under the ſkin, by making a ſtraight inciſion only through it; but if they exceed this bulk, an oval piece of ſkin muſt be cut through firſt, to make room for the management of the knife and taking away the tumour; in which caſe, it will be adviſable to take off the upper portion of the cyſt with the ſkin; and then, by the help of a hook, to diſſect away as much of the remainder of it as can be conveniently, which is a leſs painful and more ſecure method than deſtroying it afterwards with eſcharotics. This rule is to be obſerved when the cyſt runs ſo deep amongſt the interſtices of the muſcles, as to make it impoſſible to remove the whole of it, where, if we cut off a great quantity, the reſt uſually comes away in ſloughs and matter.

The *ganglion* of the tendon is an encyſted tumour of the meliceris kind, but its fluid is generally like the white of an egg: when it is ſmall, it ſometimes diſperſes of itſelf; preſſure and ſudden blows do alſo remove it; but for the moſt part it continues, unleſs it be extirpated. It is no uncommon caſe to meet with this ſpecies of ganglion running under the ligamentum carpale, and extending itſelf both up the wriſt and down to the palm of the hand. The cure of this diſorder cannot be effected but by an inciſion through its whole length and dividing the ligamentum carpale.

The dreſſing in theſe caſes does not at all differ from the general methods of treating wounds.

§ 3. *Of the Amputation of the Cancered and Scirrhous Breaſt.*

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WHEN a ſcirrhus has admitted of a long delay before the operation, the patient ſeems to have a better proſpect of cure without danger of a relapſe, than when it has increaſed very faſt, and with acute pain.

The ſcirrhus may be diſtinguiſhed, by its want of inflammation in the ſkin, its ſmoothneſs and ſlipperineſs deep in the breaſt, and generally by its pricking pain; which as it is more or leſs, increaſes the danger accordingly; though there are ſome few with little or none in the beginning: as the tumour degenerates into a cancer, which is the worſt degree of ſcirrhus, it becomes unequal and livid, and the veſſels growing varicous, at laſt ulcerates.

In extirpating the ſcirrhus, if it be ſmall, a longitudinal inciſion will dilate ſufficiently for the operation; but if too large to be diſſected out in that manner, an oval piece of ſkin muſt be cut through firſt, the ſize of which is to be proportioned to that of the tumour; for example, if the ſwelling is five inches long and three broad, the oval piece of ſkin cut away muſt be nearly of the ſame length, and about an inch and a half in breadth. In taking off the whole breaſt, the ſkin may be very much preſerved, by making the wound of it a great deal leſs than the baſis of the breaſt, which muſt be carefully cleared away from the pectoral muſcle. This is not difficult to do, becauſe all theſe ſcirrhuſes being enlarged glands, are encompaſſed with their proper membranes, which make them quite diſtinct from the neighbouring parts, and eaſily ſeparable: at leaſt this is the caſe when the tumour is moveable; for ſometimes it adheres to the ſubjacent muſcle, and that muſcle to the ribs; in which circumſtance, the operation is impracticable. When it is attended with knots in the arm-pit, no ſervice can be done by amputation, unleſs the knots be taken away; for there is no ſort of dependence to be laid on their ſubſiding, by the diſcharge of the wound of the breaſt.

The bleeding of the large arteries is to be ſtopped by paſſing the needle twice through the fleſh, almoſt round every veſſel, and tying upon it, which will neceſſarily include it in the ligature. In order to diſcover the orifices of the veſſels, the wound muſt be cleaned with a ſponge wrung out of warm water.

The ſcirrhous tumours which appear about the lower jaw, are, generally ſpeaking, ſcrophulous diſorders, that diſtinguiſh themſelves almoſt by the circumſtance of fixing on the ſalivary glands. Theſe are very ſtubborn of cure, but not ſo bad as the ſcirrhus, ſince they frequently ſuppurate, and heal afterwards: if they impoſthumate again after healing, it is for want of a good bottom, which may ſometimes be procured by deſtroying their bad ſurface with a cauſtic. Beſides theſe, there is another ſpecies of ſcirrhus in the neck, that ſucceeds better after extirpation than either of the former kind; this is an enlargement of the lymphatic glands, which run cloſe up by the jugular vein, and is diſtinguiſhable from the cancers of this part, by its moveableneſs, want of pain, the laxneſs of the ſkin covering it, the ſmall degree of preſſure it makes on the œſophagus and trochea, and laſtly the good habit of body, as it ſeldom affects the conſtitution, which cancers here do very early, after their firſt appearance. This tumour, from its ſituation, requires great exactneſs in the cutting off: they ſometimes extend up to the chin towards the mouth, and occaſion a diviſion of the ſalivary duct in operating, which proves very troubleſome to heal; but, when all other methods have failed, may be cured by a perforation into the mouth, through that part of the cheek where it is wounded, which by a tent or ſmall ſeton may be made fiſtulous; then, by properly dreſſing upon the outſide, the oozing of the ſaliva that way will be prevented, and the external orifice healed without difficulty.

The treatment of all theſe wounds may be with dry lint firſt, and afterwards as in common wounds.

SECT. XIV. *Of the Operation for the Empyema, Aſcites, and Hydrocele.*

§ 1. *Of the Empyema.*

THE operation for the empyema implies an artificial opening made into the cavity of the thorax, by which we evacuate any fluid that lies there extravaſated, and is become dangerous by its weight and quantity. The fluids deſcribed as neceſſary to be avoided by this operation, are blood, matter, and water.

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Of the different caſes in which the operation for empyema is requiſite.

When blood is the fluid ſuppoſed to require evacuation by this method, it is always extravaſated through ſome wound of the veſſels of the lungs or thorax; and being diſcharged in great quantities on the diaphragm, is ſaid to oppreſs reſpiration, till let out by ſome convenient opening made in the moſt depending part of that cavity, which is the only kind of perforation into the thorax diſtinguiſhed by the name of the *operation for the empyema*: But though this opening is univerſally recommended in the caſe here ſtated, yet we meet with few or no examples where it has been practiſed for a mere extravaſation of blood.

The ſecond circumſtance in which this operation takes place, is a rupture of matter from the pleura, mediaſtinum, or lungs, into the cavity of the thorax; where accumulating, it at length proves fatal for want of a diſcharge. It is true, that the caſe occurs but very ſeldom where the operation is neceſſary; becauſe, in moſt abſceſſes of the thorax, the matter is uſually ſpit up as faſt as it is generated; and in the diſſection of thoſe who have died of this ſpecies of conſumption, we rarely find much extravaſated pus in the cavity, though a great portion of the lungs be deſtroyed. However, there are a few caſes which require the operation; and theſe may be diſtinguiſhed by the following ſymptoms. The patient is obliged to lie upon the diſeaſed ſide, or, in caſe there is matter in both cavities of the thorax, on his back; becauſe the mediaſtinum can ſeldom ſupport the weight of the incumbent fluid, without ſuffering great pain. But this rule is not certain, it ſometimes happening that the patient can lie with eaſe on that ſide where there is no fluid. Another ſymptom of extravaſated matter, is an evident undulation of it, ſo that in certain motions it may be hard to quaſh. For the moſt part too, upon careful inquiry, an œdema, or at leaſt a thickening of ſome portion of the intercoſtal muſcles, will be diſcovered. And laſtly, if there be much fluid, it will be attended with a preternatural expanſion of that ſide of the cheſt where it lies. When therefore theſe ſigns appear after a previous pleuritic or pulmonary diſorder, and the caſe has been attended with the ſymptoms of a ſuppuration, it is moſt probably owing to a collection of matter; though the patient will alſo labour under a continual low fever, and a particular anxiety from the load of fluid.

The laſt ſort of fluid ſaid to require iſſue from this operation is water, which however very ſeldom collects in ſuch manner as to become the proper ſubject of the operation: for if the dropſy of the thorax be complicated with an anaſarca, or even aſcites, it is certainly improper; and indeed it hardly ever takes place, but where the diſtemper is ſingle, and takes its riſe from the ſame ſort of diſorders in the lymphatics of the pleura, as the hydrocele does from thoſe of the tunica vaginalis. The ſymptoms of this dropſy are, a ſmall cough without ſpitting; a little ſlow fever, from the diſturbance of reſpiration; ſometimes, too, the water, by a ſudden jerk, may be heard to quaſh; and generally ſpeaking, its weight upon the diaphragm and mediaſtinum are ſo troubleſome as to oblige the patient to ſtoop forward, and to turn upon the affected ſide when he lies down; for the ſame reaſon, when there is water in both cavities of the thorax, he is forced to lie on his back.

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Method of performing it.

The manner of operating, whether it be for the diſcharge of matter or water, is to pitch upon the depending part of the thorax, which ſome have ſuppoſed to be between the eighth and ninth ribs, and others between the ninth and tenth, at ſuch a diſtance from the vertebræ that the depth of the fleſh may not be an impediment to the perforation. This diſtance is determined to be about a hand's-breadth: and here, with a knife, ſciſſars, or trocar, we are ordered to make the perforation; but in doing it there are a great many difficulties. In fat perſons, it is not eaſy to count the ribs, and the wound will be very deep, and troubleſome to make; it is hardly poſſible to eſcape wounding the intercoſtal artery, which runs in this place between the ribs. But if the only advantage propoſed by the ſituation of the wound be derived from its dependency, the purpoſe of diſcharging the fluid will be as well anſwered by an opening between the ſixth and ſeventh ribs, half way from the ſternum towards the ſpine; which, by laying ourſelves down, becomes in effect as depending an orifice as the other in ſitting up; and by an opening made in this manner we avoid all the inconveniences in the other method: for in this part of the thorax there is very little depth of muſcles; the artery lies concealed under the rib; and the diaphragm is at a great diſtance. The opening is beſt made with a knife; and ſhould be about an inch long through the ſkin, and half an inch through the ſubjacent muſcles: tho', to make the inciſion with leſs riſk of wounding the lungs, it may be adviſable to dilate it with the blunt-pointed knife (as is practiſed in the operation for the bu-

bubonocele), after having made a ſmall puncture with a common knife. The treatment of the wound will be according to the nature of the diſcharge. If, after a few days, there appears no drain, you may let the orifice heal up; but if it continues, it may be kept open with a ſhort ſilver canula, until ſuch time as an alteration in that circumſtance will give us leave to cicatrize with ſafety.

§ 2. *Of the Paracenteſis, or tapping for the Dropſy.*

THIS operation is an opening made into the abdomen, in order to empty any quantity of extravaſated water, collected in that ſpecies of dropſy called the *aſcites;* but as there is much more difficulty in learning when to perform than how to perform it, and indeed in ſome inſtances requires the niceſt judgment, we ſhall endeavour to ſpecify the diſtinctions which render the undertaking more or leſs proper.

487 Of the different kinds of dropſy. There are but two kinds of dropſy: the anaſarca, called alſo *leucophlegmacy*, when the extravaſated water ſwims in the cells of the membrana adipoſa; and the *aſcites*, when the water poſſeſſes the cavity of the abdomen. In the firſt kind, the water is clear and limpid; but in the ſecond, a little groſſer, very often gelatinous and corrupted, and ſometimes even mixed with fleſhy concretions.

The operation of tapping is ſeldom the cure of the diſtemper: but dropſies, which are the conſequence of a mere impoveriſhment of the blood, are leſs likely to return than thoſe which are owing to any previous diſorder of the liver; and it is not uncommon for dropſies that follow agues, hæmorrhagies, and diarrhœas, to do well; whereas in ſuch as are complicated with a ſcirrhous liver, there is hardly an example of a cure.

The water floating in the belly, is, by its fluctuation, to determine whether the operation be adviſable; for if, by the laying one hand on any part of the abdomen, you cannot feel an undulation from ſtriking on an oppoſite part with the other, it is to be preſumed there will be ſome obſtacle to the evacuation. It ſometimes happens, that a great quantity, or almoſt all the water, is contained in little bladders, adhering to the liver and the ſurface of the peritonæum known by the name of *hydatids;* and the reſt of it in different-ſized ones, from the degree of a hydatid, to the ſize of a globe holding half a pint or pint of water. This is called the *encyſted dropſy*, and from the ſmallneſs of its cyſts makes the operation uſeleſs; but is not difficult to be diſhinguiſhed, becauſe there is not a fluctuation of the water, unleſs it is complicated with an extravaſation.

When the fluctuation is hardly perceptible, (except the teguments of the abdomen are very much thickened by an anaſarca), in all probability the fluid is gelatinous.

There is another kind of dropſy, which for the moſt part forbids the operation, and is peculiar to women, being ſeated in the body of one or both ovaries. There is no example of this ſpecies but what may be known by the hardneſs and irregularity of the tumour of the abdomen, which is nearly uniform in the other caſes.

When the ovary is dropſical, the water is generally depoſited in a great number of cells formed in the body of it; which circumſtance makes the fluctuation inſenſible, and the perforation uſeleſs: though ſometimes there are only one or two cells; in which caſe, if the ovary is greatly magnified, the undulation will be readily felt, and the operation be adviſable.

When the aſcites and anaſarca are complicated, it is ſeldom proper to perform the operation, ſince the water may be much more effectually evacuated by ſcarifications in the legs than by tapping.

488 Method of tapping. Upon the ſuppoſition that nothing forbids the extraction of the water, the manner of operating is this. Having placed the patient in a chair of a convenient height, let him join his hands ſo as to preſs upon his ſtomach; then dipping the trocar in oil, you ſtab it ſuddenly through the teguments, and, withdrawing the perforator, leave the waters to empty by the canula. The abdomen being, when filled, in the circumſtance of a bladder diſtended with a fluid, would make it indifferent where to wound; but the apprehenſion of hurting the liver, if it be much enlarged, has induced operators rather to chooſe the left ſide, and generally in that part which is about three inches obliquely below the navel. If the navel protuberates, you may make a ſmall puncture with a lancet through the ſkin, and the waters will be readily voided by that orifice, without any danger of a hernia ſucceeding: but it ſhould be carefully attended to whether the protuberance is formed by the water or rupture; in which latter caſe, the inteſtine would be wounded, and not without the greateſt danger. The ſurgeon, neither in opening with the lancet, nor perforating with the torcar, need fear injuring the inteſtines, unleſs there is but little water in the abdomen, ſince they are too much confined by the meſentery to come within reach of danger from theſe inſtruments; but it ſometimes happens, that when the water is almoſt all emptied, it is ſuddenly ſtopped by the inteſtine or omentum preſſing againſt the end of the canula; in which caſe you may puſh them away with a probe. During the evacuation, your aſſiſtants muſt keep preſſing on each ſide of the abdomen, with a force equal to that of the waters before contained there: for, by neglecting this rule, the patient will be apt to fall into faintings, from the weight on the great veſſels of the abdomen being taken off, and the ſinking of the diaphragm ſucceeding; in conſequence of which, more blood flowing into the inferior veſſels than uſual, leaves the ſuperior ones of a ſudden too empty, and thus interrupts the regular progreſs of the circulation. To obviate this inconvenience, the compreſſion muſt not only be made with the hands during the operation; but be afterwards continued, by ſwathing the abdomen with a roller of flannel, about eight yards long and five inches broad, beginning at the bottom of the belly, ſo that the inteſtines may be borne up againſt the diaphragm: you may change the roller every day till the third or fourth day, by which time the ſeveral parts will have acquired their due tone. For the dreſſing, a piece of dry lint and plaſter ſuffice; but between the ſkin and roller it may be proper to lay a double flannel a foot ſquare, dipt in brandy or ſpirit of wine.

This operation, though it does not often abſolutely cure, yet it ſometimes preſerves life a great many years, and even a comfortable one, eſpecially if the waters have been long collected.

§ 3. *Of*

§ 3. *Of the Hydrocele.*

The term *hydrocele*, if uſed in a literal ſenſe, means any tumour produced by water; but ſurgeons have always confined it to thoſe which poſſeſs either the membranes of the ſcrotum, or the coats of the teſticle and its veſſels.

The firſt of theſe, viz. that which has its ſeat in the membranes of the ſcrotum, is common to the whole bag, and to all the cellular ſubſtance which looſely envelopes both the teſtes. It is, ſtrictly ſpeaking, only a ſymptom of a diſeaſe, in which the whole habit is moſt frequently more or leſs concerned, and very ſeldom affects this part only. The latter, or thoſe which occupy the coats immediately inveſting the teſticle and its veſſels, are abſolutely local, very ſeldom affect the common membrane of the ſcrotum, generally attack one ſide only, and are frequently found in perſons who are perfectly free from all other complaints.

489 Different kinds of hydrocele confounded together by chirurgical writers.

Notwithſtanding the obvious and material difference between the two kinds of diſeaſe, they have by the majority of writers been confounded together; have been conſidered as ſpringing from the ſame immediate ſource, and as requiring the ſame kind of treatment; although the one is plainly and evidently a mere ſymptom or attendant on a general diſorder, and the others are ſtrictly and abſolutely local complaints. This one fundamental error has been the occaſion of many others. The ſuppoſition, that all collections found in the membranes and coats of the ſcrotum and teſticles are of the ſame general kind, has produced an infinite variety of wild conjectures concerning the particular aud immediate nature and origin of them. By ſome they have been attributed to a particular indiſpoſition of the liver, kidneys, or ſpleen; by others, to a natural and neceſſary connection between the ſpermatic veſſels and thoſe of the kidney: by many the fluid has been thought to be of the urinary kind, or at leaſt that it ought to have paſſed through the kidney; but that, miſtaking its right way, it gets into the membranes of the ſcrotum and teſticles: while others have affirmed, that all complaints of this kind are really ſymptoms of a dropſical habit; that the fluid comes from the cavity of the belly, and either paſſes through the peritonæum, or extends that membrane down into the ſcrotum. Many cautions have been laid down againſt attempting the cure of one ſpecies of this diſeaſe haſtily, or without a previous courſe of medicine, upon a ſuppoſition that the defluxion is of a noxious nature, and that by falling on this part it frees the conſtitution from ſeveral other diſtempers. It has been deſcribed as frequently producing a corrupted or otherwiſe diſeaſed teſticle; as being nearly allied in nature to thoſe tumours which are called encyſted, whoſe tunics are formed out of the common membrane by mere preſſure; and as being generally accompanied with a true hernia, or deſcent of the inteſtine or omentum; which laſt (ſuppoſed) circumſtance has been gravely urged as a reaſon for not attempting a radical cure. The ſame wanton liberty has been taken in aſſigning different ſeats to theſe diſorders, as in accounting for their origin: every part which inveſts or accompanies the ſpermatic veſſels or the teſticles, not only the tunica communis of the proceſs, and the cavity of the tunica vaginalis (the true and real ſeats of one or other of theſe diſorders), have been enumerated, but ſeveral imaginary ones have been added; firm compact membranes have been ſplit into lamellæ, and cyſts and coats have been deviſed which never had a real exiſtence.

If all this were matter of mere ſpeculation, and produced no miſchief in practice, it would be of no importance; but in matters of phyſic and ſurgery this ſeldom or never happens: erroneous ideas of the nature, origin, and ſeats of diſeaſes, moſt commonly are followed by improper methods of treating them. In the preſent caſe, the abſurdity of the conjectures concerning theſe circumſtances in the diſorder, is fully equalled by the methods of cure which have been propoſed and practiſed.

490 Improper directions for the cure.

Upon a ſuppoſition that the extravaſation of fluid was the conſequence of a dropſical habit, ſtrong purges and powerfully diuretic medicines have been preſcribed; actual cauteries have been uſed, and ligatures and inciſions made, both on the ſpermatic veſſels and in the groin, to hinder the deſcent of the water from the cavity of the belly; aſtringent liquors and ardent ſpirits have been injected, with a view to cloſing or ſoldering broken lymphatics; tedious and painful operations have been practiſed for the eradication of imaginary cyſts; directions have been given to evacuate the water at different times, leſt the patient's ſtrength ſhould fail or his health ſuffer, by its being done too ſuddenly; and the teſticles being ſuppoſed to be frequently ſpoiled by long lying in the water, caſtration has often been performed in the ſimple hydrocele.

491 Of the watery ſwelling of the ſcrotum.

The ſcrotum is the common receptacle of both the teſticles, and conſiſts of the cuticula, cutis, and what all the anatomiſts have now agreed to call the *dartos*; which is a looſe cellular membrane, perfectly void of fat, and whoſe cells or cavities communicate with each other, with the utmoſt freedom through every part.

As this membrane has no immediate communication with the cavity of the abdomen within the peritoneum, it is plain, that whatever kind or quantity of fluid may be depoſited in it, it cannot be derived from the ſaid cavity, even though the patient ſhould labour under a true aſcites: but as its cells have a free intercourſe with thoſe of the general cellular membrane all over the body, they will be liable to be affected by all thoſe diſorders which have their ſeat in that membrane; that is, by all diſorders proceeding from a low impoveriſhed ſtate of blood, from a deficiency of the urinary ſecretion, or from non-execution of the office of the abſorbent veſſels; and conſequently, in anaſarcous and leucophlegmatic habits, will become the ſeat of a watery extravaſation.

This watery ſwelling of the ſcrotum, although it is moſt frequently a ſymptom of a dropſical habit, and very often accompanies both the general anaſarca and the particular collection within the abdomen called the *aſcites*; yet, even in the latter caſe, neither is or can be derived from the cavity of belly, but is confined to the tela celluloſa, which lies on the outſide of the peritoneum: the water derived from hence diſtends the ſcrotum in the ſame manner, and for the ſame reaſons, that it often does the legs and feet. The cells of the dartos being larger and abſolutely void of fat, and the ſkin which covers them being extremely dilatable, and giving way for a larger influx into this part than into moſt others, has indeed occaſioned its being taken notice of as a particular diſeaſe, though it is moſt properly a ſymptom only.

This being the caſe, and the true method of cure conſiſting in an internal medical proceſs, it has been improperly ranked among the ſpecies of hydrocele; though the nature of the contents will certainly admit the uſe of the word.

492 Deſcription of the watery ſwelling of the ſcrotum.

It is an equal ſoft tumour, poſſeſſing every part of the cellular membrane in which both the teſticles are enveloped, and conſequently is generally as large on one ſide as on the other: it leaves the ſkin of its natural colour; or, to ſpeak more properly, it does not redden or inflame it: if the quantity of water be not large, nor the diſtention great, the ſkin preſerves ſome degree of rugoſity, the tumour has a doughy kind of feel, and eaſily receives and for a while retains the impreſſion of the fingers; the raphe or ſeam of the ſcrotum divides the ſwelling nearly equally; the ſpermatic proceſs is perfectly free, and of its natural ſize; and the teſticles ſeem to be in the middle of the loaded membrane. This is the appearance when the diſeaſe is in a moderate degree; but if the quantity of extravaſated ſerum be large, or the diſeaſe farther advanced, the ſkin, inſtead of being wrinkled, is ſmooth, tenſe, and plainly ſhows the limpid ſtate of the fluid underneath: it is cold to the touch, does not ſo long retain the impreſſion of the finger, and is always accompanied with a ſimilar diſtention of the ſkin of the penis; the preputium of which is ſometimes ſo enlarged, and ſo twiſted and diſtorted, as to make a very diſagreeable appearance. Theſe are the local ſymptoms; to which it may be added, that a yellow countenance, a loſs of appetite, a deficiency of urinary ſecretion, ſwelled legs, a hard belly, and mucous ſtools, are its very frequent companions.

The cure of the original diſeaſe comes within the province of the phyſician, and requires a courſe of internal medicine: but ſometimes the loaded ſcrotum and penis are ſo troubleſome to the patient, and in ſuch danger of mortification, that a reduction of their ſize becomes abſolutely neceſſary; and at other times a derivation or diſcharge of the redundant extravaſated ſerum from this part is ordered as an aſſiſtant to the internal regimen.

The chirurgical means in uſe for this end is called in general *ſcarification:* a term whoſe preciſe ſenſe has by no means been ſettled; from which it has now and then happened, that a general order being given, and the particular method of executing it being left to the choice of thoſe who have not been ſufficiently acquainted with this kind of buſineſs, much hazard has been incurred, and conſiderable miſchief done which might have been avoided.

The means of making this diſcharge are two, viz. puncture and inciſion: the former is made with the point of a lancet; the latter with the ſame inſtrument, or with a knife.

The generality of writers on this ſubject have ſpoken of the two methods in ſuch a manner, that a practitioner who had ſeen but little of either, would be inclined to think that it was a matter of great indifference which we ſhould make uſe of, and that the ſafety and utility of each were equal: which is by no means the caſe.

The intention of the uſe of either is, by a diſcharge of extravaſated ſerum, to alleviate the preſent uneaſineſs; and, by reducing the ſize of the ſcrotum, to render it leſs troubleſome, and leſs likely to mortify. In ſome few inſtances it has indeed happened, that this drain has proved a radical cure of the original diſeaſe; but that has been accidental, and is not in general to be expected. The intention is generally palliative; and, if the patient lives, is moſt likely to require repetition: therefore, if there be any difference between the two methods, with regard either to eaſe or ſafety, there can be no doubt which ought to be preferred.

All wounds of membranous parts in anaſarcous or dropſical habits, are neceſſarily both painful and hazardous; they are apt to inflame, are very difficultly brought to ſuppuration, and will often prove gangrenous in ſpite of all endeavours to the contrary. But the larger and deeper the wounds are, the more probable are theſe bad conſequences. Simple punctures with the point of a lancet are much leſs liable to be attended by them than any other kind of wound; they generally leave the ſkin eaſy, ſoft, cool, uninflamed, and in a ſtate to admit a repetition of the ſame operation if neceſſary. Inciſions create a painful, crude, hazardous ſore, requiring conſtant care. Punctures ſeldom produce any uneaſineſs at all, and ſtand in need of only a ſuperficial pledgit for dreſſing.

Now although there is ſo very material a difference in the ſymptoms and trouble attending the two methods, yet there is none in their effect: the communication of the cells of the dartos with each other is ſo free through every part of it, that punctures made with the fine point of a bleeding lancet into the moſt ſuperficial of them, will as certainly and as freely drain off all the water as a large inciſion, without any of its inconveniences or its hazard.

493 Hydrocele of the cells of the tunica communis.

Another ſpecies of hydrocele affects the cells of the tunica communis.

When the diſeaſe is ſimple, it is perfectly local; that is, it is confined entirely to the membrane forming the tunica communis, and does not at all affect either the dartos, the tunica vaginalis teſtis, or any other part.

It is a complaint which does not give a great deal of trouble, unleſs it arrives to a conſiderable ſize; and being by no means ſo frequent as either of the other two kinds of hydrocele, it is in general but little known or attended to. With ſome it paſſes for a varix of the ſpermatic cord; with others, for the deſcent of a portion of omentum, which having contracted an adheſion cannot be returned. Thus its true nature not being in general rightly underſtood, and it giving but little trouble or uneaſineſs while it is within moderate bounds, and neither hindering any neceſſary action or faculty, they who have it are moſt frequently adviſed to be contented with a ſuſpenſory bandage, and find very little inconvenience from it.

Sometimes it ariſes to ſo large a ſize, and gets into ſuch a ſtate, as to become an object of ſurgery, and to require our very ſerious attention.

In general, while it is of moderate ſize, the ſtate of it is as follows. The ſcrotal bag is free from all appearance of diſeaſe, except that when the ſkin is not corrugated it ſeems rather fuller, and hangs rather lower on that ſide than on the other, and, if ſuſpended lightly on the palm of the hand, feels heavier: the teſticle, with its epididymis, is to be felt perfectly diſtinct below this fulneſs, neither enlarged, nor in any manner altered from its natural ſtate: the ſpermatic proceſs is conſiderably larger than it ought to be; and feels like a varix or like an omental hernia, according to the different ſize of the tumour: it has a pyramidal kind of form, broader at the bottom than at the top: by gentle and continued preſſure, it ſeems gradually to recede or go up, but drops down again immediately upon removing the preſſure, and that as freely in a ſupine as in an erect poſture: it is attended with a very ſmall degree of pain or uneaſineſs; which uneaſineſs is not felt in the ſcrotum where the tumefaction is, but in the loins.

If the extravaſation be confined to what is called the *ſpermatic proceſs*, the opening in the tendon of the abdominal muſcle is not at all dilated, and the proceſs paſſing through it may be very diſtinctly felt; but if the cellular membrane which inveſts the ſpermatic veſſels within the abdomen be affected, the tendinous aperture is enlarged, and the increaſed ſize of the diſtended membrane paſſing through it produces to the touch a ſenſation not very unlike that of an omental rupture.

While it is ſmall, it is hardly an object of ſurgery; the pain or inconvenience which it produces being ſo little, that few people would chooſe to ſubmit to an operation to get rid of it, and it is very ſeldom radically curable without one: but when it is large, or affects the membrane within the cavity as well as without, it becomes an apparent deformity, is very inconvenient both from its ſize and weight, and the only method of cure which it admits is far from being void of hazard; as muſt appear to every one who will conſider, or who is at all acquainted either with the nature of lymphatic extravaſation or abſorption, or with the frequent conſequences of wounds inflicted on parts merely membranous.

The *encyſted* hydrocele of the tunica communis has its ſeat in the ſame part as the preceding, viz. the tunica communis or cellular membrane, which inveſts the ſpermatic veſſels; with this difference, that in the former the water is diffuſed in general through all the cells of the membrane, whereas in this it is contained in one cavity only.

It is a complaint by no means unfrequent, eſpecially in children. It was very well known to many of the ancients, and has been very accurately deſcribed by ſome of them; but later writers have often miſtaken it for and repreſented it as a wind-rupture, or pneumatocele, a diſeaſe exiſting in their imaginations only. It moſt frequently poſſeſſes the middle part of the proceſs, between the teſticle and groin, and is generally of an oblong figure; whence it has by ſome people been compared to an egg, by others to a fiſh's bladder. Whether it be large or ſmall, it is generally pretty tenſe, and conſequently the fluctuation of the water within it not always immediately or eaſily perceptible; for which reaſon it has been ſuppoſed to contain air only. It gives no pain, nor (unleſs it be very large indeed) does it hinder any neceſſary action. It is perfectly circumſcribed, and has no communication either with the cavity of the belly above, or that of the vaginal coat of the teſticle below it. The teſtis and its epididymis are perfectly and diſtinctly to be felt below the tumour, and are abſolutely independent of it. The upper part of the ſpermatic proceſs in the groin is moſt frequently very diſtinguiſhable. The ſwelling does not retain the impreſſion of the fingers; and when lightly ſtruck upon, ſounds as if it contained wind only. It undergoes no alteration from change of the patient's poſture, nor is affected by his coughing, ſneezing, &c. and has no effect on the diſcharge *per anum*.

Infants are much more ſubject to this diſeaſe than adults, though it often affects the latter. In young children it frequently diſſipates in a ſhort time; eſpecially if aſſiſted by warm fomentation, and an open belly. If it does not diſperſe, that is, if it be not abſorbed, the point of a lancet will give diſcharge to the water, and in young children will moſt frequently produce a cure. In adults, the cyſt formed by the preſſure of the fluid does ſometimes become ſo thick as to require diviſion through its whole length; which operation may in general be performed with great eaſe and perfect ſafety: though even this may prove troubleſome, hazardous, and fatal; of ſuch conſequence are wounds in membranous parts in ſome particular habits.

494 Hydrocele of the vaginal coat.

The third ſpecies of this diſeaſe is that which is confined to the vaginal coat or bag which looſely envelopes the teſticle. In a natural healthy ſtate, the cavity of this bag always contains a ſmall quantity of a fine fluid exhaled from the capillary arteries, and conſtantly abſorbed by veſſels appointed for that purpoſe. This fluid in the natural ſmall quantity ſerves to keep the tunica albuginea moiſt, and to prevent a coheſion between it and the vaginalis; a conſequence which almoſt neceſſarily follows any ſuch diſeaſed ſtate of theſe parts as prevents the due ſecretion of it. On the contrary, if the quantity depoſited be too large, or if the regular abſorption of it be by any means prevented, it will be gradually accumulated, and, by diſtending the containing bag, will form the diſeaſe in queſtion.

The two preceding ſpecies of hydrocele have their ſeat in the tunica communis of the ſpermatic veſſels, that is, in the cellular membrane which inveſts them; one by a general diffuſion of lymph through all its cells, the other by a collection of it in one particular cyſt or bag: that which makes our preſent ſubject has no concern or connection with that membrane at all, but is abſolutely confined to the tunica vaginalis teſtis.

It is a diſeaſe from which no time of life is exempt; not only adults are ſubject to it, but young children are frequently afflicted with it, and infants ſometimes born with it.

From all the circumſtances attending the complaint, it is pretty clear, that whatever tends to increaſe the ſecretion of the fluid into the ſacculus beyond the due and neceſſary quantity, or to prevent its being taken up and carried off by the proper abſorbent veſſels, muſt contribute to its production; which is ſo ſlow and gradual, and at the ſame time ſo void of pain, that the patient ſeldom attends to it until it has arrived to ſome ſize. Not but that it ſometimes is produced very ſuddenly, and in a very ſhort ſpace of time attains conſiderable magnitude.

The ſize and figure of the tumour are various in different people, and under different circumſtances. In general, at its firſt beginning, it is rather round; but as it increaſes it frequently aſſumes a pyriform kind of figure, with its larger extremity downward: ſometimes it is hard, and almoſt incompreſſible, ſo much ſo, that in ſome few inſtances it has been miſtaken for an induration of the teſticle; at other times it is ſo ſoft and lax, that both the teſticle and the fluid ſurrounding it, are eaſily diſcoverable. It is perfectly indolent in itſelf, though its weight does ſometimes produce ſome ſmall degree of uneaſineſs in the back. The great characteriſtic (as it is called) of this diſeaſe, and on which almoſt all writers have agreed to lay the greateſt ſtreſs, and to reſt their proof of the nature of the diſorder, viz. the tranſparency of the tumour, is the moſt fallible and uncertain ſign belonging to it; it is a circumſtance which does not depend upon the quantity, colour, or conſiſtence of the fluid conſtituting the diſeaſe, ſo much as on the uncertain thickneſs or thinneſs of the containing bag, and of the common membranes of the ſcrotum.

If they are thin, the fluid limpid, and the accumulation made ſo quick as not to give the tunica vaginalis time to thicken much, the rays of light may ſometimes be ſeen to paſs through the tumour; but this is accidental, and by no means to be depended upon. Whoever would be acquainted with this diſorder muſt learn to diſtinguiſh it by other, and thoſe more certain, marks, or he will be apt to fall into very diſgraceful as well as pernicious blunders. The colour of the fluid is very different and uncertain: ſometimes it is of a pale yellow, or ſtraw-colour; ſometimes it is inclined to a greeniſh caſt; ſometimes it is dark, turbid, and bloody; and ſometimes it is perfectly thin and limpid.

495 Different methods of cure in the hydrocele.

The methods of cure (as they are called) in this ſpecies of hydrocele, though various, are reducible to two, viz. the palliative, or that which pretends only to relieve the diſeaſe in preſent, by diſcharging the fluid; and the radical, or that which aims at a perfect cure without leaving a poſſibility of relapſe. The end of the former is accompliſhed by merely opening the containing bag in ſuch a manner as to let out the water; that of the latter cannot be obtained unleſs the cavity of that bag be aboliſhed, and no receptacle for a future accumulation left. One may be practiſed at all times of the patient's life, and in almoſt any ſtate of health and habit; the other lies under ſome reſtraints and prohibitions, ariſing from the circumſtances of age, conſtitution, ſtate of the parts, &c.

496 Inſtruments uſed in the palliative cure.

The palliative cure may be accompliſhed by a very ſimple operation. The only circumſtances requiring our attention in it, are, the inſtrument wherewith we would perform it; and the place or part of the tumour into which ſuch inſtrument ſhould be paſſed. The two inſtruments in uſe, are the common bleeding lancet, and the trocar.

The former having the finer point, may poſſibly paſs in rather the eaſier, (though the difference is hardly perceptible), but is, in our opinion, liable to inconveniences to which the latter is not. The trocar, by means of its canula, ſecures the exit of the whole fluid without a poſſibility of prevention; the lancet cannot. And therefore it frequently happens, when this inſtrument is uſed, either that ſome of the water is left behind, or that ſome degree of handling and ſqueezing is required for its expulſion; or that the introduction of a probe, or a director, or ſome ſuch inſtrument, becomes neceſſary for the ſame purpoſe. The former of theſe may, in ſome habits, be productive of inflammation: the latter prolongs what would otherwiſe be a ſhort operation, and multiplies the neceſſary inſtruments; which, in every operation in ſurgery, is wrong. To which it may be added, that if any of the fluid be left in the vaginal coat, or inſinuates itſelf into the cells of the dartos, the patient will have reaſon to think the operation imperfect, and to fear that he ſhall not reap even the temporary advantage which he expected. The place where this puncture ought to be made, is a circumſtance of much more real conſequence; the ſucceſs of the attempt, the eaſe, and even ſometimes the ſafety, of the patient, depending upon it.

497 Proper place for the perforation.

Whoever conceives, as many have done, and ſome ſtill do, that the teſticle hangs looſe in the middle of the water within the vaginal coat, muſt alſo ſuppoſe that every part of the general tumour is equally fit and proper for this operation. The idea is erroneous, and the experiment may prove highly miſchievous. All the anterior and lateral parts of the vaginal coat are looſe and detached from the albuginea; in its poſterior and ſuperior part theſe two tunics make one; conſequently the teſticle is, as it were, affixed to the poſterior and ſuperior part of the cavity of the ſac of an hydrocele, and conſequently the water or fluid can never get quite round it. This being the ſtate of the caſe, the operation ought always to be performed on that part of the tumour where the two coats are at the greateſt diſtance from each other, and where the fluid muſt, therefore, be accumulated in the largeſt quantity; and never on that part of it where the fluid cannot poſſibly be. The conſequence of acting otherwiſe muſt not only produce a diſappointment by not reaching the ſaid fluid, but may prove, and has proved, highly and even fatally miſchievous to the patient.

498 Of the applications to the wound after the operation is performed.

It was a cuſtom formerly, after performing this operation, to make uſe of fomentations and diſcutient applications, upon a ſuppoſition that by ſuch means a return of the diſeaſe might be prevented. Among the old writers are to be found the forms of medicines to be applied to the groin and ſcrotum, to prevent a future deſcent of the fluid; but anatomy and experience have proved the falſehood of ſuch ſuppoſition, and the abſurdity of ſuch applications: the preſent practitioners content themſelves with a bit of lint and a plaſter; and if the ſcrotum has been conſiderably diſtended, they ſuſpend it in a bag-truſs, and give the patient no farther trouble.

499 This operation ſometimes proves a radical cure.

In moſt people the orifice thus made heals in a few hours, (like that made for blood-letting); but in ſome habits and circumſtances, it inflames and feſters: this feſtering is generally ſuperficial only, and is ſoon quieted by any ſimple dreſſing; but it ſometimes is ſo conſiderable, and extends ſo deep, as to affect the vaginal coat, and by accident produce a radical cure. It has alſo been known to prove ſtill more troubleſome, and even fatal; but then the circumſtances both of the patient and of the caſe have been particular, and ſuch as required attention.

Every other method of treating this kind of hydrocele, except the puncture, was either originally intended to obtain a radical cure, or, having been found to have been often productive of ſuch, has been by different people ranked ſometimes among the palliative, ſometimes among the radical, means.

500 Of cures attempted by means of ligature, canula, tent, &c.

In many of the old writers are found directions for obtaining the cure of this diſeaſe by the uſe of a ſeton, a canula, a tent, a cauſtic, a ligature, an injection, or an inciſion.

Some of theſe are adopted or preferred by one, and ſome by another, according to the theory which they have entertained of the diſorder, or to the benefits which they have ſeen to have accidentally ariſen from the uſe of the ſaid means.

To reduce theſe under ſome kind of method, (which the manner of their being delivered to us does in general not very eaſily admit), we may ſay, that the ſeton, the tent, and the canula, were either originally meant to palliate a diſeaſe of which the old practitioners had very diſagreeable apprehenſions, or that they were made uſe of upon a ſuppoſition that the fluid contained in the cyſt was in itſelf noxious; or that the general habit of the patient was relieved, and many other diſorders prevented, by the ſaid humour falling or being depoſited in that part; or from an opinion that the cure of it ought not by any means to be haſtily or raſhly attempted: that the cauſtic, cautery, and ligature, were deſigned to prevent the ſuppoſed deſcent of the water from the abdomen into the ſcrotum; and that the injection was calculated for the conſtriction of a ſuppoſed breach in the lymphatic veſſels.

501 Reaſons againſt the uſe of the cautery.

Some of theſe (happily for mankind) are now quite laid aſide, the reaſons for their uſe being found to be falſe and groundleſs; of this kind are the cautery, the ligature, and the injection. The water is now, by every body who has made any inquiry into the matter, known to be formed and collected in the part where it is found; and not to have fallen into it from the belly: and, though an obſtruction in the lymphatic veſſels of the ſpermatic cord, may in ſome degree prevent the regular and due abſorption of the fluid from the vaginal tunic, yet no breach or rupture of ſuch veſſels can ever produce the diſeaſe in queſtion: the extravaſation, in ſuch caſe, muſt be in another part; and may poſſibly cauſe a hydrocele of the cellular kind, in the common membrane of the ſpermatic veſſels, but which can never be found within the tunica vaginalis.

502 Of the tent and canula.

The reaſons originally given for the uſe of the tent and the canula, viz. the noxious quality of the fluid, and the neceſſity of a gradual cure, are now alſo known and acknowledged to be without foundation; and therefore, though theſe methods, or methods like theſe, do ſtill continue to be uſed, yet it is with another view, and upon other principles: not with intention to lengthen the time of a cure, by making a gradual drain for the prevention of other diſorders; but merely to aboliſh the cavity of the tunica vaginalis, by having excited and maintained ſuch a degree of inflammation and ſuppuration as ſhall produce an union between that coat and the albuginea teſtis.

This is indeed the only rational end which can by any of theſe means be purſued; for the diſorder being abſolutely local, and the tunica vaginalis (the ſeat of it) moſt commonly ſomewhat altered from its natural ſtate, by having been diſtended; unleſs the abſorbent veſſels can again be reſtored to a capacity of doing their duty, (a circumſtance which does not very often happen), the arteries will continue to exhale new ſerum into the cavity, and the hydrocele will ſtill remain, or be renewed in a ſhort time after each diſcharge.

To obtain this end, two kinds of means are propoſed. In the uſe of one, it is intended, by means of a ſmall wound, to excite ſuch a degree of inflammation, as ſhall occaſion or be followed by a total and abſolute coheſion of the tunica vaginalis with the tunica albuginea: in the other, a larger and more free inciſion is made, whereby the cavity of the former of theſe coats is converted into a hollow or open ſore or ulcer, to be filled up by a new incarnation; or elſe a part of the ſaid tunic being cut away, its power of again holding the extravaſated fluid is equally prevented.

The firſt, or union of the two coats in conſequence of inflammation, has ſometimes been found to follow the uſe of ſuch means as were intended to procure only a temporary relief: it ſometimes follows the ſimple puncture with the trocar or lancet; the ancient method of letting out the water by a ſmall inciſion frequently produced it; and the ſeton, the tent, and the canula, though uſed for another purpoſe, or at leaſt for other reaſons, were found to be followed by it ſo often, that they ſoon were ranked among the means for obtaining a radical cure.

They were indeed originally deſigned to diſcharge the water gradually; and to continue ſuch a drain from the parts where it had been collected, as might prevent any of the ill conſequences apprehended from the removal of the local diſorder: but the inflammation which ſupervened, ſometimes producing a coheſion of the ſacculus to the ſurface of the teſticle, what was originally calculated for a palliative remedy only, was by many adopted for a radical one.

503 Bad conſequences ſometimes flowing from the uſe of theſe methods.

If the event and conſequence flowing from theſe means were as much in our power as they have been ſaid to be, that is, if we could with any tolerable preciſion or certainty determine the degree of inflammation to be excited, and the effect of ſuch inflammation on the vaginal coat, there would be no doubt of the utility of them; but this is far from being the caſe: for although it ſometimes is ſufficient for the purpoſe wiſhed for, and riſes no higher than juſt to a degree equal to that purpoſe, yet it alſo frequently happens, that either ſuch degree and extent of it is not excited, or it riſes much higher and proves much more painful and fatiguing than was promiſed or intended; or, after a great deal of pain and confinement, a partial coheſion only has been the conſequence, and the diſeaſe has ſtill remained, notwithſtanding all the patient's and our trouble. Sometimes the pain, inflammation, and ſymptomatic fever, are but little; but, on the other hand, they are all three ſometimes ſo great as to become alarming, at leaſt to a patient who has been taught to expect a cure upon much more eaſy terms. The whole ſcrotum ſometimes becomes exceſſively inflamed, and, after a good deal of pain and trouble, large ſloughs are produced, and the proceſs becomes as irkſome as any of thoſe whoſe event (with regard to a cure) is much more certain.

If the inflammation be but ſlight, the pain and tumefaction moderate, the ſymptomatic fever light, the ſuppuration ſmall, and an univerſal coheſion of the two membranes is produced, the event is very fortunate, and a very troubleſome complaint is thereby got rid of upon very eaſy terms. If either the inflammation be confined to the dartos, where it ſometimes produces ſeveral ſuperficial abſceſſes (of no conſequence toward the cure of the diſeaſe), or if it has been ſo partial as only to have occaſioned the coheſion between the tunics of ſmall compaſs, the cavity will not by this means be aboliſhed, nor any thing like a radical cure be obtained; conſequently the patient will have undergone all the fatigue, confinement, or pain (be it more or leſs) for nothing: but if the inflammation riſes high, if the ſcrotum ſwells conſiderably, and large deep ſloughs are formed (as ſometimes happens), the ſymptoms and the hazard are then fully equal to what attend thoſe more certain methods. Which of the three will be the event, no man can ſay. Under the ſame external appearances, different people are more or leſs liable to inflammation and fever: the confinement of matter, in conſequence of too ſmall an opening, will in ſome habits make ſtrange havock in a very ſhort time; and if a large opening and a plentiful ſuppuration muſt at laſt be ſubmitted to, the method by a large inciſion at firſt is preferable, as the cure is more certain, and the loſs of time leſs. Different circumſtances in the patient will render one method preferable to and more likely to ſucceed than another; but whenever a cure is attempted by any of the before-mentioned means, the uncertainty of the event ſhould be made known, and the patient be appriſed of what may happen either with regard to trouble or diſappointment.

504 Of the radical cure.

All the methods hitherto taken notice of are calculated to produce a perfect or radical cure, without making a large wound, or bearing the appearance of a chirurgical operation: thoſe of which we are now to ſpeak, are intended for the ſame purpoſe; but by making a large and free opening into the bag containing the fluid, to render the accompliſhment of ſuch purpoſe more certain.

505 Method of curing by cauſtic.

Theſe are called the cure by *cauſtic* and the cure by *inciſion*. The cure by cauſtic is calculated to ſpare the terror which a cutting inſtrument always conveys, and (as the patrons of it ſay) to avoid the painful ſymptoms and hazard which frequently attend a large inciſion in theſe parts. The method is this: A piece of the common paſte cauſtic, rather leſs than a finger's breadth, properly ſecured by plaſter, is applied the whole length of the anterior part of the tumour, which will neceſſarily make an eſchar of proportional ſize. When this eſchar either caſts off or is divided, an opening of nearly the ſame length and breadth is thereby intended to be made into the cavity of the tunica vaginalis teſtis; by which means an opportunity is given to the ſurgeon to apply ſuch dreſſings to the inſide of the ſaid tunic as ſhall, by the generation of new fleſh, fill up and aboliſh its cavity. The preference which ſome practitioners have given to this method before that by inciſion, has been upon a ſuppoſition, that a circumſtance which very ſeldom happens will moſt frequently occur; we mean the penetration of the cauſtic through the vaginal tunic containing the fluid.

506 This method not preferable to that by inciſion.

By this they hope to avoid the ſymptoms which are ſuppoſed to be generally excited by the diviſion of the ſaid bag by a cutting inſtrument; but this the cauſtic very ſeldom does. If the tumour be very large and full, the containing parts be very much on the ſtreſs, and the ſkin and dartos very thin, the cauſtic may now and then penetrate through to the vaginal coat: but this, whatever may be thought or pretended, very ſeldom happens; and when it does not, the tunica vaginalis muſt be divided in the ſame ſtate and manner as if no cauſtic had been applied. All the difference between the two methods (cauſtic and inciſion) will then amount to this: That in the former, the ſkin being mortified, the patient is freed from a part of his apprehenſion at its being cut; and the ſurgeon, fancying that his eſcharotic has gone through the vaginal coat, will divide it as a part of the eſchar: but a more careful examination of what he is about at the time of ſuch operation, would generally convince him that he divides the bag unaltered by the cauſtic; and the ſymptoms which often attend this proceſs confirm it. It has indeed been propoſed to divide the eſchar made in the ſkin down to the ſurface of the tunica vaginalis, and then by the application of a freſh cauſtic to make an eſchar in that coat alſo. But whoever makes or ſubmits to this experiment, will find, that of two evils he chooſes the greater; and, to avoid the pain of inciſion, incurs a much greater degree of it by the repetition of the eſcharotic. The pain attending the firſt application of the cauſtic is indeed to ſome perſons but little; but in many it is fully equal to that of the knife, and muſt always be of much longer duration: if it does not penetrate the tunica vaginalis, that bag muſt be divided by a cutting inſtrument, (as we have already ſaid), in the ſame ſtate as if no cauſtic had been applied; which inciſion is and muſt be accompanied with the ſame ſymptoms (in the ſame perſon) as in the operation by the knife only. Nor can we at all times confine the cauſtic, ſo as that it ſhall not cauſe a much larger ſore than is intended or can be neceſſary.

Upon the whole, the cure by cauſtic, as it ſpares the terror and apprehenſion of a bloody operation by the knife, and as it requires no dexterity in the operator, may, on thoſe two accounts, become preferable both to many patients and ſurgeons: yet whoever promiſes to perform, or expects to receive, a radical cure by cauſtic upon much eaſier terms than by inciſion, will moſt frequently be diſappointed; that is, they will frequently find the fever and inflammatory ſymptoms full as high, and the ſore full as painful, in the one as in the other, and conſequently all their care and attention to obviate miſchief full as neceſſary. Neither is the neceſſary confinement, in general, at all leſs in the one than in the other.

507 Of performing the operation by the knife.

The method of performing the operation by the knife is as follows: Having appointed an aſſiſtant to graſp the upper-part of the tumour, in order to render it tenſe below, a puncture ſhould be made in the lower and anterior part through the ſkin and vaginal coat. If the operator intends to finiſh the inciſion with a knife, he ſhould make this puncture large enough to admit the end of his fore-finger; which he ſhould introduce immediately before the water is all diſcharged and the vaginal coat collapſed; and upon that finger ſo introduced, he ſhould continue his diviſion of the whole length of the bag and of the ſcrotum which covers it. If he intends to uſe the probe-ſciſſars (a more tedious and a more painful method), he may make his firſt puncture with a lancet, and then introduce his ſciſſars. Upon the firſt diviſion, the water ruſhes out, and the tumour ſubſides. If the puncture be made ſmall, a part of the fluid will inſinuate itſelf into the cells of the dartos; and by the immediate collapſion of the vaginal coat, the operator will find ſome difficulty in introducing either his finger or his inſtrument into the orifice made in it. If he does not do this, he will divide only the ſkin and dartos, and the patient muſt undergo a ſecond inciſion for the diviſion of the cyſt: all which inconvenience may be avoided, by making the firſt opening large enough for the introduction of the finger; and when that is in, all the reſt is upon that very eaſily executed.

508 Treatment of the teſticle and wound after the operation.

When the vaginal tunic is divided, and the fluid thereby diſcharged, the teſticle, covered only by its tunica albuginea, comes into view; and, if the inciſion was either begun or continued very low, it generally thruſts itſelf out from the wound. This ſhould be gently replaced; and if the vaginal coat is not much thickened by having been long diſtended, nothing more need be done than to lay a ſmall quantity of fine lint into its cavity, and then, covering the wound with a large pledgit and a ſoft bolſter, tie the ſcrotum up in a ſuſpenſory bag. This operation, if properly performed, may be executed in a very few ſeconds: it requires no other violence than the mere diviſion of the parts; and if this diviſion be made with a knife rather than ſciſſars, it will require much leſs time, and cauſe much leſs pain.

The membranous ſtructure of the parts on which this wound is inflicted, their continuation from the peritonæum, and the great irritability of ſome of thoſe which are neceſſarily laid bare, and put under a neceſſity of receiving dreſſings, muſt occaſion pain and ſymptomatic fever: this it is the buſineſs of art to moderate and relieve; phlebotomy, lenient aperitives, febrifuges, and opiates, will therefore become neceſſary. But in this caſe, as in many others, it will generally be found much more eaſy to prevent bad ſymptoms, than to remove them when they have been permitted to attain a conſiderable height. The operation is, or ought to be, confined to the young and the healthy, in whom inflammatory ſymptoms are moſt likely to occur; but (we may venture to ſay) to whom we have more efficacious remedies to apply in ſuch diſorders, than can be uſed to people of a different habit and in different circumſtances.

The general induration of all the parts about, the thick tumid lips of the inciſion, and the general inflammatory enlargement of the ſcrotum, have, for the firſt four or five days, a diſagreeable appearance; and may, if neglected or wrong treated, prove very troubleſome or even hazardous; and the kind of diſcharge which during that time is made (a thin diſcoloured gleet), ſeems very unequal to the reduction of ſo much tumefaction: but when the febrile ſymptoms are appeaſed, and a kindly ſuppuration is begun, let the ſurgeon have patience, and not by an over-officiouſneſs, or by improper dreſſings, interrupt nature in what ſhe is about: let him, by warm fomentations, keep the parts clean and perſpirable; let him dreſs the wound with a ſmall quantity of ſoft eaſy digeſtive applications, and, covering the whole ſcrotum with a ſoft warm poultice, ſuſpend it in a proper bag, and he will in general ſoon ſee a favourable change in all the appearances; he will ſee the inflammation diſappear, the tumour reſolve, and all the tumefaction in due time ſubſide. But if he neglects theſe general cautions, and, under a notion of aſſiſting digeſtion, goes to work with precipitate and other irritating dreſſings, the face of things will not be ſo agreeable: the tumour will not ſubſide; and he will continue, or rather create, a painful undigeſted ſore, with all its conſequences; but for which he only is accountable.

In about ſix weeks the ſcrotum is generally reduced to nearly its natural ſize; and when the wound is quite healed, the cicatrix is a mere line, correſpondent to the original inciſion; which is a circumſtance of more conſequence to the patient than is imagined, eſpecially if he be obliged to get his bread by labour.

If the tunica vaginalis containing the water, by long or frequent diſtention or from any other cauſe is become thick and hard, and cannot therefore contract itſelf or be contracted upon the evacuation of the fluid, it will contribute conſiderably to the thickneſs of the lips of the wound, as well as to their hardneſs, pain, and difficulty of digeſtion. In this caſe, the beſt way is to remove a part of it on each ſide at the time of the operation. The cellular ſtructure of the dartos eaſily admits this to be done; and when theſe ſides are thus taken away, the lips of the wound conſiſt only of the common integuments. A knife will do this with much more eaſe and expedition than any other inſtrument whatever. The method propoſed by the late Mr Douglas, of doing it by repeated ſnips of the probe-ſciſſars, is operoſe, unhandy, and unneceſſarily painful and tedious; nor is the cutting away an oval piece of the ſcrotum, as adviſed by that gentleman and ſome others, at all neceſſary: on the contrary, the more looſe that part of the ſcrotum is which is to cover the teſticle (now deprived of its vaginal coat) the better, as it will be more capable of corrugation.

With theſe cautions, and under the proper reſtrictions already mentioned, this method of obtaining a radical cure is very practicable. That it is ſometimes accompanied by troubleſome ſymptoms, is beyond all doubt; and ſo is the method by cauſtic. We cannot ſay that we have never ſeen it prove fatal; nor can that be ſaid of any operation of conſequence: much depends on the choice of a proper ſubject, and the obſervance of the neceſſary means and cautions; without which, both this and the uſe of the cauſtic will always be troubleſome, and ſometimes hazardous.

509 Diſcharging the water by puncture is ſometimes eligible.

When the quantity of fluid is large, and the ſcrotum and tunic much on the ſtretch, Mr Pott thinks it is better to diſcharge the water by mere puncture, and not to perform the operation for the radical cure until a freſh accumulation has again moderately diſtended it. The inflammation neceſſarily conſequent upon the diviſion of theſe parts, juſt after they have been ſo much on the ſtretch, and ſo ſuddenly let looſe, may be productive of worſe ſymptoms, and a higher degree of fever and tumefaction, than uſually occurs when the ſame parts are divided in a leſs diſtended ſtate.

In this operation, the point to be aimed at, as Mr Pott obſerves, is to excite ſuch a degree of inflammation, both in the tunica vaginalis and tunica albuginea, as ſhall occaſion a general and perfect coheſion between them: and this, if poſſible, without the production of ſlough or abſceſs, without the hazard of gangrene, and without that degree of ſymptomatic fever which now and then attends both the cauſtic and the inciſion; and which, when it does happen, is ſo alarming both to patient and ſurgeon.

510 Of the uſe of a ſeton.

Theſe ends he has frequently obtained by the uſe of a ſeton. It is a method of cure mentioned by Aquapendens, as uſed by Guido and others before him, (though their proceſs was ſomewhat different from his.) He has ſeveral times tried it on ſubjects of very different ages, ſome of them more than 50 years old. It requires confinement to bed only for a few days; after which the patient may lie on a couch to the end of the attendance, which is generally finiſhed in about three weeks or a month at the fartheſt; and during all that time no other proceſs or regimen is neceſſary, than what an inflammation of the ſame part from any other cauſe would require.

Sect. XV. *Of Trepanning.*

There appears ſcarce any part of the cranium, from the frontal ſinuſes to the inſertions of the muſcles into the occipital bone, that may not be perforated with ſafety. There are ſome late inſtances in this kingdom, where the trepan has been ſucceſsfully applied to the frontal ſinuſes. How far it might be practicable to ſeparate the muſcles from and apply the trepan to the inferior part of the occipital bone, almoſt to the foramen magnum, may be worth future conſideration; as it is no unreaſonable ſuppoſition, that a caſe may happen to be ſo circumſtanced as to admit of no other remedy; and, according to Celſus, a doubtful one is better than none (A).

511 Parts of the ſkull not eligible for trepanning.

The parts of the ſkull not eligible for the application of the trepan are, 1. The frontal ſinuſes. 2. The ſutures, in young ſubjects; for in old ones the adheſion of the dura mater to them is but little more than to other parts of the cranium. 3. The middle of the os frontis, towards the noſe, where the ſpinal proceſs of that bone projects conſiderably. 4. The anterior and inferior angles of the parietal bones, on the internal parts of which run the arteries of the dura mater. 5. The ſagittal ſuture, on account of the longitudinal ſinus running immediately under it. 6. The lambdoidal ſuture, under which lies the courſe of the lateral ſinuſes. 7. The occipital bone, on account of its great inequality of thickneſs, and irregularity of its internal ſurface. 8. The os temporale, as the temporal muſcle muſt unavoidably be wounded in making room for the trepan: and laſtly, we muſt be careful, not to apply it to a yielding fractured part of the bone, that will not reſiſt the neceſſary force in making the perforation.

512 They are not always to be avoided.

There are, however, inſtances from the beſt authorities, of the ſucceſsful application of the trepan to all theſe exceptionable parts, ſufficient to encourage a cautious and judicious practitioner upon emergencies; to which, ſays Mr Gooch, I will venture to join my own experience, hoping it may have ſome weight in determining a matter of ſo much importance to ſurgery. The frontal ſinuſes have been trepanned with ſucceſs in London and Paris. Perforations may be made lower down the os frontis in children than in adults, without running the hazard of falling upon the ſinuſes; for they gradually enlarge, extending higher up as they arrive at puberty. Mr Gooch has applied the trepan near the middle of the os frontis, without meeting with any obſtacle from the ſpinal proceſs: and at the anterior and inferior angles of the parietal bones, without opening the *art. duræ matris*. The operation has been performed by Mr Warner upon the ſagittal ſuture, when bits of bone ſtuck in the longitudinal ſinus, which he eaſily extracted after enlarging the wound with his lancet, ſtopping the hæmorrhagy with dry lint without any difficulty.

513 Method of performing the operation.

After having deliberately conſidered every circumſtance, and reſolved upon the operation, the inſtruments, ſponges, dreſſings, compreſſes, bandage, and every neceſſary thing, are to be diſpoſed in perfect good order, that the operator may have nothing to ſeek when he wants it. The head is to be ſhaved, if it has not been already, as indeed it ſhould all over immediately after any of the preceding accidents: it is then to be reſted and firmly held upon a perſon's knees; and, with the knife appropriated to this uſe and the ſcalprum, a piece of the ſcalp is to be removed, of a circular, elliptical, or other figure, as the circumſtances of the caſe require. The ſcalping ſhould be of ſuch extent, as may give a fair opportunity of making as many perforations as ſhall be found neceſſary, as far as the ſurgeon's judgment and obſervation can direct him. He ought not to be ſparing in this reſpect, leſt he ſhould be under the diſagreeable neceſſity of extending the inciſion farther. The manner of cutting, is to apply force enough to the knife, to carry it quite through to the bone at once, not bearing too much upon the point, eſpecially if we cut over looſe fragments, which we ſhould endeavour to avoid; the edge of the knife ſhould be ſo inclined, as to cut rather more of the pericranium than the ſkin. When we have proceeded thus far, the pericranium is to be raiſed a little, with the point of the knife, quite round the inciſion; and then the ſcalprum uſed, which will be found the beſt inſtrument to clear the bone of that membrane, as has been found by frequent experience. Should it be thought proper to proceed immediately to trepanning, if any conſiderable veſſels have been divided in ſcalping, they muſt be ſecured by needle and ligature; but when we do not intend performing the operation directly, dry lint with compreſs and bandage is generally ſufficient to reſtrain the hæmorrhagy; but ſometimes the preſſure of an aſſiſtant's fingers upon it will ſerve that purpoſe without a ligature,

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(A) Bontius, a writer of the beſt credit, relates a ſingular caſe of a ſailor, whoſe head was cruſhed between the ſhip and a boat; in conſequence of which dreadful accident, the greateſt part of the occipital bone was taken away in fragments, almoſt as far as the foramen magnum, and the patient perfectly cured by him and another ſurgeon.

ture, when we determine to proceed to the operation directly.

514 The trephine the moſt eligible inſtrument.

That kind of trepan called the *trephine*, is now in general uſe in all places: it is more commodious than the other, and can be better managed and regulated in the operation, as the different bearings may require; and it will cut full as faſt, being worked both backwards and forwards. Before the operation is begun, the patient's head muſt be fixed ſo that the light may fall properly upon it, and in ſuch a convenient poſition, that the inſtrument may be placed perpendicularly upon the part; and of ſuch a height and manner, that the attitude may be eaſy during the operation, which often proves tedious, requiring many perforations (B).

515 Of the poſture of the patient's head, working of the ſaw, &c.

Whether the patient has the operation performed in bed or ſeated in a chair, it is always found that reſting his head on a pillow, with a board underneath it, upon the knees of an aſſiſtant, is preferable to any other manner; for being thus placed, the aſſiſtant will have more power to keep it ſteady, to reſiſt the motion of the inſtrument. When the head is well adjuſted, the next ſtep is to make a hole with the perforator, deep enough to fix the central pin of the trephine, in order to prevent the ſaw from ſlipping out of its circular courſe, till it has formed a ſulcus ſufficiently deep to be wrought ſteadily in; and then the pin is to be taken out. If the ſkull is thick, the teeth of the ſaw muſt be bruſhed clean now and then during the terebration; and dipping it into oil as often, will greatly facilitate the motion, and expedite the operation, making it leſs diſagreeable to the patient if he has his ſenſes; and, in order to loſe no time, it would not be amiſs to be provided with two inſtruments of the ſame ſize—We muſt remember, after having made ſome conſiderable progreſs in the operation, to examine the ſulcus often with a picktooth, or ſome other proper inſtrument, in order to diſcover where the bearings are neceſſary to be made.—Theſe precautions are of more conſequence when we are employed in perforating a part of the ſkull that we know has an unequal thickneſs, eſpecially after having paſſed the diplöe. And though we are told by writers in general, that we may ſaw boldly till we come at the diplöe, generally to be known by an appearance of blood, yet we ſhould be upon our guard in this point; examining if the piece be looſe, when we have ſawn ſome away into the bone, leſt we ſhould happen through inadvertence to wound the ſubjacent membrane; for in ſome parts of the ſkull there is naturally very little diplöe, and in old ſubjects ſcarce any remains to afford direction to our judgment by the bloody appearance. And for the ſame reaſon, it is alſo to be remembered, that childrens ſkulls are very thin. —When the piece is quite looſe, it is to be taken out with the forceps contrived for this purpoſe; and if the lower edge of the perforation is left jagged, it is to be ſmoothed with the lenticular, that it may not irritate the dura mater. The next ſtep is to raiſe the depreſſed piece or pieces of the cranium with the elevator; or to extract the fragments of the bone, grumous blood, or any extraneous body, with proper inſtruments. After this, if there appears good reaſon to apprehend that blood, lymph, or matter, is contained under the dura mater, we ſhould open it directly with a lancet very cautiouſly; endeavouring to avoid the blood-veſſels ramified upon it, and thoſe which lie immediately under it: and, on this occaſion, it will be prudential to conceal the inſtrument as much as we can, by wrapping it all round with tow almoſt to the point, in order to prevent impreſſions being made upon the ſpectators to our prejudice.

When we have recourſe to the trepan, on account of a fiſſure in which the bone will not yield, we ſhould apply the inſtrument ſo as to include part of it, if not directly over it, as it is moſt likely the extravaſated blood or lymph ſhould be found directly underneath it: and when the fiſſure is of great extent, it may be proper to make a perforation at each end, if the whole can be conveniently brought in view; and, in ſome caſes, more perforations may be requiſite, according to the courſe of it, even to its full extent.

When we propoſe to make ſeveral perforations, in order to remove depreſſed fragments of the bone that are firmly fixed, and having the internal ſurface larger than the external, or to raiſe them ſufficiently, it is neceſſary to apply the trepan as near the fractured parts as they will admit of; making the perforations adjoining, to ſave the trouble of cutting the intermediate ſpaces with the head-ſaw: and, as before hinted, we ſhould invariably obſerve to make the perforations in the moſt depending parts we can, for the ſame reaſon as we endeavour to obtain depending openings in the fleſhy parts. And in perforating the ſkull, where there is great inequality of its thickneſs, it appears more adviſable to raiſe the piece before it is cut quite through in every part of it, to obviate injuring the ſubjacent membrane with the ſaw.

516 Of trepanning on a ſuture.

When the ſkull has ſuffered an injury upon a ſuture, and it is not thought adviſable to uſe the trepan there, eſpecially in young ſubjects, in whom the dura mater adheres more ſtrongly than in adults, as has been remarked, we ſhould always remember to make a perforation on each ſide of the ſuture; for this obvious reaſon, becauſe there cannot be a free communication between the one ſide and the other, on account of the attachment of that membrane to the ſuture.

517 Of the dreſſings proper after the operation.

After the elevation of the fragments of the bone, or the removal of them, the extraction of extraneous bodies, and the evacuation of extravaſated blood, lymph, or ſanies, &c. the membranes may be dreſſed with *unguent. è gum. elemi*, extolled by Franciſcus Arcæus, the inventor of it, made of a ſofter conſiſtence with *balſ. è copaib.* or ſome other natural balſam; applying it juſt warm with a feather, and ſoft lint lightly over it, dreſſing the other parts as we have already directed in wounds of the head: after which, it may be proper to embrocate the whole head with *ol. et acet.* adding a little *ſpirit. lavend.* and to apply

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(B) Scultetus ſays, he was obliged to make 7 perforations in a fracture with great depreſſion. Glandorpius ſays, his maſter Spigelius made the ſame number upon the like occaſion. Dionis made 12. Philip count of Naſſau had 27 made in different parts of his head by Henry Chadborn, a very eminent ſurgeon; and that nobleman has atteſted the cure under his own hand. Mr Gooch made 13 in the caſe of an old man, with ſucceſs, as related in his Caſes and Remarks on Surgery.

ply a plaſter of *cerat. alb.* or ſome ſuch eaſy application, with gentle compreſs and bandage. The proper bandages upon this occaſion are what the French call the *grand couvre-chef*, and the *capeline* or *reflex bandage*, which require great care and exactneſs in their application, for the patient's eaſe. A bandage with ſix tails, or a kind of coif with lappets affixed to it, may be found very applicable in ſome caſes; but to ſerve this purpoſe, the ſurgeon muſt occaſionally exerciſe his invention.

After the dreſſing, the patient is to be placed in as eaſy a poſition in his bed as poſſible, with his head and ſhoulders elevated a little more than ordinary; and the rules we have laid down in the cure of wounds are to be duly obſerved. Warmer applications and bandages are required in winter than in ſummer. The degree of heat in the room muſt be regulated according to the temperature of the ſeaſon; and it is neceſſary to exclude the light. In injuries of the head, bad ſymptoms are apt to come on ſooner in warm, moiſt, ſultry weather, than in a cold ſeaſon, when it may be very beneficial to make the circumambient air warm, and dreſs the wound as expeditiouſly as poſſible, defending it from the attack of the cold air. A ſtrict regimen and obſervance of the non-naturals are now of the greateſt importance to be attended to; for a ſlight tranſgreſſion therein may prove of fatal conſequence, as we have amply evinced.

When the digeſtion of the wound proves kind, we ſhall ſoon obſerve granulations of fleſh, of a good complexion, ſhooting from the extremities of the veſſels, and throwing off the parts of the dura mater that may have ſuffered; which, by extending themſelves and twiſting one with another, form in the aperture a ſubſtance having the appearance of fleſh. The ſame operation of nature, in a longer time, throws off exfoliations from the circumference of the perforation and other parts of the denudated ſkull, thicker or thinner, ſooner or later, according to the age and conſtitution of the patient, the degree of injury the ſubſtance of the bone has ſuſtained, the ſeaſon of the year, &c. The granulations which ariſe from the different parts, uniting together, conſtitute the organized or vaſcular carnous ſubſtance, which is called the *incarnation* of the wound: and this regenerated ſubſtance, in young ſubjects, generally acquires a perfect boney hardneſs in the perforation, but ſeldom in old perſons.

518 Of the method of preventing fungi.

In order to remove the fungi mentioned, n° 132. ligature, exciſion, and eſcharotics, have been recommended; and ſometimes practiſed with fatal effects, throwing the nervous ſyſtem into great diſorder. And as there is ſo much to be apprehended from theſe methods, we ſhould by all means take early care to prevent the growth of ſuch excreſcences; which, if neglected, may increaſe to a great ſize in a ſhort time.

The beſt method of doing this is, firſt to apply to the dura mater a ſindon, ſpread with the balſam recommended, or dipped into it, moderately warm, according to the ſtate the membrane appears in: then a a plate of lead is to be exactly adjuſted in the perforation upon the ſindon, having the ears of it turned back upon the ſkull; over which a compreſs, conſiſting of a few doubles of common plaſter, with a piece of very thin ſheet-lead or card interpoſed, is to be laid; filling the wound up with even lint, rather above the level of the ſcalp; then a ſmall eaſy compreſs of cloth, faced with *cerat. alb.* is to be applied, with a piece of card or thin ſtiff paper on the outſide of it; over which, ſtrips of common plaſter about an inch broad are to be laid crucially, extending two or three inches beyond the compreſs. By this means the plate will be properly confined, and the degree of preſſure may be eaſily regulated, without inconvenience to the patient, or interrupting the diſcharge at the wound; and ſhould a greater degree of preſſure be required, it may be obtained by thickening the compreſs, and making one of the ſtrips of plaſter paſs through a ſlit in the other, as in the uniting bandage. After proceeding thus far, the head is to be embrocated, and a large thin compreſs ſpread with cerate, applied over the crucial plaſters, with eaſy bandage, as before directed. When the dura mater is granulated with fleſh, the ſindon or lint, moiſtened with a mixture of *tinct. myrrhæ* and *aq. calcis*, is a good application; and the other parts of the wound are alſo to be attended to, according to the rules of ſurgery which we have before laid down, in order to prevent the luxuriance of fleſh, till the exfoliations are completed; for ſhould this point be neglected, and looſe fleſh ſuffered to creep upon the bone from the circumference of the wound, much inconvenience and trouble, beſides pain to the patient, might proceed from ſuch inattention.

An abatment of the ſymptoms after the operation, with a good aſpect of the wound in a healthy ſubject, give us reaſon to hope for ſucceſs; but if the ſymptoms continue threatening, with a drineſs, glaſſy appearance, or livid colour of the wound, or a diſcharge of a fetid gleet from the membranes or brain, they are to be looked upon as very bad omens: however, we are to omit the uſe of no rational means, having inſtances upon record of the happy event of the moſt alarming caſes to encourage our perſeverance. The ſymptoms after the operation may require frequent bleeding, as well as ſtrict regimen.

Should the patient, at any time after the cure, complain of pain or diſorder in his head, with ſymptoms of plenitude, recourſe ought to be had immediately to bleeding and gentle purging, with the obſervance of a ſpare diet; and for ſome time after his cure, he ſhould alſo be very exact in his regimen and government of himſelf, both as to body and mind. It will be likewiſe very prudent to wear for a conſiderable time a thin braſs, ſteel, or tin plate, to defend the part againſt external injuries, eſpecially if there has been any great loſs of the bone; under which circumſtance, in old perſons, ſuch a defence may be found neceſſary for life.

SECT. XVI. *Of Tumours on the Heads of new-born Children.*

519 Cauſes of tumours on the heads of children.

THIS kind of tumour proceeds from an extravaſation of blood; probably in conſequence of ſome injury in a laborious, haſty, or injudicious delivery; as time ſhould always be allowed for a gradual dilatation of the parts, to admit of the excluſion of the fœtus with ſafety. It is ſeldom obſerved on any other parts of the head than the parietal bones; and the extravaſated blood is moſt frequently lodged between the pericranium and the cranium.

520 Deſcription of theſe tumours. This tumour is generally circumſcribed by a ridge, when the extravaſated fluid is contained between the cranium and the pericranium, and feels as if there was a depreſſion or deficiency of the bone; but the deception is owing to the fluid in the diſtended pericranium yielding to the fingers, and to the ridge circumſcribing the tumour, which, without very accurate examination, may be taken for the edge of the bone.

Some ſurgeons have looked upon this ſort of tumour as an aneuriſm proceeding from the inſide of the ſkull, others as a hernia of the brain. But was either of theſe the caſe in queſtion, it muſt appear between, and not upon, the bones it does; and a pulſation would be obſerved in it.

521 Method of cure in the foundling-hoſpital. The ſurgeons of the foundling-hoſpital, who have had the greateſt opportunities of diſcovering the nature of theſe tumours, and the beſt method of cure, from their large experience, ſay, they generally ſucceed by opening them, in caſe the children were otherwiſe healthy; and that they prefer this method, rather than waiting in expectation of abſorption by any other, apprehending that the bad conſequences they have ſeen may proceed from the putrid quality of the fluid contracted by its ſtagnation. They make an inciſion the whole length of the tumour; lay ſoft dry lint under the edges of the wound, to favour the diſcharge of the extravaſated blood, after preſſing out as much as they can without bruiſing the tender parts; and then apply a pledgit of common digeſtive over the lint, with eaſy compreſs and bandage.

322 Another method. Some other practitioners, of experience too, are againſt opening theſe tumours; adviſing the application of compreſſes, moiſtened in warm auſtere red wine, or red wine and vinegar, to be renewed as often as they grow dry; and ſay they have generally obſerved abſorption of the fluid to be the effect of this method without bad conſequences. However, ſhould there appear no diminution of the tumour by regularly purſuing this method a reaſonable time, it will then certainly be adviſable to open it, leſt the fluid ſhould be abſorbed in a putrid ſtate, or the bone injured by it, whence bad conſequences might enſue; and if the bone received an injury originally, the neceſſity of opening is indiſputable.

SECT. XVII. *Of the Cataract, cutting the Iris, and Operation for the Fiſtula Lachrymalis.*

§ 1. *Of the Cataract.*

THE cataract, called by the Latins *ſuffuſio*, is a diſeaſe of the cryſtalline humour, rendering the whole body of it opake; ſo that the rays of light which, in the natural ſtate of its tranſparency, were tranſmitted to the tunica retina, become now totally intercepted, and produce no effect. This is pretty nearly the account delivered down to us by Hippocrates and the ancient Greeks, who likewiſe knew it by the name of *glaucoma*.

523 The cataract a diſeaſe of the cryſtalline humour. Anatomiſts have frequently diſſected the eyes of perſons under this diſorder after their death; and have found it to be always an opacity of the cryſtalline humour, agreeably to the definition of a glaucoma: ſo that by conſequence we muſt underſtand the words *cataract* and *glaucoma* as ſynonymous terms.

524 Different colour of cataracts. The general criterion of the fitneſs of cataracts for the operation is taken from their colour: the pearl-coloured, and thoſe of the colour of burniſhed iron, are eſteemed proper to endure the needle; the white are ſuppoſed milky, the green and yellow horny, and incurable.

The depreſſion of a cataract of any colour would be the cure, if that alone was the diſtemper of the eye; but it generally happens, that the yellow cataracts adhere to the iris ſo firmly as to become immoveable: beſides, when they follow in conſequence of a blow, which is often the caſe, either the cells of the vitreous humour are ſo much diſturbed and broken, or the retina affected, that a degree of blindneſs will remain, though the cataract be depreſſed.

To judge whether the cataract adheres to the iris, if you cannot at once diſtinguiſh it by your ſight, ſhut the patient's eye, and rub the lids a little; then ſuddenly opening it, you will perceive the pupil contract, if the cryſtalline humour does not prevent the action by its adheſion: and when this is the caſe in any kind of cataract, the operation can hardly be adviſed.

Another conſideration of the greateſt moment, before undertaking the cure, is to be aſſured of the right ſtate of the tunica retina; which is very readily learnt, where there is no adheſion of the cataract, from the light falling between the iris and cryſtalline humour, which if the eye is not ſenſible of, it is a certain indication of another malady, and abſolutely forbids the operation. Generally this cataract takes its riſe from headachs, convulſions, and nervous diſorders.

525 Method of performing the operation. When none of theſe objections forbid the operation, it may be thus done. Having placed your patient in a convenient light, and in a chair ſuitable to the height of that you yourſelf ſit in, let a pillow or two be placed behind his back, in ſuch a manner, that the body bending forward, the head may approach near to you; then inclining the head a little backward upon the breaſt of your aſſiſtant, and covering the other eye ſo as to prevent its rolling, let the aſſiſtant lift up the ſuperior eye-lid, and yourſelf depreſs a little the inferior one: this done, ſtrike the needle through the tunica conjunctiva, ſomething leſs than one tenth of an inch from the cornea, even with the middle of the pupil, into the poſterior chamber, and gently endeavour to depreſs the cataract with the flat ſurface of it. If, after it is diſlodged, it riſes again, though not with much elaſticity, it muſt again and again be puſhed down. If it is membranous, after the diſcharge of the fluid, the pellicle muſt be more broke and depreſſed; if it is uniformly fluid, or exceedingly elaſtic, we muſt not continue to endanger a terrible inflammation by a vain attempt to ſucceed. If a cataract of the right eye is to be couched, and the ſurgeon cannot uſe his left-hand ſo dexterouſly as his right, he may place himſelf behind the patient, and uſe his right-hand.

556 Why there is no occaſion for uſing the ſpeculum oculi. We have not recommended the ſpeculum oculi, becauſe, upon the diſcharge of the aqueous humour thro' the puncture, the eye, being ſomewhat emptied, more readily admits of the depreſſion of the cryſtalline humour than when preſſed upon by the inſtrument.

As to the method of treating the ſucceeding inflammation,

mation, bleeding and other gentle evacuations are found abſolutely neceſſary.

§ 2. *Of cutting the Iris.*

There are two caſes where this operation may be of ſome ſervice; one when the cataract is from its adheſion immoveable; and the other when the pupil of the eye is totally cloſed up by a diſorder of the muſcular fibres of the iris, which gradually contracting the orifice, at laſt leaves the membrane quite imperforate. This laſt diſtemper has hitherto been deemed incurable. The adheſion of the cataract has alſo been conſidered as a ſpecies of blindneſs not to be relieved. But Mr Cheſelden has invented a method of making an artificial pupil, by ſlitting the iris, which may relieve in both the inſtances here ſtated.

In doing this operation, the patient muſt be placed as for couching, and the eye kept open and fixed by the ſpeculum oculi, which is abſolutely neceſſary here; then introducing the knife in the ſame part of the conjunctiva you wound in couching, inſinuate it with its blade held horizontally, and the back of it towards you, between the ligamentum ciliare and circumference of the iris, into the anterior chamber of the eye; and after it is advanced to the farther ſide of it, make your inciſion quite through the membrane; and if the operation ſucceeds, it will upon wounding fly open, and appear a large orifice, though not ſo wide as it becomes afterwards.

The place to be opened in the iris will be according to the nature of the diſeaſe: if the membrane itſelf be only affected with a contraction, the middle part of it, which is the natural ſituation of the pupil, muſt be cut; but if there be a cataract, the inciſion muſt be made above or below the cataract, though it is more eligible to do it above.

The contracted iris from a paralytic diſorder, is ſo often complicated with an affection of the retina, that the ſucceſs is very precarious in this caſe. This operation has anſwered beſt in adheſions of the cryſtalline humour, though but very ſeldom even there.

§ 3. *Fiſtula Lachrymalis.*

557 Varieties in the fiſtula lachrymalis.

The fiſtula lachrymalis is generally underſtood to be ſuch a diſorder of the canals leading from the eye to the noſe, as obſtructs the natural progreſs of the tears, and makes them trickle down the cheek. Although the ſeat of this diſeaſe is the ſame in almoſt every ſubject, yet its appearance is very different in different perſons, and under different circumſtances. Theſe variations depend principally on, 1. The degree of obſtruction in the naſal duct; 2. The ſtate of the cellular membrane covering the ſac; 3. The ſtate of the ſacculus itſelf; 4. That of the bone underneath; 5. The general ſtate and habit of the patient.

Sometimes a ſerous kind of defluxion, by which the lining of the ſact and duct are ſo thickened as to obſtruct or prevent the paſſage of the fluid through them into the noſe, makes the whole complaint; and the cellular membrane on the outſide not being diſeaſed, there is no appearance of inflammation. In this caſe the duct is ſtopped, and the ſacculus dilated, but without any alteration in the colour of the ſkin; a fulneſs appears in the corner of the eye next to the noſe; and upon the application of a finger to this tumour, a clear viſcid mucus is diſcharged through the puncta lachrymalia: the patient feels no pain, nor finds any inconvenience, except what is produced by the diſcharge of this mucus, and by the trickling of the lymph down the cheek.

In ſome caſes the mucus is not perfectly and always clear, but is ſometimes cloudy, and looks as if it had a mixture of milk or cream in it: at firſt waking ſome of it is generally found in the corner of the eye; and the eye-laſhes being ſmeared over with it during ſleep, moſt commonly adhere together in the morning.

This is the moſt ſimple ſtate of the diſeaſe, what the French have called the *hernia*, or *hydrops ſacculi lachrymalis*. It is frequently met with in children who have been rickety, or are ſubject to glandular obſtructions: and in this ſtate it ſometimes remains for ſome years, ſubject to little alterations, as the health or habit ſhall happen to vary, the ſacculus being ſometimes more ſometimes leſs full and troubleſome; the mucus which is preſſed out is ſometimes more ſometimes leſs cloudy, and now and then it is attended with a ſlight ophthalmy, or an inflammation of the eye-lids; but which, by common care, is eaſily removed.

If the ſacculus is not much dilated, the diſcharge ſmall, and produced only by preſſure, the chief inconveniences are the weeping eye, and the gumming together of the lids after ſleeping: but theſe, by being attended to, may be kept from being very troubleſome; and if the diſeaſe makes no further progreſs, may be ſo regulated as to render any more painful proceſs totally unneceſſary.

If the dilatation is conſiderable, the ſwelling is more viſible, and the quantity of mucus is larger; it is alſo in this ſtate more frequently mixt and cloudy, and more troubleſome, from the more frequent neceſſity of emptying the bag; but if the patient be adult, it may, even in this more dilated ſtate of it, be kept from being very inconvenient.

If an inflammation comes on, the tumour is thereby conſiderably increaſed, the diſcharge is larger, as well during ſleep as upon preſſure; the ſkin covering it loſes its natural whiteneſs and ſoftneſs, becomes hard, and acquires an inflamed redneſs; and with the mucus a mixture of ſomething, which in colour reſembles matter, is diſcharged, eſpecially if the preſſure be made with any force or continued for any time. This circumſtance, added to the painful ſenſation and inflamed appearance of the parts, has been productive of a ſuppoſition that in this ſtate there is either an ulcer or an abſceſs within the ſacculus or duct. This opinion, though it may poſſibly ſometimes have ſome foundation in truth, yet is in general entertained much too haſtily, and is alſo the principal ſource whence moſt of the miſtakes concerning this diſeaſe have ſprung; but as there is a certain criterion by which we may diſtinguiſh between pus and mucus, practitioners cannot now be liable to ſuch errors in this reſpect as formerly.

The inflammation of the cellular membrane covering the ſac is a circumſtance which makes a conſiderable difference both in the appearance of the diſeaſe and in its requiſite treatment; in ſome caſes it is confined merely to the ſurface of the tumour in the corner of the eye; in others it ſpreads ſtill farther, affecting the eye-lids, cheek, and ſide of the noſe.

When the parts are in this ſtate, the mucus within the bag has generally the appearance of being matter; that is, it wears a deep yellow colour, and is of a more thin conſiſtence: if the puncta lachrymalia are naturally large and open, and the inflammation confined to the ſurface of the ſac, its contents will paſs off pretty freely, and the ſkin will remain entire. This is what the ancients called the *ſimple* or *imperfect*, or *anchylops*.

But when the ſkin covering the lachrymal bag has been for ſome time inflamed, or ſubject to frequently returning inflammations, it moſt commonly happens that the puncta lachrymalia are affected by it, and the fluid, not having an opportunity of paſſing off through them, diſtends the inflamed ſkin, ſo that at laſt it becomes ſloughy, and burſts externally. This is that ſtate of the diſeaſe which is called perfect *Aigylops* or *Ægylops*: the diſcharge which uſed to be made thro' the puncta lachrymalia, while the ſkin was entire, is now made through the new opening, and, by excoriating the eye-lids and cheek, increaſes the inflammation, and gives the diſeaſe a much more diſagreeable appearance. In ſome, the matter burſts through a ſmall hole; and after it has diſcharged itſelf the tumour ſubſides, the neighbouring parts becomes cool, and though the ſkin covering the ſurface of the ſacculus is ſloughy and foul, yet there is no reaſon to believe that the ſac itſelf is much diſeaſed below. In others the breach is large, the ſkin remains hard and inflamed, and, from the appearance of the ſore, there is reaſon to ſuppoſe the whole inſide of the bag to be in a diſeaſed ſtate; and in ſome caſes which have been much neglected or irritated by ill treatment, the cavity of the ſacculus ſeems to be filled with a looſe ill-conditioned fungus, which gleets largely, and produces inflammation and excoriation of all the parts about.

558
In what caſes a caries of the bone attends this diſeaſe.

There is alſo another circumſtance which ſometimes is found to attend this diſorder, viz. a carious ſtate of the bones. This was by our forefathers ſuppoſed to be a frequent one, and was the principal reaſon for their ſo free uſe of cauſtic, cautery, and ſcalpra, in the treatment of it; but ſince the diſeaſe has been more minutely examined into, this circumſtance has been found to be a very rare one. When the fiſtula lachrymalis is a ſymptom of the lues venerea, as it ſometimes is, the bones are indeed often carious; but then the fiſtula is not the original complaint, but produced ſecondarily, and is a conſequence of the diſeaſed ſtate of the os ethmoides and oſſa ſpongioſa of the noſe, and is not curable by any local means or applications, but depends entirely on the cure of the diſeaſe of which it is a ſymptom.

An abſceſs after the ſmall-pox, by falling on the lachrymal bag, has made it all ſlough away, and leave the bones bare; which circumſtance alſo ſometimes attends the free uſe of ſtrong eſcharotics applied to deſtroy what is called the *cyſt*; but without the acceſſion of ſome other diſorder producing it, or the moſt abſurd method of treating the complaint, a caries of the bones will very ſeldom be met with. Indeed the combination of other diſeaſes, either of the general habit, or affecting the ſame or the neighbouring parts, does often make a very material difference, both in the appearance of the diſorder, in the prognoſtic, and in the proper method of treating it; which therefore ſhould always be inquired into. For inſtance, the patient is ſometimes ſubject to an habitual ophthalmy or lippitudo, which will add to the deformity, and give a good deal of additional trouble during the cure: an ozæna, or ſome other diſeaſe of the membrane and cells of the ethmoid bone, or a polypous excreſcence within the noſe, are now and then combined with it. The habit is ſometimes, as we have before obſerved, infected with the lues venerea, of which this diſeaſe may be a ſymptom: ſtrumous glandular obſtructions are its too frequent companions; and, what is worſt of all, it is ſometimes cancerous.

559
General heads under which this diſeaſe may be claſſed.

From what has been ſaid, we may divide this diſeaſe into four general heads or ſtates, under which all its leſſer diſtinctions may be comprehended. The firſt conſiſts in a ſimple dilatation of the ſacculus and obſtruction of the naſal duct, diſcharging upon preſſure a mucus, either quite clear or a little cloudy; the ſkin covering the bag being entire and perfectly free from inflammation. In the ſecond, the tumour is ſomewhat larger; the ſkin which covers it is in an inflamed ſtate, but entire; and the diſcharge made through the puncta lachrymalia is of a pale yellow or purulent colour. In the third, the ſkin covering the ſacculus is become ſloughy, and burſts; by which means the ſwelling is in ſome meaſure leſſened: but the mucus, which while the ſkin was entire uſed to be preſſed out through the puncta lachrymalia, now diſcharges itſelf through the new aperture. The ductus ad nares, both in this and the preceding ſtate, are not otherwiſe diſeaſed than by the thickening of its lining. In the fourth, the paſſage from the ſacculus lachrymalis into the noſe is totally obliterated, the inſide of the former being either ulcerated or filled up with a fungus, and attended ſometimes with a caries of the bone underneath.

560
How the diſeaſe in its firſt ſtate was treated by the ancients.

The ancients, who ſuppoſed this diſorder, in its firſt ſtate, to be an inflammatory defluxion from the brain on the caruncle, tending to ſuppurate, directed their firſt attention to prevent ſuch conſequence: for which purpoſe they employed phlebotomy, cathartics, iſſues, ſetons, collyria, and refrigerant applications of all ſorts; and theſe not ſucceeding, they had recourſe to ſuch as they thought would haſten the ſuppuration of the ſuppoſed abſceſs.

By the improper uſe of medicines of the latter kind, it frequently happened that the ſkin became inflamed and burſt: the diſcharge which neceſſarily followed this accident, together with the heated appearance of the parts about, confirmed their opinion of a collection of matter within; and, according to ſuch ſuppoſition, they attempted to obtain a cure by dilating the orifice, and endeavouring to make an incarnation from the bottom of the hollow. Not being acquainted with the ſituation or uſe of the naſal duct, they took no care to free it from the obſtruction under which it laboured; but, dreſſing the ſore like a common impoſthumation, permitted it either to be filled up with a looſe fungus, or to contract itſelf to a narrow fiſtulous orifice; which daily diſcharging a diſcoloured kind of fluid, and not healing by ſuch means as they made uſe of, they concluded the bone underneath was carious, and made way down to it, either by removing the parts with a cutting inſtrument, or by deſtroying them with cauſtic and cautery, intending to procure an exfoliation, and thereby a firmer baſis to heal on.

But ſince the uſe of the ductus naſalis has been known, ſince it has been diſcovered that an obſtruction in this is the primary and principal cauſe of the diſorder, and that what paſſed for the cavity of an abſceſs is really the ſacculus lachrymalis, both the intention of cure, and the means, have been conſiderably altered.

561 Methods of cure propoſed by the moderns.

In the firſt and moſt ſimple ſtate of the diſeaſe, viz. that of mere obſtruction without inflammation, much pains have been taken to reſtore the parts to their natural ſtate and uſe, without making any wound or diviſion at all; the introduction of a probe, the injection of a fluid, and a conſtant compreſſion made on the outſide of the ſacculus in the corner of the eye, are the principal means by which this has been attempted.

562 Of Mr Anel's probe and ſyringe.

Some few years ago, M. Anel made a probe of ſo ſmall a ſize as to be capable of paſſing from the eyelid into the noſe, being introduced at one of the puncta lachrymalia, and paſſing through the ſacculus and duct; with which probe he propoſed to break thro' any ſmall obſtruction which might be found in its paſſage. He alſo invented a ſyringe, whoſe pipe is ſmall enough to enter one of the puncta, and by that means to furniſh an opportunity of injecting a liquor into the ſacculus and duct; and with theſe two inſtruments he pretended to be able to cure the diſeaſe whenever it conſiſted in obſtruction merely, and the diſcharge was not much diſcoloured. The firſt of theſe, viz. the paſſage of a ſmall probe through the puncta, has a plauſible appearance; but will, upon trial, be found very unequal to the taſk aſſigned: the very ſmall ſize of it, its neceſſary flexibility, and the very little reſiſtance it is capable of making, are manifeſt deficiences in the inſtrument; the quick ſenſation in the lining of the ſac and duct, and its diſeaſed ſtate, are great objections on the ſide of the parts; ſuppoſing it were capable of anſwering any valuable end, which it moſt certainly is not.

That the paſſing a fine probe from one of the puncta lachrymalia into the noſe is very practicable, is known from experience; but the pain it gives, and the inflammation it often excites, are much greater than any benefit which does or can ariſe from it.

It is ſaid, that the principal uſe of this probe is to clear the little ducts leading from the puncta into the ſacculus, and the obſtruction of thoſe ducts is often mentioned as a part of this diſeaſe. Hence one would be led to ſuppoſe that it was a circumſtance which frequently occurred; whereas it is ſeldom, if ever, met with. Nor, even if it did happen, could it ever produce the diſeaſe in queſtion; the principal characteriſtic of which is a diſcharge into the inner corner of the eye upon preſſure made in the angle. This diſcharge is made from the ſacculus through the puncta, and proves that the latter are open. The paſſing a probe, therefore, through theſe, ſeems to be perfectly unneceſſary, ſince a ſtoppage of them would never give riſe to that diſeaſe, which conſiſts in an obſtruction to the paſſage of any thing from the ſac into the noſe, and not from the eye into the ſac.

The ſyringe, if uſed judiciouſly while the diſeaſe is recent, the ſac very little dilated, and the mucus perfectly clear, will ſometimes be found ſerviceable; it gives no pain; and a few trials render the uſe of it very little troubleſome.

563 The ſcrew of Aquapendente.

Fabricius ab Aquapendente invented an inſtrument, which was ſo contrived, as by means of a ſcrew to make a preſſure externally on the lachrymal bag; from the uſe of which, he ſays, his patients received much benefit. This inſtrument has been conſiderably improved by late practitioners, and is ſtill recommended as very uſeful.

All the good that can be obtained by compreſs and bandage, this ſcrew is capable of procuring; but it is alſo ſubject to all the ſame inconveniences, ariſing from the impoſſibility of determining exactly the due degree of preſſure: for if it be ſo great as to bring the ſides of the upper part of the ſac into contact, all communication between it and the puncta will be thereby ſtopt; if it be but ſlight, the accumulation will not be prevented; nor does it in either caſe contribute to the removal of the obſtruction in the naſal duct, the primary and original cauſe of the diſeaſe.

If the curative intention was to procure an union of the ſides of the ſacculus, as in the caſe of parts ſeparated from each other, by the formation of matter or ſloughs, and the preſſure could be made uniformly and conſtantly, poſſibly it might be ſo managed as to anſwer a valuable purpoſe; but as that is not the intention, the preſſure, whether made by an inſtrument, or by a common roller and compreſs, contributes little or nothing toward a cure.

564 Of introducing a probe within the noſe.

Beſides theſe means of attempting a cure without inciſion, the gentlemen of the French academy have tried ſome others, ſuch as the introduction of a probe into the lower part of the naſal duct within the noſe, the injection of a fluid by the ſame orifice, the paſſing a ſeton from the punctum lachrymale ſuperius through the ſacculus and duct and out at the noſtril, there to remain till the cure is completed: and for thoſe purpoſes they have invented and given figures of a number of probes, ſyringes, and many other inſtruments, which, they ſay, have been very ſucceſsfully uſed; though others have not found them to anſwer the purpoſe.

When the diſeaſe is got beyond the ſimple ſtate juſt deſcribed, that is, when the parts round about are much or conſtantly inflamed, or the ſkin covering the tumour is burſt, there is ſomething more to be done if a cure is intended.

564 When it is neceſſary to open the ſacculus.

In this ſtate, an opening in the upper part of the ſacculus lachrymalis becomes in general abſolutely neceſſary; and as a wound made by a knife leaves a much leſs diſagreeable ſcar than that which neceſſarily follows the burſting of the ſkin, one being a mere ſimple diviſion, the other a loſs of ſubſtance; it will always be found beſt to anticipate the accident of burſting, by making the opening as ſoon as the integuments are in ſuch a ſtate as to threaten it.

For the making this inciſion, authors have been very very particular in their directions with regard to its place, manner, and form. They have ordered it to be ſemilunar, having its concave part toward the eye, and that the point of union of the lids ſhould be exactly oppoſite to the centre of the inciſion. This lunated figure was calculated to correſpond with the courſe of the fibres of the orbicular muſcle, upon a ſuppoſition that a tranſverſe ſection of them would produce an inverſion of the lower lid, an effect which never follows: all that the ſurgeon need obſerve is, to take care to keep the knife at a proper diſtance from the juncture of the palpebræ, to begin the inciſion a very little above a line drawn from that juncture toward the noſe, and to continue it downward; its form may full as well be ſtraight as any other, and the beſt inſtrument to make it with is a ſmall crooked biſtory.

If the ſacculus is already burſt, the place of opening is determined; and the orifice may be enlarged with a knife, or dilated.

The inciſion made, the ſacculus ſhould be moderately diſtended, either with dry lint or a bit of prepared ſponge; by which means an opportunity will be gained in two or three days of knowing the ſtate of the inſide of the ſac, and of the ductus naſalis: if the former is neither ſloughy nor otherwiſe diſeaſed, and the obſtruction in the latter but ſlight, it ſometimes happens, that, after a free diſcharge has been made for ſome days, and the inflammation occaſioned by the firſt operation is gone off, the ſac contracts itſelf, a ſuperficial dreſſing, with moderate preſſure, heals the ſore, the lachrymal fluid reſumes its wonted courſe, and the diſeaſe diſappears.

565
Of dilating the paſſage into the noſe.

If this ſimple method does not ſucceed, or from the ſtate of the parts ſeems unlikely to do ſo, another muſt be tried, which the opening already made will enable us to put in practice. The point to be aimed at is, if poſſible, to render the naſal duct pervious to the lachrymal fluid; and we muſt endeavour to obtain this end by ſuch means as give the leaſt pain, excite the leaſt inflammation, and leave the parts as near as poſſible in their natural ſtate; that is, we are to endeavour to dilate the paſſage from the ſac to the noſe, by ſome means which will gradually diſtend it without deſtroying its texture, in the ſame manner as the dilatation of the urethra ought to be effected in the caſe of ſtrictures, by paſſing either a probe, or a piece of catgut, or a bougie, gently into it, as far as it will eaſily go, and repeating it occaſionally, until it is got quite through, and the paſſage is free (A).

When a paſſage has been once obtained, it ſhould be carefully kept open, either by a piece of catgut, a ſmall bougie, a leaden probe, or ſomething of that ſort; and when it is thoroughly eſtabliſhed, the ſore may be permitted to contract, until it becomes no more than what ſerves for the introduction of the bougie into the duct; in this ſtate it ſhould be kept open for ſome time, injecting now and then a little aqua calcis, ſoftened with mell. roſar. through from above into the noſe; and when it appears that the paſſage is ſo free and ſo well eſtabliſhed that there is good probability of its preſerving itſelf, the orifice in the angle of the eye, by being covered only by a ſuperficial bit of plaſter, or pledgit, will contract and cloſe; and if during its cloſing moderate preſſure be uſed on the ſacculus, to prevent a freſh accumulation of mucus, it will aſſiſt the cure.

566
Of making an artificial paſſage.

The laſt ſtate of this diſorder is that in which the natural paſſage from the ſacculus to the noſe is ſo diſeaſed as to be quite obliterated, or in which the bones are ſometimes found to be carious. The methods hitherto deſcribed have all been calculated to preſerve the natural paſſage, and to derive the lachrymal fluid again through it: in this attempt they are ſometimes ſucceſsful; but when they are not, there is no chirurgical means left, but to attempt the formation of an artificial one in its ſtead. The upper and hinder part of the ſacculus lachrymalis is firmly attached to the os unguis, a ſmall and very thin bone juſt within the orbit of the eye; which bone is ſo ſituated, that, if it be by any means broken through or removed, the two cavities of the noſe and of the orbit, communicate with each other; conſequently the os unguis forms the partition between the hinder part of the lachrymal bag, and the upper part of the cavity of the noſe; and it is by making a breach in this partition that we attempt the formation of an artificial paſſage for the lachrymal fluid.

To make this opening, many different inſtruments have been deviſed, and uſed; a large probe, an inſtrument like a common gimblet, a curved trocar, &c. each of which, if dexterouſly and properly applied, will do the buſineſs very well: the one neceſſary caution is, ſo to apply whatever inſtrument is uſed, that it may pierce through that part of the bone which lies immediately behind the ſacculus lachrymalis; and not to puſh up too far into the noſe, for fear of injuring the os ſpongioſum behind, while it breaks its way.

567
Mr Pott's method.

Mr Pott prefers the curved trocar, which has ſerved his purpoſe well, and from which he never experienced any inconvenience. In uſing it, the point ſhould be turned obliquely downward, from the angle of the eye toward the inſide of the noſe; the accompliſhment of the breach will be known by the diſcharge of blood from the noſtril, and of air from the wound upon blowing the noſe. The moſt preciſe direction in this part of the operation will be of but little uſe to him who has no idea of the natural ſtructure and diſpoſition of the parts concerned, and who ought therefore to get ſuch information as ſoon as he can: but whoever is at all acquainted with this matter, or will attend to the ſituation and connection of the os unguis, knows that this bone is divided into two parts by a perpendicular ridge; that the lachrymal ſac is connected to all that part which is anterior to this ridge; and that the poſterior part of the bone contributes to form the orbit of the eye, and has little or no connection with the lacrymal ſac. The trocar muſt be applied therefore to that part of the bone which is anterior to the ridge, and conſequently behind the lacrymal bag; by the paſſage of the inſtrument, all this part of the bone will in all probability be broken, but from which no miſchief will enſue.

568
How to keep it open.

As ſoon as the perforation is made, a tent of lint ſhould be introduced, of ſuch ſize as to fill the aperture, and ſo long as to paſs through it into the cavity of the noſe: this ſhould be permitted to remain in two, three, or four days, till the ſuppuration of the parts renders its extraction eaſy; and after that a freſh one ſhould be paſſed every day, until the clean granulating

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(A) This caution is very neceſſary to be obſerved in the cure of ſtrictures of the urethra; in which caſe the proper intention is, gradually to dilate the paſſage, and to procure an increaſed diſcharge of mucus from the lacunæ: this ſhould always be done gently, and by means which give as little pain as poſſible; whatever irritates or gives pain will certainly do miſchief, will add to the obſtruction, and increaſe the dyſury.

lating appearance of the ſore makes it probable that the edges of the divided membrane are in the ſame ſtate. The buſineſs now is to prevent the incarnation from cloſing the orifice, for which purpoſe the end of the tent may be moiſtened with ſpir. vitriol. ten.; or a piece of lunar cauſtic ſo included in a quill as to leave little more than the extremity naked, may at each dreſſing, or every other or every third day, be introduced, by which the granulation will be repreſſed, and the opening maintained: and when this has been done for ſome little time, a piece of bougie of proper ſize, or a leaden canula, may be introduced inſtead of the tent; and, leaving off all other dreſſing, the ſore may be ſuffered to contract as much as the bougie will permit, which ſhould be of ſuch length that one extremity of it may lie level with the ſkin in the centre of the eye, and the other be within the noſe.

The longer time the patient can be prevailed upon to wear the bougie, the more likely will be the continuance of the opening; and when it is withdrawn, the external orifice ſhould be covered only by a ſuperficial pledgit or plaſter, and ſuffered to heal under moderate preſſure.

569 Of introducing a metal canula.

There is another method which has been much recommended by ſome French writers, to prevent the cloſing of the opening in the os unguis, and which is now generally approved in this country; namely, to introduce a canula either of gold or ſilver, or lead, into the aperture, and to permit the ſore to heal over it, ſuffering the canula to remain, or to come away by the noſe.

570 Mr Wathen's directions.

Mr Wathen, who has written a treatiſe on this ſubject, generally makes uſe of gold; becauſe moſt eaſy to be procured in a ſtate of perfect purity, which is a quality firſt to be regarded, whatever the metal be: and he prefers this or ſilver to lead, chiefly on account of their firmer texture, which muſt render a tube made of either of them leſs liable to be affected by any preſſure it may receive. The tube is ſomewhat conical, to prevent its deſcent into the noſe; and it is made ſufficiently long, to reach from the upper portion of the bony duct, to its aperture below the os ſpongioſum.

To introduce it more eaſily, it is furniſhed with a ſtyle, nearly as long as a common probe; the lower end of which is rounded, ſo as that, paſſing through the tube, it may exactly fill the aperture at the ſmall end: and it is prevented from paſſing further, by a ſhoulder of the ſame ſize with the outſide of the tube.

The tube is held upon the ſtyle by a doubled thread, which paſſes through a ſmall hole on the one ſide of its upper or larger aperture, and is continued to a ring at the upper end of the ſtyle. By faſtening this thread to the ring, the ſtyle and tube become one inſtrument, capable of being introduced and extracted at pleaſure, and poſſeſſing all the power of a probe.

By means of this, the operator may be enabled to examine the ſtate of the diſeaſe, and to judge with the greateſt preciſion of the diameter of the duct, and conſequently of the proper ſize of the tube. For as the duct in perſons of different ages, &c. will vary both in the diameter and length, there muſt on this account be a proportional difference in the tube: and the operator ſhould therefore be furniſhed with ſtyles and tubes of ſeveral different ſizes.

The neceſſity of paying a cloſe attention to the ſize of the tube is apparent. For if it be too large, it cannot be introduced; and if too ſmall, it will be liable to ſlip, if not paſs, through the lower aperture of the duct into the noſe. If, again, it riſes too high, it may preſs againſt the ſides of the ſac, and thus cloſe the orifice through which the tears ſhould paſs. If, on the other hand, it comes down too low, it will project beyond the inferior extremity of the duct, and may produce a very troubleſome titillation. When the tube is found exactly to fit, the thread, which was paſſed through the ring at the upper end of the ſtyle, being tied in a knot, at about the diſtance of an inch from the top of the tube, the longer portion of it, above the knot, is to be cut off. By this the ſtyle will be diſengaged, ſo that it may be extracted with eaſe, leaving the tube behind, with the thread hanging out of the wound.

When the tube is fixed, ſome ſimple liquor is to be paſſed by a ſyringe through it into the noſe, as a proof of its being ſo placed that it will anſwer the intended purpoſe. The opening made in the ſac might be entirely cloſed within the ſpace of a few days, if it was not thought proper to leave the thread in. When it has continued there about a week, if the tears abſorbed by the puncta are conveyed by the tube to the noſe, the thread, which is double, may then be extracted, by cutting one ſide of it with the ſciſſars, and drawing the other out. The little orifice thro' which the threads paſſed will be cloſed in the ſpace of a day. And thus a diſorder, which had continued for months, and perhaps years, may be perfectly cured within the ſhort ſpace of a week.

Sect. XVIII. *Of Amputation.*

In this operation the great end to be aimed at is, the procuring of a handſome ſtump, in which the bone may not protrude, but be well covered with fleſh; ſo that no excoriation or rawneſs may be apt to take place, as is too frequently found to be the caſe after amputation has been performed in the common manner. As long ago as the year 1679, it was propoſed by Jacob Young, an Engliſh ſurgeon, in a treatiſe intitled *Currus Triumphalis ex Terebinthino*, to preſerve a flap of fleſh and ſkin, which was to be folded over the bone, and which, uniting to the parts of the wound after amputation, would effectually cover the bone, and prevent the inconveniences abovementioned. No traces of the ſucceſs of this method, however, can be found till the year 1696; when a Latin diſſertation was publiſhed upon it by P. Adrians Verduin, an eminent ſurgeon in Amſterdam. The moſt ſanguine expectations were formed of its ſucceſs; and it was even thought that the flap would prevent the neceſſity of tying up the blood-veſſels. However, it does not appear that the method as at that time practiſed, either did or could ſucceed; and accordingly it was entirely laid aſide, till lately that it has been revived with conſiderable improvements.

§ 1. *Of Amputating the Leg.*

In Verduin's method of amputation, the rule was, 571 Method of determining the quantity of fleſh neceſſary to be left for a flap.

to cut away the fleſhy parts to the tendo achillis; and after ſawing through the bone, if the flap was too big, it again ſuffered a ſecond inciſion. To keep this flap united to the bare bone, he contrived a variety of ſtraps and machines, highly embarraſſing to the operator, and painful to the ſick. But Mr O'Halloran, having demonſtrated that the attempting an union of theſe parts before ſuppuration was the true cauſe of this operation's failing of ſucceſs, and willing to determine the preciſe quantity of fleſh neceſſary to be taken off in the flap-operation, found that 15 inches might be conſidered as a medium ſtandard of the circumference of a man's leg; the diameter of which (ſuppoſing it a complete circle) would be about $4\frac{3}{4}$ inches, which appeared to him neceſſary to be preſerved below the amputated part, in order to form a flap ſufficient to cover the ſtump. But as this great length of fleſh would make the operation practicable but in a few caſes, he began to conſider of ſome conciſer means. After ſawing ſome tibiæ at the uſual place of amputation, and meaſuring the diameter of the two bones together, he conjectured, that about $3+\frac{1}{2}$ inches, might be admitted as a general ſtandard of adults. If, then, an oblique ſection be made of the ſkin and muſcles, at about three inches, or at moſt three and an half, below the part to be amputated, and continued in a ſloping direction till it reaches the bone, at the place of exciſion; by a circular inciſion of the remainder of the fleſh and ſkin at this part, we ſhall preſerve flap enough to cover the ends of the bones. By this means ſurgeons will be enabled to perform this operation, in every caſe where amputation becomes neceſſary; and it will be then found as expeditious as the method of the double inciſion, and attended with no more pain.

After a trial on a body, he found the flap a little ſhort, on account of the thickneſs of the gaſterocnemii muſcles; but upon repeating his experiment on another body, and having firſt carefully drawn back as much ſkin as he could, a flap of $3+\frac{1}{2}$ inches anſwered exactly, allowing for the melting down of the corpus adipoſum, and cellular ſubſtance of the muſcles, by ſuppuration, as leſſening conſiderably the bulk of fleſh, though not the length of the flap. This rule ſhould not be deemed infallible; becauſe, where the limb is extenuated, a leſs quantity of ſkin will ſuffice to cover the extremities of the bones than where the parts are turgid and full. He has ſince found, that beſides the previous drawing up of the ſkin, if in the circular tour care is taken to ſave ſome ſkin in the anterior part of the leg, which is eaſily done by drawing it back during the inciſion, a flap of three inches will certainly anſwer. This operation he performed three times ſucceſsfully in the courſe of eight months, and never meaſured the quantity of fleſh he intended to preſerve, but with the eye; however, in a week after each operation, he was curious enough to meaſure the particular flaps. The firſt meaſured $3+\frac{1}{2}$ inches without, from the extremity of the flap to the place of the circular inciſion; and $2+\frac{1}{4}$ from the internal edge of the flap to the bone; and this flap was found ſufficient to cover the extremity of the ſtump, though a good-ſized leg; and that the circumference of it meaſured 14 inches. In the ſecond caſe, the flap meaſured from without, three inches; and internally, not quite two. This woman's leg was ſmaller than the firſt patient's, but both bones were rather larger and much more firm. The periphery of this ſtump was twelve inches. In the third inſtance, the leg was burnt ſo high up, that no greater flap could be allowed than two inches and one-fourth, and from within it meaſured $1+\frac{1}{2}$ inches; and yet this ſtump was alſo completely covered with a good cuſhion of fleſh and ſkin. The limb was greatly extenuated, and the circumference of the ſtump was not quite ten inches. Upon the whole, then, he conjectured that the difference between 3 and $3+\frac{1}{2}$ inches of a flap, will take in moſt legs; i. e. in adults, that it ſhould be ſeldom under 3, nor ever exceed $3+\frac{1}{2}$ inches.

572 Method of performing the operation.

Theſe neceſſary details premiſed, where the neceſſity of taking off a leg is manifeſt, let the hair be ſhaved off from the knee to where the limb is to be taken off, which will ſave the patient a good deal of trouble in the dreſſings. The ſkin ſhould then be drawn up pretty tight; and let a ſmall band moderately rolled up, and ſewed from its outſide folds to the centre of an open roller, of about two inches broad and a yard long, be placed in the ham, over the artery; and with the open one going round the knee, let it be thus firmly ſecured. If one ſide of the open band is perforated, ſo as to make it a kind of uniting band, it will roll ſmoother. Then with Petit's or the common tourniquet, let the artery be ſufficiently compreſſed. On this occaſion Mr O'Halloran prefers the common one; becauſe, by its uniform preſſure round the limb, leſs blood is loſt than in the ordinary way. The difference, nevertheleſs, is not of ſo much conſequence as to give one an abſolute preference to the other: the choice, therefore, may be ſafely left to the option of the ſurgeon. The patient ſhould be placed on a chair, or low table, of about two feet high, as the leg muſt have ſome degree of elevation. All the apparatus being properly diſpoſed, which conſiſt of a ſtraight edged knife, with the blade as long as that of the common cateline, and pointed at its extremity, the common amputating knife, ſaw, and a few needles armed with flat threads, waxed, of different ſizes. Let the leg be elevated about a foot higher than if in an horizontal poſture; and with ſtrong tape of about an inch broad, let it be bound round pretty firm at the intended place of exciſion; and if at this time he lies in a reclining poſture, the raiſing the leg will be the more eaſy.

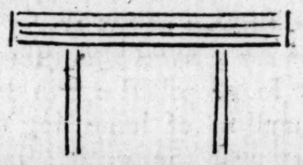
Mark with a pen the traces where you are to commence your inciſion, which ſhould be, in adults at leaſt, three inches from where the bone is to be ſawed. Then with the ſtraight inciſion-knife, make an oblique ſection from this point almoſt or quite to the bone, ending at your tape: then with this ſame, or the common amputating knife, let the circular inciſion of the remainder of the fleſh be expeditiouſly performed. To do this firſt part of the operation with greater eaſe to yourſelf and advantage to the patient, you muſt be careful, if the left leg be the part diſeaſed, to place yourſelf between his legs; and if the right, to be outſide the limb. The reaſon of theſe ſituations is very obvious; for you cannot with the right-hand command an exact ſight, or commence your operation dexterouſly, but in theſe poſtures. This done, apply a ſplit cloth, the two tails of which ſhould croſs over the tibia, and with the ſingle one draw back the flap. Though ſome operators do not approve of the ſplit cloth in the common

mon method, yet here it is eſſentially neceſſary: for this purpoſe the tape ſhould be firſt removed. Any little undivided fleſh may be now ſeparated by the cateline; the perioſteum divided round about, and ſcraped upwards, agreeable to the advice of profeſſor Monro; and the ligamentum interoſſeum divided. The next thing to be done is to ſaw the bones; but whatever be your poſition in dividing the ſoft parts, you muſt be always between the legs to cut away the bones. As ſoon as you have marked the traces of the ſaw on the tibia, run it along both bones, very light and nimble; and continue this manœuvre till the bones are divided. By this means the teeth of the ſaw will not be entangled in the bones, nor you often obſtructed in your motion; but the divided bones will be ſmooth, and the operation expeditious.

573 Of tying up the blood-veſſels.

The limb being taken off, the tourniquet muſt be relaxed, and the tibialis anticus, poſticus, and interoſſeus arteries, carefully taken up. Where the fleſh was thin, and not very firm, Mr O'Halloran has ſometimes made a ligature round the bone in which the artery was included: but if you uſe, inſtead of the ligature of the veſſels, the agaric or lycoperdon, which, our author thinks, may be ſafely depended on in the leg and fore-arm, you muſt be careful that the fungus does firmly adhere to the veſſels before you dreſs up the ſtump; as alſo that it be not removed during the laſt period. As for the veſſels that ſpread themſelves on the gaſterocnemii and ſolæus muſcles in this operation, the taking them up becomes neceſſary. The blood being carefully maſtered, which you will know by relaxing the tourniquet for ſome time, and no blood ſpurting out, you are then to dreſs the ſtump thus. Let the the tibia be covered with a pledgit of dry lint, and the reſt of the ſtump with ſoft lint, looſe, and ſtrewed with fine flour. In the thigh and arm, beſides the ſuture, he generally applies ſome lycoperdon to the extremities of the principal veſſels; the ſame may be alſo done in the preſent caſe, if the ligature has been uſed. He particularly recommends it to the ſpace between the tibia and fibula; becauſe it ſometimes happens that the interoſſeus artery ſhrinks between the bones; and though no appearance of an hæmorrhagy at preſent happens, yet in a few hours it may return. The poſſibility of this accident juſtifies the precaution. The flap is likewiſe to be dreſſed with ſoft looſe lint, and a cloth cut in form of a double T, and covered with adheſive plaſter, is to cover the dreſſings. Its figure is thus:

574 Of the dreſſings.



The long one is to ſurround the ſtump above the amputated part, whilſt the tails, by croſſing the flap, preſs it againſt the ſtump, and make all the dreſſings the more compact. This done, an hog's bladder moiſtened and notched is to incloſe the ſtump; but previous to this an handful of lint is to be applied between the outſide of the flap and the bladder: preſs this laſt to the ſtump; and the notches covering each other above make the whole dreſſings ſmooth, and the preſſure ſoft, and ſuch as is beſt calculated to prevent an hæmorrhagy. Let a croſs compreſs, moiſtened, cover the bladder; and then with a band, of between eight and nine yards long, and near three inches broad, rolled up to two heads, ſecure your dreſſings thus:

After removing the tourniquet and other bands uſed antecedent to the operation, an handful of ſoft lint ſhould be applied to the ham; which, in the circumvolutions of the band here, greatly reſtrains the violence of the blood; for as this is the moſt troubleſome and alarming ſymptom, and the moſt reproachful to the ſurgeon, all theſe precautions are juſtifiable. With one of the heads of your band make three circulars above the knee moderately tight; then with the ſame deſcend, and make two or three turns below the knee, rather ſmooth than tight; and then mount obliquely till you get above the knee, and here make a circular turn. Let the other head of the band go ſtraight down from the poſterior and inferior part of the thigh over the flap, and above the knee anteriorly; which will become here ſecured by a circular turn of the other head over it. Let the other head again croſs the ſtump and flap from the inſide of the thigh, and aſcend at its outſide above the knee, and here be again ſecured by a freſh circular turn of the other head. Croſs over the ſtump again between theſe folds, ſo as to form on the flap a kind of ſtar of ſix points; and this fold becomes alſo ſecure by a new turn of the other. Let the remainder of both bands be then diſpoſed of round the thigh at pleaſure, or cut off.

575 Treatment of the patient after the operation.

The ſtump being dreſſed, let the patient be laid on his bed, and a pillow put under the thigh, ſo as to raiſe that part. Let the patient be kept to a proper diet: but in this point it is impoſſible to fix any criterion; for regard muſt always be had to the patient's uſual manner of living, what is high diet to one being inſufficient to preſerve the life of another. And on this ſingle point the ſucceſs of many a cure plainly depends. In general, young people of plethoric habits ſhould be kept low; thoſe advanced in years, or whoſe conſtitutions are otherwiſe impaired, ſhould live freer. Some bleed on the commencement of the fever: but this ought to be avoided, except the fever is high, or the ſubject full of blood; becauſe without a fever there can be no ſuppuration, of courſe no tendency to recovery. In general, the firſt opening of the ſore ſhould not be for four or five days, according to the ſeaſon or ſymptoms. This ſhould be done, by firſt ſoftening the dreſſings in warm water, and removing only as much of the lint as comes off looſe and eaſy. Let the whole part be then covered with pledgits, armed with proper ointment, and ſecured by the double T plaſter, with the compreſs and bandage already deſcribed. The flap and the ſtump, at every dreſſing, are to be regarded as diſtinct ſores, and ſeparately dreſſed. If the diſcharge is ſmall, it may be promoted by ſtuping the ſtump with ſponges preſſed out of very hot water, by the common digeſtive, and the like. If abundant, it may be leſſened by doſſils of lint wet in brandy or tincture of myrrh, or by dry lint alone, which is an excellent abſorbent: the bark, in ſubſtance, will alſo greatly reſtrain it; often a pill or two of calomel. In general, an abundant ſuppuration will promote a ſpeedy coalition; whereas, when ſlow, it will be more tedious.

About the 12th day, then, that is, when inflammation is entirely paſſed, and ſuppuration effectually eſtabliſhed, the bare flap may be turned up againſt the naked ſtump, and ſo be ſecured by plaſter, compreſſion, and bandage. Inſtead of the bandage already deſcribed, our author on this occaſion uſes one compoſed of a ſtrip of ſtrong cloth to go round the knee; and to the centre of this is fixed another, which, croſſing from under the ham, the ſtump is ſecured to the circular above the knee by means of four or five pieces of tape attached to this laſt. The ſore ſhould not be opened for at leaſt two days after this, and the dreſſings taken off with great caution. He often bathed this part very hot; and though the flap ſhould in part ſeparate, yet muſt it again and again be returned until the parts firmly unite. The little ſore which the flap does not cover ſhould be dreſſed with lint and brandy. Soon after the union of the flap and ſtump, the former ſometimes inflames; but a relaxing ſtupe, and a poultice of flummery, ſoon removes this. At every dreſſing of the remaining little ſore of the fleſh, the ſtump may be bathed in bran and water hot, which will greatly accelerate healing. Though after 15 or 16 days the cure may be finiſhed by any common nurſe, yet do the parts remain tender for ſome days longer. By the diſſection of one of his patients, who died many months after this operation of a malignant ſmall-pox, our author found it was occaſioned by the extremities of the bones not being completely healed: ſo that what he then thought a diſadvantage to this operation, appears now to be one of its greateſt excellencies; namely, that the bones ſhould be fairly covered by a firm perioſteum; which at the ſame time accounted for this phænomenon.

§ 2. *Of amputating the Thigh.*

576
Of the quantity of flap neceſſary to be preſerved in amputating the thigh.

To attempt this operation, by preſerving a flap of fleſh in the poſterior and inferior part of the thigh, muſt leave ſo large a fleſh-wound, and ſo great a quantity of muſcular fleſh bare, as to require a very great length of time to bring on a firm union of the divided parts: beſides, the fever, and great diſcharge from ſo large a ſurface, may alone endanger the patient's life. Mr O'Halloran, after a variety of trials, concluded, that a flap of fleſh and ſkin preſerved in the anterior part of the thigh, muſt anſwer our moſt ſanguine expectations: for the quantity of fleſh here is not much, the ſkin, corpus adipoſum, and rectus muſcle, being only intereſted in the inciſion; of conſequence the wound not conſiderable, and the flap not required very large. Our author attempted to determine, on a dead body, the quantity of flap neceſſary to be preſerved in this manner. The circumference of the thigh, at four inches from the inferior part of the rotula, meaſured eighteen inches. Here he drew up the fleſh, and bound it by a ſmall band. He then began a flap-inciſion on the rotula, bringing it up to the circular band, and here ſawed through the bone, having firſt cut through all the intervening fleſh. The preſerved flap meaſured three inches externally, and two and an half from the circular inciſion of the fleſh to its internal extremity. The diameter of the femur, in its loweſt axis, or nearly from ſide to ſide, was exactly an inch and one-tenth; and yet this flap, beſides completely covering the bone, extended an half inch beyond it. By this plain and ſimple experiment, it appears, that the flap-operation in the thigh, by making your inciſion in its anterior part, becomes leſs complex, leſs painful, and even more expeditious in its cure, than the ſame operation in the leg. After determining on the preciſe place on which the limb is to be taken off, care muſt be taken to have the blood-veſſels maſtered in the operation, either by Petit's or the common tourniquet, as in the uſual manner: then let the fleſh and ſkin be tightly drawn up from the knee, and ſo ſecured above the place of election by a circular tape or band. Mr Gooch propoſes a kind of thick circular cuſhion to ſerve inſtead of this band, to direct the knife exactly in the circular tour; but Mr O'Halloran thinks that a thick tape will anſwer this purpoſe every bit as well, as this operation is moſtly exactly even, and that the cuſhion rather hides the direction of the knife from the eye. With a ſtraight knife, ſuch as has been deſcribed in taking off the leg, commence your flap-inciſion at about three inches more anteriorly than where the bone is to be ſawed through, ſuppoſing an adult, and ſo in proportion to the age and ſize of the limb. Let this inciſion be continued in an oblique direction till you reach the bone at the circular tape; then with the ſame, or a common amputating knife, make your circular ſweep, commencing from the ſide of the flap and directly to the bone; obſerving here, as in the leg, to place yourſelf outſide the body in taking off the right thigh, and between the legs in removing the left. But then there is no neceſſity here, as in the leg, of change of place in ſawing the bone; becauſe, as it is but one, wherever you place yourſelf to cut off the ſoft parts, there you may ſtay to finiſh the operation.

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Of dreſſing the ſtump.

As ſoon as the circular inciſion is completed, the tape ſhould be removed and the ſplit cloth croſs the divided parts, in order to draw up the ſkin and muſcles, the ſingle tail covering the flap; and as ſoon as the perioſteum is ſeparated, &c. let the bone be ſawed. The femoral artery ſhould be ſecured as already directed; and beſides this ligature, let ſome agaric or lycoperdon be applied: and any other conſiderable branches of veſſels may be taken up or ſtopt by the above funguſes. Let the ſurface of the ſore be covered with looſe unformed lint ſtrewed with flour, and the flap laid over this dreſſing covered by a double T plaſter; an handful of lint outſide this, gently preſſed againſt the flap by an hog's bladder, moiſtened and notched at its orifice; and the whole covered by a croſs compreſs. Let ſoft lint, tow, or a linen compreſs, cover the direction of the artery; and ſecure all theſe dreſſings on by a band about three inches broad, and twelve yards long, rolled up in two even heads. Apply a large handful of looſe lint or ſoft tow over the femoral artery near the groin; and after making a couple of circulars about this part, moderately tight, ſo as to break in ſome meaſure the force of the circulating fluid, let the bands croſs round the body. Fix a piece of ſtrong tape, about an inch or more broad, and a yard long, along the inſide of the amputated thigh, one end of which is to be ſecured to the band that went round the body, and the other to hang looſe over the ſtump: let a ſimilar piece of tape be in like manner fixed to the outſide of the thigh: then, with one of the heads of your bandages, make three or four circulars round the thigh over theſe tapes, gently deſcending;

ſcending; and with the other head croſs directly over the anterior part of the thigh and ſtump, and aſcend poſteriorly: a couple of circulars of the other head, gently aſcending, will ſecure it ſmooth and firm. Deſcend again over the inſide of the thigh, croſs the ſtump, and mount with your firſt band outſide the thigh; and here another circular or two makes this ſecond turn firm. Between the anterior and lateral turns of the band you muſt bring down your roller croſs the ſtump, and aſcend in the oppoſite direction: and here, again, a couple of circulars of the other roller will make all firm. Between the poſterior and lateral parts of the band you muſt make a fourth turn over the ſtump, and ſecure it by another circular, and finiſh both heads by circulars or ſpiral turns round the ſtump; or if too long, they may be cut off. Though the ſtump be now apparently well bound, yet, by reaſon of the form of the thigh, the bands may be apt to looſen, or even drop off: to prevent this, let the tapes already mentioned be turned up at their looſe extremities; the inſide one to croſs over the inſide of the thigh, and, as it aſcends, to be here and there ſecured by pins to the circulars, and to part of the band that went round the body; and in like manner the outſide tape. By this means the circular turns, which only could looſen, will be ſmoothly retained in their different places, and the whole bandaging convenient, firm, and even. The bandaging, however, ſhould be but moderately tight, as the ſwelling of the ſtump will ſoon make them ſufficiently diſtended.

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§ 3. *Of amputating the Arm.*

580 In amputating the thigh, we have, for very obvious reaſons, choſen to taken the flap from its anterior part, as being a leſs conſiderable wound, having leſs of ſubſtance, and of courſe ſooner covering the bone, the principal object of all. For preciſely the ſame reaſons, in taking off the arm, the flap of fleſh ſhould be taken from its poſterior part, as being leſs fleſhy, and nearer the bone: here a flap of fleſh, from two and half to three inches, will be certainly ſufficient to cover the bone. The bandaging here muſt be pretty nearly the ſame as in the thigh; though, as the arm is almoſt cylindrical, ſome may think it unneceſſary to croſs the band round the body, as it might be apt to heat and oppreſs the patient. But if this ſhould be thought proper to be diſpenſed with, a flat tape ſhould from the neck hang down each ſide of the arm, the bandaging to be performed over it, and the two extremities of it turned back, pinned to the circulars, and ſo firmly ſecured to the neck-band. The union ſhould be attempted about the eleventh day.

§ 4. *Of amputating the Fore-arm.*

578 To take off the fore-arm, we muſt look for the flap in its external part, as having leſs to cut through; but above all, as by this means you avoid bringing in that groupe of tendons which cover the inſide of the fore-arm. Here from an inch and an half to two inches will be undoubtedly ſufficient to cover the bones; but then in the inciſion you muſt comprehend the full breadth of the fleſh and ſkin on the back of the fore-arm. The dreſſings and bandaging will be eaſily comprehended from what has been already ſaid; and about the tenth day you may attempt an union of parts.

SECT. XIX. *The Method of opening a dead Body.*

579 SURGEONS are often called on this occaſion, in order to inveſtigate the cauſe and ſeat of diſeaſes and death, either by the relations of the deceaſed, or the magiſtrates, to whom report is to be made; therefore, at the time of performing this operation, minutes ſhould be taken of what is obſerved. The inſtruments, and all things neceſſary, ſhould be diſpoſed in order, as for any other operation; as knives, a razor, a great and ſmall ſaw, ſciſſars ſtraight and curved, elevators, needles threaded, ſponges, tow, ſaw-duſt or bran, baſons with water, towels, and receivers for the viſcera when they are to be taken out of their cavities; and ſhould the body have undergone any degree of putrefaction making it offenſive, it will be right to have a mixture of lavender-water and vinegar, or ſome ſuch thing, to ſprinkle it with, &c. The body is to be laid upon a ſuitable table, advantageouſly placed for the light, having a cloth thrown over the parts which decency demands ſhould be concealed, eſpecially in females.

When it is intended only to inſpect the abdomen and its contents, a longitudinal inciſion from the xiphoid cartilage to the os pubis, interſected by a tranſverſe one at the navel, will give a fair opportunity of anſwering theſe purpoſes, when the angles are reverſed. Should it be required to examine all the three cavities, and the parts contained in them, we are to begin by opening the head, making an inciſion quite croſs to the bone, from ear to ear; which ſection is preferable to the crucial, commonly made on this occaſion: then the ſcalp may be eaſily diſſected from the ſkull, and turned down over the face, and eſtabliſhed, the bare flap may be turned up againſt the naked ſtump, and ſo be ſecured by plaſter, compreſſion, and bandage. Inſtead of the bandage already deſcribed, our author on this occaſion uſes one compoſed of a ſtrip of ſtrong cloth to go round the knee; and to the centre of this is fixed another, which, croſſing from under the ham, the ſtump is ſecured to the circular above the knee by means of four or five pieces of tape attached to this laſt. The ſore ſhould not be opened for at leaſt two days after this, and the dreſſings taken off with great caution. He often bathed this part very hot; and though the flap ſhould in part ſeparate, yet muſt it again and again be returned until the parts firmly unite. The little ſore which the flap does not cover ſhould be dreſſed with lint and brandy. Soon after the union of the flap and ſtump, the former ſometimes inflames; but a relaxing ſtupe, and a poultice of flummery, ſoon removes this. At every dreſſing of the remaining little ſore of the fleſh, the ſtump may be bathed in bran and water hot, which will greatly accelerate healing. Though after 15 or 16 days the cure may be finiſhed by any common nurſe, yet do the parts remain tender for ſome days longer. By the diſſection of one of his patients, who died many months after this operation of a malignant ſmall-pox, our author found it was occaſioned by the extremities of the bones not being completely healed: ſo that what he then thought a diſadvantage to this operation, appears now to be one of its greateſt excellencies; namely, that the bones ſhould be fairly covered by a firm perioſteum; which at the ſame time accounted for this phænomenon.

§ 2. *Of amputating the Thigh.*

To attempt this operation, by preſerving a flap of fleſh in the poſterior and inferior part of the thigh, muſt leave ſo large a fleſh-wound, and ſo great a quantity of muſcular fleſh bare, as to require a very great length of time to bring on a firm union of the divided parts: beſides, the fever, and great diſcharge from ſo large a ſurface, may alone endanger the patient's life. Mr O'Halloran, after a variety of trials, concluded, that a flap of fleſh and ſkin preſerved in the anterior part of the thigh, muſt anſwer our moſt ſanguine expectations: for the quantity of fleſh here is not much, the ſkin, corpus adipoſum, and rectus muſcle, being only intereſted in the inciſion; of conſequence the wound not conſiderable, and the flap not required very large. Our author attempted to determine, on a dead body, the quantity of flap neceſſary to be preſerved in this manner. The circumference of the thigh, at four inches from the inferior part of the rotula, meaſured eighteen inches. Here he drew up the fleſh, and bound it by a ſmall band. He then began a flap-inciſion on the rotula, bringing it up to the circular band, and here ſawed through the bone, having firſt cut through all the intervening fleſh. The preſerved flap meaſured three inches externally, and two and an half from the circular inciſion of the fleſh to its internal extremity. The diameter of the femur, in its loweſt axis, or nearly from ſide to ſide, was exactly an inch and one-tenth; and yet this flap, beſides completely covering the bone, extended an half inch beyond it. By this plain and ſimple experiment, it appears, that the flap-operation in the thigh, by making your inciſion in its anterior part, becomes leſs complex, leſs painful, and even more expeditious in its cure, than the ſame operation in the leg. After determining on the preciſe place on which the limb is to be taken off, care muſt be taken to have the blood-veſſels maſtered in the operation, either by Petit's or the common tourniquet, as in the uſual manner: then let the fleſh and ſkin be tightly drawn up from the knee, and ſo ſecured above the place of election by a circular tape or band. Mr Gooch propoſes a kind of thick circular cuſhion to ſerve inſtead of this band, to direct the knife exactly in the circular tour; but Mr O'Halloran thinks that a thick tape will anſwer this purpoſe every bit as well, as this operation is moſtly exactly even, and that the cuſhion rather hides the direction of the knife from the eye. With a ſtraight knife, ſuch as has been deſcribed in taking off the leg, commence your flap-inciſion at about three inches more anteriorly than where the bone is to be ſawed through, ſuppoſing an adult, and ſo in proportion to the age and ſize of the limb. Let this inciſion be continued in an oblique direction till you reach the bone at the circular tape; then with the ſame, or a common amputating knife, make your circular ſweep, commencing from the ſide of the flap and directly to the bone; obſerving here, as in the leg, to place yourſelf outſide the body in taking off the right thigh, and between the legs in removing the left. But then there is no neceſſity here, as in the leg, of change of place in ſawing the bone; becauſe, as it is but one, wherever you place yourſelf to cut off the ſoft parts, there you may ſtay to finiſh the operation.

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Of the quantity of flap neceſſary to be preſerved in amputating the thigh.

As ſoon as the circular inciſion is completed, the tape ſhould be removed and the ſplit cloth croſs the divided parts, in order to draw up the ſkin and muſcles, the ſingle tail covering the flap; and as ſoon as the perioſteum is ſeparated, &c. let the bone be ſawed. The femoral artery ſhould be ſecured as already directed; and beſides this ligature, let ſome agaric or lycoperdon be applied: and any other conſiderable branches of veſſels may be taken up or ſtopt by the above funguſes. Let the ſurface of the ſore be covered with looſe unformed lint ſtrewed with flour, and the flap laid over this dreſſing covered by a double T plaſter; an handful of lint outſide this, gently preſſed againſt the flap by an hog's bladder, moiſtened and notched at its orifice; and the whole covered by a croſs compreſs. Let ſoft lint, tow, or a linen compreſs, cover the direction of the artery; and ſecure all theſe dreſſings on by a band about three inches broad, and twelve yards long, rolled up in two even heads. Apply a large handful of looſe lint or ſoft tow over the femoral artery near the groin; and after making a couple of circulars about this part, moderately tight, ſo as to break in ſome meaſure the force of the circulating fluid, let the bands croſs round the body. Fix a piece of ſtrong tape, about an inch or more broad, and a yard long, along the inſide of the amputated thigh, one end of which is to be ſecured to the band that went round the body, and the other to hang looſe over the ſtump: let a ſimilar piece of tape be in like manner fixed to the outſide of the thigh: then, with one of the heads of your bandages, make three or four circulars round the thigh over theſe tapes, gently deſcending;

577
Of dreſſing the ſtump.

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In winter, the ſtump ſhould not be opened before the fifth, or even ſixth day; nor in ſummer ſooner than the fourth: the bone ſhould be dreſſed with dry lint, or lint wet in brandy, and the ſoft parts with the common digeſtive; taking care to remove no more of the old dreſſings than what are looſe. When ſuppuration is well eſtabliſhed, the ſtump and flap may be dreſſed with dry lint, as the ſoft digeſtives at this time are apt to encourage exuberant or proud fleſh. If, nevertheleſs, ſuch ſhould riſe on the flap, it may be now and then ſprinkled with red precipitate; but the ſurgeon need never be uneaſy at attempting an union of the flap and ſtump at ſuch time. About the 12th or 13th day, and not ſooner, ſhould the flap and ſtump be brought into perfect union: before this they are to be treated as diſtinct ſores, and preſerved in ſuch ſituation by a bandage ſomething like what has been recommended for the leg. But whereas that was ſecured above the knee, to make this a fixed point, the ſtraps muſt go round the body, and the body of the band lie on the anterior part of the ſtump, in order gently to bring the flap and ſtump into an exact union. This firſt dreſſing is not to be opened for three days; and every other rule recommended in the leg is here exactly to be followed. If, in the ſuppurative ſtate, the ſore ſhould have an unuſual degree of pain and ſenſibility, the parts may be often bathed in milk and water; the ſick let blood; and even opium, alone or mixed with digeſtives, may be ſucceſsfully applied to the parts.

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SECT. XIX. *The Method of opening a dead Body.*

Surgeons are often called on this occaſion, in order to inveſtigate the cauſe and ſeat of diſeaſes and death, either by the relations of the deceaſed, or the magiſtrates, to whom report is to be made; therefore, at the time of performing this operation, minutes ſhould be taken of what is obſerved. The inſtruments, and all things neceſſary, ſhould be diſpoſed in order, as for any other operation; as knives, a razor, a great and ſmall ſaw, ſciſſars ſtraight and curved, elevators, needles threaded, ſponges, tow, ſaw-duſt or bran, baſons with water, towels, and receivers for the viſcera when they are to be taken out of their cavities; and ſhould the body have undergone any degree of putrefaction making it offenſive, it will be right to have a mixture of lavender-water and vinegar, or ſome ſuch thing, to ſprinkle it with, &c. The body is to be laid upon a ſuitable table, advantageouſly placed for the light, having a cloth thrown over the parts which decency demands ſhould be concealed, eſpecially in females. 579

When it is intended only to inſpect the abdomen and its contents, a longitudinal inciſion from the xiphoid cartilage to the os pubis, interſected by a tranſverſe one at the navel, will give a fair opportunity of anſwering theſe purpoſes, when the angles are reverſed. Should it be required to examine all the three cavities, and the parts contained in them, we are to begin by opening the head, making an inciſion quite croſs to the bone, from ear to ear; which ſection is preferable to the crucial, commonly made on this occaſion: then the ſcalp may be eaſily diſſected from the ſkull, and turned down over the face, and towards the neck, giving room for the ſaw. The head muſt be held very ſteadily by an aſſiſtant during the ſawing, which ſhould be begun on the middle of the frontal, proceeding to each temporal bone, and ſo to finiſh the circle upon the middle of the occipital bone; which may generally be done conveniently enough, by raiſing the head and inclining it forward, after having proceeded as far as this bone; or the body may then be turned prone, ſhould that poſture be found more convenient, to complete the circle. The cap of the ſkull is then to be raiſed with the elevator, occaſionally cutting the adheſions of the dura mater: after this the encephalon is to be removed, carefully ſeparating the other attachments of the membrane.

In order to bring the thorax and abdomen, with the parts contained in theſe cavities, under one view, an inciſion is to be made on each ſide the ſternum, in the courſe of the cartilages of the ribs which are annexed to it; diſſecting from thence the muſcles with the teguments, the ſpace of two or three inches towards the ſpine; then cutting through the cartilages, which will be ſeen, and eaſily divided with a knife a little curved near the point; then the inciſions are to be continued from the ſternum through the abdominal cavity, in an oblique direction, to each ileon or inguen; after which the clavicles are to be ſeparated from the ſternum, or this bone divided at its ſuperior cartilaginous junction, with a ſtrong knife, diſſecting it from the mediaſtinum, and turning it downwards with the muſcles, &c. of the abdomen. This is the moſt eligible manner of opening theſe cavities, and gives an opportunity of ſewing them up, with a better appearance for any perſon's view afterwards. That kind of ſtitch called by ſempſtreſſes the *herring-bone* or *flat ſeam*, has a very pretty and neat effect upon theſe occaſions.

If it is propoſed to take out the thoracic and abdominal viſcera together, for further examination, the diaphragm is firſt to be cut down to the ſpine on both ſides; then, to avoid being incommoded with blood, &c. two very ſtrong ligatures are to be paſſed round the œſophagus and large blood-veſſels, in which the trachea may be included; tying them ſtrait, and then dividing theſe parts between the ligatures: the ſame meaſures are to taken in reſpect to the inferior veſſels, upon the lumbar region, a little above the bifurcation of the aorta, including the vena cava; and alſo upon the rectum. After having obſerved theſe precautions, the viſcera, with the diaphragm, are to be removed, by a wary diſſection, all the way cloſe to the ſpine; and gently drawing them at the ſame time, will greatly facilitate the ſeparation.

When the thoracic and abdominal viſcera are to be taken out ſeparately, in the firſt caſe ligatures muſt be made as have been deſcribed upon the veſſels, &c. juſt above the diaphragm, and in the other juſt below it, and upon the rectum.

Should we be called upon to perform this office when the body is become very putrid, it will be abſolutely neceſſary to have ſuch parts of it well waſhed with warm vinegar and brandy, and then ſprinkled with lavender-water or ſome ſuch odoriferous antiputreſcent liquor, before the examination, in order to correct the ſtench, and defend us againſt the noxious quality of the effluvia: a precaution, the neglect of which may be attended with very direful effects, and of which we have inſtances.

Sect. XX. *Of Embalming dead Bodies.*

581 In the early ages of the world, the practice of embalming dead bodies was very common, particularly among the Egyptians; but it has long been diſuſed in almoſt all countries, except for great perſonages. See Embalming. The following directions are taken from Mr Gooch, to whom they were communicated by a perſon of great character, and well acquainted with the modern practice of embalming in this kingdom.

After eviſceration, as has been directed in opening a dead body, and continuing the inciſion farther upwards, even into the mouth, and, if practicable, without cutting the ſkin of the neck, all the cavities are to be well cleanſed, and the humidity ſucked up with ſponges, then waſhed with *tinct. myrrhæ*, and filled with a ſpecies, compounded of fragrant herbs, aromatic drugs, and gums reduced to powder not very fine, firſt reſtoring the heart to its former reſidence, after having opened its ventricles, cleanſed and waſhed them with the tincture, ſtuffed them with the ſpecies, and ſewed them up; and then the cavities are to be ſtitched very cloſe with the glover's or ſpiral ſuture. Large and deep inciſions are alſo to be made in all the moſt fleſhy parts, cleaning and waſhing them with the tincture in the ſame manner, filling them with the antiſeptic ſpecies, and ſtitching them up. Then the head, trunk, and limbs, are to be perfectly well covered with cerecloth; putting a piece under the chin, to be ſecured by ſewing on the top of the head, after having well adjuſted the cap of the ſkull, ſewed the ſcalp together, and cleaned the mouth, as has been directed for the other parts, and putting in ſome of the ſpecies. The cerecloth is to be prepared, according to art, with a compoſition made of wax, roſin, ſtorax, and painter's drying oil. After the application of the cerecloth, with great care and exactneſs, cut into ſuitable pieces, according to the reſpective parts, and cloſing them well every where; the face being cloſe ſhaved, is to be covered with ſome of the above compoſition melted, and laid on with a bruſh of a proper degree of heat, and of a moderate thickneſs; which may have a faint fleſh-colour given it with vermillion; and when it is grown cold and ſtiff upon this part, it may be lightly ſtruck over with hard varniſh; or this varniſh, applied thick, may here ſerve the purpoſe alone. A cap is to be well adapted to the head, falling down upon the neck, and to be ſewed under the chin, making a few circular turns about the neck with a roller of a fit breadth. All the reſt of the corpſe is to be incloſed in a ſheet, to be artfully cut, and ſewed on very cloſe and ſmooth, with the fineſt tape, and the *flat ſeam* mentioned in the preceding ſection; over which an appropriate dreſs is to be put, as the relations or friends think fit to direct and appoint, and then laid into the coffin, which ſhould be in readineſs: but when it is ſome great perſonage, who is to lie in ſtate for public view before the funeral rites are ſolemnized, the dreſs muſt be appropriated to his dignity and character. The brain and other viſcera are to be put with ſome of the ſpecies into a leaden box. Sometimes

times the heart, prepared as has been directed, to preſerve it from putrefaction, is depoſited in an urn by itſelf.

Explanation of Plates CCLXXVIII. CCLXXIX. CCLXXX. CCLXXXI. CCLXXXII.

Fig. 1. A, A director by which to guide the knife in the opening of abſceſſes that are burſt of themſelves, or firſt punctured with a lancet. This inſtrument ſhould be made either of ſteel, ſilver, or iron; but ſo tempered, that it may be bent and accommodated to the direction of the cavity. It is uſually made quite ſtraight; but that form prevents the operator from holding it firmly while he is cutting. The manner of uſing it is, by paſſing the thumb through the ring, and ſupporting it with the fore-finger, while the ſtraight-edged knife is to ſlide along the groove with its edge upwards, towards the extremity of the abſceſs.

B, The ſtraight-edged knife, proper for opening abſceſſes with the aſſiſtance of a director; but which, in few other reſpects, is preferable to the round-edged knife.

C, A crooked needle, with its convex and concave ſides ſharp: this is uſed only in the ſuture of the tendon, and is made thin, that but few of the fibres of ſo ſlender a body as a tendon may be injured in the paſſing of it. This needle is large enough for ſtitching the tendo achillis.

D, The largeſt crooked needle neceſſary for the tying of any veſſels, and ſhould be uſed with a ligature of the ſize it is threaded with in taking up the ſpermatic veſſels in caſtration, or the femoral and humeral arteries in amputation. This needle may alſo be uſed in ſewing up deep wounds.

E, A crooked needle and ligature of the moſt uſeful ſize, being not much too little for the largeſt veſſels, nor a great deal too big for the ſmalleſt; and therefore, in the taking up of the greateſt number of veſſels in an amputation, is the proper needle to be employed. This needle alſo is of a convenient ſize for ſewing up moſt wounds.

F, A ſmall crooked needle and ligature for taking up the leſſer arteries, ſuch as thoſe of the ſcalp, and thoſe of the ſkin that are wounded in opening abſceſſes.

Great care ſhould be taken by the makers of theſe needles to give them a due temper: for if they are too ſoft, the force ſometimes exerted to carry them through the fleſh, will bend them; if they are too brittle, they ſnap; both which accidents may happen to be terrible inconveniences, if the ſurgeon be not provided with a ſufficient number of them. It is of great importance alſo to give them the form of part of a circle, which makes them paſs much more readily round any veſſel, than if they were made partly of a circle, and partly of a ſtraight line; and in taking up veſſels at the bottom of a deep wound is abſolutely neceſſary, it being impracticable to turn the needle with a ſtraight handle, and bring it round the veſſel when in that ſituation. The convex ſurface of the needle is flat, and its two edges are ſharp. Its concave ſide is compoſed of two ſurfaces, riſing from the edges of the needle, and meeting in a ridge or eminence, ſo that the needle has three ſides. The beſt materials for making ligatures, are the flaxen thread that ſhoe-makers uſe; which is ſufficiently ſtrong when four, ſix, or eight of the threads are twiſted together and waxed; and is not ſo apt to cut the veſſels as threads that are more finely ſpun.

G, A ſtraight needle, ſuch as glovers uſe, with a three-edged point, uſeful in the uninterrupted ſuture, in the ſuture of tendons where the crooked one C is not preferred, and in ſewing up dead bodies, and is rather more handy for taking up the veſſels of the ſcalp.

Fig. 2. A, The round-edged knife, of a convenient ſize for almoſt all operations where a knife is uſed: the make of it will be better underſtood by the figure than any other deſcription; only it may be remarked, that the handle is made of a light wood, as indeed the handles of all inſtruments ſhould be, that the reſiſtance to the blades may be better felt by the ſurgeon.

B, A pair of probe-ſciſſars, which require nothing very particular in their form, but that the lower blade ſhould be made as ſmall as poſſible, provided it be ſtrong and has a good edge; becauſe, being chiefly uſed in fiſtulas *in ano*, the introduction of a thick blade into the ſinus, which is generally narrow, would be very painful to the patient.

C, The crooked knife with the point blunted, uſed in the operation of the bubonocele.

Fig. 3. A, A trocar of the moſt convenient ſize for emptying the abdomen when the water is not gelatinous. It is here repreſented with the perforator in the canula, juſt as it is placed when we perform the operation.

B, The canula of a large trocar, recommended in caſes where the water is gelatinous.

C, The perforator of the large trocar.

Fig. 4. A, A ſound uſed in ſearching for the ſtone. The ſize repreſented here is but a little too large for the youngeſt children, and may be uſed upon boys till they are thirteen or fourteen years of age: a larger ſhould be employed between that age and adultneſs, when one of about ten inches, in a right line from the handle to the extremity, is proper. This ſhould be made of ſteel, and its extremity be round and ſmooth.

B, A ſtaff fit for the operation on boys from eight to fourteen years of age. The ſtaff for a man muſt be of the ſize of the ſound already deſcribed.

C, A ſtaff ſomething too big for the ſmalleſt children, but may be uſed upon boys from about four years of age to eight.

The ſtaff has a groove on its convex ſide, which firſt ſerves as a direction where to cut, and afterwards, receiving the beak of the gorget, guides it readily to the bladder. Care ſhould be taken, in making the groove, that the edges of it be ſmoothed down, ſo that they cannot wound in paſſing through the urethra. The extremity ſhould alſo be open; otherwiſe it will be ſometimes difficult to withdraw the ſtaff when the gorget is introduced and preſſes againſt the end of it.

Theſe inſtruments are uſually made with a greater bending than here repreſented; but this ſhape is more like to that of the urethra, and rather more advantageous for making the inciſion.

D, The yoke; an inſtrument to be worn by men with an incontinence of urine. It is made with iron, but for uſe muſt be covered with velvet. It moves upon a joint at one end; and is faſtened at the other by catches at different diſtances placed on a ſpring. It muſt be accommodated to the ſize of the penis, and be taken off whenever the patient finds an inclination to make water. This inſtrument is exceedingly uſeful, becauſe it always anſwers the purpoſe, and ſeldom galls the part after a few days wearing.

Fig. 5. A, A ſmall catheter made of ſilver. This inſtrument is hollow, and ſerves to draw off the urine when under a ſuppreſſion. It is alſo uſed in the high operation to fill the bladder with water. Near its extremity are two orifices, through which the water paſſes into its cavity. Care ſhould be taken that the edges of theſe orifices are quite ſmooth.

B, The knife uſed in cutting for the ſtone: it is the ſame already deſcribed; but it is not improper to repeat the figure with the alteration of a quantity of tow twiſted round it, which makes it eaſier to hold when we perform the lateral operation, and turn the edge upwards to wound the proſtate gland.

C, A female catheter, differing from the male catheter, it being almoſt ſtraight, and ſomething larger.

D, A ſilver-wire to paſs into either catheter, for the removing any grumous blood or matter that clogs them up.

Fig. 6. A, The gorget uſed upon men in the lateral operation.

B, the gorget uſed upon children under five years years of age in the lateral operation.

A gorget between the ſizes of theſe two will be fit for boys from five years of age to fifteen or ſixteen.

Theſe inſtruments are hollow for the paſſage of the forceps into the bladder; and their handles lie ſlanting, that they may the more readily be carried thro' the wound of the proſtate, which is made obliquely on the left ſide of it. The beak at the extremity of the gorget muſt be ſmaller than the groove of the ſtaff which is cut upon, becauſe it is to be received in the groove. Care ſhould be taken that the edges of the gorget near the beak are not ſharp, leſt, inſtead of dilating the wound as it ought, it ſhould only cut on each ſide when introduced; in which caſe, it would be difficult to carry the forceps into the bladder.

C, A gorget, with its handle exactly in the middle. This ſhaped inſtrument is uſed in the old way. All the gorgets ſhould be made of ſteel.

Fig. 7. A, The forceps for extracting the ſtone. Theſe are repreſented a little open, that the teeth may be better ſeen within-ſide.

This inſtrument muſt be of different ſizes for different ages and ſtones, from the length of four inches to one of near a foot long; but the forceps of about eight inches long will be found moſt generally uſeful. The number neceſſary to be furniſhed with will be four or five.

Great care ſhould be taken by the makers of this inſtrument that it move eaſily upon the rivet; that the extremity of the chops do not meet when they are ſhut; and particularly that the teeth be not too large, leſt, in entering deep into the ſtone, they ſhould break it. It is of conſequence alſo that the teeth do not reach farther towards the joint than here repreſented; becauſe a ſmall ſtone, when received into that part, being held faſt there, would dilate the forceps exceſſively, and make the extraction difficult; on which account, the inſide of the blades near the joint ſhould be ſmooth, that the ſtone may ſlip towards the teeth.

B, A director made of ſteel, uſed for the direction of the gorget, in the extraction of the ſtone from women.

C, A ſcoop to take away the ſtone when it is broken into ſmall pieces like ſand. This inſtrument is made of ſteel.

Fig. 8. A, The perforator, commonly called the *perforating trepan*. With this inſtrument an orifice is uſually made for the reception of the pin on the centre of the piece of bone that is to be taken away in the operation of trepanning; though, if the pin be very ſharp, and project but little beyond the teeth of the ſaw, as in that marked with the letter B, the perforator would be needleſs; but as the point of the pin preſently grows blunt with uſe, and in that caſe it is difficult to fix the ſaw, it is adviſable to have this inſtrument in readineſs. It is alſo handy for boring into the ſubſtance of the bones, in order to promote a granulation of fleſh on their ſurfaces. When it is made uſe of, it muſt be received and faſtened in the handle C.

B, The crown or ſaw of the trepan, with the pin appearing juſt beyond the extremities of the teeth. The ſhape of this ſaw is cylindrical.

C, The handle of the foregoing inſtrument, called the *trephine*; which is much preferable to the trepan (an inſtrument like a wimble uſed by joiners), becauſe of the great convenience of holding it, and leaning on one ſide or other of the ſaw, as we find it neceſſary: The trepan, however, though allowed to be unhandy, is the inſtrument moſt uſed by ſurgeons in other parts of Europe, upon the ſuppoſition of its working quicker than the trephine.

The trephine here repreſented is of ſuch a ſhape as to make it a convenient elevator; for which purpoſe the extremities of it are made rough.

D, A key to take out the pin E, when the ſaw has made an impreſſion deep enough to be worked without the help of it.

Fig. 9. A, A convenient forceps to take out the circular piece of bone, when it does not ſtick to the ſaw: the contrivance by which they readily lay hold of it, is to make the extremities that are to graſp it with an arch of the ſame circle as the ſaw is made. Upon one of the handles there is added a little elevator, to lift up any ſmall ſplinter of bone.

B, A lenticular: the fore-part of its blade is ſharp, in order to ſcrape the lower edge of the orifice of the cranium, in caſe any ſplinters ſhould remain after the operation; and the button at its extremity receives the duſt, that it may not fall on the brain; but there is ſeldom any occaſion for this inſtrument.

C, A rugine or raſpatory, for ſcraping bones in order to promote granulations of fleſh. The handles of theſe two laſt inſtruments are wood; whereas every part of the others ſhould be made of ſteel.

Fig10. A, The couching needle; the broad part of which towards the point is flat on one ſide; but on the other is a little convex, to give it more ſubſtance and ſtrength.

The handle of this inſtrument is white ivory, inlaid with a ſtreak of black in that part of it lying even with the convex ſurface of the blade: The meaning of which is, that by holding the handle with the ſtreak upwards, we may be guided to depreſs the membrane of a milky cataract with the flat ſurface, though the ſubſtance of the cataract ſwimming in the eye obſcures the needle, and prevents its being directed in a proper poſition by the ſight.

B, A ſpeculum oculi, which is made to open or ſhut by an iron button ſliding along a ſlit in the handle. This inſtrument is compoſed of one piece of ſteel, in ſuch a manner that it would fly open by its elaſticity, if the two branches of the handle were not confined by the button. The circle of it ſhould be covered with velvet, to make it lie ſofter on the eye-lids.

C, The knife for cutting the iris; the blade of which has two edges, reſembling a lancet, which are more advantageous than one only, in cutting the cornea for the extraction of the cataract.

Fig. 11. A, the eye, with the ſkin of the eye-lids denuded, in order to ſhow the orbicularis muſcle: the white ſtreak running from the inner angle of the eye towards the noſe, is the tendon of the orbicularis muſcle. At a little diſtance from the internal angle, on the edge of the eye-lids, may be obſerved two black ſpots, which are the orifices of the lachrymal channels, and called the *puncta lachrymalia*.

B, the exact dimenſion of the lachrymal channels and bag; the pricked line repreſents the edge of the orbit.

C, A ſmall inciſion knife, more handy than a larger for opening the bag.

D, The perforator to deſtroy the os unguis, if ever it ſhould happen to be neceſſary.

E, An iron inſtrument made thin and pliable, to ſet even on the forehead, and for uſe covered with velvet: the holes at the three extremities receive two pieces of ribband, by which it is faſtened on the forehead: the button at the end of the ſcrew is to be placed on the ſaccus lachrymalis, and the ſcrew to be twiſted till the button makes a conſiderable preſſure on the bag: the button ſhould be covered with velvet, and a little compreſs of plaſter be laid on the bag before it is applied, to prevent the ſkin from being galled by the preſſure. The little branch of iron which receives the ſcrew muſt be ſoft enough to admit of bending, otherwiſe it will be difficult to place the button exactly on the bag. This inſtrument is for the left eye only; it ſhould be worn night and day in the beginning of a fiſtula, and after a fiſtula has been healed by inciſion; but as the ſucceſs depends upon the exact ſituation of the button upon the bag, it ſhould be carefully looked after.

Fig. 12. A, The bent probe uſed in extirpating the tonſils, fixed in a handle, with the ligature made of the ſame thread as the ligatures for tying the blood-veſſels.

B, The iron inſtrument for tying the tonſils.

This inſtrument is alſo of great ſervice in extirpating, by ligature, a ſpecies of ſcirrhus that ſometimes grows from the neck or cavity of the uterus.

C, The needle with the eye towards the point, for paſſing the ligature through the tonſil, when the baſis is larger than the extremity.

D, A canula made of ſilver to be uſed in the empyema.

E, A canula to be uſed in bronchotomy.

To keep the canulas in their place, ſmall ribbands may be paſſed through the rings of them, and carried round the body and neck; or they may be held by a ligature run through, and faſtened to a hole cut in a piece of ſticking-plaſter, which is to be laid on each ſide of them.

Fig. 13. A, The inſtrument called the *probe razor* to cut the maſtoideus muſcle in the wry neck; it is ſharp only about half its length at that end where the blade is broad.

B, The two pins with the twiſted ſuture, uſed in the hare-lip.

C, The polypus forceps, with one of the rings open for the reception of the thumb, which would be cramped in pulling the forceps with much force, if it were received in the ſame ſort of ring as in the other handle.

Fig. 14. A, The figure of the amputating knife. The length of the blade and handle ſhould be about thirteen inches.

B, The figure of the ſaw uſed in amputating the limbs. The length of the handle and ſaw ſhould be about ſeventeen inches.

Fig. 15. The form of the tenaculum uſed for pulling out bleeding veſſels to be tied up.

Fig. 16. and 17. Two needles of a different form from thoſe in ordinary uſe, recommended by Mr Bell as the moſt convenient, particularly in deep wounds.

Fig. 18. The inſtrument named *porteaiguille*, for preſſing through the pins in making the twiſted ſuture.

A, The handles.

B, A groove for receiving the pins uſed in the ſuture.

Fig. 19. A flat needle, ſometimes uſeful in ſtitching blood-veſſels that lie between contiguous bones.

Fig. 20. An improved tourniquet by Mr Bell. The manner of uſing it deſcribed p. 8415.

Fig. 21. An improved trocar by Mr André, for the purpoſes of tapping for the aſcites or hydrocele. The roundneſs of its point makes it pierce more eaſily than the common one, which is triangular. That the inſtrument may be eaſily withdrawn after the perforation is made, the canula (fig. 22.) is compoſed of two pieces ſcrewed together; by unlooſing which the inſtrument will eaſily dilate them, and they will cloſe by the preſſure of the ſurrounding fleſh, ſo as to afford a paſſage for the liquid to be drawn off.

Fig. 23. Mr Bell's trocar for evacuating the contents of an encyſted hydrocele. By the flatneſs of its form, and its point being of the lancet kind, this inſtrument penetrates the cyſt with great eaſe; and can thereby be uſed with more ſafety than the ordinary form of this inſtrument.

The point of the perforator is commonly made much longer than is neceſſary. It ought not to paſs more than the fifth or ſixth part of an inch from the extremity of the canula; of this length it anſwers equally well as when the point is longer, and it is not ſo apt to wound the teſtis on being introduced into the cavity of the tunica vaginalis.

Fig. 24. Repreſents figs. 25. and 27. united, which is then called the *double gorgeret*, with the cutting blade *g*, *h*, affixed to it. This inſtrument is uſed in lithotomy, and recommended by Mr Bromfield; (*vide ſupra*, n° 478, *et ſeq*).

a b, The handle of the hinder part.

c d, The grooved edge of the under gorgeret, that has received the edge of the upper gorgeret.

e, The beak of the under gorgeret.

f, The handle of the upper gorgeret, by which the inſtruments when united, are to be introduced into the bladder.

Fig. 25. The upper part of the double gorgeret, with the blade affixed for cutting the proſtate gland; *g*, the cutting blade, which is blunt at *h*.

k, A hole or ſlit, through which the urine will paſs as ſoon as the inſtrument enters the bladder. This obſervation will be a guide to the operator, as to the length of the inciſion he would wiſh to make of the proſtate, by the farther introduction of the inſtrument when united.

l, The ſcrew to fix the blade to the upper gorgeret.

Fig. 26. The poſterior ſide of the double gorgeret when united for uſe.

e, The beak formed in the under gorgeret.

l l, Shows the hollow of the two gorgerets when united, through which the urine comes out, when the extremity is got into the bladder.

Fig. 27. The under part of the double gorgeret ſeparated from the upper, which varies but little in ſhape from the common gorgeret.

a, The beak; *b b*, the inner edges of the concave part, grooved as far as *c c* to permit the edges of the upper part to glide in, by which means they become one inſtrument at the time of introducing it.

Fig. 28. The upper part of the double gorgeret with its convex ſide uppermoſt; *f*, the handle; *ee*, the edges of the gorgeret made thin, ſo as to glide along the groove in the under part of the inſtrument.

d, The point, which, when united, forms the double gorgeret, and ſomewhat reſembles the extreme part of a cow's horn. In this form it is a very great dilatator, and a much ſafer inſtrument than the common gorgeret when the membranous part of the urethra only is wounded in the operation of lithotomy.

Fig. 29. The ſame inſtrument, only intended to ſhow its internal or concave part.

Fig. 30. The cutting blade ſeparated from the upper gorgeret.

l, A ſmall hole through which a ſcrew paſſes to fix it to the upper gorgeret, as is expreſſed by *l*, fig. 28.

m, A little hook-like part, which is received into a ſlit adapted to it in the upper gorgeret.

The ſpace between *n*, *o*, is the only part of the blade that ſhould cut.

N.B. Great care muſt be taken by the inſtrument-maker, to place the blade on the upper gorgeret in ſuch direction, that its edge may incline obliquely downwards and outwards when the inſtrument is puſhed on to divide part of the proſtate gland.

Fig. 31. Mr Wathen's inſtruments for the cure of a fiſtula lachrymalis.

A, The ring at the top of the ſtyle.

B, The inferior extremity of the ſtyle rounded, ſo as to fill exactly the ſmaller end of the tube.

C, The ſhoulder; by means of which the ſtyle is prevented from paſſing further in the tube than it is deſigned it ſhould.

D, The tube, with a ſmall perforation near its upper or larger aperture for the admiſſion of a thread.

E, The tube, with its thread in it.

F, G, H, The ſtyle, tube, and thread put together; which points out the manner in which the inſtrument is fitted for uſe.

I, The knot tied in the thread at the diſtance of an inch from the tube.

Fig. 32. Shows Mr Wathen's contrivance for keeping a broken limb ſteady. It is applicable either to the ſuperior or inferior extremities; and in the figure is repreſented as applied to a compound fractured leg.

Fig. 33. Gives the ſkeleton of the machine which he calls a *conductor*, ſeparated into two portions. The knee-band *a*, made of tin, a little bent; divided by four joints *b*, that it may fit any limb, great or ſmall; holes *c*, for fixing the buckle and ſtrap; others *d*, round each margin for ſewing on the padding; two tin canulas *e*, grooved on the outſide, and furniſhed on the inſide with braſs ſprings *f*, and catches *g*; ſmall holes *h*, through which the catches paſs to meet the ſerræ of the upright portions, when they are within the canulas.

The figure in the middle repreſents the inſide of the tube with the groove.

Fig. 34. The ankle-band *a*, conſtructed as the knee-band, but leſs; ſhoulders *b*, to ſupport and render the ſerrated portions parallel to the grooved canulas; both of braſs.

By compreſſing the ſprings, the catches are raiſed, and admit the whole length of the upright ſerrated portions within the canulas; reducing the conductor to near half its length: from which reduction of the inſtrument, by the diſpoſition of the catches and ſerræ, the canulas are retracted without difficulty, but cannot be returned the ſame way unleſs the catches are elevated by compreſſing the ſprings. By this means, when the conductor is fixed, the extenſion hereby given to the leg, whatever it be, is ſecured with the greateſt certainty, tho' alterable with the utmoſt eaſe.

Fig. 35. The ſame inſtrument covered with leather, that it may ſit eaſy on the limb.

Fig. 36. and 37. The improved ſplints applied upon a broken leg, ſo that the foot-pieces are plainly to be ſeen on both ſides.

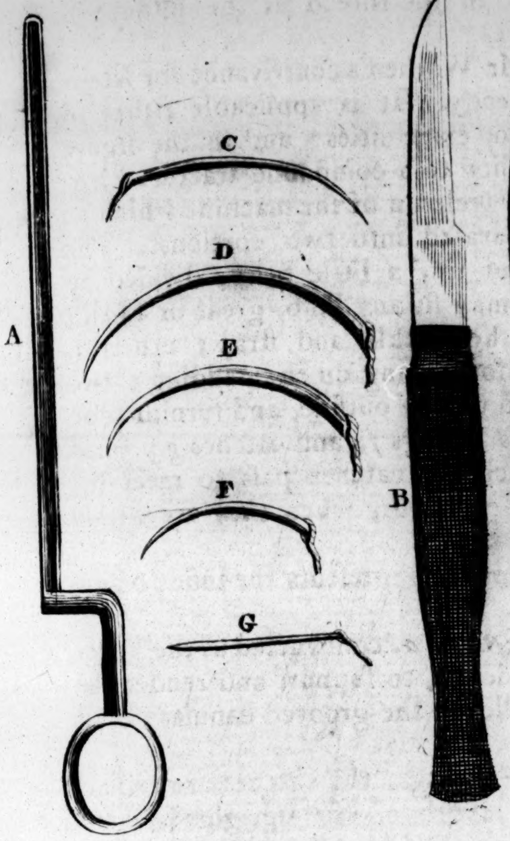
Fig. 38. Shows a machine invented by Mr Gooch for keeping up the hand, and allowing at the ſame time the motion of the fingers. This machine ſhould be made a little concave, of light tough wood, ſuch as beech, willow, or alder, and be covered with leather to be glued unto the wood. Its dimenſions for a limb of a common ſize ſhould be about ten inches long and three and a half broad. Beſides the hooks ſhown upon the ſides, it ſhould have one in the middle. It is to be confined to the limb with fillets tied upon ſtiff paper.

This very ſimple machine has been found of ſignal ſervice in luxations of the wriſt, and in fractures near that joint, as well as in other caſes where it is neceſſary to have the hand ſupported, and alſo occaſionally kept in gentle motion to preſerve the flexure of the joint.

Rule-joints may be uſed to more advantage, where there is no occaſion to drop the hand, and they will allow of a little motion upwards; when they are uſed, no hooks are required upon the machine.

SURI-

Fig. 1.



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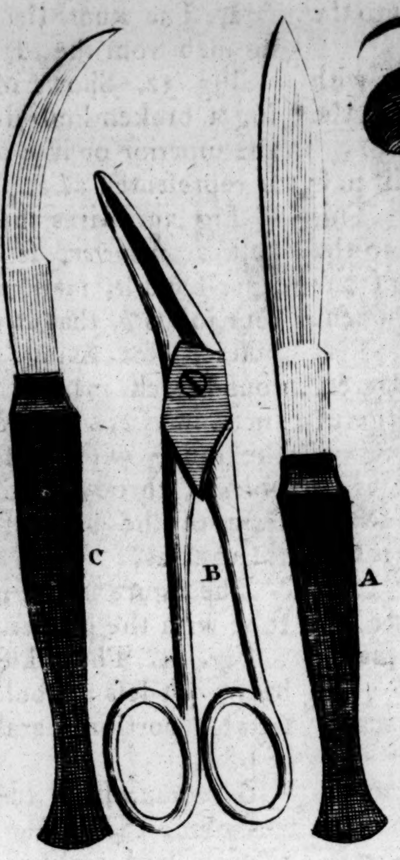

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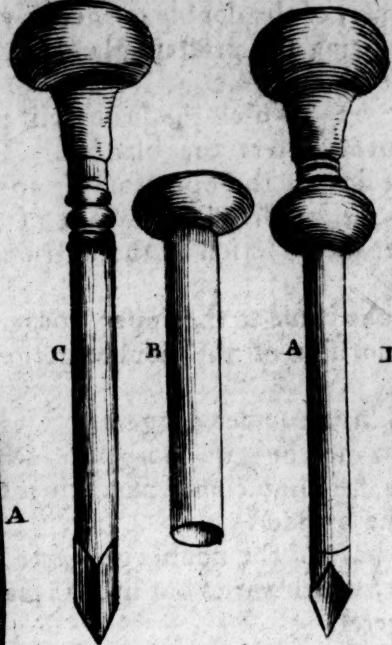

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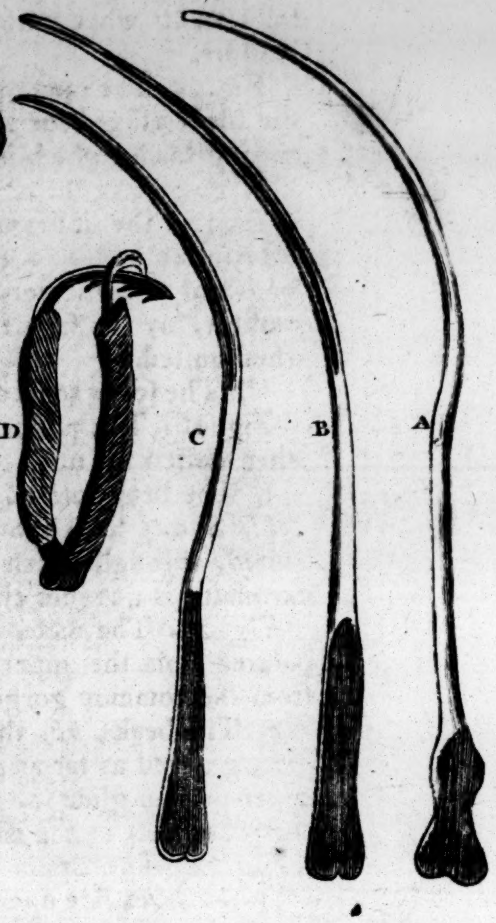

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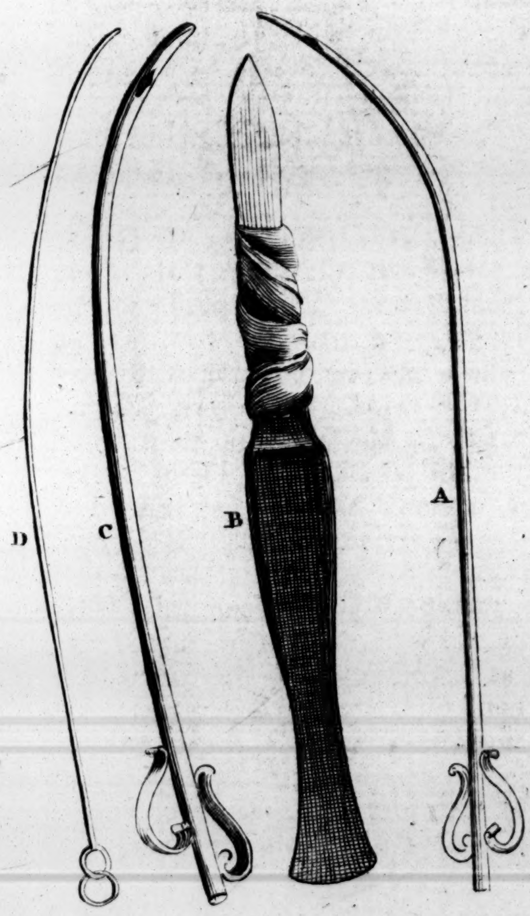

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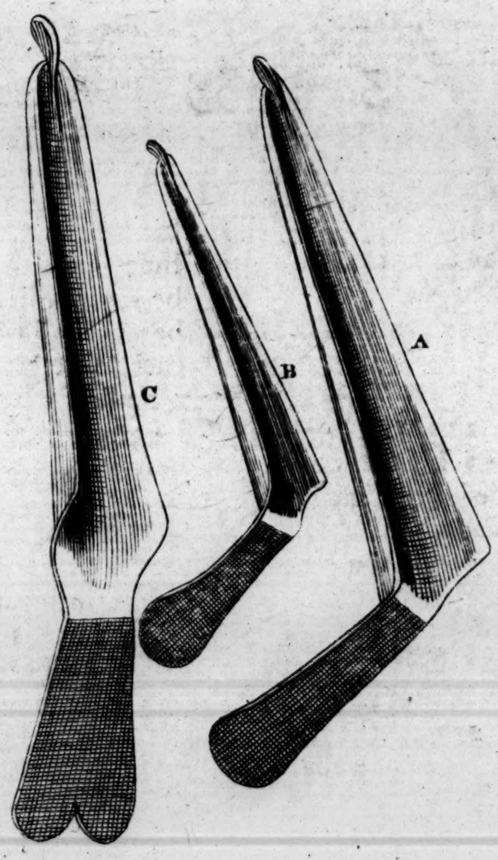

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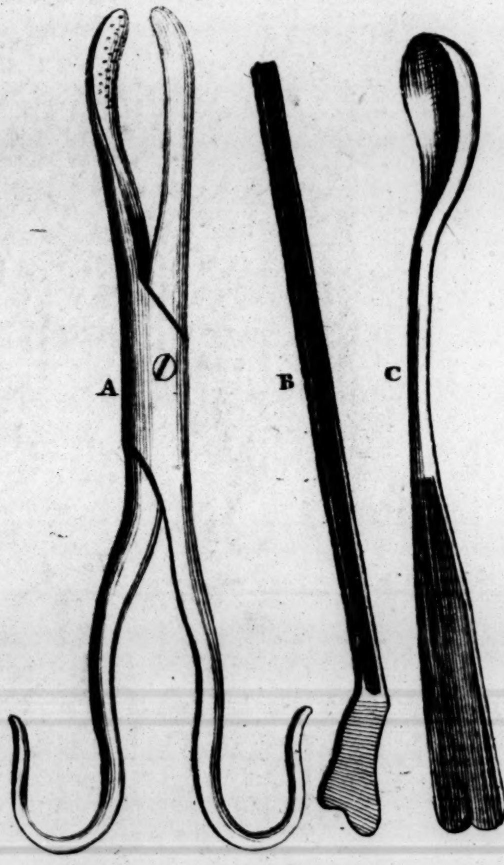
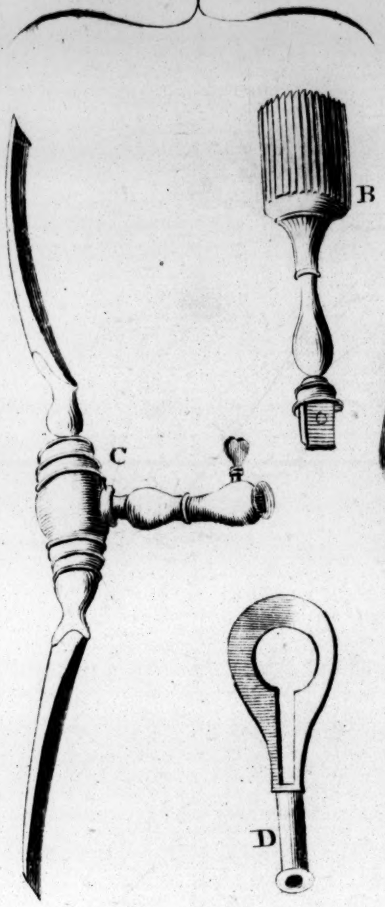


A Bell sculp.

3 MA 53

Fig. 8.



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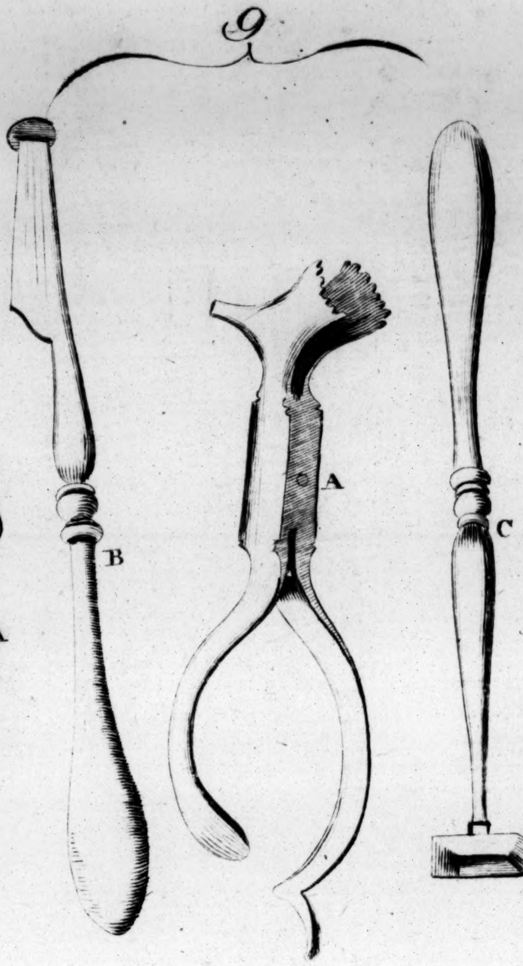

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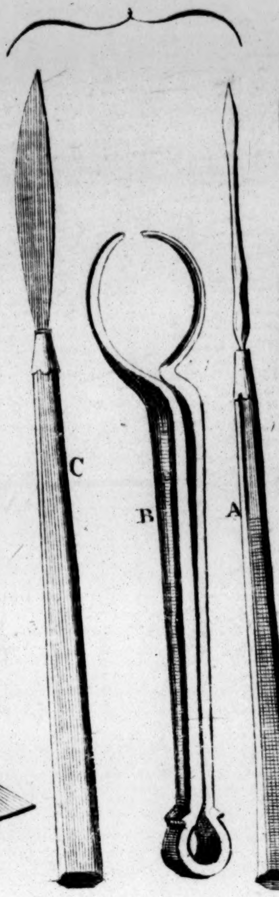

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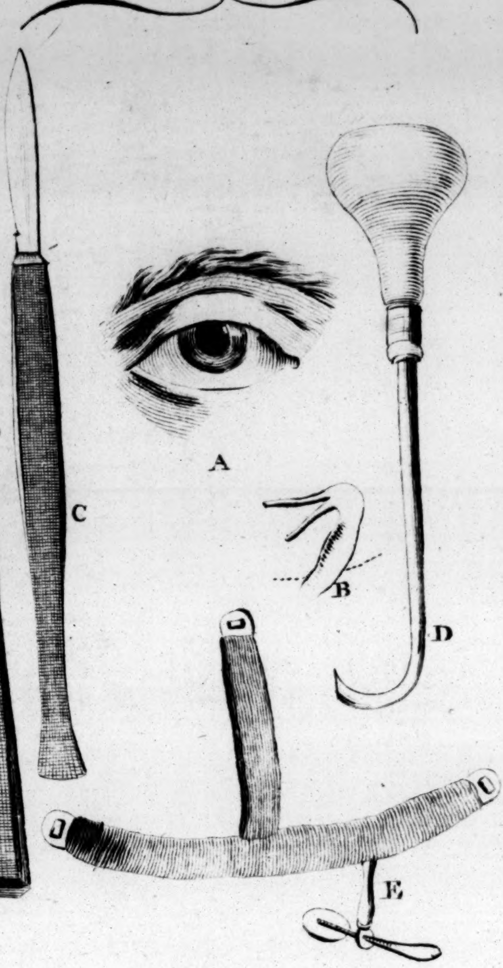

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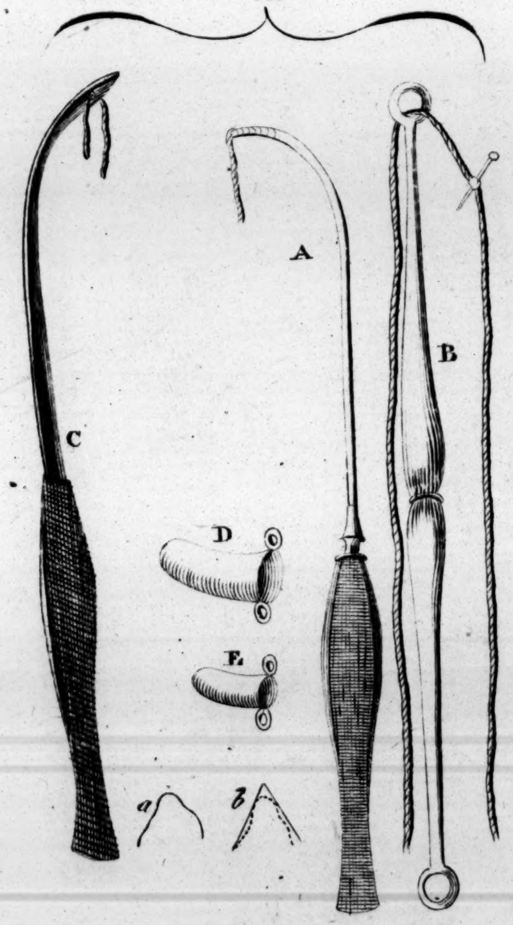

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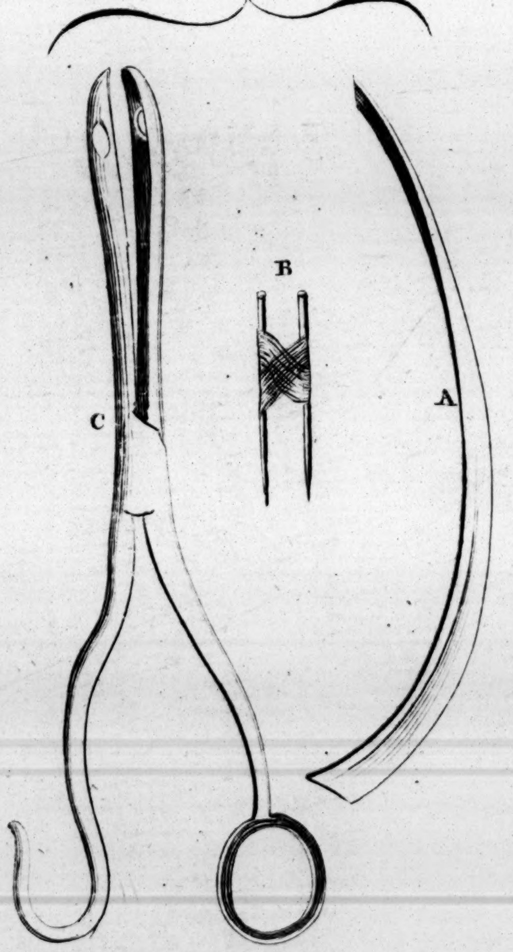

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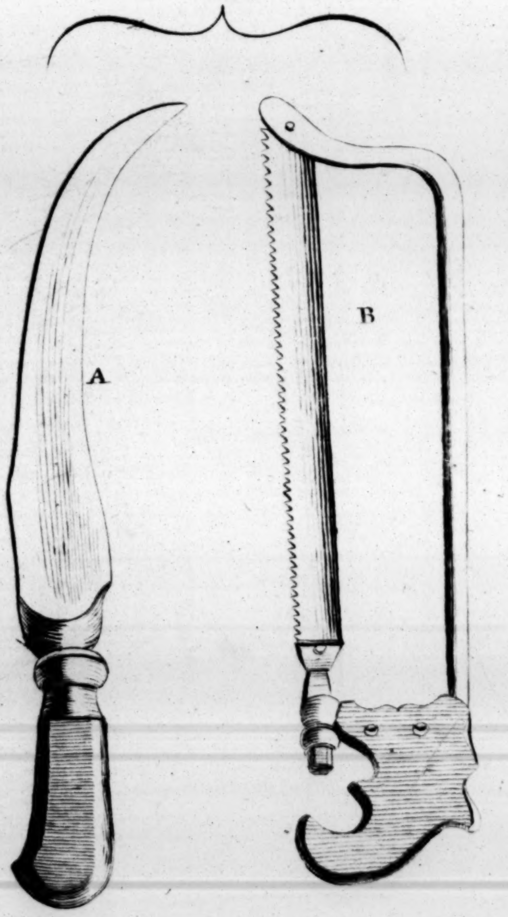
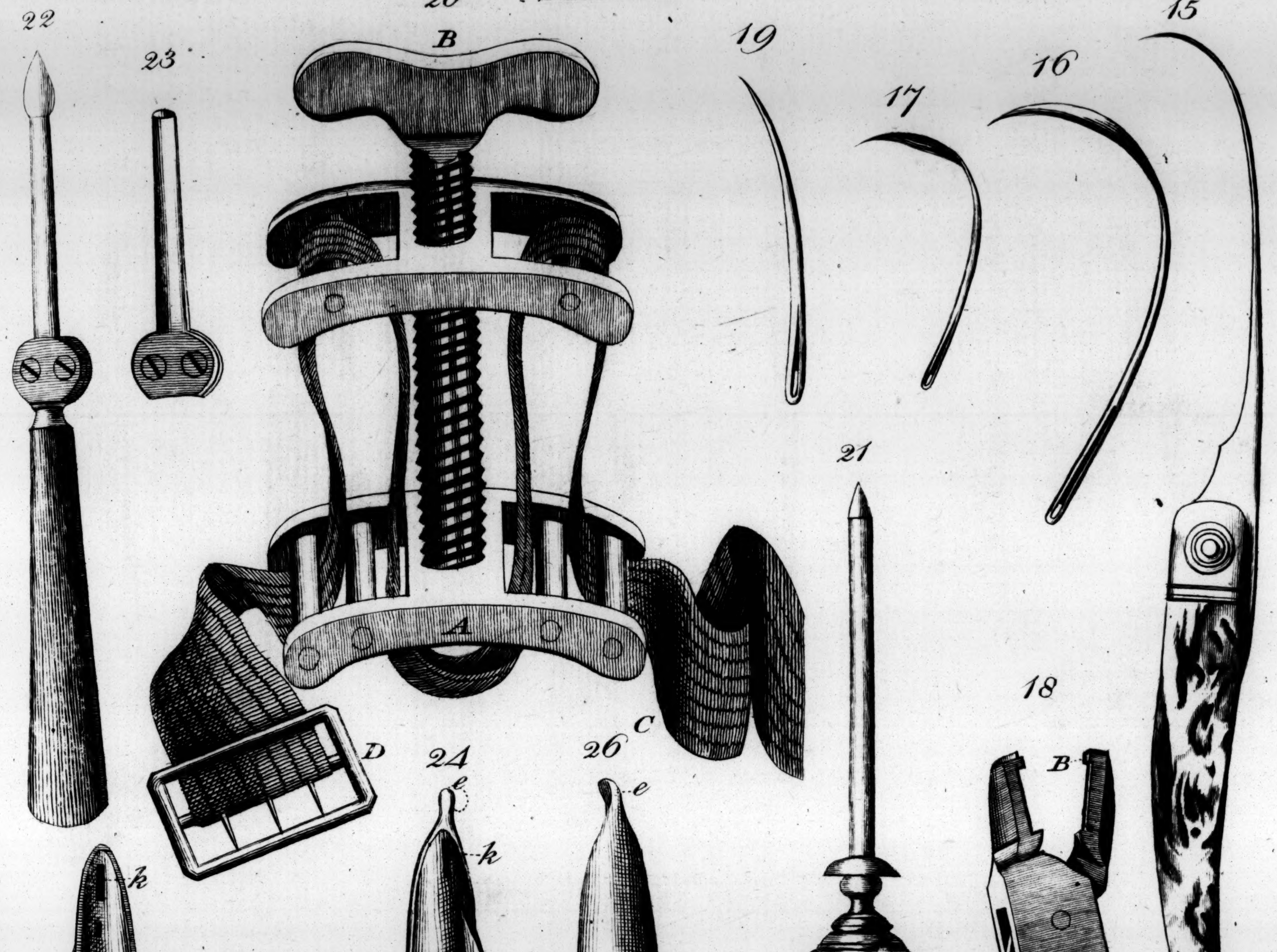


A Bell Sculp^t.

3 MA 53

SURGERY. Plate CCLXXX.



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A Bell Sculpt.

3 MA 53

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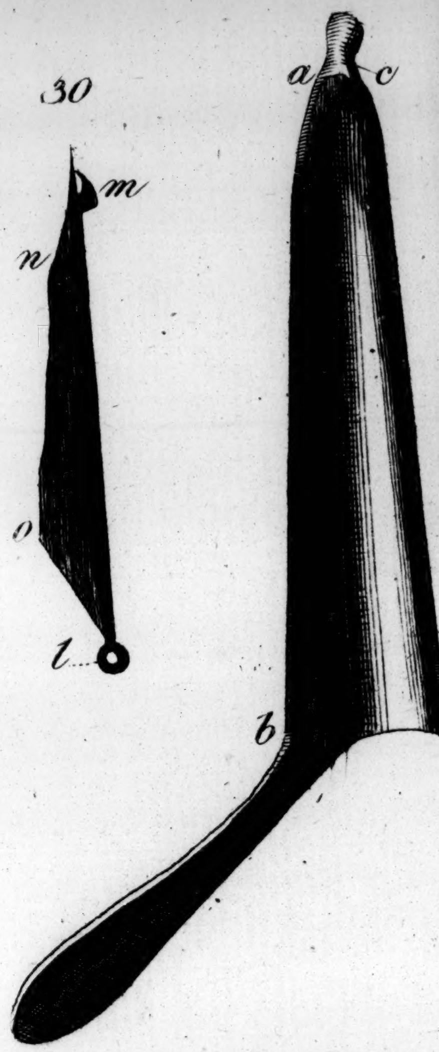

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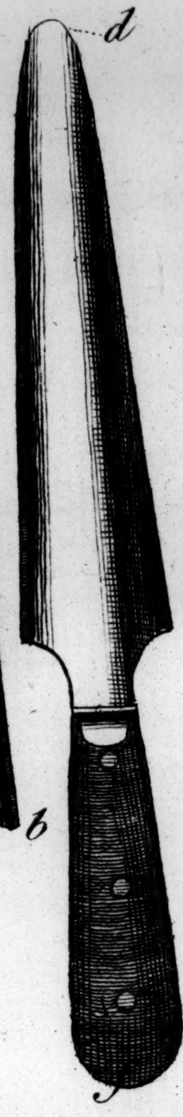

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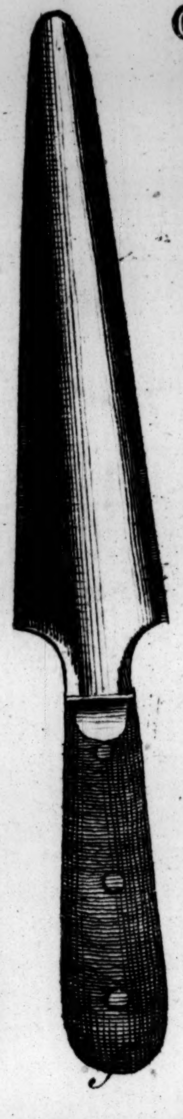

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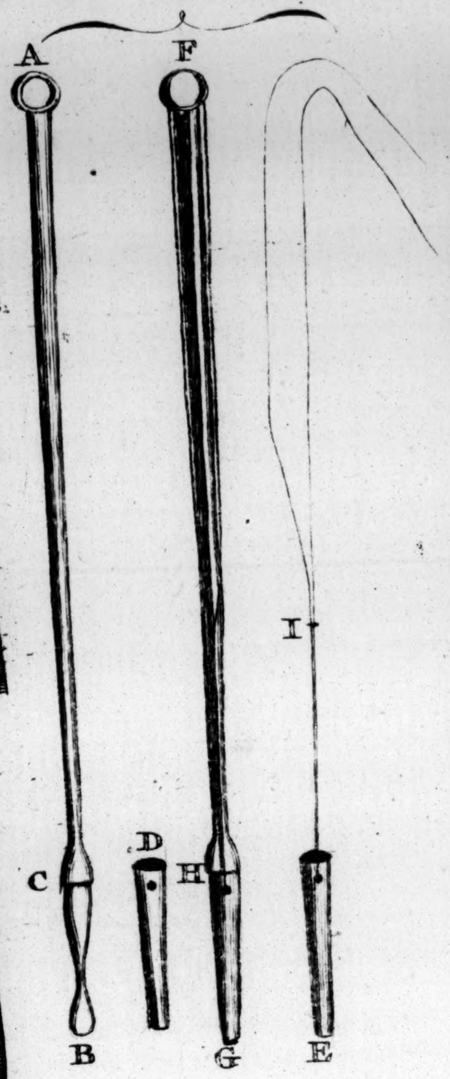

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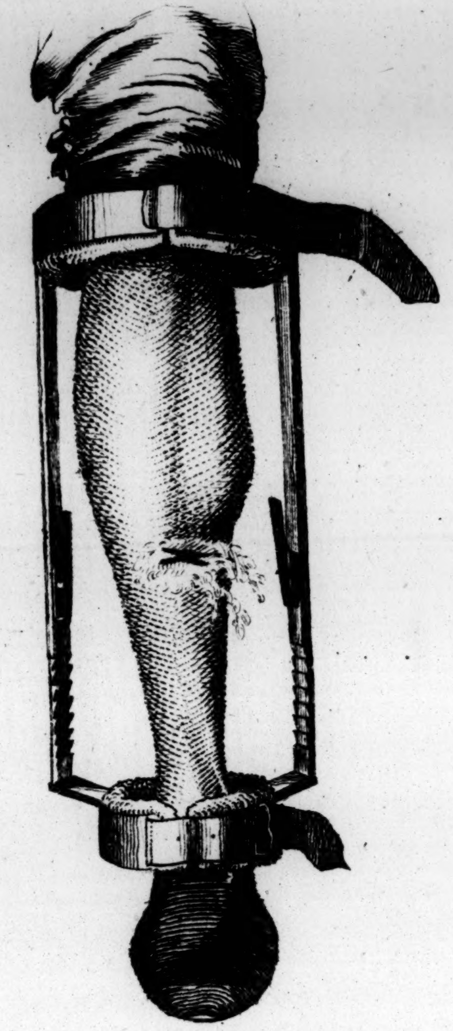

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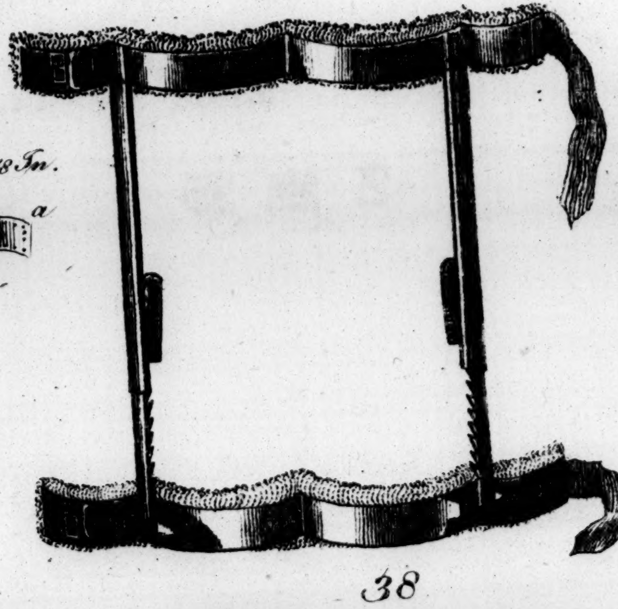

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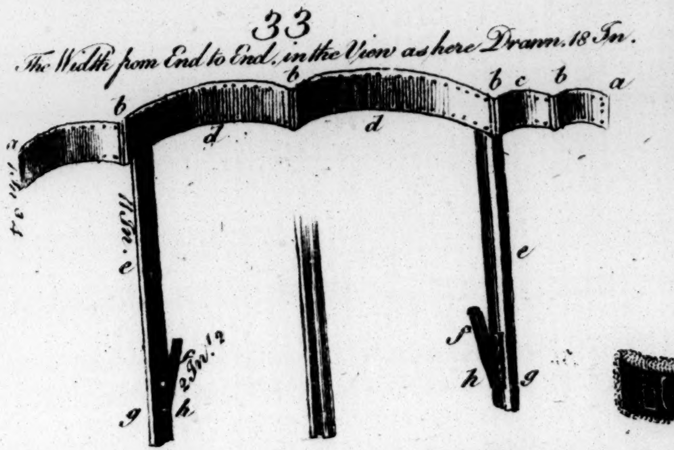
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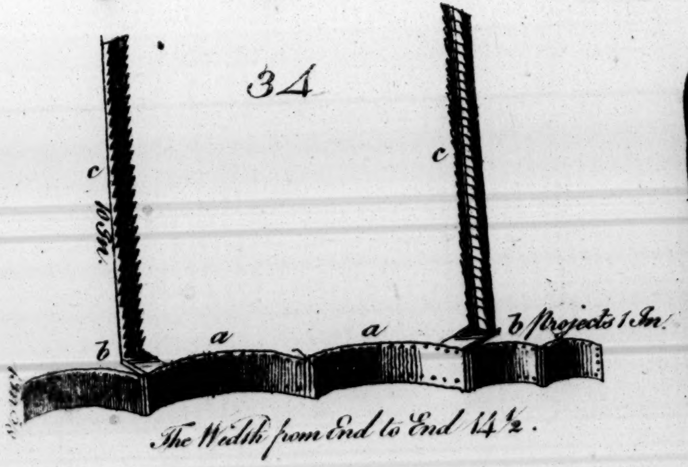
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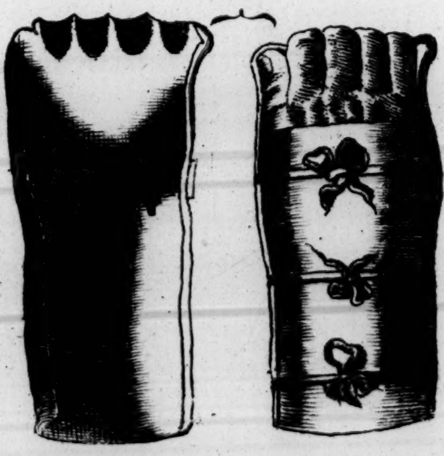

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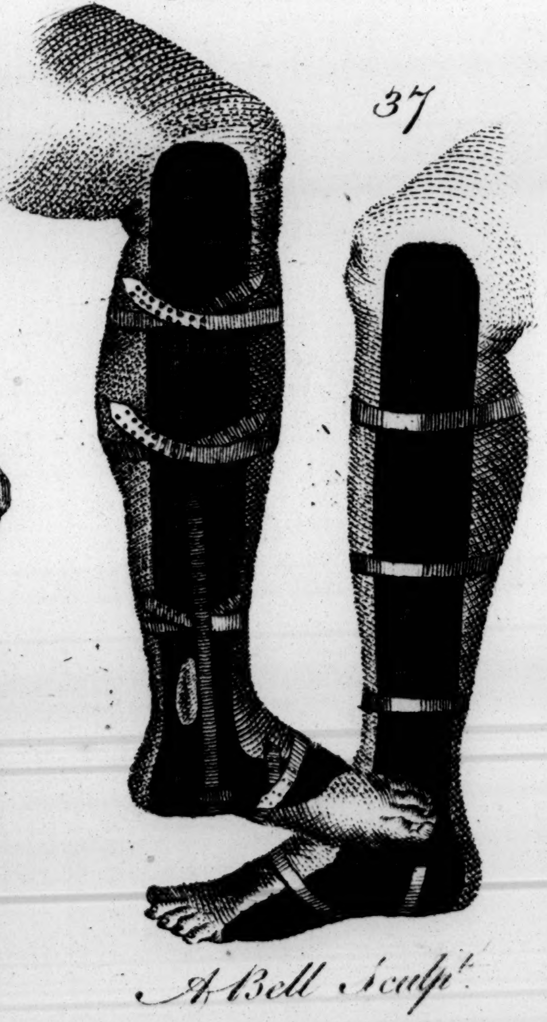

A Bell Sculpt.

3 MA 53

SURINAM, the capital of the Dutch ſettlements in Guiana, ſituated on a river of the ſame name, in N. Lat. 6. 16. W. Long. 56. 0. It gives name to the country for 100 miles round; and ſtands on a river of the ſame name, which is navigable for 30 leagues up the country. Beſides Surinam, there are ſeven or eight large towns, all rich and populous, and about 500 plantations. The colony is very flouriſhing, and carries on a conſiderable trade in ſugar, tobacco, cotton, flax, dyeing woods, &c.

SURMOUNTED, in heraldry, is when one figure is laid over another.

SURNAME, or SIRNAME, a name added to the proper or baptiſmal name, to denote the perſon of ſuch a family.

SURREPTITIOUS. See SUBREPTITIOUS.

SURROGATE, in law, denotes a perſon that is ſubſtituted or appointed in the room of another.

SURRY, a county of England, bounded on the weſt by Berkſhire and Hampſhire, on the ſouth by Suſſex, on the eaſt by Kent, on the north by Middleſex, from which it is parted by the Thames, whence it had the name of *Suth-rey* from the Saxons, i. e. the country on the ſouth-ſide of the river. It is 34 miles in length from eaſt to weſt, 21 in breadth from north to ſouth, and 112 in circumference. It contains 13 hundreds, 140 pariſhes, of which 35 are vicarages, 11 market-towns, 450 villages, 592,000 acres, and about 170,000 inhabitants. The members ſent from it to parliament are 14, of which two are ſent by each of the following boroughs, viz. Southwark, Bleechingley, Ryegate, Guildford, Gatton, Haſlemere, and two for the county.

The air of this county, towards the middle conſiſting moſtly of hills and heath, is ſharp, but pure and wholeſome. About the ſkirts, where it is more level, and the ſoil richer, the air is milder, but ſtill ſalubrious. In the middle parts the ſoil is barren enough in general; but towards the extremities, and where the country is open and champaign, it is fruitful in graſs and corn, particularly on the ſouth ſide in Holmſdale, in which meadows, woods, and cornfields, are agreeably intermixed. The ſoil is alſo very fertile along the Thames, eſpecially towards London, where it greatly contributes to maintain plenty in the London markets. It has ſeveral rivers, abounding with fiſh, the chief of which are the Wye, the Mole, and the Wandle. The firſt of theſe is of great benefit to the county, being navigable from Weybridge to the Thames, and thereby ſupplying many parts of it with neceſſaries of all ſorts. The Mole is ſo called becauſe it runs about two miles under-ground, entering at a place named the *Swallows*, at the bottom of Boxhill, and emerging again, as is commonly thought, at Leatherhead. The chief articles of commerce produced in the county, are corn, boxwood, walnuts, and fullers-earth, which is ſold at a groat a buſhel.

SURVEYING, the art of meaſuring land; that is, of taking the dimenſions of any tract of ground, laying down the ſame in a map or draught, and finding the content or area thereof. See GEOMETRY.

SURVEYOR, a perſon who has the overſight and care of conſiderable works, lands, or the like.

SURVEYOR, likewiſe denotes a gauger; as alſo a perſon who ſurveys lands, and makes maps of them.

SURVIVOR, in law, ſignifies the longeſt liver of joint tenants, or of any two perſons jointly intereſted in a thing.

SUS, in zoology, a genus of quadrupeds belonging to the order of belluæ. They have four converging fore-teeth in the upper jaw, and ſix prominent ones in the under jaw; the ſnout is truncated, prominent, and moveable. There are five ſpecies. 1. The ſcropha, or common hog, with the body covered with briſtles; two large teeth above and below. In a wild ſtate, of a dark brinded colour, and beneath the briſtles is a ſoft ſhort hair; the ears ſhort, and a little rounded. TAME: the ears long, ſharp-pointed, and ſlouching; the colour generally white, ſometimes mixed with other colours. In a tame ſtate it is univerſal; except in the frigid zones, and in Kamtchatka, where the cold is very ſevere. Since its introduction into America by the Europeans, it abounds to exceſs in the hot and temperate parts. It is found wild in moſt parts of Europe. In the foreſts of South America there are vaſt droves, which derive their origin from the European kind relapſed into a ſtate of nature; and are what Mr Bancroft in his Hiſtory of Guiana, 126, deſcribes as a particular ſpecies by the name of *Warree.* They cannot bear exceſſive cold; inhabit wooded countries; and are very ſwift. In America they are uſeful by clearing the country of rattle-ſnakes, which they devour with ſafety.

Of all quadrupeds, the hog is the moſt rude and brutal. The imperfections of his form ſeem to have an influence on his nature and diſpoſitions. All his habits are groſs; all his appetites are impure; all his ſenſations are confined to a furious luſt, and a brutal gluttony. He devours indiſcriminately every thing that comes in his way, even his own progeny the moment after their birth. This voraciouſneſs ſeems to proceed from the perpetual cravings of his ſtomach, which is of an immoderate ſize; and the groſſneſs of his appetites, it is probable, ariſes from the bluntneſs of his ſenſes of taſte and of feeling. The rudeneſs of the hair, the hardneſs of the ſkin, and the thickneſs of the fat, render theſe animals leſs ſenſible to blows. Mice have been known to lodge upon a hog's back, and to eat his ſkin and fat, without his ſhowing any marks of ſenſibility. The other ſenſes of the hog are very good. It is well known to the hunters that the wild boar hears and ſmells at a great diſtance; for, in order to ſurpriſe him, they are obliged to watch him in ſilence during the night, and to place themſelves oppoſite to the wind, that he may not perceive the ſmell, which never fails to make him turn back.

But the hog, though the moſt impure and filthy of all quadrupeds, is yet uſeful by the very ſordidneſs of its manners; this alone devouring what is the refuſe of all others, and contributing not only to remove what would be a nuiſance to the human race, but alſo converting the moſt nauſeous offals into the richeſt nutriment: for this reaſon its ſtomach is capacious, and its gluttony exceſſive: not that its palate is inſenſible to the difference of eatables; for where it finds variety, it will reject the worſt with as diſtinguiſhing a taſte as other quadrupeds.

The parts of this animal are finely adapted to its way of life. As its method of feeding is by turning up the earth with its noſe for roots of different kinds, ſo nature has given it a more prone form than other animals; a ſtrong brawny neck; eyes ſmall, and placed high in the head; a long ſnout, noſe callous and tough, and a quick ſenſe of ſmelling to trace out its food. Its inteſtines have a ſtrong reſemblance to thoſe of the human ſpecies. The external form of its body is very unwieldy; yet, by the ſtrength of its tendons, the wild boar (which is only a variety of the common kind) is enabled to fly from the hunters with amazing agility: the back-toe on the feet of this animal prevents its ſlipping while it deſcends declivities, and muſt be of ſingular uſe when purſued. Yet, notwithſtanding its powers of motion, it is by nature ſtupid, inactive, and drowſy; much inclined to increaſe in fat, which is diſpoſed in a different manner from that of other animals, and forms a regular coat over the whole body. It is reſtleſs at a change of weather, and in certain high winds is ſo agitated as to run violently, ſcreaming horribly at the ſame time: it is fond of wallowing in the dirt, either to cool its ſurfeited body, or to deſtroy the lice, ticks, and other inſects with which it is infeſted. Its diſeaſes generally ariſe from foul feeding and intemperance; meaſles, impoſthumes, and ſcrophulous complaints, are reckoned among them. Theſe are beſt prevented by keeping the animals, as the ancients ſtrongly recommended, very clean in their ſties; allowing them air, exerciſe, and a ſufficiency of water. Linnæus obſerves, that its fleſh is wholeſome food for athletic conſtitutions, or thoſe that uſe much exerciſe; but bad for ſuch as lead a ſedentary life: it is, however, of moſt univerſal uſe; and furniſhes numberleſs materials for epicuriſm.

The boar, or male of theſe creatures, is choſen with great care, when intended for the propagation of his ſpecies; and is thus employed from the age of two to five years, and then either ſold or fatted. The males not allotted to this uſe are caſtrated, ſometimes at the age of ſix weeks, and ſometimes when they are ſix months old; and then fed to a ſize either for ſale or for the uſe of the family. Sows are kept for breed generally from one year old to ſeven, and are then ſpayed and fatted. They have commonly more greaſe on their inteſtines than hogs, theſe being fatteſt on their backs.

As to the age of theſe animals, it is ſaid that the life of the wild boar may be extended to twenty-five or thirty years. Ariſtotle ſays, that hogs in general live twenty years; and adds, that both males and females are fertile till they arrive at the age of fifteen. They can engender at the age of nine or twelve months; but it is better to reſtrain them till they be eighteen months or two years. The firſt litter of the ſow is not numerous; and, when only one year old, her pigs are weak, and even imperfect. She may be ſaid to be in ſeaſon at all times. Though full, ſhe ſolicits the approach of the male. This may be regarded as an exceſs among animals; for almoſt every other ſpecies refuſe the male after conception. The ardour of the ſow, though almoſt perpetual, is however marked by paroxyſms and immoderate movements, which always terminate by her wallowing in the mire. She, at the ſame time, emits a thick whitiſh fluid. She goes four months with young; brings forth in the beginning of the fifth; and ſoon afterwards ſolicits the male, is impregnated a ſecond time, and of courſe brings forth twice a-year. The wild ſow, which every way reſembles the domeſtic kind, produces only once a-year. This difference in fertility is probably owing to want of nouriſhment, and the neceſſity of ſuckling her pigs much longer than the domeſtic ſow, which is never allowed to nurſe her young above fifteen days or three weeks. Only eight or nine of the litter are kept longer; the reſt are ſold. In fifteen days, pigs are excellent food.

As theſe creatures, though exceedingly voracious, will feed almoſt on any thing, they are bred and kept every where, and are quickly and cheaply fatted. In miry and in marſhy grounds (from which they are not averſe) they devour worms, frogs, fern, ruſh, and ſedge roots. In drier and in woody countries, they feed on hips, haws, ſloes, crabs, maſt, cheſnuts, acorns, &c. and on this food they will grow fleſhy and fat. They are a kind of natural ſcavengers, will thrive on the traſh of an orchard, the outcaſts of the kitchen, the ſweepings of barns and granaries, the offals of a market, and moſt richly on the refuſe of a dairy. If near the ſea, they will ſearch the ſhores for ſhell-fiſh; in the fields, they eat graſs; and in cities and large towns they are kept in great numbers, and ſupported chiefly by grains. It is evident that the facility of feeding them everywhere at a ſmall expence, is a national benefit, more eſpecially in a country where the people are accuſtomed to eat fleſh daily, and could not perhaps perform their daily labour if they did not. It is no leſs obſervable, that notwithſtanding this facility of feeding, and the multitudes of ſwine maintained, they ſeldom fail of coming to a good market. In no part of Europe is the management of theſe creatures better underſtood than in Britain. The time of farrowing is adjuſted to the nature of the farm, the food it can ſupply; and the number of pigs ſold and kept are in like manner adjuſted. New kinds of food, more wholeſome and nutritive than what were uſed formerly, have been introduced, ſuch as turnips, carrots, clover, &c. They are in moſt places regularly managed and cloſely attended. Tuſſer, many years ſince, affirmed from his own experience, that a ſow might bring as much profit as a cow. In ſome counties, it is ſaid, a ſow dependent on a dairy hath produced, all expences deducted, about 10 l. in the ſpace of a year. It may be ſome ſatisfaction to the reader to know, that, on a nice calculation, the annual profits of a ſow in France are found to be between 50 and 60 livres.——In Britain, theſe animals in different counties are of very different ſizes. In Leiceſterſhire, Northamptonſhire, and Pembrokeſhire, they are very large. In Hampſhire, Wiltſhire, and wherever they can run in the woods, and feed on maſt and acorns, their fleſh is firmer and better. The Chineſe breed are common with us: they are ſmaller, blacker, and their legs ſhorter than ours; ſo that, when fat, their bellies literally touch the ground. They thrive exceedingly well with us, are very prolific, and their fleſh admirably fine and well-taſted.

In conſidering the advantages derived from theſe creatures, it is to be obſerved, that the fleſh of all their different kinds, and at all ages, is looked upon as a very ſubſtantial and agreeable aliment, and of courſe, in their proper ſeaſons, the different ſorts of proviſions this ſupplies are all of them very ſaleable. The wild boar was eſteemed a prime delicacy amongſt the Romans, and the fleſh of the tame was much more in favour with our anceſtors than with us; though **BRAWN** has ſtill many admirers, is made in the greateſt perfection, and conſidered as a rarity peculiar to this country. Pork, though it might be wiſely prohibited in ſome warm countries, is found by experience equally nutritive and ſalutary here. As ſuch it furniſhes a very large proportion of that food which is vended in our markets. It takes ſalt better, and keeps longer, than the fleſh of any other animal; and the conſumption of it is prodigious when pickled or ſalted, more eſpecially in our foreign garriſons and in the ſea-ſervice. Our bacon is differently cured, ſo as to render it acceptable to all palates; and our hams are not at all inferior to thoſe of other countries. Freſh pork ſells nearly as dear as beef; the lard brings double or triple the price; the blood, the inteſtines, the feet, and the tongue, are all prepared as food. The fat of the inteſtines and web, which differs from common lard, is employed for greaſing axles of wheels, and many other purpoſes. Sieves are made of the ſkin; and bruſhes, pencils, &c. of the briſtles. The dung is reputed next in value to that of ſheep. Mr Worlidge (Survey of Huſbandry, p. 172.) propoſes that ſwine ſhould be turned into a cloſe, well-paled, and planted with greens, pulſe, and roots, on which they may feed, and by their trampling and their dung raiſe a great quantity of excellent ſoil. Mr Mortimer aſſures us (Art of Huſbandry, vol. i. p. 117.) that ſome, on poor light ſhallow land in Staffordſhire, ſow a ſmall white pea, which they never reap, but turn in ſo many hogs to eat them as they think they will fat; and there they lie day and night, and their dung will ſo enrich the land, that it will bring a good ſward upon it, and will graze many years afterwards. Our old huſbandmen had an ill opinion of this dung, as ſuppoſing it bred weeds, which any dung will do that abounds in ſalts. In ſome places they waſh with hogs dung for want of ſoap; which anſwers tolerably well, if the linen hangs long enough in the air to become thoroughly ſweet.

The wild boar was formerly a native of our country, as appears from the laws of Hoel dda, who permitted his grand huntſman to chace that animal from the middle of November to the beginning of December. William the Conqueror puniſhed with the loſs of their eyes any that were convicted of killing the wild boar, the ſtag, or the roebuck; and Fitz-Stephen tells us, that the vaſt foreſt that in his time grew on the north-ſide of London, was the retreat of ſtags, fallow-deer, wild boars, and bulls. Charles I. turned out wild boars in the New Foreſt, Hampſhire; but they were deſtroyed in the civil wars.

On the continent the wild boar is hunted with dogs, or killed by ſurpriſe during the night, when the moon ſhines. As he flies ſlowly, leaves a ſtrong odour behind him, and defends himſelf againſt the dogs, and often wounds them dangerouſly, fine hunting dogs are unneceſſary, and would have their noſe ſpoiled, and acquire a habit of moving ſlowly by hunting him. Maſtiffs, with very little training, are ſufficient. The oldeſt, which are known by the tract of their feet, ſhould only be attacked: A young boar of three years old is difficult to hunt down; becauſe he runs very far far without ſtopping. But the older boars do not run far, allow the dogs to run near, and often ſtop to repel them. During the day, he commonly remains in his ſoil, which is in the moſt ſequeſtrated part of the woods. He comes out in the night in queſt of food. In ſummer, when the grain is ripe, it is eaſy to ſurpriſe him among the cultivated fields, which he frequents every night. As ſoon as he is ſlain, the hunters cut off his teſticles, the odour of which is ſo ſtrong, that in a few hours it would infect the whole fleſh. The ſnout of an old boar is the only part that is eſteemed; but every part of the caſtrated and young boar, not exceeding one year fed, makes delicate eating. The pork of the domeſtic boar is ſtill worſe than that of the wild boar; and it can only be rendered fit for eating by caſtration and fattening. The ancients caſtrated the young boars which they could carry off from their mothers, and returned them to the woods, where they grew fat, and their pork was much better than that of domeſtic hogs.

2. The æthiopicus, or Ethiopian hog, with ſmall tuſks in the lower jaw, very large ones in the upper, in old boars bending towards the forehead in form of a ſemicircle: no foreteeth: noſe broad, depreſſed, and almoſt of a horny hardneſs: head very large and broad: beneath each eye a hollow, formed of looſe ſkin, very ſoft, and wrinkled; under theſe a great lobe or wattle, lying almoſt horizontal, broad, flat, and rounded at the end, placed ſo as to intercept the view of any thing below from the animal. Between theſe and the mouth on each ſide, there is a hard callous protuberance. The mouth is ſmall: ſkin duſky: briſtles diſpoſed in faſciculi, of about five each; longeſt between the ears and on the beginning of the back, thinly diſperſed on the reſt of the back. Ears large and ſharp-pointed, inſide lined with long whitiſh hairs: tail ſlender and flat, not reaching lower than the thighs, and is covered with hairs diſpoſed in faſciculi. Body longer, and legs ſhorter, than in the common common ſwine: its whole length 4 feet 9 inches; height before, 2 feet 2 inches: but in a wild ſtate, it grows to an enormous ſize.—Theſe animals inhabit the hotteſt parts of Africa, from Senegal to Congo, alſo the iſland of Madagaſcar. We know little of their nature; but they are repreſented as very fierce and ſwift, and that they will not breed with the domeſtic ſow.

3. The tajacu, or pecary, with four cutting teeth above, and ſix below: two tuſks in each jaw; thoſe in the upper jaw pointing down, and little apparent when the mouth is ſhut; the others hid: length from noſe to the end of the rump about three feet: head not ſo taper as in common ſwine: ears ſhort and erect: body covered with briſtles, ſtronger than thoſe of the European kind, and more like thoſe of a hedge-hog; they are duſky, ſurrounded with rings of white; thoſe on the top of the neck and back are near five inches long, grow ſhorter on the ſides; the belly almoſt naked; from the ſhoulders to the breaſt is a band of white: no tail: on the lower part of the back is a gland, open at the top, diſcharging a fetid ichorous liquor; this has been miſtakenly called a *navel*—Inhabits the hotteſt parts of South America, and ſome of the Antilles: lives in the foreſts on the mountains: not fond of mire or marſhy places: leſs fat than the common hog. They go in great droves. They are very fierce, and will fight ſtoutly with the beaſts of prey: the ja-

guar, or American leopard, is their mortal enemy; often the body of that animal is found with ſeveral of theſe hogs ſlain in combat. Dogs will ſcarce attack this animal: if wounded, it will turn on the hunters. They feed on fruits and roots; alſo on toads and all manner of ſerpents, which they hold with the fore-feet and ſkin with great dexterity. The fleſh is reckoned very good food; but all writers agree that the dorſal gland muſt be cut out as ſoon as the animal is killed, or the fleſh will become ſo infected as not to be eatable. The Indian name of this ſpecies is *paquiras*, from whence ſeems to be derived that of *pecary*.

Plate CCLXXVI fig. 1.

4. The babyruſſa, or Indian hog, with four cutting teeth in the upper, ſix in the lower jaw; ten grinders to each jaw; in the lower jaw two tuſks pointing towards the eyes, and ſtanding near eight inches out of their ſockets; from two ſockets on the outſide of the upper jaw two other teeth, twelve inches long, bending like horns, their ends almoſt touching the forehead: ears ſmall, erect, ſharp-pointed: along the back are ſome weak briſtles; on the reſt of the body only a ſort of wool, ſuch as is on the lambs: the tail long, ends in a tuft, and is often twiſted: the body plump and ſquare. Inhabits Buero, a ſmall iſle near Amboina: it is alſo found in Celebes, but neither on the continent of Aſia or Africa; what M. de Buffon takes for it is the Ethiopian boar. They are ſometimes kept tame in the Indian iſles: live in herds: have a very quick ſcent: feed on herbs and leaves of trees; never ravage gardens like other ſwine: their fleſh well-taſted. When purſued and driven to extremities, they ruſh into the ſea, ſwim very well, and even dive, and paſs thus from iſle to iſle. In the foreſts they often reſt their heads, by hooking their upper tuſks on ſome bough. The tuſks, from their form, are uſeleſs in fight.

5. The hydrochæris, or river-hog, has a very large and thick head and noſe; ſmall rounded ears; large black eyes; upper jaw longer than the lower: two ſtrong and great cutting teeth, and eight grinders, in each jaw; and each of thoſe grinders form on their ſurface ſeemingly three teeth, each flat at their ends: legs ſhort; toes long, connected near their bottoms by a ſmall web; their ends guarded by a ſmall hoof: no tail: hair on the body ſhort, rough, and brown; on the noſe, long and hard whiſkers. It grows to the ſize of a hog of two years old.—Inhabits the eaſtern ſide of South America, from the iſthmus of Darien to the river of Amazons: lives in the fenny parts not remote from the banks of great rivers: runs ſlowly; ſwims and dives remarkably well, and keeps for a long time under water: feeds on fruits and vegetables: is very dexterous in catching fiſh, which it brings on ſhore and eats at its eaſe: it ſits up, and holds its prey with its fore-feet, feeding like an ape: feeds in the night, and commits great ravages in gardens. They keep in large herds, and make a horrible noiſe like the braying of an aſs. The fleſh is tender, but has an oily and fiſhy taſte. They are eaſily made tame, and grow very fat.

SUSA, the ancient royal reſidence of the kings of Perſia, built by Darius Hyſtaſpis, according to Pliny; though he probably only reſtored it, being a very ancient city, founded by Tithonus father of Memnon. It was in compaſs 120 ſtadia, of an oblong quadrangular form, with a citadel called *Memnoneum*. In ſcripture it is called *Suſan*, the royal citadel, from the great number of lilies growing in that diſtrict (Athenæus); ſituate on the river Uhlai, or Eulæus (Daniel): and the Spaniards call at this day a lily *aſuſena* (Pinedo.) Suſa was the winter, as Ecbatana was the ſummer, reſidence of the kings of Perſia, (Xenophon, Strabo, Plutarch.) Here the kings kept their treaſure, (Herodotus.) Now called *Tuſter*.

SUSPENSION, in Scots law. See Law, N° clxxxv. 5. 6. 7.

SUSSEX, a county of England, deriving its name from its ſituation in reſpect of the other Saxons, and called *Suſſex*, i. e. the country of the South Saxons, has Hampſhire on the weſt, the Britiſh channel on the ſouth, Surry on the north, and Kent on the eaſt. Its length is 65 miles, its breadth 29, and its circumference 170. It is divided into 6 rapes, and theſe into 65 hundreds, in which are 312 pariſhes, of which 123 are vicarages, one city, 18 market-towns, 1060 villages and hamlets, and about 120,000 thouſand ſouls. It has few good ports, though it lies along the channel for 65 miles, which is its greateſt length, the coaſt being encumbered in many places with rocks; and where it is more open, ſuch quantities of ſand are thrown upon it by the ſouth-weſt winds, and the harbours ſo choaked up, that they will not admit veſſels of any great draught or burden. The county is well watered by the rivers Arun, Adar, Ouſe, Rother, Lavant, Cuckmeer, Aſhburn, and Aſten, by which it is well ſupplied with fiſh, as well as from the ſea. Hence different places of the county are famed for different ſorts of fiſh, as the Arun for mullets, which enter it from the ſea in ſummer in ſhoals, and by feeding upon a particular kind of herb become extremely delicious; Chicheſter for lobſters, Selſey for cockles, Amberley for trout, Pulborough for eels, Rye for herrings, and the county in general for carp. It is remarkable, that all the rivers above-mentioned riſe and fall into the ſea within the county.

The air, as well as the ſoil, is various in different parts of the county. Upon the coaſt the air is aguiſh, upon the hills and downs pleaſant and wholeſome; but ſomewhat moiſt and foggy in the valleys, the ſoil being deep and rich, and the vegetation in ſummer very vigorous. The downs in ſome places are very fertile in corn and graſs; in others they feed great flocks of ſheep, whoſe fleſh and wool are very fine; but of the latter no inconſiderable quantity is clandeſtinely exported to France. In the Weald and the valleys the roads are very deep, eſpecially in winter. In the north quarter are many woods, and ſome foreſts in other places; whence the king's yards are ſupplied with the largeſt and beſt timber in England, beſide what is made into charcoal and conſumed in the iron-works; for on the eaſt ſide is plenty of iron ore, with furnaces, forges, and mills for manufacturing it. The gunpowder of this county is ſaid to excel that of any other. Thoſe delicious birds called *wheat-ears* are bred in this ſhire: they are no bigger than a lark, but almoſt an entire lump of fat. That part now called the *Wild* or *Weald* of Suſſex, was anciently a mere deſert for hogs and deer, of great extent, taking in a part of Kent and Surry; and was called *Anderida Silva*, *Coid Andred*, and *Andradſwald*, from Anderida an adjoining city. This county is in the home-circuit and dioceſe of Chicheſter, giving title of earl to the family of Yelverton, and ſends 28 members to parliament, viz. two for the county, two for the city of Chicheſter, and two for each of the following towns, Horſham, Lewis, Bramber, Eaſt-Grinſtead, Midhurſt, Shoreham, Steyning, Arundel, Haſtings, Rye, Winchelſea, and Seaford; of which the four laſt are cinque-ports.

SUTHERLAND, one of the moſt northerly counties of Scotland. Including Strathnavern, it borders on Caithneſs to the eaſt and north-eaſt, is bounded by the ocean on the north, the country of Aſſynt on the weſt, Roſſe on the ſouth, and by the German ſea on the eaſt and ſouth-eaſt. It ſtretches about 80 miles in length, and 40 in breadth; is generally hilly, though in many parts arable; well watered with ſmall rivers and ſtreams replete with fiſh, and exhibiting about 60 lakes, the habitation of various fiſh, ſwans, ducks, geeſe, &c. The largeſt of theſe is Lochfyn, extending 41 miles in length: ſome of them are interſperſed with ſmall verdant iſlands, which in ſummer yield a very agreeable proſpect. On the coaſt are many commodious harbours, and all the bays ſwarm with fiſh; nay, the ſea in this place produces ſome valuable pearls. Sutherland affords iron, ſtone, free-ſtone, lime-ſtone, and ſlate, in abundance. Here are alſo quarries of marble, and mines of coal, though the people uſe turf and peat for fuel. Lead-ore, impregnated with ſilver, and even ſome gold, hath been found in this province, together with cryſtals and pebbles.

The air is ſo temperate, and the ſoil ſo good, that ſaffron has here been brought to perfection. Many parts of the country are remarkably fruitful in corn, and the paſturage is excellent every where. Beſides three great foreſts, there are many ſmaller woods in Sutherland, abounding with deer and other game. On the hills are fed numerous flocks of ſheep and black cattle; ſmall, yet ſweet and juicy. There is one bird peculiar to this ſhire, called *knag*, which reſembles a parrot, and digs its neſt with its beak in the trunks of oaks. The northern part, called *Strathnavern*, and ſeparated from the reſt by a ridge of mountains, is bounded on the north and weſt by the Deucaledonian and Vergivian oceans, on the eaſt by Caithneſs, and on the ſouth by Aſſynt. The length of it, from eaſt to weſt, amounts to 34 miles; but the breadth from north to ſouth does not exceed 12 in ſome places. It is very hilly; and the mountains are ſo high, that the ſnow remains on the tops of them till midſummer. It is watered by Navern, from whence it derives it name: as this diſtrict gives a title to the eldeſt ſon of the earl of Sutherland. Here are ſeveral woods, frequented by deer and other game, which the people take great delight in hunting. Iron-mines have been worked in ſome places, but to no great advantage. Strathnavern has many freſh-water lakes or lochs; the chief of which are Loch Navern, and Loch Lyel: there are ſeveral iſlands on the northern coaſt; and in various parts of the country we ſee monuments of victories obtained over the Danes or other foreign invaders. Sutherland boaſts of ſome towns, and a great many villages. The people are numerous, hardy, bold, and enterpriſing; courteous to ſtrangers; cheerful, open, frugal, and induſtrious. They, as well as their neighbours of Caithneſs, ſpeak the language, and wear the garb, uſed in the Lowlands of Scotland. They carry on a conſiderable ſalmon-fiſhery. They drive a traffic with their black cattle, ſheep, and horſes, at the neighbouring fairs; but export their corn, barley, ſalt, coal, ſalmon, ſalted beef, butter, cheeſe, wool-ſkins, hides, and tallow. Here are proviſions of all ſorts in plenty; and ſo cheap through all this country, that a gentleman may keep houſe and live much more ſumptuouſly for 200l. a year than he can live for three times the money in the ſouth of England.

SUTLER, in war, on who follows the army and furniſhes the troops with proviſion. They pitch their tents, or build their huts, in the rear of each regiment, and about head-quarters.

SUTRIUM, (anc. geog.) a famous city, and an ancient colony of the Romans; the key of Etruria. The colony led ſeven years after the taking of Rome by the Gauls, (Velleius). Now *Sutri* in St Peter's patrimony, on the river Pozzolo; ſurrounded on every ſide with rocks, 24 miles to the north-weſt of Rome.

SUTTON (Samuel), was born at Alfretton in Derbyſhire, and going into the army ſerved under the duke of Marlborough in queen Anne's wars with great credit. He afterwards came to London, commenced brewer, and kept a coffee-houſe in Alderſgate ſtreet, which was well frequented by the learned men of that time, by whom Mr Sutton was much reſpected, as a man of ſtrong natural parts and uncultivated genius. About the year 1740, he ſchemed a very ſimple and natural method for extracting the foul air from the wells of ſhips, by pipes communicating with the fire places of the coppers; which operated as long as any fire was kept burning for the ſhip's uſe. In this happy invention, ſo conducive to the ſafety of mariners, he met, however, with a formidable competitor in Dr Stephen Hales; who was at the ſame time engaged in promoting his own ventilators: tho' theſe ventilators were by no means ſo well adapted to ſea-uſe, where room and labour are precious, as Sutton's air pipes; which could ſcarcely be ſaid to occupy any room, and required no labour to work them, as they produced a regular circulation of air, on philoſophical principles. Nevertheleſs, though Mr Sutton's invention was warmly patronized by Dr Mead and Dr Watſon, it was ungenerouſly diſcouraged by ſome leading men in the navy department. Dr Mead annexed an account of theſe air-pipes, and the hiſtory of the author's difficulties in procuring a fair trial to be made of them, to his Diſcourſe on the Scurvy. Mr Sutton took out a patent in 1744, to ſecure the profits of his invention to himſelf; and died about the year 1752.

SUTTON's *Air-pipes*. See AIR-*Pipes*.

SUTURE, in anatomy, a kind of articulation peculiar to the cranium or ſkull. See ANATOMY, nº 2 e. and chap. ii. *paſſim*.

SUTURE, in ſurgery, a method of uniting the lips of wounds together. See SURGERY, nº 65, 397, *et ſeq*.

SWABBER, an inferior officer on board ſhips of war, whoſe employment it is to ſee that the decks are kept clean and neat.

SWALLOW, in ornithology. See Hirundo.

Swallow-*Wort*, in botany. See Asclepias.

SWAMMERDAM (John), a celebrated and learned natural philoſopher, was the ſon of John James Swammerdam, an apothecary and famous naturaliſt of Amſterdam, and was born in 1637. His father intended him for the church, and with this view had him inſtructed in Latin and Greek; but he, thinking himſelf unequal to ſo important a taſk, prevailed with his father to conſent to his applying himſelf to phyſic. As he was kept at home till he ſhould be properly qualified to engage in that ſtudy, he was frequently employed in cleaning his father's curioſities, and putting every thing in its proper place. This inſpired our author with an early taſte for natural hiſtory; ſo that, not content with the ſurvey of the curioſities his father had purchaſed, he ſoon began to make a collection of his own, which he compared with the accounts given of them by the beſt writers. When grown up, he ſeriouſly attended to his anatomical and medical ſtudies; yet ſpent part of the day and the night in diſcovering, catching, and examining the flying inſects proper to thoſe different times, not only in the province of Holland, but in thoſe of Guelderland and Utrecht. Thus initiated in natural hiſtory, he went to the univerſity of Leyden in 1651; and, in 1663, was admitted a candidate of phyſic in that univerſity. His attention being now engaged by anatomy, he began to conſider how the parts of the body, prepared by diſſection, could be preſerved, and kept in conſtant order for anatomical demonſtration; and herein he ſucceeded, as he had done before in his nice contrivances to diſſect and manage the minuteſt inſects. Our author afterwards made a journey into France, where he ſpent ſome time at Saumur, and where he became acquainted with ſeveral learned men. In 1667, he returned to Leyden, and took up his degree of doctor of phyſic. The next year the grand duke of Tuſcany being in Holland, in order to ſee the curioſities of the country, came to view thoſe of our author and his father; and on this occaſion Swammerdam made ſome anatomical diſſections of inſects in the preſence of that prince, who was ſtruck with admiration at our author's great ſkill in managing them, eſpecially at his proving that the future butterfly lay with all its parts neatly folded up in a caterpillar, by actually removing the integuments that covered the former, and extricating and exhibiting all its parts, however minute, with incredible ingenuity, by means of inſtruments of inconceivable fineneſs. On this occaſion the duke offered our author 12,000 florins for his ſhare of the collection, on condition of his removing them himſelf into Tuſcany, and coming to live at the court of Florence; but Swammerdam, who hated a court life, declined his highneſs's propoſal. In 1663, he publiſhed a General Hiſtory of Inſects. About this time, his father began to take offence at his inconſiderately neglecting the practice of phyſic, which might have ſupported him in affluence; and would neither ſupply him with money nor cloaths. This reduced him to ſome difficulties. In 1675, he publiſhed his Hiſtory of the Ephemeras; and his father dying the ſame year, left him a fortune ſufficient for his ſupport: but he did not long ſurvive him, for he died in 1682. Gaubius gave a tranſlation of all his works from the orginal Dutch into Latin, from which they were tranſlated into Engliſh, in folio, in 1758. The celebrated Boerhaave wrote his life.

SWAN, in ornithology. See Anas.

SWANPAN, or Chineſe Abacus; a board or inſtrument for performing arithmetical operations, deſcribed by Du Halde in his Hiſtory of China. The following conſtruction is an improvement of that by Mr G. Smethurſt, publiſhed in the Gent. Mag. for 1748.

Plate CCLXX.

In the ſquare frame of wood A B C D, are four diviſions formed by the bars E F and G H; of theſe diviſions three are ſeparated into two parts by the leſſer bars *a b*. In each of the ſmaller diviſions are placed wires, to be taken out at pleaſure; and on each of the wires in the left-hand diviſions is ſtrung a ſmall ivory ball, or large bead; and on the wires on the right-hand diviſion are placed four ſuch balls or beads.

The balls in the left-hand diviſions, when brought up to the middle bar, ſtand each for five; and thoſe in the right diviſions, when brought to the bar, ſtand for units.

The balls in the two lower diviſions repreſent integers, or the whole of any quantity; thoſe on the uppermoſt wires ſtand for ten of ſuch integers, the next for hundreds, and ſo on, as is expreſſed in the figure. The wires, in all the diviſions, may be increaſed to any number you think proper.

The balls in the four upper diviſions repreſent parts of integers; thoſe in the two diviſions next the left-hand ſtand for tens; and thoſe in the two other diviſions, for units of ſuch parts.

Now if the ſum you would ſet down be integers, begin with the balls in the two lower diviſions: for example, on the third row from the top bring two balls, of the right hand diviſion, up to the middle bar (ſee the figure); then bring up two on the next row, and one on the ſame row in the left diviſion; next, four on the top row, and one on the other ſide of the ſame row: then in the firſt row of units, from the bottom, and in the right-hand diviſion, place two balls, on the ſecond row one, and one alſo on the ſame line in the right-hand diviſion of tens; laſtly, on the third row of units place three balls. The balls being thus placed, if the integers be pounds ſterling, they will expreſs 279 l. 2s. 11¼d. If the integers be hundred weights, the ſum will be 279 cwt. 2 qrs. 11 lb. 3 oz.; or if they be years, they will denote 279 years, 2 months, 11 days, 3 hours.

A part of theſe balls may repreſent fractions, either vulgar or decimal: the balls in the firſt two diviſions of parts may ſtand for the numerators, and thoſe in the other two for denominators; or the numbers in either of theſe diviſions may be added to thoſe in the integers, as decimals. There may alſo be holes made in the bars where the dots are placed, in which pegs may be occaſionally put, to ſhow that thoſe numbers ſtand for fractions.

By this inſtrument all the operations of arithmetic may be readily performed. Suppoſe, for example, you would multiply the ſum ſet down in the diviſion of integers, that is, 279, by 3. Begin with the loweſt line, and ſay 3 times 2 is 6, therefore ſet that number up; then on the next row, ſay 3 times 7 is 21, therefore inſtead of 7 ſet up 1 on that line, and carry the two tens to the line below, which will make the number there 8. Then at the upper line ſay, 3 times 9 is 27, therefore ſet 7 on that line, and carry 2 to the next line below, which will make that number 3. So that the balls on the three lines will then expreſs 837.

If you would divide 279 by 3, begin in like manner with the loweſt line: but as 3 cannot be taken in 2, you add the next number to it, and ſay, the threes in 27 are 9; therefore ſet back the 2 on the loweſt line, and place 9, inſtead of 7, on the next line above: then at the uppermoſt line ſay, the threes in 9 are 3; therefore inſtead of 9 place 3 on that line, and conſequently the quotient will be 93. When there is a remainder, it may be placed with the diviſor, as a fraction, in the upper diviſions. Where there are many figures in the multiplicand and multiplier, the latter may be placed in the firſt two diviſions of parts, and the former and products in the diviſions of integers. In like manner, when there are ſeveral figures in the dividend and diviſor, the former may be placed in the diviſion of integers, the latter in the firſt two diviſions of parts, and the figures of the quotient, as they riſe, in the remaining two diviſions.

It is well worth obſerving, that by means of this inſtrument a blind man may be taught to add, ſubtract, multiply, divide, and perform all the other operations of arithmetic, with as much certainty as another perſon can by figures.

SWANEMOTE, SWAINMOTE, or SWEINMOTE. See FOREST-*Courts*.

SWEAT, a ſenſible moiſture iſſuing from the pores of the ſkins of living animals.

SWEDEN, one of the moſt northerly kingdoms of Europe, lying between Lat. 55. 20. and 69. 30. north, and between 12° and 32° eaſt from London. On the ſouth it is bounded by the Baltic, the Sounds, and Schager-rack, or Categate; on the north by Daniſh Lapland; on the eaſt by Muſcovy; and on the weſt by the mountains of Norway.

1 Early hiſtory uncertain.

The early hiſtory of Sweden is no leſs involved in fables than that of moſt other nations. Some hiſtorians have pretended to give regular catalogues of the princes who reigned in Sweden in very early times; but they differ ſo much among themſelves, that no credit can be given to them. However, all agree that ancient Scandinavia was firſt governed by judges elected for a certain time by the voice of the people. Among theſe temporary princes the country was divided, until, in the year of the world 2054, according to ſome, or 1951, according to others, Eric, or, if we believe Puffendorf, *Suenon*, was raiſed to the ſupreme power, with the prerogatives of all the temporary magiſtrates united in his perſon for life, or until his conduct ſhould merit depoſition.

2 Albert of Mecklenburg declared king in 1366.

3 War with Denmark and Norway.

4 Is defeated and taken priſoner by Margaret of Norway.

From this very early period till the year 1366 of the Chriſtian æra, the hiſtories of Sweden preſent us with nothing but what is common to all nations in their early periods, viz. the endleſs combats and maſſacres of barbarians, tending to no other purpoſe than the effuſion of blood. At the time juſt mentioned, however, Albert of Mecklenburg, having concluded a peace between Sweden and Denmark, which two kingdoms had been at violent war for ſome time before, was proclaimed king of Sweden. The peace was of ſhort duration, being broken in 1368; on which Albert entered into an offenſive and defenſive league with the earl of Holſtein, the Jutland nobility, the dukes of Sleſwick, Mecklenburg, and the Hanſe-towns, againſt the kings of Denmark and Norway. Albert proved very ſucceſsful againſt Waldemar king of Denmark at that time, driving him entirely out of his dominions; but he himſelf was defeated by the king of Norway, who laid ſiege to his capital. Soon after this, a new treaty of peace was concluded, by which Albert was allowed to enjoy the crown of Sweden in peace. However, having formed a deſign of rendering himſelf abſolute, he fell under the diſpleaſure of his ſubjects, and Margaret of Norway was proclaimed queen of Sweden by the malcontents. A war immediately enſued, in which Albert was defeated and taken priſoner; but as the princes of Mecklenburg, the earls of Holſtein, and the Hanſe-towns, entered into a league in his favour, the war was ſo far from being extinguiſhed by this event, that it raged with more fury than ever.

5 Set at liberty.

At length, in 1394, the contending parties came to an accommodation. Albert was ſet at liberty, on condition that he ſhould in three years ſurrender to Margaret all pretenſions to the city of Stockholm; and the Hanſe-towns engaged to pay the ſum of 60,000 marks of ſilver in caſe of Albert's breach of faith. Not long after this, Eric the ſon of Albert died; and he, having no other child, did not think it worth his while to contend for the kingdom of Sweden: he therefore acquieſced in the pretenſions of Margaret, and paſſed the remainder of his days at Mecklenburg.

6 Margaret is ſucceeded by Eric a cruel tyrant.

7 A general revolt takes place, and Eric is depoſed.

Margaret died in 1415, and was ſucceeded by Eric of Pomerania. This prince's reign was cruel and oppreſſive to the laſt degree. The people were ruined by taxes; and the Danes being every where preferred to the offices of power, committed the greateſt cruelties. The conſequence of this was a revolt; and Charles Canutſon, grand mareſchal of Sweden and governor of Finland, having joined the malcontents, was declared commander in chief of their army. Eric was now formally depoſed, and commenced pirate: Canutſon was choſen regent: but beginning to oppreſs the people, and aſpiring openly at the crown, the Swedes and Danes revolted; in conſequence of which a revolution took place, and Chriſtopher duke of Bavaria, nephew to Eric, was choſen king of Denmark, Sweden, and Norway, in 1442.

8 The three kingdoms united under Chriſtian king of Denmark, who proves a tyrant, and is driven out.

On the acceſſion of the new prince, complaints againſt Canutſon were brought from all quarters; but, through the intereſt of his friends, he eſcaped the puniſhment due to him; and in 1448, Chriſtopher having died after a tyrannical reign of ſomewhat more than five years, he was raiſed to the throne at which he had ſo long aſpired. However, the kingdoms of Denmark and Norway refuſed to own allegiance to him; upon which a war immediately commenced. In 1454 peace was concluded, and Denmark for the preſent freed from the Swediſh yoke. Neither did Canutſon long enjoy even the crown of Sweden itſelf. Having quarrelled with the archbiſhop of Upſal, the latter formed ſuch a ſtrong party that the king could not reſiſt him. Chriſtian king of Denmark was called to the throne of Sweden; and in 1459 once more united the three kingdoms. He enjoyed his dignity but a ſhort time; for having begun to oppreſs his ſubjects in an arbitrary manner, he was obliged to retire to Denmark in 1463. Katil biſhop of Lincoping, who had driven out the king, took upon himſelf the office of regent. Next year Chriſtian returned with a powerful army; but was defeated. The people then thought proper to recal Canutſon: but he, on his firſt acceſſion, having offended the warlike biſhop Katil, was by him defeated, and obliged to renounce his right to the crown. After this the kingdom was rent into factions; between whom the moſt cruel civil wars took place, until the year 1467, when Canutſon was again recalled, and enjoyed the kingdom, though not without difficulty and oppoſition, till his death, which happened in 1470.

The confuſion in which the Swediſh affairs had been ſo long involved did not ceaſe on the death of Canutſon. Chriſtian again invaded Sweden; but was defeated by Steen Sture, nephew to the late king. After this the kingdom ſeems to have remained in peace till the year 1487, when the Ruſſians invaded Carelia, committing every where the greateſt ravages. Theſe were ſoon driven out: but in 1497, a rupture happening betwixt Sture and the ſenate, an offer was made of the Swediſh crown to John king of Denmark. This prince readily accepted the offer, and was crowned accordingly; but no ſooner was he ſeated on the throne than he became odious to the Swedes, from his partiality to the Danes. In a ſhort time he ſet out for Denmark, leaving his queen, with a ſtrong garriſon, in the citadel of Stockholm. He was no ſooner gone than the capital was inveſted; and though the queen made a noble defence, ſhe was at laſt obliged to capitulate, on condition of being allowed to paſs into Denmark. All the garriſon were made priſoners of war, and the queen herſelf was confined in a monaſtery till the following year.

9
John king of Denmark obtains the Swediſh crown, but is driven out.

The Swediſh affairs continued to be involved in the ſame dreadful confuſion as we have already related, until the year 1520, when a great revolution was effected by Guſtavus Ericſon, a nobleman of the firſt rank, who reſtored the kingdom to its liberty, and laid the foundation of its future grandeur. The occaſion of this great revolution was as follows: In 1518, Chriſtian king of Denmark invaded Sweden, with a deſign to ſubdue the whole country: but being defeated with great loſs by young Steen Sture, the regent at that time, he ſet ſail for Denmark. But meeting with contrary winds, he made ſeveral deſcents on the Swediſh coaſt, which he ravaged with all the fury of an incenſed barbarian. The inhabitants, however, bravely defended themſelves, and Chriſtian was reduced to the utmoſt diſtreſs; one half of his forces having periſhed with hunger, and the other being in the moſt imminent danger by the approach of a rigorous winter. He then thought of a ſtratagem, which had almoſt proved fatal to the regent; for having invited him to a conference, at which he deſigned either to aſſaſſinate or take him priſoner, Sture was about to comply, had not the ſenate, who ſuſpected the plot, interpoſed and prevented him. Chriſtian then offered to go in perſon to Stockholm in order to confer with Sture, upon condition that ſix hoſtages were ſent in his room. This was accordingly done; but the wind happening then to prove favourable, he ſet ſail for Denmark with the hoſtages, of whom Guſtavus Ericſon was one. Next year he returned; and having drawn Sture into an ambuſh, the regent received a wound of which he died ſome time after. The kingdom being thus left without an head, matters ſoon came to the moſt deſperate criſis. The army diſbanded itſelf; and the ſenate, inſtead of taking proper meaſures to oppoſe the enemy, ſpent their time in idle debates. Chriſtian in the mean time advanced into the heart of the kingdom, deſtroying every thing with fire and ſword; but on his arrival at Stragnez, he granted a ſuſpenſion of arms, to give the people time to deliberate on their ſituation, and to reflect that they might eaſily get rid of their troubles by electing him king. This they accordingly did; and Chriſtian proved one of the moſt bloody tyrants that ever ſat on the throne of any kingdom. Immediately after his coronation, he gave grand entertainments for three days; during which time he projected the diabolical deſign of extirpating at once all the Swediſh nobility, and thus for ever preventing the people from revolting, by depriving them of proper leaders. As the tyrant had ſigned articles, by which he promiſed indemnity to all who had borne arms againſt him, it became neceſſary to invent ſome cauſe of offence againſt thoſe whom he intended to deſtroy. To accompliſh his purpoſe, Guſtavus Trolle, formerly archbiſhop of Upſal, but who had been degraded from that dignity, in an oration before his majeſty lamented the demolition of Stecka his place of reſidence, and the loſſes ſuſtained by the ſee of Upſal, amounting to near a million of money. He then proceeded in a bitter accuſation againſt the widow and the ſon-in-law of Sture the late regent, comprehending in the ſame accuſation about 15 of the principal nobility, the whole ſenate, and the burghers of Stockholm. The conſequence of this was, that above 60 of the principal nobility and people of firſt rank in Sweden were hanged up as traitors. Innumerable other cruelties were committed; part of which are owned by the Daniſh hiſtorians, and minutely related by thoſe of Sweden. At laſt he departed for Denmark, ordering gibbets to be erected, and cauſing the peaſants to be hanged on them for the ſlighteſt offences, all the way as he paſſed along; and it is related of him, that at Jencoping he cauſed two boys, one of ſeven and the other of nine years of age, to be whipped to death.

10
Chriſtian king of Denmark invades Sweden, but is defeated and driven out.

11
He treacherouſly carries off ſix hoſtages, of whom Guſtavus Ericſon is one.

12
Is choſen king, and proves a moſt bloody tyrant.

13
Maſſacres the nobility, and cauſes gibbets to be erected as he paſſes along.

This monſtrous cruelty, inſtead of ſecuring him on the throne, exaſperated the whole nation againſt him. It has already been mentioned, that Guſtavus Ericſon, or, as he is commonly called, *Guſtavus Vaſa*, was among the number of the hoſtages whom Chriſtian had perfidiouſly carried to Denmark in 1519. Large promiſes had been made in order to reconcile him to Chriſtian, and threats had been uſed for the ſame purpoſe, but all in vain. Secret orders were given to ſtrangle him in priſon; but the officer to whom the aſſaſſination was commited remonſtrated to the king about the conſequences of it, and prevailed on him to change the ſentence of death into cloſe confinement in the caſtle of Copenhagen. Some of the hoſtages periſhed in conſequence of the rigorous treatment they met with; but Guſtavus withſtood all hardſhips. At laſt one Banner, a Daniſh nobleman, prevailed

14
Adventures of Guſtavus Vaſa or Ericſon.

15 He eſcapes from Denmark.

16 Arrives at Lubec.

vailed on the king to put him into his hands, in order to try whether or not he could prevail upon him to change his ſentiments. The king, however, told Banner, that he muſt pay 6000 crowns in caſe the priſoner ſhould make his eſcape. Banner generouſly aſſented; and having brought the noble priſoner to his fortreſs of Calo in Jutland, ſoon allowed him all the liberty he could deſire, and otherwiſe heaped favours upon him. All this, however, could not extinguiſh his remembrance of the cruelties of Chriſtian, and the deſire he had of being ſerviceable to his country. He therefore determined to make his eſcape; and the liberty he enjoyed ſoon put him in a capacity of effecting it. Having one day mounted his horſe, under pretence of hunting as uſual in the foreſt, when he got at a proper diſtance, he changed his dreſs to the habit of a peaſant; and quitting his horſe, he travelled for two days on foot through by-paths, and over mountains almoſt impaſſable, arriving on the third at Flenſburgh. Here no one was admitted without a paſſport; and Guſtavus dreaded preſenting himſelf to the governor or the officer upon guard, for fear of being diſcovered. Happily for him, it chanced to be on that ſeaſon of the year when the merchants of Lower Saxony drove a conſiderable trade in cattle, which they purchaſe in Jutland. Guſtavus hired himſelf to one of theſe merchants; and under favour of his diſguiſe eſcaped out of the Daniſh territories, and arrived at Lubec.

17 Attempts in vain to draw the regency of Lubec over to his ſide.

18 He arrives at Calmar, but meets with an unfavourable reception.

Banner was no ſooner acquainted with his eſcape, than he ſet out after him with the utmoſt diligence, found him at Lubec, and reproached him with great warmth as ungrateful and treacherous; but he was ſoon appeaſed by the arguments urged by Guſtavus, and eſpecially by the promiſe he made of indemnifying him in the loſs of his ranſom. Upon this Banner returned, giving out that he could not find his priſoner. Chriſtian was enraged at his eſcape, apprehending that he might traverſe all his deſigns in Sweden; and gave orders to Otho his general to make the ſtricteſt ſearch, and leave no means untried to arreſt him. Guſtavus applied to the regency for a ſhip to convey him to Sweden, where he hoped he ſhould be able to form a party againſt the Danes. He likewiſe endeavoured to draw the regency of Lubec into his meaſures; and reaſoned with ſo much zeal and ability, that Nicholas Gemins, firſt conſul, was entirely gained: but the regency could never be prevailed on to declare for a party without friends, arms, money, or credit. However, before his departure, the conſul gave him aſſurances, that if he could raiſe a force ſufficient to make head againſt the enemy in the field, he might depend on the ſervices of the republic, and that the regency would immediately declare for him. Guſtavus deſired to be landed at Stockholm; but the captain of the ſhip, either having ſecret orders to the contrary, or buſineſs elſewhere, ſteered a different courſe, and put him on ſhore near Calmar, a city hitherto garriſoned by the troops of Chriſtina widow of the regent. In truth, the governor held this place for his own purpoſes, and only waited to make the beſt terms he could with the Danes. When Guſtavus arrived, he made himſelf known to him and the principal officers of the garriſon, who were moſtly Germans, and his fellow-ſoldiers in the late adminiſtrator's army. He flattered himſelf that his birth, his merit, and connections, would immediately procure him the command. But the mercenary band, ſeeing him without troops and without attendants, regarded him as a deſperate perſon devoted to deſtruction, refuſed to embrace his propoſals, and even threatened to kill or betray him if he did not inſtantly quit the city.

19 His friends refuſe to aſſiſt him.

Diſappointed in his expectations, Guſtavus departed with great expedition; and his arrival being now publicly known, he was again forced to have recourſe to his peaſant's diſguiſe to conceal him from the Daniſh emiſſaries diſperſed over the country to ſearch for him. In a waggon loaded with hay he paſſed thro' every quarter of the Daniſh army, and at laſt repaired to an old family-caſtle in Sundermania. From hence he wrote to his friends, notifying his return to Sweden, and beſeeching them to aſſemble all their force in order to break through the enemy's army into Stockholm, at that time beſieged; but they, too, refuſed to embark in ſo hazardous and deſperate an attempt.

20 Applies in vain to the peaſants.

Guſtavus next applied himſelf to the peaſants: but they anſwered, that they enjoyed ſalt and herrings under the government of the king of Denmark; and that any attempts to bring about a revolution would be attended with certain ruin, without the proſpect of bettering their condition; for peaſants they were, and peaſants they ſhould remain, whoever was king. At length, after ſeveral vain attempts to throw himſelf into Stockholm, after that city was ſurrendered to the king, after the horrid maſſacre of the ſenate, and after running a thouſand dangers, and undergoing hardſhips and fatigues hardly to be ſupported by human nature, he formed the reſolution of trying the courage and affection of the Dalecarlians. While he was in the deepeſt obſcurity, and plunged in almoſt unſurmountable adverſity, he never relinquiſhed his deſigns or abandoned hope. The news of the maſſacre had, however, very near ſunk him in deſpondency, as thereby he loſt all his friends, relations, and connections, and indeed almoſt every proſpect of ſafety to himſelf or deliverance to his country. It was this that inſpired the thought of going to Dalecarlia, where he might live with more ſecurity in the high mountains and thick woods of that country, if he ſhould fail in the attempt of exciting the inhabitants to revolt.

21 Arrives in Dalecarlia, is robbed by his guide and obliged to work in the mines.

22 Is diſcovered and relieved.

Attended by a peaſant, to whom he was known, he travelled in diſguiſe through Sundermania, Nericia, and Weſtermania, and arrived, after a laborious and painful journey, ſafe in the mountains of Dalecarlia. Scarce had he finiſhed his journey, when he found himſelf deſerted by his companion and guide, who carried off with him all the money he provided for his ſubſiſtence. Thus forlorn, deſtitute, half ſtarved, he entered among the miners, and wrought like a ſlave under ground, without relinquiſhing his hopes of one day aſcending the throne of Sweden. His whole proſpect for the preſent was to live concealed, and gain a maintenance, until fortune ſhould effect ſomething in his favour: nor was it long before this happened. A woman in the mines perceived, under the habit of a peaſant, that the collar of his ſhirt was embroidered. This circumſtance excited curioſity; and the graces of his perſon and converſation, which had ſomething in them to attract the notice of the meaneſt of the vulgar,

gar, afforded room for ſuſpicion that he was ſome perſon of quality in diſguiſe, forced by the tyranny of the government to ſeek ſhelter in theſe remote parts. The ſtory came to the ears of a neighbouring gentleman, who immediately went to the mines to offer his protection to the unfortunate ſtranger; and was aſtoniſhed on recogniſing the features of Guſtavus, whoſe acquaintance he had been at the univerſity of Upſal. Touched with compaſſion at the deplorable ſituation of ſo diſtinguiſhed a nobleman, he could ſcarce refrain from tears; but however had preſence of mind enough not to make the diſcovery. At night he ſent for Guſtavus, made him an offer of his houſe, and gave him the ſtrongeſt aſſurances of his friendſhip and protection. He told him, he would meet with better accommodations, and as much ſecurity as in the mines; and that, ſhould he chance to be diſcovered, he would, with all his friends and vaſſals, take arms in his defence.

This offer was embraced by Guſtavus with joy, and he remained for ſome time at his friend's houſe; but finding it impoſſible to induce him to take part in his deſigns, he quitted him, and fled to one Peterſon, a gentleman whom he had formerly known in the ſervice. By him he was received with all the appearance of kindneſs; and, on the very firſt propoſal made by Guſtavus, offered to raiſe his vaſſals. He even named the lords and peaſants whom he pretended to have engaged in his ſervice; but in a very few days after, he went ſecretly to a Daniſh officer, and gave him information of what had paſſed. The officer immediately cauſed the houſe to be ſurrounded with ſoldiers, in ſuch a manner that it ſeemed impoſſible for Guſtavus to make his eſcape. In the interval, however, he was gone, being warned by Peterſon's wife of the treachery of her huſband, and by her direction fled to the houſe of a clergyman, her friend. By him Guſtavus was received with all the reſpect due to his own birth and merit; and leſt the domeſtic who conducted him ſhould follow the treacherous example of his maſter, he removed him to the church, and conducted him to a ſmall cloſet, of which he kept the key. Having lived for ſome time in this manner, Guſtavus began to conſult with his friend concerning the moſt proper method of putting their ſchemes in execution. The prieſt adviſed him to apply directly to the peaſants themſelves; told him that it would be proper to ſpread a report, that the Danes were to enter Dalecarlia in order to eſtabliſh new taxes by force of arms; and as the annual feaſt of all the neighbouring villages was in a few days to be held, he could not have a more favourable opportunity: at the ſame time he promiſed to engage the principal perſons of the dioceſe in his intereſt.

23 Has a very narrow eſcape from the Danes.

24 His cauſe eſpouſed by the peaſants of Dalecarlia.

Agreeable to this advice Guſtavus ſet out for Mora, where the feaſt was to be held. He found the peaſants already informed of his deſigns, and impatient to ſee him. Being already prepoſſeſſed in his favour, they were ſoon excited to an enthuſiaſm in his cauſe, and inſtantly reſolved to throw off the Daniſh yoke. In this deſign they were more confirmed by their ſuperſtition; ſome of their old men having obſerved that the wind had blown from the north while Guſtavus was ſpeaking, which among them was reckoned an infallible omen of ſucceſs. Guſtavus did not give their ardour time to cool, but inſtantly led them againſt the governor's caſtle; which he took by aſſault, and put the garriſon to the ſword. This inconſiderable enterpriſe was attended with the moſt happy conſequences. Great numbers of the peaſants flocked to his ſtandard; ſome of the gentry openly eſpouſed his cauſe, and others ſupplied him with money. Chriſtian was ſoon acquainted with what had paſſed; but deſpiſing ſuch an inconſiderable enemy, he ſent only a ſlender detachment under the command of one Soren Norby, to aſſiſt his adherents in Dalecarlia. Guſtavus advanced with 5000 men, and defeated a body of Danes commanded by one Meleen; but he was ſtrenuouſly oppoſed by the archbiſhop of Upſal, who raiſed numerous forces for king Chriſtian. The fortune of Guſtavus, however, ſtill prevailed, and the archbiſhop was defeated with great loſs. Guſtavus then laid ſiege to Stockholm; but his force being too inconſiderable for ſuch an undertaking, he was forced to abandon it with loſs.

25 The Danes defeated.

This check did not prove in any conſiderable degree detrimental to the affairs of Guſtavus; the peaſants from all parts of the kingdom flocked to his camp, and he was joined by a reinforcement from Lubec. Chriſtian, unable to ſuppreſs the revolt, wreaked his vengeance on the mother and ſiſters of Guſtavus, whom he put to death with the moſt excruciating torments. Several other Swediſh ladies he cauſed to be thrown into the ſea, after having impoſed on them the inhuman taſk of making the ſacks into which they were to be incloſed. His barbarities ſerved only to make his enemies more reſolute. Guſtavus having aſſembled the ſtates at Wadſtena, he was unanimouſly choſen regent, the diet taking an oath of fidelity to him, and promiſing to aſſiſt him to the utmoſt. Having thus obtained the ſanction of legal authority, he purſued his advantages againſt the Danes. A body of troops appointed to throw ſuccours into Stockholm were totally cut in pieces; and the regent ſending ſome troops into Finland, ſtruck the Danes there with ſuch terror, that the archbiſhop of Upſal, together with Slahog and Baldenacker the Daniſh governors, fled to Denmark. Chriſtian received them but very coldly, apprehending that their flight might be prejudicial to his affairs; and in a ſhort time the two governors were put to death, that the king might have an opportunity of charging them with being guilty of the cruelties which they had committed by his order. He then ſent expreſs orders to all his governors and officers in Finland and Sweden to maſſacre the Swediſh gentry without diſtinction. The Swedes made repriſals by maſſacring all the Danes they could find; ſo that the whole country was filled with bloodſhed and ſlaughter.

26 Horrid cruelty of king Chriſtian.

27 Succeſs of Guſtavus.

In the mean time Guſtavus had laid ſiege to the towns of Calmar, Abo, and Stockholm; but Norby found means to oblige him to raiſe all of them with great loſs. Guſtavus, in revenge, laid ſiege to the capital a third time, and petitioned the regency of Lubec for a ſquadron of ſhips and other ſuccours for carrying on the ſiege. This was complied with, but on very hard conditions, viz. that Guſtavus ſhould oblige himſelf, in the name of the ſtates, to pay 60,000 merks of ſilver as the expence of the armament; that, until the kingdom ſhould be in a condition to pay that ſum, the Lubec merchants trading to Sweden ſhould be exempted from all duties on imports or exports; that all other nations ſhould be prohibited from trading with Sweden, and that ſuch traffic ſhould be deemed illicit; that Guſtavus ſhould neither conclude a peace, nor even agree to a truce, with Denmark, without the concurrence of the regency of Lubec; and that in caſe the republic ſhould be attacked by Chriſtian, he ſhould enter Denmark at the head of 20,000 men. Upon theſe hard terms did Guſtavus obtain aſſiſtance from the regency of Lubec; nor did his dear-bought allies prove very faithful. They did not indeed go over to the enemy; but in a ſea-fight, where the Danes were entirely in the power of their enemies, they ſuffered them to eſcape, when their whole force might have been entirely deſtroyed. This treachery had well nigh ruined the affairs of Guſtavus: for Norby was now making preparations effectually to relieve Stockholm; in which he would probably have ſucceeded: but at this critical period news arrived that the Danes had unanimouſly revolted, and driven Chriſtian from the throne; and that the king had retired into Germany, in hopes of being reſtored by the arms of his brother-in-law the emperor. On hearing this news, Norby retired with his whole fleet to the iſland of Gothland, leaving but a ſlender garriſon in Calmar. Guſtavus did not fail to improve this opportunity to his own advantage, and quickly made himſelf maſter of Calmar. Mean time Stockholm continued cloſely inveſted; but Guſtavus thought proper to protract the ſiege until he ſhould get himſelf elected king. Having for this purpoſe called a general diet, the firſt ſtep was to fill up the vacancy in the ſenate occaſioned by the maſſacres of Chriſtian. Guſtavus had the addreſs to get ſuch nominated as were in his intereſt; and of conſequence the aſſembly was no ſooner met, than a ſpeech was made, containing the higheſt encomiums on Guſtavus, ſetting forth in the ſtrongeſt light the many eminent ſervices he had done for his country, and concluding that the ſtates would ſhow themſelves equally ungrateful and blind to their own intereſt if they did not immediately elect him king.

28 He is choſen king of Sweden.

This propoſal was acceded to by ſuch tumultuous acclamations that it was impoſſible to collect the votes; ſo that Guſtavus himſelf acknowledged, that their affection exceeded his merit, and was more agreeable to him than the effects of their gratitude. He was urged to have the ceremony of his coronation immediately performed; but the king having ſome deſigns on the clergy, did not think proper to comply with their requeſt, as he would have been obliged to take an oath to preſerve them in their rights and privileges.

29 Diſpleaſes the clergy, and favours the reformed doctrines

—Indeed he had not been long ſeated on the throne before he incurred the diſpleaſure of that body; for having large arrears due to the army, with ſeveral other incumbrances, Guſtavus found it neceſſary to raiſe large contributions on the clergy. On this he was accuſed of avarice and hereſy before the pope's nuncio. Guſtavus took the proper methods for defending himſelf againſt theſe accuſations; and in a ſhort time after ſhowed a great partiality for the doctrines of Luther, which by this time had been preached and been received by many people in Sweden. This embroiled him more than ever with the eccleſiaſtics; and it ſoon appeared, that either Guſtavus muſt reſign his throne, or the clergy ſome part of the power they had aſſumed. Matters were driven to extremities by the king's allowing the ſcriptures to be tranſlated into the Swediſh language.

30 Renounces the Popiſh religion and eſtabliſhes Proteſtantiſm.

In 1526, the king, finding them entering into a combination againſt the reformiſts, went to Upſal, and publicly declared his reſolution of reducing the number of oppreſſive and idle monks and prieſts, who, under pretence of religion, fattened on the ſpoils of the induſtrious people. At laſt, taking advantage of the war between the pope and Charles V. of Spain, he declared himſelf to be of the reformed religion, and eſtabliſhed it throughout his dominions; and at the ſame time, to humble the arrogance of the eccleſiaſtics, he gave the ſenators the precedency of them, and in many other reſpects degraded them from the dignities they formerly enjoyed. For ſome time the ſtates heſitated at ſupporting the king in his work of reformation; inſomuch, that at laſt he threatened to reſign the kingdom, which, he ſaid, was doomed to perpetual ſlavery either to its temporal or ſpiritual tyrants. On this the ſtates came into his meaſures, and retrenched the priviliges of the eccleſiaſtics in the manner he propoſed.

31 Diſturbances in conſequence of this.

Several diſturbances, however, enſued. An impoſtor, who pretended to be of the family of Sture the former regent, having claimed the throne, the Dalecarlians revolted in his favour; but on the approach of a powerful army ſent by Guſtavus, they ſubmitted to his terms. Soon after, Lutheran profeſſors were eſtabliſhed in every dioceſe; upon which a new rebellion enſued. At the head of this, was Tnure Johanſon, who had married the king's ſiſter. Several of the nobility joined him; and the king of Denmark alſo acceded to their cauſe, thinking, by means of theſe diſturbances, to reunite the three kingdoms of Sweden, Denmark, and Norway, as they had formerly been. But Guſtavus prevailed, and the rebels were obliged to take refuge in Denmark. A freſh accident, however, had like to have embroiled matters worſe than before. The ſubſidy granted to the regency of Lubec was ſtill due; and for the payment of it the ſtates granted to the king all the uſeleſs bells of the churches and monaſteries. The people were ſhocked at the ſacrilege; and the Dalecarlians again betook themſelves to arms. Intimidated, however, by the courage and vigorous conduct of the king, they again ſubmitted, and were taken into favour. Tranquillity was not yet reſtored.

32 Unſucceſsful attempt of Chriſtian

Chriſtian having eſtabliſhed a powerful intereſt in Norway, once more made an attempt to recover his kingdoms, and was joined by the Dalecarlians; but being defeated by the Swediſh forces, he was forced to return to Norway, where, being obliged to capitulate with the Daniſh generals, he was kept priſoner all his life.

33 The crown becomes hereditary.

In 1542, Guſtavus having happily extricated himſelf out of all his troubles, prevailed on the ſtates to make the crown hereditary in his family; after which he applied himſelf to the encouragement of learning and commerce.

34 Unſucceſsful negociation for a marriage with queen Elizabeth.

A treaty was ſet on foot for a marriage between his eldeſt ſon Eric and Elizabeth queen of England. The prince's brother, duke John, went over to England, and reſided for ſome time at the court of London with great ſplendour. He returned, full of expectations of ſucceſs; but bringing with him no ſort of proofs in writing, his father ſoon perceived that he had been the dupe of Elizabeth's ſuperior policy. However, at laſt he allowed Prince Eric to go in perſon to England; but before he could embark, the death of Guſtavus made him lay aſide all thoughts of the voyage and marriage.

35 Guſtavus dies, and is ſucceeded by Eric a weak and imprudent prince.

Guſtavus Vaſa died in 1560, and was ſucceeded by his ſon Eric XIV. The new king was a man poſſeſſed of all the exterior ornaments which give an air of dignity to the perſon; but he had neither the prudence nor the penetration of his father. He created the firſt nobility that were ever known in Sweden; which he had no ſooner done than he quarrelled with them, by paſſing ſome acts which they thought derogatory to their honour and dignity. The whole courſe of his reign was diſturbed by wars with Denmark, and diſputes with his own ſubjects. In the former he was unfortunate, and towards the latter he behaved with the greateſt cruelty. At laſt, by the torments of his own conſcience, it is ſaid, he run mad. He afterwards recovered his ſenſes, but was thereupon dethroned by his brothers; of whom Duke John, who had been hitherto kept priſoner by Eric, ſucceeded him in the kingdom.

36 Eric depoſed, and ſucceeded by his brother John.

This revolution took place in the year 1568, but with no great advantage to Sweden. Diſputes about religion between the king and his brothers, and wars with Muſcovy, threw matters into the utmoſt confuſion. At laſt prince Sigiſmund, the king's ſon, was choſen king of Poland, which proved the ſource of much trouble to the kingdom. He was elected on the following conditions, viz. That there ſhould be a perpetual peace between the ſtates of Poland and Sweden; that, on the death of his father, prince Sigiſmund ſhould ſucceed to the throne of Sweden; that, on urgent occaſions, he might, with the conſent of the ſtates, return to Sweden; that he ſhould maintain, at his own expence, a fleet for the ſervice of Poland; that he ſhould cancel a debt which had been long due from the crown of Poland to Sweden; that, with the conſent of the ſtates, he ſhould build five fortreſſes on the frontiers of Poland; that he ſhould have liberty to introduce foreign ſoldiers into the kingdom, provided he maintained them at his own expence; that he ſhould not make uſe of Swediſh counſellors in Poland; that he ſhould have his body-guard entirely of Poles and Lithuanians; and that he ſhould annex to Poland that part of Livonia now ſubject to Sweden. In 1590 king John died; and as Sigiſmund was at a diſtance, every thing fell into the utmoſt confuſion: the treaſury was plundered, and the wardrobe quite ſpoiled, before even duke Charles could come to Stockholm to take the adminiſtration into his hands until king Sigiſmund ſhould return. This, however, was far from being the greateſt diſaſter which befel the nation at this time. It was known that the king had embraced the Popiſh religion, and it was with good reaſon ſuſpected that he would attempt to reſtore it upon his arrival in Sweden. Sigiſmund alſo was obliged, on leaving Poland, to promiſe that he would ſtay no longer in Sweden than was neceſſary to regulate his affairs. Theſe circumſtances ſerved to alienate the minds of the Swedes from their ſovereign even before they ſaw him; and the univerſal diſſatiſfaction was increaſed, by ſeeing him attended, on his arrival in Sweden in 1593, by Malaſpina the pope's nuncio, to whom he made a preſent of 30,000 ducats to defray the expences of his journey to Sweden.

37 Prince Sigiſmund choſen king of Poland.

38 Succeeds to the crown of Sweden.

39 A party formed againſt him.

What the people had foreſeen was too well verified: the king refuſed to confirm the Proteſtants in their religious privileges, and ſhowed ſuch partiality on all occaſions to the Papiſts, that a party was formed againſt him; at the head of which was duke Charles his uncle. Remonſtrances, accompanied with threats, took place on both ſides; and at an interview between the king and Charles, the diſpute would have ended in blows, had they not been parted by ſome of the nobility. This, however, made ſuch an impreſſion upon Sigiſmund, that he was apparently reconciled to his brother, and promiſed to comply with the inclinations of the people in every reſpect, though without any inclination to perform what he had promiſed. The agreement, indeed, was ſcarce made, before Sigiſmund conceived the horrid deſign of murdering his uncle at the Italian comedy acted the night after his coronation. The duke, however, having notice of the plot, found means to avoid it. This enraged the king ſo much, that he reſolved to accompliſh his deſigns by force; and therefore commanded a Poliſh army to march towards the frontiers of Sweden, where they committed all the ravages that could be expected from an enraged and cruel enemy. Complaints were made by the Proteſtant clergy to the ſenate: but no other reply was made them, than that they ſhould abſtain from theſe bitter invectives and reproaches, which had provoked the catholics, until the king's departure; at which time they would be at more liberty.

40 Forms a deſign of murdering his uncle.

41 Sigiſmund depoſed, and is ſucceeded by Charles IX.

In 1595 Sigiſmund ſet ſail for Dantzic, leaving the adminiſtration in the hands of duke Charles. The conſequence of this was, that the diſſenſions which had already taken place being continually increaſed by the obſtinacy of the king, duke Charles aſſumed the ſovereign power; and in 1604 Sigiſmund was formally depoſed, and his uncle Charles IX. raiſed to the throne. He proved a wiſe and brave prince, reſtoring the tranquillity of the kingdom, and carrying on a war with vigour againſt Poland and Denmark. He died in 1611, leaving the kingdom to his ſon, the celebrated Guſtavus Adolphus.

42 State of Sweden on the acceſſion of Guſtavus Adolphus.

Though Charles IX. by his wiſe and vigorous conduct had in a great meaſure retrieved the affairs of Sweden, they were ſtill in a very diſagreeable ſituation. The finances of the kingdom were entirely drained by a ſeries of wars and revolutions; powerful armies were preparing in Denmark, Poland, and Ruſſia, while the Swediſh troops were not only inferior in number to their enemies, but the government was deſtitute of reſources for their payment.

43 He is allowed to aſſume the adminiſtration while yet a minor.

Though the Swediſh law required that the prince ſhould have attained his 18th year before he was of age, yet ſuch ſtriking marks of the great qualities of Guſtavus appeared, that he was allowed by the ſtates to take upon him the adminiſtration even before this early period. His firſt act was to reſume all the crown-grants, that he might be the better able to carry on the wars in which he was unavoidably engaged; and to fill all places, both civil and military, with perſons of merit. At the head of domeſtic and foreign affairs was placed chancellor Oxenſtiern, a perſon every way equal to the important truſt, and the chooſing of whom impreſſed mankind with the higheſt opinion of the young monarch's penetration and capacity.

44
He invades Denmark, and obliges the king to conclude a peace.

Soon after his acceſſion, Guſtavus received an embaſſy from James I. of Britain, exhorting him to make peace with his neighbours. This was ſeconded by another from Holland. But as the king perceived that the Daniſh monarch intended to take every opportunity of cruſhing him, he reſolved to act with ſuch vigour, as might convince him that he was not eaſily to be overcome. Accordingly he broke into Denmark with three different armies at once; and though the enemy's ſuperiority at ſea gave them great advantages, and the number of the king's enemies diſtracted his attention, he carried on the war with ſuch ſpirit, that in 1613 a peace was concluded upon good terms. This war being finiſhed, the king applied himſelf to civil polity, and made ſome reformations in the laws of Sweden.

45
Ruſſia invaded with ſucceſs.

In 1615, hoſtilities were commenced againſt Ruſſia, on account of the refuſal of that court to reſtore ſome money which had been formerly lent them. The king entered Ingria, took Kexholm by ſtorm, and was laying ſiege to Pleſcow, when, by the mediation of James I. peace was concluded, on condition of the Ruſſians repaying the money, and yielding to Sweden ſome part of their territory.

46
Extraordinary military genius of the king.

In this and the former war, notwithſtanding the ſhortneſs of their duration, Guſtavus learned the rudiments of the military art for which he ſoon became ſo famous. He is ſaid indeed to have catched every opportunity of improvement with a quickneſs of underſtanding ſeemingly more than human. In one campaign, he not only learned, but improved, all the military maxims of La Gardie, a celebrated general, brought the Swediſh army in general to a more ſteady and regular diſcipline than had formerly been exerciſed, and formed and ſeaſoned an invincible body of Finlanders, who had afterwards a very conſiderable ſhare in the victories of the Swedes.

47
Has a friendly interview with the king of Denmark, and prepares for war with Poland.

Peace was no ſooner concluded with Ruſſia, than Guſtavus was crowned with great ſolemnity at Upſal. Soon after this, Guſtavus ordered his general La Gardie to acquaint the Poliſh commander Codekowitz, that as the truce between the two kingdoms, which had been concluded for two years, was now expired, he deſired to be certainly informed whether he was to expect peace or war from his maſter. In the mean time, having borrowed money of the Dutch for the redemption of a town from Denmark, he had an interview on the frontiers with Chriſtian the king of that country. At this interview, the two monarchs conceived the utmoſt eſteem and friendſhip for each other; and Guſtavus obtained a promiſe, that Chriſtian would not aſſiſt Sigiſmund in any deſigns he might have againſt Sweden. In the mean time, receiving no ſatisfactory anſwer from Poland, Guſtavus began to prepare for war. Sigiſmund entered into a negociation, and made ſome pretended conceſſions, with a view to ſeize Guſtavus by treachery; but the latter having intimation of his deſign, the whole negociation was changed into reproaches and threats on the part of Guſtavus.

47
Marries Eleonora daughter of the elector of Brandenburg.

Immediately after this, Guſtavus made a tour in diſguiſe through Germany, and married Eleonora the daughter of the elector of Brandenburg. He then reſolved to enter heartily into a war with Poland; and with this view ſet ſail for Riga with a great fleet, which carried 20,000 men. The place was well fortified, and defended by a body of veterans enthuſiaſtically attached to Sigiſmund.

49
Riga beſieged and taken.

A dreadful bombardment enſued; the ſtreets were raked by the cannon, and the houſes laid in aſhes by the bombs; the moat was filled up, one of the half-moons taken by ſtorm, and the ſtrong fortreſs of Dunamund was reduced. The cannon having now effected a breach in another part of the walls, Guſtavus reſolved to make a general aſſault. For this purpoſe a flying bridge over the moat was contrived by his majeſty; for tho' the ditch was filled with faſcines and rubbiſh, it ſtill contained too much water to admit the paſſage of a large body of men. The ſoldiers, however, crowded on to the attack with ſo much impetuoſity, that the bridge gave way, and the attempt proved unſucceſsful. Next day the Swedes were repulſed in attempting to ſtorm another half-moon; and the king was obliged to proceed more ſlowly. By the middle of September, at which time the town had been inveſted for ſix weeks, two bridges were thrown over the river together with a ſtrong boom, while the Swedes had formed their mines under the ditch. The garriſon being now reduced to extremity, were obliged to capitulate; and Guſtavus treated the inhabitants with great clemency.

After the reduction of Riga, the Swediſh monarch entered Courland, where he reduced Mittau; but ceded it again on the concluſion of a truce for one year. Sigiſmund, however, no ſooner had time to recover himſelf, than he began to form new enterpriſes againſt the Swedes in Pruſſia; but Guſtavus ſetting ſail with his whole fleet for Dantzic, where the king of Poland then reſided, ſo broke his meaſures, that he was obliged to prolong the truce for another year. Sigiſmund, however, was not yet appriſed of the danger he was in, and refuſed to liſten to any terms of accommodation: upon which Guſtavus entering Livonia, defeated the Poliſh general, and took Derpt, Hockenhauſen, and ſeveral other places of leſs importance; after which, entering Lithuania, he took the city of Birſen.

50
The Poles defeated, and ſeveral places taken

Notwithſtanding this ſucceſs, Guſtavus propoſed peace on the ſame equitable terms as before; but Sigiſmund was ſtill infatuated with the hopes that, by means of the emperor of Germany, he ſhould be able to conquer Sweden. Guſtavus finding him inflexible, reſolved to puſh his good fortune.

51
The Poles again defeated, and a great number of towns reduced by Guſtavus.

His generals Horn and Thurn defeated the Poles in Semigallia. Guſtavus himſelf with 150 ſhips ſet ſail for Pruſſia, where he landed at Pillaw. This place was immediately delivered up to him; as were alſo Braunſberck, Frawenberg, Elbing, Marienberg, Mew, Dirſchau, Stum, Chriſtburg, &c. Sigiſmund, alarmed at the great ſucceſſes of Guſtavus, ſent a body of forces to oppoſe him, and to prevent Dantzic from falling into his hands. In this he was attended with as bad ſucceſs as before. His troops were defeated before Marienberg, Mew, and Dirſchau;

52
The Poles defeated a third time.

and in May 1627, Guſtavus arrived with freſh forces before Dantzic, which he would probably have carried, had he not been wounded in the belly by a cannon-ſhot. The Poles in the mean time recovered Mew; and the States of Holland ſent ambaſſadors to mediate a peace between the two crowns. Sigiſmund, however, depending upon the aſſiſtance of the emperor of Germany and king of Spain, determined to hearken to no terms, and reſolved to make a winter-campaign; but Guſtavus was ſo well intrenched, and all his forts were ſo ſtrongly garriſoned, that the utmoſt efforts of the Poles were to no purpoſe (A). The city of Dantzic in the mean time made ſuch a deſperate reſiſtance as greatly irritated Guſtavus.

53
The Poles defeated by ſea, and Dantzic inveſted.

In a ſea-engagement the Swediſh fleet defeated that of the enemy; after which Guſtavus, having blocked up the harbour with his fleet, puſhed his advances on the land-ſide with incredible vigour. He made a ſurpriſing march over a moraſs 15 miles broad, aſſiſted by bridges of a peculiar conſtruction, over which he carried a ſpecies of light cannon invented by himſelf.

54
The king obliged by an inundation of the Viſtula to raiſe the ſiege.

By this unexpected manœuvre he got the command of the city in ſuch a manner, that the garriſon were on the point of ſurrendering, when, by a ſudden ſwell of the Viſtula, the Swediſh works were ruined, and the king was obliged to raiſe the ſiege. In other reſpects, however, the affairs of Guſtavus went on with their uſual good fortune. His general Wrangel defeated the Poles before Brodnitz, of whom 3000 were killed, and 1000 taken priſoners, with five pieces of cannon and 2000 waggons loaden with proviſions.

55
The Poles and Germans defeated with great ſlaughter in two engagements.

At Stum the king gained another and more conſiderable victory in perſon. The emperor had ſent 5000 foot and 2000 horſe under Arnheim, who joined the main army commanded by the Poliſh general Coniecſpolſki, in order to attack the Swediſh army encamped at Quidzin. The enemy were ſo much ſuperior in number, that the friends of Guſtavus repreſented to him the imminent danger of attacking them. But the king being determined, the engagement began. The Swediſh cavalry charged with ſuch impetuoſity, contrary to their ſovereign's expreſs order, that they were almoſt ſurrounded by the enemy; but Guſtavus, coming up to their aſſiſtance, puſhed the enemy's infantry with ſo much vigour, that they gave way, and retreated to a bridge they had thrown over the Werder. But here they were diſappointed; for the Swedes had already taken poſſeſſion of the bridge. On this a new action enſued more bloody than the former, in which the king was expoſed to great danger, and thrice narrowly eſcaped being taken priſoner; but at laſt the Poles were totaly defeated, with the loſs of a great many men, 22 pair of colours, five ſtandards, and ſeveral other military trophies. The ſlaughter of the German auxiliaries was ſo great, that Arnheim ſcarce carried off one half of the troops he brought into the field.

56
They are again defeated, and obliged to conſent to a truce of ſix years.

This defeat did not hinder the Poliſh general from attempting the ſiege of Stum; but here again he was attended by his uſual bad fortune. The garriſon ſallied out, and he was defeated with the loſs of 4000 men. The blame of this misfortune was laid upon Arnheim; who was recalled, and ſucceeded by Henry of Saxe Lawenburg and Philip count Manſfeldt. The change of general officers, however, produced no good conſequences to the Poles; a famine and plague raged in their camp, ſo that they were at laſt obliged to conſent to a truce for ſix years, to expire in the month of June 1635. The conditions were, that Guſtavus ſhould reſtore to Sigiſmund the towns of Brodnitz, Stum, and Dirſchau; that Marienberg ſhould remain ſequeſtrated in the hands of the elector of Brandenburg, to be reſtored again to Sweden in caſe a peace was not concluded at the end of the ſix years. Guſtavus, on his ſide, kept the port and citadel of Memel, the harbour of Pillau, the town of Elbing, Brunſberg, and all that he had conquered in Livonia.

57
Guſtavus reſolves on a war with the emperor.

Guſtavus having thus brought the war with Poland to an honourable concluſion, began to think of reſenting the conduct of the emperor in aſſiſting his enemies and oppreſſing the Proteſtant ſtates. Before embarking in ſuch an important undertaking, it was neceſſary that he ſhould conſult the diet. In this the propriety of engaging in a war with Germany was warmly debated; but, after much altercation, Guſtavus in a very noble ſpeech determined the matter, and ſet forth in ſuch ſtrong terns the virtuous motives by which he was actuated, that the whole aſſembly wept and every thing was granted which he could require.

It was not difficult for Guſtavus to begin his expedition. His troops amounted to 60,000 men, hardened by a ſucceſſion of ſevere campaigns in Ruſſia, Finland, Livonia, and Pruſſia. His fleet exceeded 70 ſail, carrying from 20 to 40 guns, and manned with 6000 mariners. Embarking his troops, he landed at Uſedom on the 24th of June 1630, the Imperialiſts having evacuated all the fortreſſes they poſſeſſed there; and the iſle of Rugen had been before reduced by general Leſly, in order to ſecure a retreat if fortune ſhould prove unfavourable.

58
Reduces Wolgaſt, Stetin, &c.

Paſſing the frith, Guſtavus ſtormed Wolgaſt and another ſtrong fortreſs in the neighbourhood, leaving general Bannier with a garriſon for the defence of theſe conqueſts. He then proceeded to Stetin, which was no ſooner inveſted than it conſented to receive a Swediſh garriſon, and the king perſuaded the duke of Pomerania to enter into an alliance with him. In conſequence of this the Swediſh troops were received into ſeveral towns of Pomerania; and the moſt bitter enmity took place between the Imperialiſts and Pomeranians, each refuſing the other quarters.

Theſe ſucceſſes of Guſtavus ſtruck the empire with conſternation; for being already overwhelmed with civil diſſenſions, they were in no condition to reſiſt ſo impetuous an enemy.

59
Count Tilly choſen general by the emperor.

At this time alſo the Imperialiſts were without a general, the command of the army being diſputed by a number of candidates of very unequal merit; but at laſt count Tully was fixed upon as the moſt proper perſon, and inveſted with the dignity of Veldt Mariſchal. In the mean time the king being reinforced by a conſiderable body of troops in Finland

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(A) In this campaign the practice of duelling became ſo prevalent in the Swediſh army, as to engage the king's attention, and to oblige him to ſuppreſs it by very rigorous edicts. Soon after theſe were paſſed, a quarrel aroſe between two general officers, who aſked his majeſty's permiſſion to decide their difference by the laws of honour. The king conſented, but wiſhed to be a ſpectator of their courage. He went to the place appointed, attended by a body of guards: and having ordered the executioner to be called, "Now gentlemen, ſaid he to the officers, fight until one dies;" adding to the executioner, "Do you immediately cut off the head of the other." On this the quarrel was dropped, and no more challenges were heard of in the camp.

60 Cuts off 2000 Swedes.

61 Franckfort and Landſberg taken by Guſtavus.

Finland and Livonia under the conduct of Guſtavus Horn, defeated the Imperialiſts before Griffenhagen; taking the place ſoon after by aſſault. By this and ſome other conqueſts he opened a paſſage into Luſatia and Sileſia; but in the mean time count Tilly cut off 2000 Swedes at New Brandenburg, owing to the obſtinacy of their commander Kniphauſen, who had orders to evacuate the place and join the main army. This advantage, however, was ſoon overbalanced by the conqueſt of Franckfort on the Oder, which Guſtavus took by aſſault, making the whole garriſon priſoners. Thus he commanded the rivers Elbe and Oder on both ſides, and had a fair paſſage not only to the countries already mentioned, but alſo to Saxony and the hereditary dominions of the houſe of Auſtria. Soon after this, Guſtavus laid ſiege to Landſberg, which he took by aſſault; though the number of ſoldiers he had with him was ſo inconſiderable, that he had thoughts of ſending to the main army for a reinforcement before the priſoners ſhould march out, being apprehenſive that they might give him battle in the open field, though they could not defend themſelves behind walls.

62 He reduces Pomerania, and reſtores the dukes of Mecklenburg.

About this time the Proteſtant princes held a diet at Leipſic; to which Guſtavus ſent deputies, and conducted his negociations with ſuch addreſs, as tended greatly to promote his intereſts. Immediately after this he reduced Gripſwald, and with it all Pomerania. Then marching to Guſtrow, he reſtored the dukes of Mecklenburg to their dominions. Here the Imperialiſts had tyrannized in ſuch a manner that Guſtavus was received as the deliverer of the people, and the ceremony of the duke's inauguration was in a ſhort time performed with great ſolemnity.

63 Magdeburg taken by the Imperialiſts, and the inhabitants cruelly uſed.

64 Havelſburg and Werben reduced, and the cavalry of the Imperialiſts defeated by the Swedes.

65 Count Tilly defeated by Guſtavus.

All this time count Tilly was employed in the ſiege of Magdeburg; but now, being alarmed at the repeated ſucceſſes of the Swedes, he left Pappenheim with part of the army before that city, while he marched with the reſt into Thuringia, to attack the landgrave of Heſſe-Caſſel and the elector of Saxony. After a moſt obſtinate defence, Magdeburg fell into the hands of Pappenheim, where he committed all imaginable cruelties. Guſtavus formed a plan of recovering the city; but was obliged to abandon it, by Pappenheim's throwing himſelf into the place with his whole army, and by the progreſs which Tilly was making in Thuringia. Relinquiſhing this enterpriſe, therefore, he ordered Bannier to attack Havelſburg; which was done with ſuch reſolution, that the place was forced in a few hours, and all the garriſon made priſoners. Werben was next obliged to ſubmit after an obſtinate conflict, in which many fell on both ſides.—Theſe ſucceſſes obliged count Tilly to attempt in perſon to check the progreſs of the Swedes. He detached the vanguard of his army, compoſed of the flower of the Imperial cavalry, within a few miles of the Swediſh camp. An action enſued, in which Bernſtein the Imperial general was defeated and killed, with 1500 of his men. Guſtavus, after this advantage, placed himſelf in a ſituation ſo much ſuperior to his enemies, that count Tilly was fired with indignation, and marched up to the Swediſh lines to give him battle. Guſtavus kept within his works, and Tilly attacked his camp, though almoſt impregnably fortified, keeping up a moſt terrible fire from a battery of 32 pieces of cannon; which, however, produced no other effect, than obliging the Swediſh monarch to draw up his army behind the walls of Werben. Tilly had placed his chief hopes in being able to nail up the enemy's cannon, or ſet fire to their camp in divers quarters; after which he propoſed making his grand attack. With this view he bribed ſome priſoners; but they betrayed him, and told his deſign to Guſtavus. The king ordered fires to be lighted in different parts of his camp, and his ſoldiers to imitate the noiſe of a tumultuous diſorderly rabble. This had the deſired effect. The count led his army to the breach made by the cannon; where he was received with ſuch a volley of grape-ſhot as cut off the firſt line, and put the whole body in diſorder, ſo that they could never be brought back to the charge. In this confuſion the Imperial army was attacked by Bauditzen, and, after an obſtinate conflict, obliged to quit the field.

66 A body of Britiſh ſoldiers comes to the aſſiſtance of the Swedes.

Soon after this action the queen arrived at the camp with a reinforcement of 8000 men; at the ſame time a treaty was concluded with Charles I. of England, by which that monarch allowed the marquis of Hamilton to raiſe 6000 men for the ſervice of Guſtavus. Theſe auxiliaries were to be conducted to the main army by a body of 4000 Swedes; and were in every thing to obey the king while he was perſonally preſent, but in his abſence were to be ſubject to the orders of the marquis. With theſe troops the king had reſolved to make a diverſion in Bremen; but the marquis finding it impoſſible for him to effect a junction with the Swediſh army, reſolved, without debarking his troops, to ſteer his courſe for the Oder, and land at Uſedom. Guſtavus was very much diſpleaſed at finding his project thus diſconcerted; however, making the beſt of the preſent circumſtances, he commanded the Britiſh troops to act on the Oder inſtead of the Weſer. The number of this little army was magnified exceedingly by report, inſomuch that count Tilly had ſome thoughts of marching againſt them with his whole force; but on the departure of the marquis for Sileſia, he reinforced the army in that country with a a large detachment, which was thought to contribute not a little to the defeat he ſoon after received.

67 Saxony ravaged by count Tilly, who takes Leipſic.

Ever ſince the late action Guſtavus had kept within his intrenchments, where his army was well provided with every thing. Tilly made ſeveral attempts to ſurpriſe or draw him to an engagement; but finding all his endeavours fruitleſs, he marched into Saxony, and laid ſiege to Leipſic. This precipitate meaſure proved highly advantageous to the Swediſh monarch; as thus the elector, who had been wavering in his reſolutions, was now obliged to have recourſe to the Swedes, in order to preſerve himſelf from utter deſtruction. A treaty offenſive and defenſive was immediately concluded with Guſtavus: and the elector willingly promiſed every thing that was required of him; and among the reſt, that not only the prince his ſon, but he himſelf, ſhould reſide in the Swediſh camp, and engage his life and fortune in the common cauſe. Tilly, in the mean time, carried fire and ſword into the unhappy electorate. At the head of an army of 44,000 veterans, he ſummoned the city of Leipſic to ſurrender; denouncing the ſame vengeance againſt it as had been executed on Magdeburg, in caſe of a refuſal. By this the governor was ſo much intimidated, that he inſtantly ly ſubmitted; and alſo ſurrendered the caſtle of Paſſenberg, which was in a condition to have ſtood out till the arrival of the Swediſh army. The elector, enraged at the loſs of theſe valuable places, ordered his army to join the Swedes with all expedition, and preſſed the king ſo warmly to engage, that at laſt he yielded to his deſire.

68
Battle of Leipſic.

On the 7th of September 1631, Guſtavus led out his army in the moſt beautiful order, the Swedes forming one column on the right, and the Saxons another on the left; each amounting to 15,000 men. Tilly drew up his men in one vaſt column, poſſibly with a view of ſurrounding the flanks of the king's army; but every officer of experience in his army, from the excellency of the Swediſh diſpoſition, prognoſticated the event of the engagement. Guſtavus led on the troops againſt that wing of the Imperialiſts commanded by Pappenheim, whom he drove back to ſuch a diſtance, that he gained a point of the wind; by which the ſmoke fell upon their enemies and conſiderably embarraſſed them, at the ſame time that the Swedes were got without the reach of a battery which played furiouſly on their flank. General Bannier in the mean time cut in pieces the troops of Holſtein, and mortally wounded the duke who commanded them. Pappenheim led on his troops ſeven times to the charge, in hopes of regaining his former ſituation; but was as often repulſed by the Swedes. Tilly all this while was engaged with the Saxons; but having at laſt driven them off the field, the whole ſtrength of the Imperial army was turned upon the Swediſh left wing commanded by General Horn. The Swedes ſuſtained the attack with the greateſt firmneſs, until the king detached general Teuffel with the centre to aſſiſt them. The Imperialiſts then were no longer able to ſtand their ground; but gave way every where except in the centre, which was compoſed of 18 regiments of veterans accuſtomed to victory, and deemed invincible.

69
The Imperialiſts defeated with great ſlaughter.

They made incredible efforts to maintain the reputation they had acquired; and, though ſwept off in great numbers by the Swediſh artillery, never ſhrunk or fell into confuſion. Four regiments, after their officers had been killed, formed themſelves, and retired to the ſkirt of a wood; where they were all to a man cut in pieces, without demanding quarter. Tilly retired at the head of 600 men, and eſcaped by the coming on of the night. Seven thouſand Imperialiſts lay dead on the field of battle; 4000 were taken priſoners; a fine train of artillery was loſt, with upwards of 100 ſtandards, enſigns, and other military trophies.—On this occaſion it was that the Scots regiment in the Swediſh ſervice firſt practiſed the method of firing in platoons; to which ſome aſcribe the aſtoniſhment and confuſion that appeared in the Imperial army.

70
Conduct of Guſtavus cenſured.

It is thought, however, that the Swediſh monarch diſplayed greater abilities in gaining this victory than improving it afterwards; for had he marched immediately to Vienna, before his enemies had time to recover their conſternation, it is ſuppoſed that the emperor would have been obliged to abandon his capital, and leave his hereditary dominions to the mercy of the conqueror. But Guſtavus apprehended that Tilly might fall upon the Saxons while he was ravaging the Auſtrian hereditary dominions; which would have deprived him not only of an ally, but of the free quarters which the elector had promiſed to his troops in caſe of a retreat.

71
The Swedes take a number of towns and cut off four regiments of the enemy.

For this and ſome other reaſons he determined to penetrate into Franconia, where he reduced ſeveral places, particularly the fortreſs of Workburg. Tilly, having collected his ſcattered troops, which formed an army ſtill ſuperior in number to that of Guſtavus, marched to the relief of this place; but came too late. He then directed his march towards Rottenberg, where four regiments were cut in pieces by a Swediſh detachment. After this the king reduced Hanau, Franckfort on the Maine, and Mentz; deſtroying a body of Spaniards, who had thrown themſelves in his way to obſtruct his paſſage.

The court of Vienna was now thrown into the utmoſt confuſion; and ſent every where begging aſſiſtance, and ſoliciting the Catholic princes to arm in defence of their religion. The emperor was moſt embarraſſed in finding out a general capable of oppoſing Guſtavus in the field; for the late misfortunes of count Tilly had entirely ſunk his reputation.

72
Walleſtein choſen general by the emperor.

Walleſtein, an old experienced officer, was made choice of; but as he had formerly been diſgraced, it was apprehended that he would not accept of the command of which he had once been deprived. This objection, however, was got over; and Walleſtein not only accepted of the command, but, at his own expence, augmented the army to 40,000 men.

73
A great number of towns taken by the Swedes.

During the whole winter the Swediſh army kept the field; and before the approach of ſummer had reduced Crantznach, Bobenhauſen, Kirchberg, Magdeburg, Gozlar, Northeim, Gottingen, and Dunderſtadt; while the landgrave William made great progreſs in Weſtphalia. Guſtavus Horn was repulſed before Bamberg; but ſoon had his revenge, by entriely deſtroying two regiments of Imperialiſts. To prevent the troops from being affected by the loſs before Bamberg, the king reſolved to give battle to Tilly, who was marching into Bavaria to prevent the Swedes from gaining a footing in that electorate. He purſued the Imperial general through a vaſt tract of country, defeated his rear-guard, and, having reduced a variety of towns and fortreſſes on the Danube, penetrated as far as Ulm.

74
Count Tilly defeated and killed.

Advancing to the river Leck, count Tilly poſted himſelf in a wood on the oppoſite ſide, to diſpute his paſſage. Guſtavus endeavoured to diſlodge him by a regular fire from 70 pieces of cannon. The ſlaughter was dreadful; and Tilly himſelf, being wounded by a cannon-ball in the knee, died a few days before he was to have been ſuperſeded by Walleſtein. The following night the Imperial army evacuated the poſt; part retiring to Ingoldſtadt, and others to Newburg. Guſtavus immediately croſſed the river, and ſeized the towns of Rain and Newburg, which the enemy had abandoned. Augſburg next ſubmitted; and from the inhabitants of this place Guſtavus exacted an oath of fidelity, not only to himſelf but to the crown of Sweden. This meaſure gave the greateſt offence to many of the Germanic body, and made them imagine that the king of Sweden had other views than the defence of the Proteſtant cauſe.

From Augſburg the Swedes advanced towards Ratiſbon; but were diſappointed in their deſign of getting poſſeſſion of that city by reaſon of the Bavarians having thrown a very numerous garriſon into the place.—In the mean time ambaſſadors arrived from Denmark, offering the mediation of that crown for obtaining a laſting peace between the contending powers. Guſtavus, however, replied, that no ſuch peace could take place till the Catholic princes thought proper to grant the Proteſtants full and ample ſecurity for their enjoyment of future tranquillity. But the ambaſſadors had no inſtructions to propoſe any thing farther; and thus the negociation vaniſhed. Guſtavus now, reſolving to retort upon themſelves the cruelties which the Bavarians had inflicted on the Proteſtants, laid the towns of Morzbourg, Frieſengen, and Landſhut, in aſhes. The inhabitants of Munich ſaved their city by ſubmiſſion; but, as the peaſants in that neighbourhood had collected themſelves into bodies in order to murder the ſtragglers from the Swediſh army, Guſtavus burnt their houſes, and defeated the forces of the elector, who had been joined by a conſiderable body of militia.

75 Three towns laid in aſhes by the Swedes.

While Guſtavus was thus employed, Walleſtein had aſſembled a vaſt army. He was ſtrongly ſolicited by the elector of Bavaria to come to his aſſiſtance; but, in revenge of the electors having formerly obtained the command for count Tilly in preference to himſelf, he drew off towards Bohemia to encounter the Saxons. Arnheim, who commanded the Saxon forces in that place, was the enemy of Guſtavus, who had formerly rallied him for his cowardice. He therefore permitted Walleſtein to gain an eaſy victory, in hopes that his maſter the elector of Saxony, a prince entirely devoted to his pleaſures, might be induced to relinquiſh the friendſhip of ſuch a reſtleſs and warlike ally as Guſtavus; with whom indeed he uſed all the eloquence of which he was maſter, to detach him from the Swediſh cauſe. Several advantages in the mean time were gained by the Imperialiſts. Pappenheim defeated the archbiſhop of Bremen's cavalry at Werden; and three Swediſh regiments were cut off near Kadingen. Pappenheim, however, was forced to retire, and withdraw his garriſon from Stade; of which the Swedes took poſſeſſion. Walleſtein and the elector of Bavaria, who had now joined their forces, threatened Guſtavus with greatly ſuperior numbers. At laſt, however, the king, being reinforced with 15,000 men, no longer declined the engagement; but Walleſtein was too wiſe to truſt the fate of the empire to a ſingle engagement againſt ſuch an enemy as the king of Sweden. Guſtavus attacked his camp, but was repulſed with the loſs of 2000 men; which cauſed a general murmuring and diſcontent againſt his raſhneſs. Several other miſfortunes happened to the Swedes; and at laſt, after various manœuvres, Walleſtein bent his courſe towards Miſnia, in order to oblige the elector of Saxony to declare againſt the Swedes, and to draw them out of Bavaria. Guſtavus, notwithſtanding the inconſtancy of Auguſtus, immediately ſet out to aſſiſt him. With incredible diligence he marched to Miſnia, where the Imperialiſts were aſſembling their whole ſtrength. Hearing that the enemy were encamped at Weſenfells, and that Pappenheim had been detached with a ſtrong corps, Guſtavus reſolved to engage them before they could effect a junction. With this view he marched to Lutzen, where he attacked Walleſtein with incredible fury. The Swediſh infantry broke the Imperialiſts in ſpite of their utmoſt efforts, and took all their artillery. The cavalry not being able to paſs the river ſo expeditiouſly as the king thought neceſſary, he led the way, attended only by the regiment of Smaaland and the duke of Saxe-Lawenburg. Here, after charging impetuouſly, he was killed, as Puffendorff alleges, by the treachery of the duke; who, being corrupted by the emperor, ſhot him in the back during the heat of the action. The news of his death was in an inſtant ſpread over both armies. The courage of the Imperialiſts revived, and they now made themſelves ſure of victory. But the Swedes, eager to revenge the death of their beloved monarch, charged with ſuch fury that nothing could reſiſt them. The Imperialiſts were defeated a ſecond time, juſt as Pappenheim, with his freſh corps, came up to their aſſiſtance. On this the battle was renewed, but the Swedes were ſtill irreſiſtible. Pappenheim was mortally wounded, and his army finally routed, with the loſs of 9000 killed in the field and in the purſuit.

76 The Saxon troops defeated by Walleſtein.

77 Guſtavus attacks his camp, and is repulſed with loſs.

78 Battle of Lutzen.

79 Guſtavus killed.

80 The Imperialiſts totally defeated.

The victory of Lutzen proved more unfortunate to Sweden than the greateſt defeat. The crown devolved upon Chriſtina, an infant of ſix years old; the nation was involved in an expenſive foreign war, without any perſon equal to the arduous taſk of commanding the armies, or regulating domeſtic affairs, as Guſtavus had done. However, Chriſtina, the daughter of Guſtavus, was immediately proclaimed queen. The regency devolved on the grand bailiff, the mariſchal, the high admiral, the chancellor, and the treaſurer of the crown. Oxenſtiern was inveſted with the chief management of affairs, and conducted himſelf with the greateſt prudence. He was greatly embarraſſed indeed by the diviſions among the Proteſtant princes, which became more violent after the death of Guſtavus; but, in ſpite of all difficulties, he went on purſuing the intereſt of his country, and planning the means of retaining the Swediſh conqueſts. Matters went on pretty ſucceſsfully till the year 1634, when, through the raſhneſs of the Swediſh ſoldiers, they were defeated at Nordlingen, with the loſs of 6000 men killed on the ſpot, a number of priſoners, and 130 ſtandards with other military trophies, taken by the enemy. Oxenſtiern's conſtancy was ſhaken by this dreadful blow; but he applied himſelf diligently to repair the loſs, by recruiting the army, and rendering the allies faithful. The latter proved the moſt difficult taſk. The death of Guſtavus, and the defeat at Nordlingen, had thrown them into deſpair; and every one was deſirous of making the beſt terms he could with the emperor. The Saxons not only renounced their alliance with Sweden, but openly commenced war againſt it; and tho' the regency would gladly have conſented to an honourable peace, the enemy were now too much fluſhed with ſucceſs to grant it. Oxenſtiern had no other reſource than an alliance with France, and the bravery of his generals. In 1635, he went in perſon to the court of Lewis, and concluded a treaty; which, however, anſwered no purpoſe, as it was never obſerved. The enemy, in the mean time, puſhed their good fortune. They ſurpriſed Philipſburg, where the French had laid up vaſt magazines; and reduced Spires, Augſburg, Treves, Wurtſburg, Coburg, and ſome other places. To complete the miſfortunes of Sweden, it was expected that the Poles would immediately invade Pruſſia. To prevent this, La Gardie was diſpatched thither with a powerful army; but as it was impoſſible to reſiſt ſo many enemies at once, the chancellor purchaſed the friendſhip of Poland for 26 years by ceding that duchy to the republic. Thus he

81 Chriſtina, an infant, proclaimed queen of Sweden.

82 The Swedes receive a great overthrow at Nordlingen.

83 The Saxons declare againſt Sweden.

84 Succeſſes of the Imperialiſts.

85 The Saxons defeated by general Bannier.

he got rid of a powerful enemy; and the Swediſh affairs began to revive by a victory which general Bannier gained over the Saxons, in conſequence of which they were driven beyond the Elbe.

86 The Imperialiſts defeated by Kniphauſen.

87 And by the duke of Saxe Weymar.

88 The Saxons entirely defeated by Bannier.

Early in the ſpring of 1636, the Saxons made ſome motions as if they intended to cut off Bannier's communication with Pomerania. This he prevented by a ſtratagem; defeated a body of the enemy, and obliged the Saxons to retire. Soon after this he drove them out of their winter-quarters with conſiderable loſs, at which time alſo a conſiderable body of Imperialiſts who came to their aſſiſtance were diſperſed. In Weſtphalia general Kniphauſen beat the Imperialiſts with the loſs of 1500 men; but he himſelf was killed in the purſuit, and his army obliged to repaſs the Weſer. Some advantages were alſo gained in the neighbourhood of Minden by general Leſly who had aſſembled a conſiderable army. In Alſace, Bernard duke of Saxe-Weymar defeated count Gallas the Imperial general, and diſperſed his army. But when every thing ſeemed thus ſucceſsful for the Swedes, the city of Magdeburg, contrary to the expectation of every body, ſurrendered for want of powder, which the garriſon had wantonly conſumed. The Saxons alſo made ſome conqueſts on the Elbe, which obliged Bannier to recall general Leſly from Weſtphalia to march againſt them. The Saxons fixed on a moſt convenient ſituation, whence they hoped to deſtroy the Swediſh army without coming to a battle. But Bannier, reſolving to hazard every thing rather than ſuffer his army to be waſted by famine, advanced towards Perleberg, a place cloſely blocked up by the enemy. Here he drove from an advantageous poſt four regiments of Saxon curaſſiers, having killed or taken priſoners 400 men; after which he ſoon forced them to a general engagement. The numbers were very unequal, Bannier's army amounting to 9000 horſe and 7000 foot, and the Saxons to 15,000 horſe and 13 battalions of foot. The battle began with great fury; the right wing of the Swedes was almoſt oppreſſed by numbers before the left could come to their aſſiſtance. They were ten times driven back, and as often returned to the charge. At the laſt time they made ſuch a deſperate effort, that the enemy were entirely broken and defeated. Five thouſand were killed on the ſpot, 3000 wounded, and as many taken priſoners, together with 150 colours and ſtandards, and ſeveral pieces of cannon.

89 Eight regiments of Saxons taken priſoners.

90 Bannier defeats the Imperialiſts but is obliged to retire.

Thus ended the campaign of 1636, in a manner highly honourable to the Swedes. Some fruitleſs negociations were ſet on foot during the winter; but theſe coming to nothing, Bannier quitted his winter-quarters very early in the ſeaſon; and falling upon eight regiments of Saxons cantoned at Eulenburg, purſued them to Torgau, where he obliged them to ſurrender at diſcretion. Another party of Saxons was defeated in the neighbourhood of Leipſic; after which he propoſed inveſting that city. But in this project he was diſappointed by the Imperialiſts penetrating into Thuringia. He then called in all his detachments, with a view to prevent them from croſſing a river named *Sala*; but in this alſo he was diſappointed: however, he had the good fortune to defeat 2000 imperialiſts near Pegau, and deſtroy ſeveral detachments that attempted to obſtruct his march. Yet, notwithſtanding all theſe ſucceſſes, Bannier found his ſituation every day more ſtraitened, from the continual increaſe of the enemy's forces; which obliged him at laſt to retreat into Pomerania, out of which he ſoon drove out count Gallas.

91 Pomerania ravaged by the Imperialiſts.

The affairs of the Swedes were now once more reduced to the brink of ruin through the unguarded conduct of General Wrangel, who had alſo an army in Pomerania. After Bannier had driven count Gallas out of the province as above-mentioned, Wrangel, imagining himſelf perfectly ſecure, cantoned his troops and extended his quarters, the better to accommodate his army. But Gallas being informed of this proceeding, ſuddenly returned, ravaged all Upper Pomerania, and reduced the towns of Uſedom, Dernmin, and Wollin; after which, leaving garriſons in the fortreſſes, he returned to his winter-quarters in Saxony.

92 The Imperialiſts defeated by Bannier.

93 Exploits of the duke of Saxe-Weymar.

This unfortunate campaign counterbalanced all the advantages of the former. Wrangel was ſo ſtruck with the ſuddenneſs of the blow, that he could take no meaſures for oppoſition. Some of the Swediſh allies again fell off, and took up arms againſt them. In 1638, the Swediſh affairs again began to revive in this quarter, through the excellent conduct of Bannier, who defeated count Gallas with the loſs of 3000 men killed and taken priſoners. Purſuing his good fortune, he ſo harraſſed the count, that he obliged him in great haſte to repaſs the Elbe, and take ſhelter in the hereditary dominions of Auſtria. Great as Banner's exploits had been, however, they were eclipſed by thoſe of duke Bernard. That general had ſo increaſed his army in the Proteſtant cantons of Switzerland, and in Franche Comte, that he found himſelf in a condition to act without the aſſiſtance of the French, who indeed were but treacherous allies. Advancing to the Rhine, he ſeized on Seckingen and Laſſuburg, and laid ſiege to Rheinfield. The Imperialiſts, in conjunction with the troops of Bavaria, advanced to the relief of the place. An engagement enſued; in which the victory was diſputed: the enemy threw ſuccours into the city, and the duke withdrew his army. Within a month he gave them battle a ſecond time; and ſo completely defeated them, that only one Imperial officer above the rank of a captain eſcaped being killed or taken priſoner. He then renewed the ſiege of Rheinfield; which he reduced, as well as ſeveral other important places. Advancing to Briſac, he blocked it up with a deſign of forcing the garriſon to ſurrender by famine. General Gotz, with 12,000 men, attempted to throw in 1000 waggons of proviſion; but he was defeated, with the loſs of all his men except 2500. Duke Charles of Lorrain, with 4000 men, joined the remains of Gotz's army, in order to relieve the town; but being ſurpriſed by Bernard, his whole army was cut in pieces. A third attempt was made by Gotz, but it proved as unſucceſsful as the former; and the place being reduced to great ſtraits, was obliged to capitulate.

In January 1639, the two victorious generals Bernard and Bannier prepared to attack the enemy on their own ground. Bannier made an irruption into the territories of Anhalt and Halberſtadt. Leaving his infantry behind, he puſhed on with his cavalry, and ſurpriſed Salis, grand-maſter of the Imperial artillery.

94 Bannier defeats the enemy in ſeveral engagements.

tillery. After a bloody conflict, the Swedes gained a complete victory, ſeven regiments of the enemy being cut in pieces. Next entering Saxony, he defeated four regiments of the enemy, obliging a much larger body to take ſhelter under the cannon of Dreſden. Hearing that the Saxons were encamped near Chemnitz, where they waited to be joined by the Imperialiſts, he reſolved to attack them before this junction could be effected. The ſame good fortune ſtill attended his arms, and the Saxons were almoſt all killed or taken. Bannier next entering into Bohemia, laid the country under contribution; after which, returning croſs the Elbe, he fell on general Hofſkirk, who was encamped near Brandeiz with 10 regiments of horſe and ſeveral battalions of foot. Him he defeated with the loſs of 2000 men. The remains of the Imperial forces were purſued to the walls of Prague, and the generals Hofſkirk and Montecuculi were taken priſoners. Yet, notwithſtanding theſe conſtant ſucceſſes, the enemies of Bannier multiplied daily. He had expected an inſurrection in his favour in Sileſia or Bohemia; but no ſuch event took place. The Proteſtant princes, overawed by the enemy, did not ſend him the neceſſary aſſiſtance. Undiſmayed, however, by difficulties or danger, Bannier performed wonders. He defeated a body of Imperialiſts at Glatz: three times he drove the Saxons from their camp at Firn; and yet was forced to evacuate the place, becauſe he could not ſpare a garriſon.

95 Death of the duke of Saxe-Weymar.

His army being deſtitute of the means of recruiting, was conſiderably diminiſhed in number; yet with it he reduced a number of towns, and obtained a variety of other important advantages, when on a ſudden all his hopes were blaſted by the death of the duke of Saxe-Weymar; poiſoned, as was ſuppoſed, by the French, who were deſirous of getting the town of Briſac into their hands, from which the duke prevented them.

96 Treachery of the French.

The difficulties to which Bannier was now reduced proved extreme. The French monarch took upon him to diſpoſe of the army and conqueſts of Bernard as he thought proper. Briſac, and other places of importance, he kept to himſelf; after getting poſſeſſion of which, the French endeavoured, as much as poſſible, to ruin the army. In the mean time the Imperial army under Piccolomini, in the Netherlands, was prodigiouſly augmented; and the archduke Leopold-William, in quality of generaliſſimo, was aſſembling his whole ſtrength to cruſh the Swedes at once. Bannier, however, did not deſpair. George duke of Lunenburgh having conceived ſome diſguſt at the emperor, Bannier hoped to gain him over: he therefore approached nearer to his country; by which alſo he drew towards the armies of Weymar and Heſſe.

97 Imperialiſts defeated by Konigſmark.

In his way he cut in pieces a body of 3000 Croats. General Konigſmark routed the Imperialiſts at Gera; a ſecond time at Scholen; and a third time entirely defeated them near Leipſic. Bannier was very preſſing on the allies to join him; and at laſt, in 1640, he was joined by the Weymar army under the dukes of Longueville and Gubrien, a body of Ruſſians led by general Melander, and the troops of Lunenburgh commanded by general Klitzing. The army now amounted to 22 battalions of infantry and 22,000 horſe; ſo that they were much more than a match for their enemies, had they been under the ſole direction of Bannier. But unanimity was wanting; every one would be ſupreme in the command; and Bannier, the beſt general of them all, had the leaſt influence. Inſtead of thoſe maſterly and deciſive ſtrokes by which the Swedes had hitherto diſtinguiſhed themſelves, the armies continued looking at one another, each ſuffering the rigours of famine. At laſt Bannier, reſolving to expoſe his troops no longer, ſet out for Thuringia, through Franconia, to ſeize an advantageous poſt on the Maine; but as he advanced to the Sala, he found the Imperialiſts entrenched on the other ſide. Finding it impoſſible to force a paſſage, he took the road through Heſſe, where his troops ſuffered greatly by famine. Here he propoſed to fight the enemy; but the Landgrave and duke of Lunenburg refuſed their conſent. Upon this he threatened to leave them to the mercy of the confederates, and thus obliged them to be ſomewhat more pliant. None of thoſe brilliant ſucceſſes, however, now attended the operations of the Proteſtant allies: the campaigns of 1640 and 1641 were ſpent in uſeleſs marches and countermarches; ſerving only to bring the army into the greateſt dangers, from which they were as conſtantly relieved by the active and intrepid Bannier.

98 Death of Bannier.

At laſt this brave general, worn out with perpetual fatigues, died of a fever in the year 1641, leaving the Swediſh army in a worſe ſituation than ever.

99 A Swediſh detachment cut in pieces.

The imperialiſts were too well acquainted with the abilities of Bannier not to take advantage of the opportunity offered by his death. A Swediſh detachment was cut in pieces at Quidlenberg. The Swediſh army, accuſtomed only to be obedient to Bannier, became mutinous, and Piccolomini reſolved to fall upon them with his whole force. But the four generals, Wrangel, Konigſmark, Wittemberg, and Pfuhl, having convinced the ſoldiers of the neceſſity of defending themſelves, made ſuch excellent diſpoſitions, that the Imperialiſts durſt not attack them.

100 The Imperialiſts defeated.

Piccolomini then detached part of his army to attack the Heſſians in their quarters; but Wrangel and Konigſmark threw themſelves in their way, and defeated them with the loſs of 2000 men. This victory, however, did not retrieve the Swediſh affairs. Diſſenſions and mutiny began again to take place in the army to ſuch a degree as threatened its diſſolution.

101 General Torſtenſon takes the command of the Swediſh army.

In 1642 General Torſtenſon was ſent from Sweden, with a large ſum of money and a ſtrong reinforcement, to take upon him the ſupreme command. This general was inferior in abilities to none of his predeceſſors, and deſigned without loſs of time to come to an engagement; but the Weymar army ſeparating from him, put an end to that deſign, and obliged him to remain for a conſiderable time inactive. He was alſo confined to his chamber for ſome time by a dangerous gout; and thus a report of his death being ſpread, the Imperialiſts were encouraged to begin a long march through roads ſcarce paſſable, in hopes of ſurpriſing the Swediſh army without a general. Torſtenſon having intelligence of this, ſeized an advantageous poſt which could not be forced; and thus obliged the enemy to retreat, after having ſuffered as much by their fatiguing march as if they had fought a bloody battle.

102 Reduces ſeveral towns.

Then joining general Stalhanch, who had been driven by the Imperialiſts out of Sileſia, he reduced the town of Great Glogau, with a number of other important places;

after which he laid ſiege to Schweidnitz. The duke of Saxe-Lawenburgh, at the head of all his cavalry, endeavoured to throw in ſuccours; but was defeated with the loſs of 3000 men. He himſelf was taken priſoner, and died of chagrin a few days after. In conſequence of this defeat Schweidnitz ſurrendered at diſcretion; and Torſtenſon having ſent a detachment to inveſt the city of Neiſſe, proceeded with the reſt to drive the enemy entirely out of Sileſia.

103
Drives the Imperialiſts out of Sileſia, and takes Olmutz, &c.

This he effectually performed; obliging them to retire over barren mountains, almoſt famiſhed for want of proviſion, and harraſſed by his light troops; ſo that this lately formidable army was almoſt entirely ruined. With his victorious troops the Swediſh general then poured into Moravia; where, in five days, he reduced the ſtrong town of Olmutz (which not long ago ſuſtained a ſiege of as many weeks by the king of Pruſſia.) Litta and Newſtadt ſhared the ſame fate; after which the Swedes, returning ſundenly to Sileſia, made themſelves maſters of Oppelein, Brieg, and laid ſiege to Breſlau. Here the garriſon made ſuch an obſtinate defence, that the Imperialiſts had time to aſſemble under the conduct of the archduke Leopold, and come to their relief. As Torſtenſon was greatly inferior in number, he raiſed the ſiege; but appeared ſo formidable in his retreat, that the enemy durſt neither attack him, nor attempt to prevent his encamping in a very advantageous ſituation. The Imperialiſts took this opportunity of laying ſiege to Glogau: but after having loſt a great number of men, they were forced to abandon the enterpriſe on the junction of Wrangel with Torſtenſon; by which means the Swedes were once more in a condition to face their enemies in the field.

Torſtenſon now projected an irruption into Bohemia, and putting his army into winter-quarters in that country; but in this he was prevented by the vigilance of the enemy: however, he reduced the city of Zittau, where, for the firſt time, a cartel for priſoners was eſtabliſhed; by which means the Swediſh army was conſiderably augmented. Thus diſappointed in his deſigns on Bohemia, Torſtenſon directed his courſe to Leipſic, which he intended to inveſt. The Imperial generals aſſembled their whole force, and ſet out to relieve that important place.

104
Entirely defeats them at Leipſic.

The two armies ſoon came in ſight of each other; and a furious cannonading was the prelude to a general engagement. A ſingle bullet had almoſt proved fatal to the Swediſh cauſe. It carried away the furniture of Torſtenſon's horſe, killed the count Palatine's horſe, pierced general Rabenau through the body, took off the head of a celebrated counſellor named *Crabbe*, and carried away the leg of a private ſoldier. The Swedes, as ſoon as the armies came up, behaved with their wonted reſolution, and after an obſtinate conflict obtained a complete victory; 5000 of the enemy being killed on the ſpot, 3000 wounded, and as many taken priſoners. This victory was followed by the immediate ſurrender of Leipſic; and in all probability the Swedes would have finally triumphed over all their enemies, had not a rupture with Denmark enſued.

105
War with Denmark.

Torſtenſon and Horn behaved with their uſual valour in Holſtein and Schonen, while general Konigſmark diſtinguiſhed himſelf in Germany; but the ruin of the Weymar army, which was totally defeated with the loſs of one half its number at Dettingen by the Bavarians, proved a dreadful blow, from which the Swedes could ſcarce recover themſelves.

106
The Swedes defeated at Dettingen.

Indeed, notwithſtanding the valour and ſucceſs of the Swedes, their affairs in Germany muſt have gone to wreck in the campaigns of 1643 and 1644, had not the French under Conde and Turenne made a moſt powerful diverſion, and performed ſuch exploits as immortalized the names of theſe two generals.

107
An advantageous peace with Denmark.

In 1645, the war againſt Denmark was puſhed with ſuch vigour, that a peace, very honourable and advantageous for Sweden, was concluded; and thus Torſtenſon was again at liberty to act againſt the Imperialiſts. He now took meaſures for carrying the war into the heart of the Auſtrian dominions. Hatfield aſſembled a conſiderable army to oppoſe the Swedes; and the emperor came in perſon to Prague to animate his troops. The two armies came in ſight at Jancowitz, and both prepared for an engagement.

108
The Imperialiſts entirely defeated at Jancowitz.

The valour of the Swedes once more prevailed; and they totally defeated their enemies. Four thouſand of the Imperialiſts were killed on the ſpot, among whom were general Hatfield and a great number of officers; and near 5000 were taken priſoners. No great advantages, however, were derived from this victory. Some towns indeed were reduced; but at laſt Torſtenſon was obliged to retire into Moravia, where he put his army into winter-quarters; and in the beginning of the year 1646 reſigned the command to Wrangel.

109
Torſtenſon reſigns the command to Wrangel.

The new general conducted the Swediſh affairs with great ability and ſucceſs; till at laſt the Imperialiſts, finding themſelves finally unable to drive the Swedes out of Germany, concluded a peace with them in 1648.

110
Treaty of Weſtphalia.

This was the memorable treaty of Weſtphalia, by which the Germanic conſtitution was ſettled upon its ancient principles, and thoſe implacable diſputes which had ſo long torn the empire were ended; the duchies of Bremen and Verden, all the Upper and part of Lower Pomerania, the city of Wiſmar and the iſle of Rugen, were aſſigned to Sweden, and a gratification of five millions of crowns was given to the army.

111
Charles Guſtavus appointed heir to the crown of Sweden.

Sweden now enjoyed ſome years of repoſe. Charles Guſtavus, count Palatine, having gained the favour of Chriſtina, was appointed generaliſſimo of the forces, and heir-apparent to the crown. A marriage was propoſed between them; but the queen would never liſten to this or any other propoſal of the kind. In 1650, the ceremony of the queen's coronation was performed; but in four years thereafter, ſhe reſigned the crown in favour of Guſtavus. (See the article CHRISTINA.)

112
State of Sweden on the acceſſion of Charles.

The new king found himſelf involved in conſiderable difficulties on his acceſſion to the throne. The treaſury was quite exhauſted; great part of the revenue was appointed for the ſupport of Chriſtina's houſehold; the people were oppreſſed with taxes; and the nation having been diſarmed for ſeveral years, began to loſe its reputation among foreigners. To remedy theſe evils, Charles propoſed to reſume all the crown-lands which had been alienated by grants to favourites during the late reign; to repeal a duty which had been laid upon ſalt; to put the kingdom in a poſture of defence; and to enter upon a war with ſome neighbouring ſtate. Under pretence, therefore, that Caſimir king of Poland had queſtioned his title to the throne, 113 War with Poland reſolved on.

throne, he began to make preparations for invading that kingdom. Several embaſſies were ſent from Poland to Stockholm; but ſome point of ceremony always diſappointed them of an audience of the king; ſo that they were obliged to return without their errand. As ſoon as matters were in readineſs, General Wittemberg made an irruption into Poland from the ſide of Pomerania. The Poles oppoſed him with an army of 15,000 men; but inſtead of fighting, they began to negociate, and in a ſhort time entirely diſperſed themſelves. Charles himſelf ſoon followed with a powerful army, and purſued his march without obſtruction, all the cities throwing open their gates to him as he approached, and offering to ſupply him with neceſſaries.

114 The Poles defeated, and the kingdom reduced.

As he advanced to Cracow, Caſimir reſolved to make one effort to ſave his capital. His army amounted only to 10,000 men; and theſe were unfortunately ſuch as had never ſtood fire. After a feeble reſiſtance they fled with precipitation, having loſt 1000 men killed and taken priſoners. A few days after this Charles defeated the Poles a ſecond time about eight leagues from Cracow; upon which Caſimir fled with his family to Oppelen in Sileſia. The capital was then inveſted; and, though defended with the utmoſt valour by Stephen Czarneſki, was in a ſhort time obliged to capitulate. Thus in leſs than three months Charles apparently became maſter of Poland; but it ſoon became evident that the Poles had no intention of abandoning their former ſovereign.

115 War with the Elector of Brandenburg.

In 1656 a war took place with the elector of Brandenburg. While Charles was employed in the conqueſt of Poland, that prince had invaded the Royal and Ducal Pruſſia, and reduced the moſt conſiderable towns with little oppoſition. The king of Sweden took umbrage at his progreſs; and having marched againſt him, defeated his forces in ſeveral ſlight encounters, and obliged him to own that he was a vaſſel of Sweden. Theſe rapid conqueſts alarmed all Europe; and the different powers ſought for means of driving the Swedes out of Poland, which they had ſo unexpectedly and unjuſtly ſeized.

116 The Poles revolt.

The Poles were no ſooner aſſured that they ſhould be aſſiſted, than they every where revolted and maſſacred the Swedes. Caſimir returned from Sileſia; and thoſe very troops and generals who had before ſubmitted to Charles without oppoſition, now ranged themſelves under the banners of his antagoniſt.

117 Charles gains a victory, but is obliged to retire.

Charles immediately marched from Pruſſia to chaſtiſe the inſolence of the Poles, and totally defeated a body of 12,000 men under the command of Czarneſki. This did not hinder all the Poles incorporated with his troops to deſert; which conſiderably reduced his army; and the campaign being performed in the depth of winter, he was at laſt obliged to retreat to Pruſſia. In his march he was haraſſed by the Poles; and a body of 4000 Swedes was ſurpriſed and defeated by them at Warka. This loſs, however, was ſoon after recompenſed by a complete victory gained by Adolphus the king's brother and General Wrangel over Czarneſki.

118 Concludes a treaty with the Dutch and the Elector of Brandenburg.

In the mean time the king was taking meaſures for laying ſiege to Dantzic; but was prevented by the Dutch, who threatened to oppoſe him, unleſs a proper regard was paid to their intereſt. Charles accordingly granted them advantageous terms; and afterwards gained over the elector of Brandenburg, by ceding to him the ſovereignty of Pruſſia, that he might be at liberty to turn his whole ſtrength againſt Poland.

By the treaty juſt concluded with the elector, the latter was to aſſiſt Charles in his war with Poland; but the elector had ſo procraſtinated matters, that the Poles, having obtained aſſiſtance from the Tartars, had reduced the city of Warſaw. The two princes, however, now marched in concert againſt their enemies, who were encamped in a ſtrong ſituation in the neighbourhood of the city abovementioned, their camp being fronted by the Viſtula. The Poles were driven from their entrenchments with prodigious ſlaughter, and a vaſt number taken priſoners.

119 The Poles and Tartars defeated with great ſlaughter.

The Poles and Tartars then laboured to break the alliance; with which view they entered Ducal Pruſſia, and defeated the electoral army, taking prince Radzivil and other perſons of diſtinction priſoners. The Swedes ſoon had their revenge. General Steinboeck attacked the ſame Poliſh army at Philippowa, and overthrew it with ſuch ſlaughter as obliged the Poles for that ſeaſon to quit the field. A more formidable enemy than the Poles now began to make their appearance.

120 The Ruſſians invade the Swediſh dominions.

The Ruſſians invaded the provinces of Carelia, Ingermania, and Livonia; while the elector of Brandenburg began to waver in his fidelity. To preſerve this only ally at ſuch a critical juncture, Charles was obliged to give him more advantageous terms than thoſe already mentioned; while the Ruſſians were repulſed in the provinces of Carelia and Ingermania. But in Livonia they had better ſucceſs, two important fortreſſes falling into their hands; after which they laid ſiege to Riga. For ſeven months they battered the walls of this city, without once venturing to paſs the ditch or ſtorm the practicable breaches.

121 Are defeated before Riga.

The beſieged, under the command of Magnus de la Gardie and Simon Helmfeld, defended themſelves with the greateſt intrepidity; cutting off many thouſands of the enemy in the ſallies they made. At laſt they attacked the Ruſſian camp, drove them out of it with great ſlaughter, and obliged them to raiſe the ſiege with precipitation.

Charles, notwithſtanding the number of his enemies, was now become ſo formidable by the valour and diſcipline of his troops, that whole armies often fled on the very news of his approach. At laſt, in 1657, the Poles, finding they could not reſiſt him in the field, contented themſelves with harraſſing the Swedes on their march, and cutting off the foragers and convoys.

122 Charles enters into an alliance with Ragotſki Prince of Tranſylvania.

This proved much more deſtructive to the Swedes than their former method; ſo that Charles was obliged to enter into an alliance with Ragotſki prince of Tranſylvania, by aſſigning him certain provinces in his neighbourhood, in order to furniſh himſelf with irregular troops, who might fight the Poles in their own way. This, however, proved of no real advantage: for the confederates, after ſpending a whole campaign in Lithuania, were obliged to return without accompliſhing more than the reduction of a ſingle fortreſs; upon which Charles returned with the Swediſh army to Pruſſia.

123 Leopold king of Hungary declares againſt Sweden.

Leopold, the young king of Hungary, having beheld for a long time the Swedes with a jealous eye, now reſolved to declare for Poland. The more effectually to curb the ambition of the Swediſh monarch, he ſolicited the king of Denmark to come to a rupture

ture with him. This was inſtantly complied with, and the Danes invaded Bremen. Charles haſtened to oppoſe this new enemy; which gave ſuch offence to Ragotſki, that he neglected to take the proper meaſures for his own defence in the abſence of the Swedes, and ſuffered his army to be deſtroyed by the Poles and Tartars. At the ſame time the Turks invaded Tranſylvania, under pretence that Ragotſki, being a vaſſal of the Grand Signior, had no right to invade Poland without his leave. Ragotſki oppoſed them in the field; where he was defeated and killed, leaving Charles deſtitute of the only ally on whom he could have depended.

124 Ragotſki's army deſtroyed by the Poles and Tartars.

125 He is defeated and killed by the Turks.

The king, however, not diſmayed by this misfortune, traverſed Pomerania and the duchy of Mecklenburg; after which he fell upon Holſtein, while general Wrangel with another corps entered the duchy of Bremen. The latter executed his meaſures with the utmoſt vigour and intrepidity. In 15 days he retook all the towns which the enemy had reduced; defeated and drove the Daniſh army out of the country, killing 3000 of their beſt ſoldiers. In Holſtein the king reduced ſeveral fortreſſes, laid Itzehoe in aſhes, defeated a body of Danes, and laid ſiege to Frederic-Udda, into which the Danes had thrown a ſtrong garriſon. The conduct of this ſiege he left to Wrangel, he himſelf retiring to Wiſmar in order to obſerve the ſituation of affairs in Poland; but no ſooner was he gone than Wrangel attacked the place with ſuch fury, that he became maſter of it in two hours. In the province of Halland the Swedes were defeated; but the enemy derived no advantage from their victory: at ſea the fleets met, and maintained a hot engagement for two days, without any conſiderable advantage on either ſide. In Poland matters went on much worſe. The houſe of Auſtria had now declared for Caſimir; a German army entered Poland, and reduced Cracow, though not without great loſs to themſelves. Czarneſki entered Pomerania, where he butchered the unhappy peaſants without mercy; but on the approach of Charles he fled as uſual, having gained nothing by his expedition but the character of a cruel barbarian.

126 Bravery and ſucceſs of general Wrangel.

127 The houſe of Auſtria declares againſt Sweden.

The king of Sweden was now ſurrounded by enemies. The elector of Brandenburg had declared againſt him; and he had beſides to engage the armies of Auſtria, Poland, Ruſſia, and Denmark, in the field. In this dangerous ſituation he reſolved to attack Denmark, in ſuch a manner as ſhould oblige that power to come to a ſpeedy accommodation. His deſigns were forwarded by a very early froſt, which enabled him to tranſport his troops without the expence and trouble of ſhipping. Having paſſed over on the ice to the iſland of Funen, he cut in pieces a body of 4000 Daniſh ſoldiers and 500 peaſants. The whole iſland was reduced in a few days; after which he paſſed to Langland, then to Laaland, after that to Falſtre, and laſtly to Zealand. The Danes were terrified at this unexpected invaſion, and were giving themſelves up to deſpair, when Charles offered to conclude a peace upon equitable terms. The king of Denmark very gladly conſented; but with a deſign to renew the war as ſoon as he thought it could be done with ſafety. By this treaty, called the *treaty of Roſchild*, concluded on the 12th of March 1658, the provinces of Schonen, Halland, and Bleking; Lyſter, and Huwen, the iſle of Borkholm, the bailliages of Bahus and Drontheim in Norway, were yielded to Sweden, and a free paſſage through the Sound was granted to the Swediſh ſhips.

138 Charles invades Denmark with great ſucceſs.

19 Peace concluded.

No ſooner was Charles retired, than the king of Denmark began to act againſt him in an underhand manner; on which, reſolving to anticipate him in his deſigns, he appeared unexpectedly with a fleet before Copenhagen. Had he given the aſſault immediately, before the inhabitants had time to recover from their ſurpriſe, it would probably have ſurrendered at once; but, by landing at the diſtance of 17 miles, he gave them time to prepare for their defence: the ſiege proved extremely tedious, and at laſt the place was relieved by a Dutch fleet. On this Charles converted the ſiege into a blockade, which continued till the end of the war. Wrangel reduced the ſtrong fortreſs of Cronenburg; and the Swediſh forces were ſo judiciouſly poſted, that all Denmark was in a manner blocked up; when, in 1660, king Charles died of an epidemical fever: and thus an end was put, for that time, to all the ambitious deſigns of Sweden.

130 The war renewed, and Copenhagen beſieged.

131 Death of Charles Guſtavus.

The new king Charles XI. was a minor at the time of his father's death; and as the kingdom was involved in a dangerous war with ſo many enemies, the regency determined to conclude a peace, if it could be obtained on reaſonable terms. A treaty was accordingly concluded at Oliva; by which Caſimir renounced his pretenſions to the crown of Poland, and that republic gave up all pretenſions to Livonia. Bornholm and Drontheim were ceded to Denmark; and an equivalent in Schonen remained with Sweden. During the minority of the king, nothing remarkable occurs in the hiſtory of Sweden. In 1672 he entered into an alliance with Lewis XIV. which, two years after, involved him in a war with the elector of Brandenburg. At firſt the Swedes carried all before them; but general Wrangel having fallen ſick, they continued their conqueſts under another named *Mardenfeldt*. Almoſt all the towns in Brandenburgh were reduced, when the elector arrived with an army to the relief of his diſtreſſed ſubjects. He retook ſeveral towns, defeated Mardenfeldt in a general engagement, and ſoon after forced them to abandon all their conqueſts. In conjunction with the Danes, he then invaded the Swediſh dominions: many places of importance were reduced; and, in 1676, Sweden received a moſt deſtructive blow by the defeat of her fleet in an engagement with the combined fleets of Denmark and Holland. Soon after this the king took the government into his own hands, and in ſome degree reſtored the fortune of Sweden; but thongh matters went on in a more proſperous way where the king commanded in perſon, the ſame loſſes and diſgrace attended the Swediſh arms in every other quarter. In Pomerania, count Konigſmark loſt every place of importance excepting Stralſund, Stetin, and Gripſwald. In 1678, the Swediſh fleet was defeated in two engagements. At Landſcroon a moſt obſtinate battle was fought from ten in the morning till ſix at night; when both parties were obliged, by their fatigue, to retire to their reſpective camps. At Oldeval in Norway, the Swedes were defeated; and the Danes laid deſolate the iſlands of Oeland, Smaaland, Unno, and Kuno; while the electoral troops and Imperialiſts reduced count Konigſ-

132 Charles XI.

133 Treaty of Oliva.

134 War with Brandenburg.

135 The Swedes defeated by land and ſea.

136 Their affairs every where go to wreck.

mark to the utmoſt diſtreſs in the neighbourhood of Stralſund.

In this deplorable ſituation of affairs count Konigſmark found an opportunity of attacking his enemies to ſuch advantage, that he obtained a complete victory; after which he ravaged the duchy of Mecklenburg. Yet notwithſtanding this ſucceſs, he could not prevent the elector from reducing Stralſund; after which he was obliged to evacuate Pomerania; and, to complete his diſtreſs, the fleet which tranſported the Swediſh army from Pomerania was wrecked on the coaſt of Bornholm; by which accident 2000 perſons were drowned, and the remainder plundered and taken priſoners by the Danes, though they had been furniſhed with paſſports from king Frederic.

137 Peace concluded.

138 Charles becomes abſolute.

In this unproſperous ſituation of affairs a peace was concluded at St Germain's between France and her enemies, by which the Swedes and Danes were left to decide their quarrel by themſelves. Denmark was by no means a match for Sweden, even in the diſtreſſed ſituation to which ſhe was reduced: for which reaſon a treaty was inſtantly concluded, on terms much more favourable to Sweden than could have been expected; and the peace was confirmed by a marriage between Charles and Ulrica Eleonora, daughter to the king of Denmark. From this time the Swediſh monarch applied himſelf to the reformation of the ſtate; and by artfully managing the diſputes between the nobility and peaſants, he obtained a decree of the ſtates empowering him to alter the conſtitution as he pleaſed. Being thus inveſted with abſolute power, he proceeded to take ſome very extraodinary meaſures. In 1685 it was projected to liquidate the public debts by raiſing the nominal value of money, without adding any thing to its intrinſic value. This was put in execution the following year, by which the creditors of the government loſt upwards of nine millions of crowns. This, with ſome other arbitrary ſteps taken about the ſame time, diſguſted all the nobility, merchants, and crown-creditors. In Livonia they were highly reſented; and remonſtrances were repeatedly ſent by the hands of deputies, who had orders to inſiſt upon their privileges confirmed by many acts of the king's predeceſſors. The deputies could obtain nothing, ſo that the diet was aſſembled. On their report the body of nobility reſolved to draw up a ſtronger remonſtrance than any of the former, to be preſented to the king by captain Patkul one of the deputies, who had already diſtinguiſhed himſelf by his boldneſs and attachment to liberty. His public ſpirit, however, produced no other effect than to procure his own deſtruction. An accuſation was drawn up againſt all the remonſtrants, but eſpecially Patkul. He was ſentenced to loſe his right-hand, then to be deprived of his life, honours, and eſtates; to have the latter confiſcated to the crown, and his papers burnt by the hands of the common executioner. The accuſation was declared unjuſt by the univerſity at Leipſic: but notwithſtanding this, Patkul was obliged to fly his country, to avoid the execution of his rigorous ſentence; which, however, fell upon him with redoubled fury in the ſubſequent reign, of which an account is given under the article Patkul.

139 Diſguſts many of his ſubjects.

140 Boldneſs and misfortunes of captain Patkul.

141 Charles XI. dies, and is ſucceeded by his ſon Charles XII.

142 He takes the government into his own hands at the age of 15.

143 A powerful combination formed againſt him.

144 Holſtein ravaged by the Danes.

145 They are repulſed at Tonningen

On the 15th of April 1697, died Charles XI. leaving his crown to his ſon, the celebrated Charles XII. at that time a minor. On his acceſſion he found himſelf under the tuition of his grandmother Eleonora, who had governed the kingdom during the minority of the late king. Though Charles was at that time only 15 years of age, he inſtantly ſhowed a deſire of taking the government into his own hands. His counſellors, count Piper and Axel Sparre, ſignified his deſire to the queen-regent. They were by her referred to the ſtates; and there all were unanimous: ſo that that the queen, finding that oppoſition would be vain, reſigned her power with a good grace; and Charles was inveſted with abſolute authority, in three days after he had expreſſed his deſire of reigning alone. He was ſcarce ſeated on the throne, when a powerful combination was formed againſt him. King Auguſtus of Poland formed deſigns on Livonia; the king of Denmark revived the diſputes he had with the duke of Holſtein, as a prelude to a war with Sweden; and Peter the Great of Moſcovy began to form deſigns upon Ingria, formerly a province of Ruſſia. In 1699 the king of Denmark marched an army into Holſtein. Charles ſent a conſiderable body of troops to the duke's aſſiſtance; but before their arrival the Danes had ravaged the country, taken the caſtle of Gottorp, and laid cloſe ſiege to Tonningen. Here the king of Denmark commanded in perſon; and was aſſiſted by the troops of Saxony, Brandenburg, Wolfenbuttle, and Heſſe-Caſſel. England and Holland, as guarantees of the laſt treaty with Denmark, in concert with Sweden, joined Charles againſt this confederacy, and ſent fleets to the Baltic. They propoſed a termination of the war upon equitable terms; but theſe were haughtily refuſed by the Daniſh monarch, who deſpiſed the youth and inexperience of Charles, and relied too much upon the alliance he had formed with Saxony, Brandenburg, Poland, and Ruſſia. The town of Tonningen, however, reſiſted all his efforts; and when he ordered the place to be ſtormed, he had the mortification to ſee his troop driven headlong from the walls, by a handful of Swedes under general Bannier.

146 Charles ſets out from Stockholm, and defeats the fleet of the allies.

147 Obliges the Danes to make peace.

148 Marches againſt the Ruſſians.

In the year 1700, Charles, having entruſted the affairs of the nation with a council choſen out of the ſenate, ſet out on the 8th May from his capital, to which he never after afterwards returned. He embarked at Carlſcroon, and defeated the fleet of the allies. Having made a deſcent on the iſland Zealand, he defeated a body of cavalry that oppoſed his march, and then proceeded to inveſt Copenhagen by ſea and land. The king of Denmark then ſaw the neceſſity there was either of having his capital deſtroyed, or of doing juſtice to the duke of Holſtein. He choſe the latter; and a treaty was concluded in eleven days, upon much the ſame terms as formerly. Charles, being thus at liberty to turn his arms againſt the other princes who had conſpired his deſtruction, reſolved to lead his army againſt Auguſtus king of Poland; but on his way he received intelligence that the czar of Moſcovy had laid ſiege to Narva with 100,000 men. On this he immediately embarked at Carlſcroon, though it was then the depth of winter, and the Baltic ſcarce navigable; and ſoon landed at Pernaw in Livonia with part of his forces, the reſt being ordered to Reval. His army did not exceed 20,000 men; but they were the beſt ſoldiers in Europe, while the Ruſſians were only an undiſciplined

149 Defeats two Ruſſian armies, and attacks the Czar's camp.

150 The camp forced, and the Ruſſians defeated with great ſlaughter.

151 Generoſity of Charles.

multitude. The czar, however, had thrown every poſſible obſtruction in the way of his antagoniſt. Thirty thouſand men were poſted in a defile on the road, to oppoſe his paſſage; and this corps was ſuſtained by a body of 20,000 others, poſted ſome leagues nearer Narva. The czar himſelf had ſet out to haſten the march of a reinforcement of 40,000 men, with whom he intended to attack the Swedes in flank and rear. But the celerity and valour of the Swedes baffled every endeavour. With 4000 foot and an equal number of horſe the king ſet out, leaving the reſt of the army to follow him at their leiſure. With theſe he attacked and defeated the Ruſſian armies one after another, puſhing his way to the czar's camp, which he gave immediate orders for attacking. This camp was fortified by lines of circumvallation and contravallation, by redoubts, by 150 pieces of braſs cannon placed in front; and was defended by an army of 80,000 men: yet ſo violent was the attack of the Swedes, that in three hours the entrenchments were carried; the king with 4000 men that compoſed the wing he commanded in perſon, purſued a flying army of 50,000 to the river Narva. The bridge broke down by the weight of the fugitives, and the river was inſtantly covered with their bodies. Great numbers returned in deſpair to their camp, where they defended themſelves for a while; but at laſt the generals Gallowin and Frederowitz, who commanded them, ſurrendered. Thirty thouſand were killed in the entrenchments and in the purſuit, or drowned in the river; 20,000 ſurrendered at diſcretion, and were diſmiſſed unarmed; while the reſt were totally diſperſed. An hundred and fifty pieces of fine cannon, 28 mortars, 151 pair of colours, 20 ſtandards, and all the baggage of the enemy, were taken. Among the priſoners were the duke de Croy, the prince of Georgia, and ſeven other generals. Charles behaved with the greateſt generoſity to the conquered. Being informed that the tradeſmen of Narva had refuſed credit to the officers whom he detained priſoners, he ſent 1000 ducats to the duke de Croy, and to every other officer a proportionable ſum.

Peter was advancing with 40,000 men to ſurround the Swedes, when he received intelligence of the dreadful defeat at Narva. He was greatly chagrined; but, comforting himſelf with the hopes that the Swedes would in time teach the Ruiſſians to beat them, he returned to his own dominions, where he applied himſelf with the utmoſt diligence to the raiſing of another army. He evacuated all the provinces which he had invaded, and for a time abandoned all his great projects, thus leaving Charles at liberty to proſecute the war againſt Poland.

152 Treaty between the Czar and king of Poland.

As Auguſtus had expected an attack, he endeavoured to draw the czar into a cloſer alliance with him. The two monarchs had an interview at Birſen, where it was agreed that Auguſtus ſhould lend the czar 50,000 German ſoldiers, to be paid by Moſcovy; that the czar ſhould ſend an equal number of his troops to be trained up to the art of war in Poland; and that he ſhould pay the king three millions of rixdollars in the ſpace of two years. Of this treaty Charles had notice, and by means of his miniſter count Piper entirely fruſtrated the ſcheme.

153 Charles marches againſt the Saxons.

154 And entirely defeats them.

In 1701, as early as the ſeaſon permitted, Charles, having received a reinforcement from Sweden, took the field, and appeared ſuddenly on the banks of the Duna, along which the Saxon army was poſted to receive him. The king of Poland at that time being ſick, the army was commanded by Ferdinand duke of Courland, mariſchal Stenau, and general Paykel, all officers of valour and experience. They had fortified certain iſlands in the mouth of the river, and taken every other precaution againſt an attack; the ſoldiers were hardy, well-diſciplined, and nearly equal to the Swedes in number: yet Charles, having paſſed the river in boats with high ſide, to ſcreen the men from the fire of the enemy, attacked them with ſuch fury, that they were entirely defeated, with the loſs of 2500 killed on the ſpot, and 1500 taken priſoners. All the Saxon baggage, 36 pieces of cannon, five pair of colours, and ſix ſtandards, fell into the hands of the Swedes.

155 Forms a ſcheme for dethroning Auguſtus.

156 Confuſions in Poland.

157 Auguſtus attempts to treat, but in vain.

This victory was followed by the ſurrender of all the towns and fortreſſes in the duchy of Courland. The king then paſſed into Lithuania, where every town opened its gates to him. At Birſen, an army of 20,000 Ruſſians retired with the utmoſt precipitation on the news of his approach. Here Charles, perceiving that the kingdom of Poland was greatly diſaffected to Auguſtus, began to project the ſcheme of dethroning him by means of his own ſubjects. This ſcheme he executed with more policy than he ever ſhowed on any other occaſion. The manner of putting it in execution was concerted between Radziewiſchi, cardinal primate of Poland, and count Piper. Intrigues and cabals were held at the houſe of the treacherous eccleſiaſtic, while he was publiſhing circular letters to keep the people in their duty to the king. The diet being filled with Swediſh partiſans, became tumultuous, and broke up in confuſion. The affairs of the kingdom then fell into the hands of the ſenate; but here the Swediſh party was as ſtrong as in the diet. It was agreed that they ſhould ſent an embaſſy to Charles; that the poſpolite ſhould mount, and be ready againſt all events: but the chief regulations reſpected the king's authority, which it was determined at any rate to retrench. Auguſtus, reſolving rather to receive laws from the victorious Charles than from his own ſubjects, ſent an embaſſy to him, committing the management of the whole to the counteſs of Konigſmark, a native of Sweden, and a lady famous for her wit and beauty. But the king refuſed to ſee her; on which ſhe returned, chagrined and diſappointed, to Warſaw. The ambaſſadors of the ſenate inſtantly obtained an audience; and were aſſured by Charles, that he took arms againſt the Saxons in defence of the liberties of the Poles, whom he ſhould always regard as his beſt friends. Conferences were appointed to be held at Kinſchin; but Charles ſoon after altered his mind, and told the ambaſſadors he would hold them at Warſaw.

158 Makes a ſecond application to no purpoſe.

159 Warſaw taken.

Auguſtus, in the mean time, finding his ſcheme of peace fruſtrated, had recourſe to the ſenate; but met with ſuch a rough anſwer from them, that he determined once more to apply to Charles. To him therefore he ſent his chamberlain; but a paſſport being forgot, the ambaſſador was arreſted. Charles continued his march to Warſaw, which ſurrendered on the firſt ſummons; but the citadel held out for ſome days. Auguſtus, finding at laſt that no dependence was to be had on the Poles, determined to truſt his fortune wholly to the Saxon army and the nobility of the palatinate of Cracow, who offered to ſupport him to the utmoſt of their power. The Saxon army was now advanced to the frontiers, and Auguſtus immediately put himſelf at the head of it. Being joined by the nobility of Cracow, he found his forces to amount to 30,000 men, all brave and well-diſciplined. With theſe he marched in queſt of his enemy; who did not decline the combat, though he had with him only 12,000 men.

160 The Saxons entirely defeated.

Tho' the Saxons were ſtrongly poſted, having their front covered by a moraſs, beſides being fortified with palliſadoes and chevaux de friſe, they were attacked with irreſiſtible impetuoſity, and entirely defeated, with the loſs of 4000 killed, 2000 made priſoners, and all their baggage and cannon. This victory was followed by the loſs of Cracow:

161 Cracow taken.

after which Charles ſet out in purſuit of the flying army, with a deſign of preventing them from re-aſſembling; but his horſe falling under him, he had the misfortune to break his thigh, by which he was confined ſix weeks: and thus Auguſtus obtained ſome reſpite. The interval he made the beſt uſe of. Having convoked a diet firſt at Mariemburg, and then at Lublin, from them he obtained the following reſolutions; that an army of 50,000 men ſhould be raiſed by the republic for the ſervice of the prince; that ſix weeks ſhould be allowed the Swedes to determine whether they were for war or peace; and that the ſame time ſhould be granted to the turbulent and diſcontented nobles of Poland to make their conceſſions. To counteract the effects of theſe reſolutions, Charles aſſembled another diet at Warſaw; and while the two aſſemblies diſputed concerning their rights and privileges, he recovered of his wound, received a ſtrong reinforcement from Pomerania, and utterly defeated and diſperſed the remains of the Saxon army.

162 Remains of the Saxon army entirely defeated.

163 Auguſtus formally depoſed, and Staniſlaus raiſed to the throne.

The ill fortune of Auguſtus continued ſtill to perſecute him. In 1704 he was formally depoſed by the diet, and the crown conferred by Charles on Staniſlaus Lecſinſky palatine of Poſnania. Auguſtus, however, did not yet tamely give up his kingdom. His adherents daily ſkirmiſhed with the Swedes; and Auguſtus himſelf, being reinforced by 9000 Ruſſians, retook Warſaw, and was very near ſurpriſing the new king, who lived in perfect ſecurity in the city while Charles fought in his cauſe.

164 Warſaw retaken by Auguſtus.

Count Horn, with 1500 Swedes, vigorouſly defended the citadel; but at laſt, finding it no longer tenable, he was obliged to ſurrender at diſcretion. The reduction of Warſaw was among the laſt advantages gained by Auguſtus in the courſe of this war. His troops were now compoſed of Saxon recruits and undiſciplined Poles, who had no attachment to his perſon, and were ready on all occaſions to forſake him. Charles and Staniſlaus advanced with the victorious army; the Saxons fled before them, and the towns for ſeveral miles round ſent their ſubmiſſions.

165 Excellent conduct of his general Schullemberg.

The Poles and Saxons were under the command of Schullemberg, a moſt ſagacious and experienced general, who uſed every expedient to check the progreſs of the Swedes, by ſeizing on the advantageous poſts, ſacrificing ſmall parties to the ſafety of the whole, and to miſlead the enemy, &c. However, with all his conduct and caution, he found himſelf outwitted, and Charles in the neighbourhood of his camp ready to fall upon him, while he thought him at 50 leagues diſtance. The Swediſh monarch attacked him with a ſuperior army, but entirely compoſed of horſe.

166 His engagement with the Swedes.

Schullemberg had poſted his men in ſuch a manner as rendered it impoſſible to ſurround them. His firſt rank being armed with pikes and fuſees, preſented a kind of rampart of bayonets; the ſecond line ſtooping over the firſt who kneeled, fired over their heads, while the third rank, who ſtood upon their feet, kept up an inceſſant fire, by which the Swediſh horſe were exceedingly galled and put in diſorder. Charles loſt the opportunity of cutting off the whole Saxon army, by omitting to order his men to diſmount. This was almoſt the firſt time that infantry had been regularly oppoſed to cavalry, and the ſuperiority of the former was evident.

167 His fine retreat.

After the engagement had continued about three hours, the Saxons retreated in good order; which no enemy had ever done before in any engagement with Charles. The Swedes purſued their enemies towards the Oder, and forced them to retreat through thick woods, almoſt impervious even to infantry. The Swediſh horſe, however, puſhed their way, and at laſt incloſed Schullemberg between a wood and the river, where Charles had no doubt of obliging him to ſurrender at diſcretion, or die ſword-in-hand, as having neither boats nor bridges; but the genius of Schullemberg ſupplied every defect. In the night he ordered planks and floats of trees to be faſtened together; upon which he carried over his troops, while the Swedes were employed in diſlodging 300 men, which he had placed in a windmill, for the purpoſe of defending his flank and keeping the enemy in play. Charles ſpoke of this retreat with admiration, and ſaid he had been conquered by Schullemberg.

168 Auguſtus leaves Poland.

No material advantage, however, reſulted from this to Auguſtus; who was again obliged to leave Poland, and fortify the capital of his hereditary dominions, which he expected every moment to ſee inveſted.

196 The Ruſſians take ſeveral towns in Livonia, and invade Poland.

In the mean time, however, the Ruſſians having recovered their ſpirits, fell upon the Swedes in Livonia with the utmoſt fury. Narva, Dorpt, and ſeveral other towns, were taken, and the inhabitants and garriſons treated with great barbarity. Soon after, an army of 100,000 Ruſſians entered Poland. Sixty thouſand Coſſacks under Mazeppa entered the country at the ſame time, and ravaged every thing with the fury of barbarians. Schullemberg, too, perhaps more formidable than either, advanced with 14,000 Saxons and 7000 Ruſſians, diſciplined in Germany, and reputed excellent ſoldiers. Could numbers have determined the event of war, the Swedes muſt certainly have been at this time overpowered. Inſtead of this, however, Charles ſeemed to triumph over his enemies with more eaſe the more numerous they were. The Ruſſians were defeated ſo faſt, that they were all diſperſed before one party had notice of the misfortunes of another.

170 Aſtoniſhing ſucceſs of Charles againſt them.

The defeating an army of 40,000 men ſcarcely obſtructed the march of the Swedes, while their aſtoniſhed enemies looked upon theſe actions as the effects of witchcraft, and imagined that the king of Sweden had dealings with infernal ſpirits. With theſe apprehenſions they fled beyond the Boriſthenes, leaving the unhappy Auguſtus to his ill fate. Schullemberg, with all his ſkill and experience, ſucceeded no better. The Swediſh general Renſchild engaged and defeated him in

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171 Schullemberg entirely defeated by Renſchild.

half an hour, though the Swedes were vaſtly inferior in number, and their enemies poſted in a moſt advantageous ſituation. Nothing could be more complete than this victory. Whole regiments of Saxons threw down their arms, and begged their lives in the moſt ſuppliant poſture. Six thouſand were ſlain in the field, and 7000 taken priſoners. Thirty-ſix pieces of cannon, 11,000 muſkets, 40 pair of colours and ſtandards, with all the Saxon baggage, fell into the hands of the Swedes: and the conſequences were ſtill more important; for now a paſſage was opened into Saxony, and Auguſtus ſeemed to be in as great danger of loſing his hereditary dominions as he had been of loſing Poland. This extraordinary victory, indeed, is ſaid to have been owing to a panic which ſeized the troops of Schullemberg: however, it was looked upon with admiration, and thought to equal the renown of Renſchild to that of his ſovereign. Charles himſelf was jealous, and could not help exclaiming, "Surely Renſchild will not compare himſelf with me!"

172 Cruelty of the Swediſh general.

But the cruelty of this general ſullied his reputation; for, ſix hours after the engagement, he cauſed 1000 Ruſſians to be maſſacred in cold blood, to revenge, as he ſaid, the cruelties they had committed in Poland.

173 Charles invades Saxony.

Soon after this victory, which was gained on the 12th of February 1706, Charles entered Saxony at the head of 24,000 men. The diet at Ratiſbon declared him an enemy to the empire if he croſſed the Oder. But to this declaration no regard was paid. Charles purſued his march; while Auguſtus was reduced to the condition of a vagrant in Poland, where he poſſeſſed not a ſingle town beſides Cracow. Into this city he threw himſelf with a few Saxon, Poliſh, and Ruſſian regiments, and began to erect ſome fortifications for its defence; but the approach of the Swediſh general Meyerfeldt, and the news of the invaſion of Saxony, diſconcerted all his meaſures, and threw him into deſpair.

174 Auguſtus begs for peace on any terms.

The Ruſſians indeed were his faithful allies; but he dreaded them almoſt as much as the Swedes: ſo that he was reduced to the neceſſity of writing a letter to Charles with his own hand, begging for peace on whatever terms he thought proper to grant. However, as he was then at the mercy of the Ruſſians, this tranſaction was concealed with the greateſt care.

175 Charles's anſwer.

His emiſſaries were introduced to the Swediſh court in the night-time; and being preſented to Charles, received the following anſwer: That king Auguſtus ſhould for ever renounce the crown of Poland, acknowledge Staniſlaus, and promiſe never to re-aſcend the throne, ſhould an opportunity offer; that he ſhould releaſe the princes Sobieſki, and all the Swediſh priſoners made in the courſe of the war; ſurrender Patkul, at that time reſident at his court as ambaſſador for the Czar of Muſcovy, and ſtop proceedings againſt all who had paſſed from his into the Swediſh ſervice. Theſe articles Charles wrote with his own hand, and delivered to count Piper, ordering him to finiſh them with the Saxon ambaſſadors.

176 Auguſtus, in conjunction with the Ruſſians, defeats and takes priſoner a whole Swediſh army.

Auguſtus all this time was obliged to continue a ſhew of war, though he had neither ability nor inclination to carry it on. He was joined by prince Menzikoff with 30,000 Ruſſians; which obliged him, contrary to his inclination, to come to an engagement with Meyerfeldt, who commanded 10,000 men, one half of whom were Swedes. As at this time no diſparity of numbers whatever was reckoned an equivalent to the valour of the Swedes, Meyerfeldt did not decline the combat, though the army of the enemy was four times as numerous as his own. With his countrymen he defeated the enemy's firſt line, and was on the point of defeating the ſecond, when Staniſlaus, with the Poles and Lithuanians, gave way. Meyerfeldt then perceived that the battle was loſt; but he fought deſperately, on purpoſe to avoid the diſgrace of a defeat. At laſt, however, he was oppreſſed by numbers, and forced to ſurrender; ſuffering the Swedes, for the firſt time, to be conquered by their enemies. The whole army were taken priſoners excepting major-general Kraſſau; who having repeatedly rallied a body of horſe formed into a brigade, at laſt broke through the enemy, and eſcaped to Poſnania.—Auguſtus had ſcarce ſung *Te Deum* for this victory, when his plenipotentiary returned from Saxony with the articles of the treaty above-mentioned.

177 But is obliged to reſign the crown of Poland.

The king heſitated and ſcrupled, but at laſt ſigned them; after which he ſet out for Saxony, glad at any rate to be freed from ſuch an enemy as the king of Sweden, and from ſuch allies as the Ruſſians.

178 Czar Peter complains to all the ſtates in Europe.

Czar Peter was no ſooner informed of this extraordinary treaty, and the cruel execution of his plenipotentiary Patkul †, than he ſent letters to every court in Chriſtendom, complaining of this groſs violation of the law of nations. He intreated the emperor, the queen of Britain, and the States-General, to revenge this inſult on humanity. He ſtigmatized the compliance of Auguſtus with the opprobrious name of *puſillanimity;* exhorted them not to guarantee a treaty ſo unjuſt, but to deſpiſe the menaces of the Swediſh bully. So well, however, was the proweſs of the king of Sweden known, that none of the allies thought proper to irritate him, by refuſing to guarantee any treaty he thought proper. At firſt, Peter thought of revenging Patkul's death by maſſacring the Swediſh priſoners at Moſcow; but from this he was ſoon deterred, by remembering that Charles had many more Ruſſian priſoners than he had of Swedes.

179 Invades Poland, and formally depoſes Staniſlaus.

Giving over thoughts of revenging himſelf in this way, therefore, in the year 1707 he entered Poland at the head of 60,000 men. Advancing to Leopold, he made himſelf maſter of that city, where he aſſembled a diet, and ſolemnly depoſed Staniſlaus with the ſame ceremonies which had been uſed with regard to Auguſtus. The country was now reduced to the moſt miſerable ſituation; one party, through fear, adhered to the Swedes; another was gained over, or forced by Peter to take part with him: a violent civil war took place between the two, and great numbers of people were butchered, while cities, towns, and villages, were laid in aſhes by the frantic multitude. The appearance of a Swediſh army under king Staniſlaus and general Lewenhaupt put a ſtop to theſe diſorders, Peter himſelf not caring to ſtand before ſuch enemies.

180 Retires into Lithuania.

He retired, therefore, into Lithuania, giving as the cauſe of his retreat, that the country could not ſupply him with proviſion and forage neceſſary for ſo great an army.

181 Imperious behaviour of Charles.

In the mean time Charles had taken up his reſidence in Saxony, where he gave law to the court of Vienna, and in a manner intimidated all Europe. He declared himſelf the protector of the Proteſtant intereſt in Ger-

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† See the article *Patkul*.

182 Submiſſive behaviour of the emperor to him.

183 Charles viſits king Auguſtus.

Germany, particularly of the Emperor's Proteſtant ſubjects in Sileſia. He deſired, or rather *commanded*, the Emperor to renew and confirm to them all the liberties granted by the treaties of Weſtphalia, but ſince that time reclaimed or eluded at the treaty of Ryſwick. The emperor durſt not refuſe; and upwards of 100 churches were given to the Proteſtants. On this occaſion the Emperor is reported to have ſaid, that "had Charles deſired him to become a Lutheran, he did not know whether he could have refuſed." One would indeed have imagined that Charles had ſome thoughts of converting, or at leaſt dethroning, the Pope himſelf; for being incenſed at the conſtant oppoſition of the court of Rome, whoſe weakneſs and intrigues he deſpiſed, he one day told the emperor's miniſter, that "the Swedes had conquered Rome before now, and he might one day demand an inventory of the effects left there by queen Chriſtina." At laſt, ſatiated with the glory of having dethroned one king, ſet up another, and ſtruck all Europe with terror and admiration, Charles began to evacuate Saxony, in purſuit of his great plan, the dethroning Czar Peter, and conquering the vaſt empire of Ruſſia. While the army was on full march in the neighbourhood of Dreſden, he took the extraordinary reſolution of viſiting king Auguſtus with no more than five attendants. Though he had no reaſon to imagine that Auguſtus either did or could entertain any friendſhip for him, he was not uneaſy at the conſequences of thus putting himſelf entirely in his power. He got to the palace-door of Auguſtus before it was known that he had entered the city. General Fleming having ſeen him at a diſtance, had only time to run and inform his maſter. What might be done in the preſent caſe immediately occurred to the miniſter; but Charles entered the elector's chamber in his boots before the latter had time to recover from his ſurpriſe. He breakfaſted with him in a friendly manner, and then expreſſed a deſire of viewing the fortifications. While he was walking round them, a Livonian, who had formerly been condemned in Sweden, and ſerved in the troops of Saxony, thought he could never have a more favourable opportunity of obtaining pardon. He therefore begged of king Auguſtus to intercede for him, being fully aſſured that his majeſty could not refuſe ſo ſlight a requeſt to a prince in whoſe power he then was. Auguſtus accordingly made the requeſt; but Charles refuſed it in ſuch a manner, that he did not think proper to aſk it a ſecond time. Having paſſed ſome hours in this extraordinary viſit, he returned to his army, after having embraced and taken leave of the king he had dethroned.

184 Marches againſt the Ruſſians.

185 Defeats and drives them out of Lithuania.

186 Gains a remarkable victory,

The armies of Sweden, in Saxony, Poland, and Finland, now exceeded 70,000 men; a force more than ſufficient to have conquered all the power of Muſcovy, had they met them on equal terms. Peter, who had his army diſperſed in ſmall parties, inſtantly aſſembled it on receiving notice of the king of Sweden's march, was making all poſſible preparations for a vigorous reſiſtance, and was on the point of attacking Staniſlaus when the approach of Charles ſtruck his whole army with terror. In the month of January 1708 he paſſed the Niemen, and entered the ſouth gate of Grodno juſt as Peter was quitting the place by the north gate. Charles at this time had advanced to ſome diſtance before the army at the head of 600 horſe. The Czar, having intelligence of his ſituation, ſent back a detachment of 2000 men to attack him: but they were utterly defeated; and this diſappointment was followed by the total evacuation of Lithuania. The king purſued his flying enemies in the midſt of ſnow and ice, over mountains, rivers, moraſſes, and through almoſt every obſtacle that could be ſurmounted by human power. He had foreſeen all difficulties, and determined to ſurmount them all. As he knew that the country could not furniſh proviſion ſufficient for the ſubſiſtence of his army, he had provided a great quantity of biſcuit, on which his men chiefly ſubſiſted till they came to the banks of the Berezine, in view of Boriſlow. Here the Czar was poſted, and Charles deſigned to bring him to a battle; after which he could penetrate with the greater eaſe into Ruſſia. Peter, however, did not think proper to come to an action; but retreated towards the Boriſthenes, whither he was purſued by Charles as ſoon as he had refreſhed his army. The Ruſſians had deſtroyed the roads and deſolated the country; nevertheleſs the Swediſh army advanced with great celerity, and in their way defeated 20,000 of the enemy, tho' entrenched to the teeth. This victory, conſidering the circumſtances in which it was gained, was one of the moſt glorious the Swedes had ever obtained. The memory of it is preſerved by a medal ſtruck in Sweden, with this inſcription, *Sylvæ, Paludes, Aggeres, Hoſtes, victi.*

187 The Czar ſues for peace, but receives an haughty anſwer.

188 Another deſperate engagement.

When the Ruſſians had repaſſed the Boriſthenes, which ſeparates Poland from Moſcovy, the Czar, finding himſelf cloſely purſued by an enemy with whom he was not able to cope, determined at laſt to propoſe peace. Propoſals were accordingly made; but Charles returned no other anſwer, than that he would treat at Moſcow; which being reported to Peter, he coolly replied, "My brother Charles affects to play Alexander, but he will not find in me a Darius." However, he did not think proper to venture an engagement, but continued his retreat; and Charles purſued ſo cloſe, that he was daily ſkirmiſhing with the rear of the enemy. In theſe actions the Swedes had generally the advantage, though in the main theſe victories proved detrimental, by weakening the army in a country where it was impoſſible to recruit. Near Smolenſko, the king, with only ſix regiments, defeated a body of 10,000 horſe and 6000 Calmucks. In this engagement he was expoſed to the utmoſt danger, the enemy having ſeparated him from his troops. With one regiment only, he fought with ſuch fury as diſperſed the enemy, and drove them before him, at the time they thought themſelves ſure of taking him priſoner. Two aids-de-camp that fought near him were killed; his horſe was killed, as was alſo an equerry while he preſented another. The enemy had broke through the regiment, and got quite up to the king; who is ſaid to have on this occaſion killed twelve men with his own hand without receiving a wound.

189 Charles arrives within 100 leagues of Moſcow, but finds the roads impaſſable.

By the 3d of October 1708, Charles was within 100 leagues of Moſcow; but the Czar had made the roads impaſſable, either by laying them under water, digging deep ditches, or covering them with the wood of whole foreſts. He had alſo deſtroyed the villages on every ſide, and taken away every poſſibility of ſubſiſting an army. The ſeaſon was alſo far advanced; the intenſe ſevere weather was approaching; ſo that the Swedes were threatened with all the miſeries of cold and famine, at the ſame time that they were expoſed to the attacks of an enemy greatly ſuperior in number, who, from their knowledge of the country, had almoſt conſtant opportunities of harraſſing and attacking them by ſurpriſe.

190
Reſolves to paſs thro' the Ukrain.

For theſe reaſons the king reſolved to paſs through the Ukrain, where Mazeppa, a Poliſh gentleman, was general and chief of the nation. Mazeppa having been affronted by the Czar, readily entered into a treaty with Charles, whom he promiſed to aſſiſt with 30,000 men, great quantities of proviſions and ammunition, and with all his treaſures, which were immenſe. The Swediſh army advanced towards the river Diſna, where they had to encounter the greateſt difficulties;

191
Meets with great difficulties.

a foreſt above 40 leagues in extent, filled with rocks, mountains, and marſhes. To complete their misfortunes, they were led 30 leagues out of the right way; all the artillery was ſunk in bogs and marſhes; the proviſion of the ſoldiers, which conſiſted of biſcuit, was exhauſted; and the whole army ſpent and emaciated when they arrived at the Diſna. Here they expected to have met Mazeppa with his reinforcement; but inſtead of that, they perceived the oppoſite banks of the river covered with a hoſtile army, and the paſſage itſelf almoſt impracticable. Charles, however, was ſtill undaunted; he let his ſoldiers by ropes down the ſteep banks; they croſſed the river either by ſwimming, or on rafters haſtily put together; drove the Ruſſians from their poſt, and continued their march.

192
Defeats the Ruſſians, and is joined by Mazeppa in great diſtreſs.

Mazeppa ſoon after appeared, having with him about 6000 broken remains of the army he had promiſed. The Ruſſians had got intelligence of his deſigns, defeated and diſperſed his adherents, laid his towns in aſhes, and taken all the proviſions collected for the Swediſh army. However, he ſtill hoped to be uſeful by his intelligence in an unknown country; and the Coſſacks, out of revenge, crowded daily to the camp with proviſions.

193
Deſperate encounters between General Lewenhaupt and the Ruſſians.

Worſe misfortunes, however, ſtill awaited the Swedes. When Charles entered the Ukrain, he had ſent orders to general Lewenhaupt to meet him with 15,000 men, 6000 of whom were Swedes, and a large convoy of proviſions. Againſt this detachment Peter now bent his whole force, and marched againſt him with an army of 65,000 men. Lewenhaupt had received intelligence that the Ruſſian army conſiſted only of 24,000; a force to which he thought 6000 Swedes ſuperior, and therefore diſdained to entrench himſelf. A furious conteſt enſued; in which the Ruſſians were defeated with the loſs of 15000 men. The Swedes continued their march; but, by the treachery of their guide, were led into a marſhy country, where the roads were made impaſſable by deep ditches and trees laid acroſs. Here he was again attacked by the Czar with his whole army. Lewenhaupt had ſent a detachment of two battalions to diſpute the paſſage of the enemy over a moraſs; but finding they were likely to be overpowered, he marched at the head of the whole infantry to their relief. Another deſperate battle enſued; when at laſt the Ruſſians were put in diſorder, and on the point of being totally defeated, when the Czar gave orders to the Coſſacks and Calmucks to fire upon all the Ruſſians who fled. "Even kill me (ſaid he) if I ſhould be ſo cowardly as to turn my back." On this the battle was renewed with great vigour; but notwithſtanding theſe poſitive orders, and the example of the Czar himſelf, the Ruſſians were a third time put in diſorder, after loſing 6000 men, when general Baver arrived with a ſtrong reinforcement of freſh Ruſſian troops. The engagement was again renewed, and continued without intermiſſion till night. The Swedes took poſſeſſion of an advantageous poſt; but were next morning attacked by the Ruſſians. Lewenhaupt had formed a kind of rampart of his waggons, but was obliged to ſet fire to them, in order to prevent their falling into the hands of the enemy, and at the ſame time to cover his retreat by the ſmoke.

194
All the Swediſh Proviſions burnt or taken by the Ruſſians.

The Ruſſians, however, came ſoon enough to ſave 5000 waggons of thoſe proviſions deſigned for the diſtreſſed Swedes. A ſtrong detachment was ſent to purſue Lewenhaupt; but ſo terrible did he appear, that the Ruſſian general offered him an honourable capitulation. This was refuſed with diſdain; and the battle renewed with the ſame vigour as before. The Swedes, though reduced to 4000, again defeated their enemies, and killed 5000 on the ſpot.

195
Lewenhaupt joins the main army in ſpite of all oppoſition.

After this, Lewenhaupt was ſuffered to purſue his march without moleſtation, but alſo without cannon or proviſions. Prince Menzikoff, indeed, was detached to harraſs him; but ſuch was the formidable appearance of the Swedes even in their diſtreſs, that he was afraid to attack them: ſo that at laſt the 4000 arrived ſafe in the camp of Charles, after having killed upwards of 30,000 of the enemy on their march.

This, we may ſay, was the laſt effort of Swediſh valour. The difficulties they had now to undergo exceeded what human nature could bear; yet ſtill they hoped, by conſtancy and courage, to overcome every obſtacle.

196
Extreme diſtreſs of the Swedes.

In the ſevereſt winter known for a long time even in Ruſſia, they made long marches, clothed like ſavages in the ſkins of wild beaſts; all the draught-horſes periſhed; thouſands of ſoldiers dropped dead with cold and hunger: ſo that by the month of February 1709, the whole army was reduced to 18,000 Swedes.

197
Charles beſieges Pultowa.

Amidſt numberleſs difficulties theſe penetrated at laſt to Pultowa, a town on the eaſtern frontier of the Ukrain, where the Czar had laid up magazines; and of theſe Charles reſolved to get poſſeſſion. Mazeppa adviſed the king to inveſt the place, in conſequence of his having correſpondence with ſome of the inhabitants, by whoſe means he hoped it would be ſurrendered. However, he was deceived;

198
A detachment of 8000 Swedes entirely defeated and cut off.

the beſieged made an obſtinate defence, the Swedes were repulſed in every aſſault, and 8000 of them were defeated, and almoſt entitely cut off, in an engagement with a party of Ruſſians. To complete his misfortunes, Charles received a ſhot from a carbine in his heel, which ſhattered the bone. For ſix hours after he continued calmly on horſeback, giving orders, till he fainted with the loſs of blood; after which he was carried into his tent. It was imagined that amputation would be neceſſary, as the wound had already begun to mortify; but one Newman undertook to ſave the limb. It was told the king that deep inciſions would be neceſſary. "Fall to work then (ſaid he), cut boldly, and fear nothing." He held out his leg while the operation was performing; never changed countenance; and while the dreſſing was laid on, ordered an aſſault for the next morning.

199 The Swedes harraſſed by an army of 70,000 Ruſſians. For ſome days the Czar, with an army of 70,000 men, had lain at a ſmall diſtance, harraſſing the Swediſh camp, and cutting off the convoys of proviſions; but now intelligence was received, that he was advancing as if with a deſign of attacking the lines. In this ſituation, Charles, wounded, diſtreſſed, and almoſt ſurrounded by enemies, is ſaid to have, for the firſt time, aſſembled a grand council of war; the reſult of which was, that it was expedient to march out and attack the Ruſſians. Voltaire, however, totally denies that the king relaxed one jot of his wonted obſtinacy and arbitrary temper; but that, on the 7th of July, he ſent for general Renſchild, and told him, without any emotion, to prepare for attacking the enemy next morning.

200 Battle of Pultowa. The 8th of July 1709 is remarkable for the battle which decided the fate of Sweden. Charles having left 8000 men in the camp to defend the works and repel the ſallies of the beſieged, began to march againſt his enemies by break of day with the reſt of the army, conſiſting of 26,000 men, of whom 18,000 were Coſſacks. The Ruſſians were drawn up in two lines behind their intrenchments, the horſe in front, and the foot in the rear, with chaſms to ſuffer the horſe to fall back in caſe of neceſſity. General Slippenbach was diſpatched to attack the cavalry; which he did with ſuch impetuoſity, that they were broken in an inſtant. However, they rallied behind the infantry, and returned to the charge with ſuch vigour, that they diſordered the Swedes in their turn, and took Slippenbach priſoner. Charles was now carried in his litter to this ſcene of confuſion. The troops were animated by his preſence, and returned to the charge; the battle became doubtful, when general Creuk was diſpatched by Charles to attack the enemy in flank. Creuk miſtook his way, which occaſioned the loſs of the battle. Peter now diſpatched prince Menzikoff with a ſtrong detachment, to poſt himſelf between the Swedes and Pultowa, to cut off their communication with their camp, and to fall upon their rear. He executed his orders with great ſucceſs; cut off a corps de reſerve of 3000 men; and thus decided the fortune of the day. The king, however, had ranged his remaining troops in two lines; the foot in the centre, and the horſe in the two wings. They had already been twice rallied, and were now attacked with fury on all ſides. Charles, in his litter, with his ſword drawn in one hand, and a piſtol in the other, ſeemed to be every where preſent. New miſfortunes, however, awaited him. A cannon ball killed both horſes in the litter; and ſcarce were others put in their place, when a ſecond broke the litter itſelf in pieces, and overturned the king. The ſoldiers now believing him killed, fell back in conſternation. 201 The Swedes entirely defeated. The firſt line was broke, and the ſecond fled. Charles did every thing in his power to reſtore order; but the Ruſſians preſſed ſo hard, that rallying was impoſſible, eſpecially as powder was alſo wanting. Renſchild and ſeveral other general officers were taken priſoners; and the king himſelf muſt have fallen into the hands of the enemy, had not count Poniatowſky drawn up 500 horſe, ſurrounded the royal perſon, and with deſperate fury broke through ten regiments of the enemy. With theſe the king arrived on the banks of the Boriſthenes. The Ruſſians forced the Swediſh camp, where they found ſix millions in ſpecie; 202 The camp taken, and the Swediſh army almoſt all killed or taken. but could not hinder Lewenhaupt, with 4000 foot and all the remaining cavalry, from retreating to the banks of the Boriſthenes. This, however, availed them but little; for being purſued by prince Menzikoff, they were obliged, for want of boats or bridges, to ſurrender at diſcretion. Charles fled in a mean calaſh, attended by a little troop inviolably attached to his perſon, ſome on foot, and ſome on horſeback. They were obliged to croſs a ſandy deſart, where neither herb nor tree was to be ſeen, and where the burning heat and want of water were more intolerable than the extremities of cold they had formerly ſuffered. The whole had almoſt periſhed for want of water, when a ſpring was fortunately diſcovered; 203 Charles arrives ſafe in Turky. after which they reached Ozakow, a town in the Turkiſh dominions, the baſhaw of which ſupplied the king with every neceſſary. It was ſome time, however, before boats could be got ready for tranſporting the whole of the king's attendants; by which accident 500 Swedes and Coſſacks fell into the hands of the enemy. This loſs affected him more than all his other miſfortunes. He ſhed tears at ſeeing acroſs the river Bogh the greater part of his few remaining friends carried into captivity, without having it in his power to aſſiſt them. The baſhaw waited upon him to apologize for the delay, and was ſeverely reprimanded by Charles, as if he had been his own ſubject.

The king remained but a few days at Ozakow, when the ſeraſquier of Bender ſent an aga to compliment him on his arrival in the Turkiſh dominions, and to invite him to that city. 204 Is kindly received, and his hopes of conquering Ruſſia begin to revive. Here he was treated with the utmoſt hoſpitality: the Turks practiſed to its utmoſt extent their generous maxim of regarding as ſacred the perſons of unfortunate princes who had taken ſhelter in their dominions; and perhaps regarded him, notwithſtanding his miſfortunes, as an ally that might be uſeful to themſelves againſt the Ruſſians. Every one, indeed, regarded him in his diſtreſs. The French king offered him a ſafe paſſage from the Levant to Marſeilles, from whence he might eaſily return to his own dominions. But Charles was too obſtinate to receive advice. Puffed up with the notion of imitating Alexander the Great, he diſdained to return, except at the head of a numerous army; and he yet expected, by means of the Turks, to dethrone his adverſary Czar Peter. Negociations for this purpoſe, indeed, were carried on in the Turkiſh divan; and it was propoſed to eſcort Charles with a numerous army to the frontiers of Poland: but the revolution which took place there quickly put an end to all ſuch projects. 205 Auguſtus recovers the kingdom of Poland. Auguſtus thought himſelf no longer bound to obſerve the treaty which he had made, than Charles was at hand to force him to it. After the battle of Pultowa, therefore, he entered Poland, and took every meaſure, in concert with the Czar, for the recovery of his kingdom. Staniſlaus was not able to ſtand before ſuch enemies, but was obliged to leave his dominions and fly to Bender in the diſguiſe of a Swediſh officer, in order to ſhare the fortune of Charles.—It was not in Poland alone that the Swediſh affairs began to ſuffer in conſequence of the defeat at Pultowa. 206 The Danes invade Sweden. The Danes quickly invaded the province of Schonen with an army of 13,000 foot and 2500 horſe. Only 13,000 Swediſh forces remained to defend all the territories poſſeſſed by Charles in Germany; and of theſe only a ſmall part were allotted for the defence of Schonen. The regency of Sweden, however, exerted themſelves to the utmoſt to repel this ungenerous invaſion; and having collected an army of 12,000 militia and 8000 regulars, diſpatched them under general Steenboek into Schonen. Some Saxon troops were incorporated in this army; and among theſe a prodigious deſertion took place, which the general found it impoſſible to prevent: and thus the Danes gained ſeveral advantages, and at laſt took Chriſtianſtadt. Their inſolence on this ſucceſs was ſo great, that the Swedes demanded to be inſtantly led againſt them. Here the good fortune of Sweden ſeemed once more to revive. The Danes were driven from a very ſtrong ſituation, with the loſs of 8000 killed and taken priſoners, beſides a vaſt number wounded. The king received the intelligence of this victory with the greateſt exultation; and could not help exclaiming, "My brave Swedes, ſhould it pleaſe God that I once more join you, we will conquer them all!"

207
But are utterly defeated.

In the mean time Charles, by means of his agents the count Poniatowſki and the Sieur Neugebar, uſed his utmoſt efforts to procure a rupture between the porte and Ruſſia. For a long time the money beſtowed by Peter on the vizirs and janiſaries prevailed; but at laſt, in 1711, the grand ſignior, influenced by his mother, who was ſtrongly in the intereſt of Charles, and had been wont to call him *her lion*, determined to avenge his quarrel with Peter. He therefore gave orders to the vizir to fall upon the Ruſſians with an army of 200,000 men. The vizir promiſed obedience; but at the ſame time profeſſed his ignorance in the art of war, and diſlike to the preſent expedition. The cham of Crim Tartary, who had been gained over by the reputation and preſents of the king of Sweden, had orders to take the field with 40,000 of his men, and had the liberty of aſſembling his army at Bender, that Charles might ſee that the war was undertaken upon his account. The czar, on this news, left the ſiege of Riga, where he had continued for ſome months; and with 24,000 men entered Moldavia, where he was joined by Cantemir a vaſſal of the porte. The vizir marched againſt him with a prodigious army, and, through the negligence of the czar, cooped him up in ſuch a manner that he could neither advance nor retreat. In this deſperate ſituation he obſerved that he was now in as bad a ſituation as Charles at Pultowa; and gave orders for breaking thro' the enemy with fixed bayonets. The deſponding ſpiritleſs ſoldiers, however, were little diſpoſed to execute theſe orders; when Catharine, wife to the czar, without his knowledge, ſet on foot a treaty with the vizir; and having ſoon obtained his conſent, had the peace ſigned in ſix hours, by which means, in all probability, the whole Ruſſian army was ſaved.

208
The Turks declare war againſt the Ruſſians.

209
The Czar brought into a deſperate ſituation, but is relieved by a treaty.

The new treaty was moſt violently oppoſed by count Poniatowſki and the cham of Tartary. The former had made the king acquainted with the ſituation of both armies; on which he inſtantly ſet out from Bender, filled with the hopes of fighting the Ruſſians, and taking ample vengeance. Having rode 50 leagues poſt, he arrived at the camp juſt as the czar was drawing off his half-famiſhed troops. He alighted at Poniatowſki's tent; and being informed of particulars, inſtantly flew in a rage to the vizir, whom he loaded with reproaches, and accuſed of treachery. Recollecting himſelf, however, he propoſed a method by which the fault might be remedied; but finding his propoſal rejected, he poſted back to Bender, after having by the groſſeſt inſults ſhowed his contempt of the vizir.

210
Rage of Charles on this occaſion.

The violent behaviour of Charles did not promote his intereſt. The vizir perceived that his ſtay in Turkey might prove fatal to himſelf; and therefore determined to get him out of the country as ſoon as poſſible, either by fair means or foul. Succeeding vizirs adopted the ſame plan; and at laſt the grand ſignior himſelf wrote a letter to the king, in which he deſired him to depart by next winter, promiſing to ſupply him with a ſufficient guard, with money, and every thing elſe neceſſary for his journey. Charles gave an evaſive anſwer, and determined to procraſtinate his journey, as well to gratify his own ſtubborn temper, as becauſe he diſcovered a correſpondence between king Auguſtus and the cham of Tartary, the object of which, he had reaſon to believe, was to betray him to the Saxons. When he was therefore again preſſed to fix the day of his departure, he replied, that he could not think of going before his debts were paid. Being aſked how much was requiſite for this purpoſe, he replied, 1000 purſes (A). Twelve hundred purſes were inſtantly ſent to the ſeraſquier at Bender, with orders to deliver them to the king of Sweden, but not before he ſhould have begun his journey. By fair promiſes, however, Charles perſuaded him to part with the money; after which, inſtead of ſetting out, he ſquandered away his treaſure in preſents and gratifications, and then demanded 1000 purſes more before he would ſet out. The ſeraſquier was aſtoniſhed at this behaviour. He ſhed tears; and, turning to the king, told him, that his head would be the forfeit of having obliged him with the money. The grand ſignior, on being acquainted with this ſhameful behaviour of Charles, flew into a rage, and called an extraordinary divan, where he himſelf ſpoke, a thing very unuſual for the Turkiſh monarchs. It was unanimouſly agreed that ſuch a troubleſome gueſt ought to be removed by force, ſhould other means fail. Orders were therefore poſitively ſent to Charles to depart; or, in caſe of his refuſal, to attack him in his quarters. Nothing could equal his obſtinacy on this occaſion: in ſpite of the menaces of his enemies, in ſpite of the intreaties of his friends, he perſiſted in his reſolution; and at laſt determined to reſiſt with 300 Swedes, being all the attendants he had, an army of 20,000 janiſaries well armed and furniſhed with cannon. At length he was attacked in good earneſt; though it muſt be owned, that even in this extremity the Turks ſhowed their regard to him, and were tender of his life, which the king did not at all return in a ſimilar manner. The moſt of the Swedes ſurrendered at once, perhaps as thinking it the only method of ſaving the king's life. This miſconduct, however, had a quite contrary effect. Charles became the more obſtinate, the more deſperate his affairs ſeemed to be. With 40 menial ſervants only, and the generals Hord and Dardorff, he determined to defend himſelf to the laſt extremity. Seeing his ſoldiers

211
The Grand Signior deſires him to depart.

212
Mean and unjuſt behaviour of Charles.

213
The Turks reſolve to force him to depart.

214
His deſperate reſolution to reſiſt.

215
Is abandoned by all his followers except 40.

(A) Each purſe contained 30 ſequins.

ſoldiers lay down their arms, he told the generals, "We muſt now defend the houſe. Come, (adds he with a ſmile), let us fight *pro aris et focis.*" The houſe had been already forced by the Tartars, all but a hall which was near the door, and where his domeſtics had aſſembled themſelves. Charles forced his way through the janiſaries, attended by the generals Hord and Dardorff, joined his people, and then barricadoed the door. The moment he entered, the enemy, who were in the houſe, threw down their booty, and endeavoured to eſcape at the windows. Charles purſued them from room to room with much bloodſhed, and cleared the houſe in a few minutes. He then fired furiouſly from the windows, killed 200 of the Turks in a quarter of an hour, ſo that the baſhaw who commanded them was at length forced to ſet the houſe on fire. This was done by arrows with lighted matches ſhot into the roof; but Charles, inſtead of quitting it, gave orders for extinguiſhing the fire, in which he himſelf aſſiſted with great diligence. All efforts, however, were vain: the roof fell in; and Charles, with his few faithful companions, was ready to be buried in the ruins. In this extremity one called out, that there was a neceſſity for ſurrendering. "What a ſtrange fellow! (cries the king), who would rather be a priſoner with Turks than mix his aſhes with thoſe of his ſovereign." Another had the preſence of mind to cry out, that the chancery was but 50 paces off, had a ſtone roof, and was proof againſt fire. Pleaſed with the thoughts of again coming to blows, the king exclaimed, "A true Swede! Let us take all the powder and ball we can carry." He then put himſelf at the head of his troops, and ſallied out with ſuch fury that the Turks retreated 50 paces; but falling down in the hurry, they ruſhed in upon him, and carried him by the legs and arms to the baſhaw's tent.

216
Fights like a madman, but is taken priſoner with all his followers.

217
Staniſlaus arreſted in Turkey.

218
Extreme inſenſibility of Charles.

This extraordinary adventure, which favours not a little of inſanity, happened on the 12th of February 1713. He was now kept priſoner, with all his retinue; and in this ſituation he was viſited by the unfortunate Staniſlaus. The latter, as we have already obſerved, came in the diſguiſe of a Swediſh officer, and had indeed ſerved in the Swediſh army in Pomerania, for which reaſon he was arreſted in the Turkiſh dominions; but being known at Bender, notice was ſent to the baſhaw who was conducting the king of Sweden to Adrianople. The baſhaw communicated the news to baron Fabricius, a favourite of Charles, who immediately imparted it to the king. "Dear Fabricius, (ſays this inflexible monarch), run and tell him never to make peace with Auguſtus; we ſhall ſoon have a change in our affairs."

219
Begins to think of returning to his dominions.

Such were the conſiderations that ſtill occurred to the mind of Charles; however, at laſt he ſeemed inclined to ſubmit to his fate, and began ſeriouſly to think of returning to his kingdom, now reduced to the moſt deplorable ſituation. His habitation was now fixed at Demotica, a ſmall town about ſix leagues from Adrianople. Here he was allowed proviſions for his own table and thoſe of his retinue; but only 25 crowns a-day in money, inſtead of 500 which he had received at Bender. During his reſidence here he received a deputation from Heſſe-Caſſel, ſoliciting his conſent to the marriage of the landgrave with Eleonora princeſs royal of Sweden; to which he readily agreed: a deputation was alſo ſent him by the regency of Sweden, requeſting that he would prepare for returning to his own dominions, which were ready to ſink under a ruinous war in his abſence. What determined him, however, more than any thing to haſten his return, was the following accident. The new grand vizir Ibrahim Molla, having for private reaſons determined to come to a rupture with the czar, invited Charles to a conference, in the ſtyle and with the familiarity of an equal. Charles was ſo much chagrined at this indignity, that he ſent his chancellor Mullern to meet the vizir, with a pretence that he was ſick. To avoid giving offence to this miniſter, Charles was obliged to keep his bed during his reſidence at Demotica, which was for 10 months after. At laſt, this vizir being ſtrangled, and the Swediſh intereſt at the porte thereby entirely ruined, he determined to quit Turkey at all events. His departure was to be negociated by his favourite Grothuſen, whom he veſted with the character of ambaſſador extraordinary; ſending him to Adrianople with a train of 14 perſons richly dreſſed. To equip this retinue the king was reduced to the moſt mortifying ſhifts, and to the neceſſity of borrowing money from uſurers at 50 *per cent.* The great object was, to obtain from the vizir money and a paſſport. Grothuſen was received with all the reſpect due to his rank; but the vizir ſtarted difficulties. With regard to the paſſport, he ſaid, it could be of no uſe until the conſent of the court of Vienna was firſt obtained; and as to money, he ſaid, "his maſter knew how to *give* when he thought proper, but it was beneath his dignity to *lend;* that the king ſhould have every neceſſary provided for his journey, and poſſibly the porte might make ſome pecuniary preſent, but he would not have it expected." The Imperial miniſter, however, removed every difficulty with regard to the paſſport, by granting it in the moſt full and ample manner, in the name of the emperor, the princes and ſtates of Germany. He ſent alſo a preſent to the king, conſiſting of a tent of ſcarlet richly embroidered with gold; a ſabre, the handle of which was ſtudded with jewels; and eight fine horſes richly capariſoned. Money, the article moſt wanted, was entirely forgot; however, the day was fixed for Charles's departure, and the vizir appointed 60 carriages loaded with all kinds of proviſions, and ſeveral companies of janiſaries and other troops to attend him to the frontiers of Tranſylvania.

220
Obliged, by his unſeaſonable pride, to keep his bed for 10 months.

221
Sends an ambaſſador to the Porte, who is not very favourably received.

222
Sets out for Sweden.

On the 14th of October 1714, Charles quitted his bed at Demotica, and ſet out for Sweden. All the princes through whoſe territories he was to paſs, had given orders for his entertainment in the moſt magnificent manner; but the king perceiving that theſe compliments only rendered his impriſonment and other misfortunes more conſpicuous, ſuddenly diſmiſſed his Turkiſh attendants, and, aſſembling his own people, bid them take no care about him, but make the beſt of their way to Stralſund. After this he ſet out poſt, in the habit of a German officer, attended only by colonel During. Keeping the bye-roads through Hungary, Moravia, Auſtria, Bavaria, Wirtemberg, the palatinate, Weſtphalia, and Mecklenburg, arrived on the 21ſt of November at midnight, before the gates of Stralſund. Being unknown, he was admitted with

223
Diſmiſſes his retinue, and proceeds with only one attendant.

224 Arrives at Stralſund, and is received with the utmoſt joy.

difficulty; but being ſoon recognized by the governor, the greateſt tokens of joy were ſhown all over the town. In the midſt of the tumult Charles went to bed. He had been booted for 16 days, and now his legs were ſwelled to ſuch a degree that his boots were cut off. Having ſlept for ſome hours, he aroſe, reviewed his troops, and gave orders for renewing the war with redoubled vigour.

225 Diſtreſſed ſituation of Sweden.

Sweden was now in the greateſt diſtreſs. We have already mentioned, that on the news of the defeat at Pultowa, the Danes had invaded Schonen, but were defeated by general Steenbock. This victory, however, did not put an end to the war. On the contrary, the kings of Denmark and Poland, with the czar of Moſcovy, entered into ſtricter bonds of amity than ever. They dreaded the return of Charles to his own dominions, and apprehended that numberleſs victories would ſoon efface the remembrance of Pultowa. They determined, therefore, to make the beſt uſe of their time; and perhaps Charles never took a more imprudent reſolution than obſtinately to remain ſo long in the Turkiſh dominions. The kings of Denmark and Poland invaded Pomerania; but after laying ſiege in vain to Stralſund, Wiſmar, and other places, they were obliged to retire with diſgrace into winter-quarters. In 1712, the king of Denmark invaded and reduced Bremen and Verden; but the ſame year met with a terrible defeat from Steenbock, with the loſs of a vaſt number killed and wounded, and almoſt all their artillery taken. The following year, however, this general being purſued, and ſurrounded by the united forces of the Ruſſians, Danes, and Saxons, was obliged to throw himſelf into the neutral town of Tommingen; where he was beſieged, and obliged to ſurrender at diſcretion, with his whole army. The conſequence of this diſaſter was an invaſion of Finland by the czar; which province he totally reduced, after defeating the Swedes in ſeveral engagements. Indeed, the Swediſh forces were now ſo much reduced, that they were unable to cope with almoſt any enemy. The return of Charles, however, ſeemed to give new life to the whole nation. Though the number of inhabitants was viſibly diminiſhed, the levies he had ordered were complete in a few weeks: but the hands left to cultivate the earth conſiſted of the infirm, aged, and decrepid; ſo that a famine was threatened in conſequence of the military rage which had ſeized all the youth of the kingdom.

226 Steenbock defeats the the Danes, but is afterwards taken priſoner with his whole army.

227 The king is unable to retrieve the Swediſh affairs.

The preſence of Charles did not now produce thoſe conſequences which the allies had feared. The kingdom was too much reduced to be able to furniſh the neceſſary ſupplies of men and money; and though the king's courage and military ſkill were not in the leaſt diminiſhed, the efforts he made, inſtead of reſtoring Sweden to its ſplendour, ſerved entirely to ruin it. In 1715, Pruſſia declared againſt him, on account of his demanding back the town of Stetin, which that monarch had ſeized. To complete his embarraſſment, the elector of Hanover, George I. of Britain, alſo became his enemy. The forces of Denmark, Pruſſia, Saxony, and Hanover, joined to inveſt Wiſmar, while a body of 36,000 men formed the ſiege of Stralſund; at the ſame time that the czar, with a fleet of 20 large ſhips of war, and 150 tranſports, carrying 30,000 men, threw every part of the Swediſh coaſt into the greateſt conſternation. The heroiſm of Charles could not prevail againſt ſo many enemies. So dreadful, however, he ſtill was, that the prince of Anhalt, with 12,000 brave troops, did not think himſelf a match for this furious enemy when at the head of only 2000, till he had entrenched his army behind a ditch, defended by chevaux de frize. It appeared, indeed, that his precaution was not unneceſſary; for, in the night, Charles with his men clambered up the ditch, and attacked the enemy in his uſual manner. Numbers, however, at laſt prevailed; and Charles was obliged to retire, after having ſeen his favourite Grothuſen, general Dardorff and During, the companions of his exile, killed by his ſide, and himſelf being wounded in the breaſt.

228 Is encompaſſed on all ſides by enemies.

229 His deſperate valour.

230 Stralſund beſieged.

This raſh attempt was made in order to ſave Rugen, from whence the town of Stralſund was ſupplied with proviſions. The place was well fortified, and garriſoned with 9000 men, with Charles himſelf at their head; but nothing could reſiſt the efforts of the enemy. The houſes were laid in aſhes by the bombs; the walls miſerably ſhattered, and large breaches made in them by the cannon; ſo that by the 17th of December it was propoſed to give the aſſault. The attack on the horn-work was deſperate: the enemy were twice repulſed; but at laſt, by dint of numbers, effected a lodgment. The next day Charles headed a ſally in which he dealt terrible deſtruction among the beſiegers, but was at length overpowered and obliged to retreat into the town. At laſt his officers, apprehending that he muſt either fall into the hands of the enemy, or be buried in the ruins of the place, intreated him to retire. A retreat, however, was now almoſt as dangerous as to remain in the town, on account of the fleets of the enemy with which the ſea was covered, and it is thought that this very circumſtance induced the king to conſent to it. Setting out therefore in a ſmall boat with ſails and oars, he paſſed all the enemy's ſhips and batteries, and arrived ſafe at Yſtedt in Schonen.

231 And taken, in ſpite of the utmoſt efforts of the king.

232 Charles invades Norway to no purpoſe.

To revenge himſelf for theſe loſſes, Charles invaded Norway with an army of 25,000 men, The Danes were every where defeated and purſued with that vigour for which the king of Sweden was ſo remarkable; but ſtrong reinforcements arriving from Denmark, and proviſion failing, he was at laſt obliged to retire, and evacuate the country. Soon after this the Swedes loſt Wiſmar; but when every thing ſeemed to go to wreck, Baron Goertz the chief miniſter and favourite of Charles found means to ſet on foot a treaty with the czar of Moſcovy, by which the moſt formidable of all Charles's enemies was taken off. The miniſter found means to work upon the inflexible and ſtubborn temper of Charles by repreſenting to him that the ceſſions of certain provinces to Peter would induce him to aſſiſt him in his projects of again dethroning Auguſtus, and of replacing James on the throne of Britain; which laſt ſcheme he had projected out of revenge for the elector of Hanover having ſeized on the duchies of Bremen and Verden. In conſequence of the conferences between the czar and Goertz, the former engaged to ſend into Poland an army of 80,000 men, in order to dethrone that prince whom he had ſo long long defended. He engaged alſo to furniſh ſhips for tranſporting 30,000 Swedes to Germany

233 A treaty with the Czar of Muſcovy projected.

many, and 10,000 into Denmark. This treaty, however, was not fully ratified; and the king's death, which happened in 1718, put a final ſtop to all the great proſpects of Sweden.

234 Charles invades Norway again, and lays ſiege to Frederickſhall.

The king had reſolved on the conqueſt of Norway before he dethroned Auguſtus; and as no difficulties ever deterred him, he marched his army into that cold and barren country in the month of October, when the ground was covered with froſt and ſnow. With 18,000 men he formed the ſiege of Frederickſhall, though the ſeverity of the froſt rendered it almoſt impoſſible to break ground. Charles, however, reſolved to form trenches; and his ſoldiers cheerfully obeyed, digging into the ground with the ſame labour as if they had been piercing a rock. 235 His extreme raſhneſs, in conſequence of which he is killed. On the 11th of December the king viſited the trenches in the midſt of a terrible fire from the enemy, imagining that his men might be animated by his preſence. He took his poſt in the moſt dangerous ſtation he could chooſe, ſtanding upon a gabion and leaning with his arm over the parapet, while the enemy were firing chain-ſhot at the very ſpot where he ſtood. He was intreated to change his ſtation; but he remained obſtinate, as if he had been proof againſt cannon-bullets. At laſt he was ſeen to fall on the parapet with a deep groan. A ſmall cannon-ball had ſtruck him on the temple, beat in the left eye, and forced the right quite out of its ſocket; his right hand in the mean time graſped the hilt of his ſword, as if he had meant to revenge the blow.

236 Account of the Swediſh affairs from the death of Cha. XII. to the year 1771.

Charles XII. was ſucceeded by his ſiſter the princeſs Ulrica Eleonora, wife to the hereditary prince of Heſſe. On this occaſion the ſtates took care to make a previous ſtipulation for the recovery of their liberties, and obliged the princeſs to ſign a paper to this purpoſe before entering on the government. Their firſt care was to make a peace with Great Britain, which the late king intended to have invaded. The Swedes then, to prevent their farther loſſes by the progreſs of the Ruſſian, the Daniſh, the Saxon, and other arms, made many great ſacrifices to obtain peace from thoſe powers. The French, however, about the year 1738, formed a dangerous party in the kingdom, under the name of the *Hats;* which not only broke the internal quiet of the kingdom, but led it into a ruinous war with Ruſſia, by which the province of Finland was loſt. Their Swediſh majeſties having no children, it was neceſſary to ſettle the ſucceſſion; eſpecially as the duke of Holſtein was deſcended from the queen's eldeſt ſiſter, and was, at the ſame time, the preſumptive heir to the empire of Ruſſia. Four competitors appeared; the duke of Holſtein Gottorp, prince Frederic of Heſſe-Caſſel nephew to the king, the prince of Denmark, and the duke of Deux-Ponts. The duke of Holſtein would have carried the election, had he not embraced the Greek religion, that he might mount the throne of Ruſſia. The czarina interpoſed, and offered to reſtore all the conqueſts ſhe had made from Sweden, excepting a ſmall diſtrict in Finland, if the Swedes would receive the duke of Holſtein's uncle, Adolphus Frederic biſhop of Lubec, as their hereditary prince and ſucceſſor to their crown. This was agreed to; and a peace was concluded at Abo, under the mediation of his Britannic majeſty. This peace was ſo firmly adhered to by the czarina, that his Daniſh majeſty thought proper to drop all reſentment for the indignity done his ſon. The prince-ſucceſſor married the princeſs Ulrica, third ſiſter to the king of Pruſſia; and in 1751 entered into the poſſeſſion of his new dignity, which proved to him a crown of thorns. Through a ſtrange medley of affairs and views of intereſt, the French had acquired vaſt influence in all the deliberations of the Swediſh ſenate, who of late have been little better than penſioners to that crown. The intrigues of the ſenators forced Adolphus to take part in the late war againſt Pruſſia: but as that war was diſagreeable not only to the people, but alſo to the king of Sweden, the nation never made ſo mean an appearance; and upon Ruſſia's making peace with the king of Pruſſia, the Swedes likewiſe made their peace, upon the terms of leaving things as they ſtood at the beginning of the war. 237 Guſtavus the preſent king of Sweden aſcends the throne. Adolphus died diſpirited in 1771, after a turbulent reign of twenty years; and was ſucceeded by his ſon Guſtavus, the preſent monarch. The moſt remarkable tranſaction of this reign is the revolution which took place in the government in the year 1772, by which the king, from being the moſt limited became one of the moſt deſpotic monarchs in Europe. 238 Account of the revolution in 1772, by which he became deſpotic. Ever ſince the death of Charles XII. the whole power of the kingdom had been lodged in the ſtates; and this power they had on all occaſions moſt grievouſly abuſed. Guſtavus therefore determined either to ſeize on that power of which they made ſuch a bad uſe, or periſh in the attempt. The revolution was effected in the following manner. On the morning of the 19th of Auguſt 1772, a conſiderable number of officers, as well as other perſons known to be attached to the royal cauſe, had been ſummoned to attend his majeſty. Before ten he was on horſeback, and viſited the regiment of artillery. As he paſſed through the ſtreets he was more than uſually courteous to all he met, bowing familiarly to the loweſt of the people. On the king's return to his palace, the detachment which was to mount guard that day being drawn up together with that which was to be relieved, his majeſty retired with the officers into the guard-room. He then addreſſed them with all that eloquence of which he is ſaid to be a perfect maſter; and after inſinuating to them that his life was in danger, he expoſed to them in the ſtrongeſt colours the wretched ſtate of the kingdom, the ſhackles in which it was held by means of foreign gold, and the diſſenſions and troubles ariſing from the ſame cauſe which had diſtracted the diet during the courſe of fourteen months. He aſſured them that his only deſign was to put an end to theſe diſorders; to baniſh corruption, reſtore true liberty, and revive the ancient luſtre of the Swediſh name, which had been long tarniſhed by a venality as notorious as it was diſgraceful. Then aſſuring them in the ſtrongeſt terms that he diſclaimed for ever all abſolute power, or what the Swedes call *ſovereignty*, he concluded with theſe words: "I am obliged to defend my own liberty and that of the kingdom, againſt the ariſtocracy which reigns. Will you be faithful to me, as your forefathers were to Guſtavus Vaſa and Guſtavus Adolphus? I will then riſk my life for your welfare and that of my country."

The officers, moſt of them young men, of whoſe attachment the king had been long ſecure, who did not thoroughly perhaps ſee into the nature of the requeſt his majeſty made them, and were allowed no time to reflect upon it, immediately conſented to every thing, and took an oath of fidelity to him.

239
Reſolution of a Swediſh officer.

Three only refuſed. One of theſe, Frederic Cederſtrom, captain of a company of the guards, alledged he had already and very lately taken an oath to be faithful to the ſtates, and conſequently could not take that which his majeſty then exacted of him. The king, looking at him ſternly, anſwered, "Think of what your are doing." "I do," replied Cederſtrom, "and what I think to-day, I ſhall think to-morrow; and were I capable of breaking the oath by which I am already bound to the ſtates, I ſhould be likewiſe capable of breaking that your majeſty now requeſts me to take."

The king then ordered Cederſtrom to deliver up his ſword, and put him in arreſt.

His majeſty however, apprehenſive of the impreſſion which the proper and reſolute conduct of Cederſtrom might make upon the minds of the other officers, ſhortly afterwards ſoftened his tone of voice; and again addreſſing himſelf to Cederſtrom, told him, that as a proof of the opinion he entertained of him, and the confidence he placed in him, he would return him his ſword without inſiſting upon his taking the oath, and would only deſire his attendance that day. Cederſtrom continued firm; he anſwered, that his majeſty could place no confidence in him that day, and that he begged to be excuſed from the ſervice.

While the king was ſhut up with the officers, Senator Ralling, to whom the command of the troops in the town had been given two days before, came to the door of the guard-room, and was told that he could not be admitted. The ſenator inſiſted upon being preſent at the diſtribution of the orders, and ſent in to the king to deſire it; but was anſwered, he muſt go to the ſenate, where his majeſty would ſpeak to him.

The officers then received their orders from the king; the firſt of which was, that the two regiments of guards and of artillery ſhould be immediately aſſembled, and that a detachment of 36 grenadiers ſhould be poſted at the door of the council-chamber to prevent any of the ſenators from coming out.

But before the orders could be carried into execution, it was neceſſary that the king ſhould addreſs himſelf to the ſoldiers; men wholly unacquainted with his deſigns, and accuſtomed to pay obedience only to the orders of the ſenate, whom they had been taught to hold in the higheſt reverence.

240
The king gains over the ſoldiers.

As his majeſty, followed by the officers, was advancing from the guard room to the parade for this purpoſe, ſome of them more cautious, or perhaps more timid than the reſt, became, on a ſhort reflection, apprehenſive of the conſequences of the meaſure in which they were engaged: they began to expreſs their fears to the king, that unleſs ſome perſons of greater weight and influence than themſelves were to take a part in the ſame cauſe, he could hardly hope to ſucceed in his enterpriſe. The king ſtopped a while, and appeared to heſitate. A ſerjeant of the guards overheard their diſcourſe, and cried aloud—"It ſhall ſucceed—Long live Guſtavus!" His majeſty immediately ſaid, "Then I will venture;"—and ſtepping forward to the ſoldiers, he addreſſed them in terms nearly ſimilar to thoſe he had made uſe of to the officers, and with the ſame ſucceſs. They anſwered him with loud acclamations: one voice only ſaid, No; but it was not attended to.

In the mean time ſome of the king's emiſſaries had ſpread a report about the town that the king was arreſted. This drew the populace to the palace in great numbers, where they arrived as his majeſty had concluded his harangue to the guards. They teſtified by reiterated ſhoots their joy at ſeeing him ſafe; a joy which promiſed the happieſt concluſion to the buſineſs of the day.

240
Secures the ſenators, and becomes maſter of the whole power in the kingdom.

The ſenators were now immediately ſecured. They had from the window of the council-chamber beheld what was going forward on the parade before the palace; and, at a loſs to know the meaning of the ſhouts they heard, were coming down to inquire into the cauſe of them, when 30 grenadiers, with their bayonets fixed, informed them it was his majeſty's pleaſure they ſhould continue where they were. They began to talk in a high tone, but were anſwered only by having the door ſhut and locked upon them.

The moment the ſecret committee heard that the ſenate was arreſted, they ſeparated of themſelves, each individual providing for his own ſafety. The king then mounting his horſe, followed by his officers with their ſwords drawn, a large body of ſoldiers, and numbers of the populace, went to the other quarters of the town where the ſoldiers he had ordered to be aſſembled were poſted. He found them all equally willing to ſupport his cauſe, and to take an oath of fidelity to him. As he paſſed through the ſtreets, he declared to the people, that he only meant to defend them, and ſave his country; and that if they would not confide in him, he would lay down his ſceptre, and ſurrender up his kingdom. So much was the king beloved, that the people (ſome of whom even fell down upon their knees) with tears in their eyes implored his majeſty not to abandon them.

The king proceeded in his courſe, and in leſs than an hour made himſelf maſter of all the military force in Stockholm.

241
Diviſion of Sweden.

The kingdom of Sweden, in its preſent ſtate, is divided into the following provinces: 1. Sweden Proper. 2. Gothland. 3. Finland. Swediſh Lapland. And, 5. The Swediſh iſlands. Great abatements muſt be made for the lakes, and unimproved parts of Sweden; which are ſo extenſive, that the habitable part is confined to narrow bounds.

242
Climate, ſoil, &c.

The face of Sweden is pretty ſimilar to thoſe of its neighbouring countries; only it has the advantage of navigable rivers.

The ſame may be ſaid with regard to its climate, ſoil, &c. Summer burſts from winter; and vegetation is more ſpeedy than in ſouthern climates. Stoves and warm furs mitigate the cold of winter, which is ſo intenſe, that the noſes and extremities of the inhabitants are ſometimes mortified. The Swedes, ſince the days of Charles XII. have been at incredible pains to correct the native barrenneſs of that country, by erecting colleges of agriculture, and in ſome places with great ſucceſs. The ſoil is much the ſame with that of Denmark and ſome parts of Norway, generally very bad, but in ſome valleys ſurpriſingly fertile.

The Swedes, till of late years, had not induſtry ſufficient to remedy the one, nor improve the other. The peaſants now follow the agriculture of France and England; and ſome late accounts ſay, that they rear almoſt as much grain as maintains the natives. Gothland produces wheat, rye, barley, oats, peaſe, and beans; and in caſe of deficiency, the people are ſupplied from Livonia and the Baltic provinces. In ſummer, the fields are verdant, and covered with flowers; and produce ſtrawberries, raſpberries, currants, and other ſmall fruits. The common people know, as yet, little of the cultivation of apricots, peaches, nectarines, pine-apples, and the like high-flavoured fruits; but melons are brought to great perfection in dry ſeaſons.

Sweden produces cryſtals, amethyſts, topazes, porphyry, lapis-lazuli, agate, cornelian, marble, and other foſſils. The chief wealth of the country, however, ariſes from her mines of ſilver, copper, lead, and iron. The laſt-mentioned metal employs no fewer than 450 forges, hammering-mills, and ſmelting-houſes. A kind of a gold mine has likewiſe been diſcovered in Sweden; but ſo inconſiderable, that from the year 1741 to 1747, it produced only 2398 gold ducats, each valued at 9 s. 4 d. ſterling. The firſt gallery of one ſilver mine is 100 fathoms below the ſurface of the earth; the roof is ſupported by prodigious oaken beams; and from thence the miners deſcend about 40 fathoms to the loweſt vein. This mine is ſaid to produce 20,000 crowns a year. The product of the copper mines is uncertain; but the whole is loaded with vaſt taxes and reductions to the government, which has no other reſources for the exigences of ſtate. Thoſe ſubterraneous manſions are aſtoniſhingly ſpacious, and at the ſame time commodious for their inhabitants, ſo that they ſeem to form a hidden world. The water-falls in Sweden afford excellent conveniency for turning mills for forges; and for ſome years the exports of iron from Sweden brought in 300,000 l. ſterling. Dr Buſching thinks that they conſtituted two-thirds of the national revenue. It muſt, however, be obſerved, that the extortions of the Swediſh government, and the importation of American bar-iron into Europe, and ſome other cauſes, have greatly diminiſhed this manufacture in Sweden; ſo that the Swedes very ſoon muſt apply themſelves to other branches of trade and improvements, eſpecially in agriculture.

243
Animals.

The animals differ little from thoſe of Norway and Denmark, only the Swediſh horſe are known to be more ſerviceable in war than the German. The fiſhes found in the rivers and lakes of Sweden, are the ſame with thoſe in other northern countries, and taken in ſuch quantities, that their pikes (particularly) are ſalted and pickled for exportation. The train-oil of the ſeals, taken in the gulph of Finland, is a conſiderable article of exportation.

244
Character of the Swedes.

There is a great diverſity of characters among the people of Sweden; and what is peculiarly remarkable among them, they have been known to have different characters in different ages. At preſent, their peaſants ſeem to be a heavy plodding race of men, ſtrong and hardy; but without any other ambition than that of ſubſiſting themſelves and their families as well as they can: they are honeſt, ſimple, and hoſpitable; and the mercantile claſſes are much the of the ſame caſt; but great application and perſeverance is diſcovered among them all. One could form no idea that the modern Swedes are the deſcendants of thoſe who, under Guſtavus Adolphus and Charles XII. carried terror in their names through the moſt diſtant countries, and ſhook the foundations of the greateſt empires. The principal nobility and gentry of Sweden are naturally brave, polite, and hoſpitable; they have high and warm notions of honour, and are jealous of their national intereſts. The dreſs of the common people is almoſt the ſame with that of Denmark: the better ſort are infatuated with French modes and faſhion. The common diverſions of the Swedes, are ſkaiting, running races in ſledges, and ſailing in yachts upon the ice. They are not fond of marrying their daughters when young, as they have little to ſpare in their own life-time. The women go to plough, threſh out the corn, row upon the water, ſerve the bricklayers, carry burdens, and do all the common drudgeries in huſbandry.

245
Religion.

Chriſtianity was introduced here in the 9th century. Their religion is Lutheran, which was propagated among them by Guſtavus Vaſa, about the year 1523, as we have already related. The Swedes are ſurpriſingly uniform and unremitting in religious matters; and have ſuch an averſion to Popery, that caſtration is the fate of every Roman-catholic prieſt diſcovered in their country. The archbiſhop of Upſal has a revenue of about 400 l. a-year; and has under him thirteen ſuffragans, beſides ſupperintendants, with moderate ſtipends. No clergyman has the leaſt direction in the affairs of ſtate; but their morals, and the ſanctity of of their lives, endear them ſo much to the people, that the government would repent making them its enemies. Their churches are neat, and often ornamented. A body of eccleſiaſtical laws and canons direct their religious œconomy. A converſion to Popery, or a long continuance under excommunication, which cannot paſs without the king's permiſſion, is puniſhed by impriſonment and exile.

246
Language.

The Swediſh language is a dialect of the Teutonic, and reſembles that of Denmark. The Swediſh nobility and gentry are, in general, more converſant in polite literature than thoſe of many other more flouriſhing ſtates. They have of late exhibited ſome noble ſpecimens of their munificence for the improvement of literature and ſcience, particularly natural hiſtory.

247
Manufactures, &c.

The Swediſh commonalty ſubſiſts by agriculture, mining, grazing, hunting, and fiſhing. Their materials for traffic are the bulky and uſeful commodities of maſts, beams, beal-coards, and other ſorts of timber for ſhipping; tar, pitch, bark of trees, pot-aſh, wooden utenſils, hides, flax, hemp, peltry, furs, copper, lead, iron, cordage, and fiſh.

Even the manufacturing of iron was introduced into Sweden ſo late as the 16th century; for till that time they ſold their own crude ore to the Hanſe-towns, and bought it back again manufactured into utenſils. About the middle of the 17th century, by the aſſiſtance of the Dutch and Flemings, they ſet up ſome manufactures of glaſs, ſtarch, tin, woollen, ſilk, ſoap, leather-dreſſing, and ſaw-mills. Bookſelling was at that time a trade unknown in Sweden. They have ſince had ſugar-baking, tobacco-plantations, and manufactures of ſail-cloth, cotton, fuſtian, and other ſtuffs; of linen, alum, brimſtone, paper-mills, and gunpowder-mills. Vaſt quantities of copper, braſs, ſteel, and iron, are now wrought in Sweden. They have alſo founderies for cannon, forgeries for fire-arms and anchors, armories, wire and flatting-mills, mills alſo for fulling, and for boring and ſtamping; and of late they have built many ſhips for ſale.

Certain towns in Sweden, being 24 in number, are called *Staple-towns*, where the merchants are allowed to import and export commodities in their own ſhips. Thoſe towns which have no foreign commerce, though lying near the ſea, are called *land-towns*. A third kind are termed *mine-towns*, as belonging to mine-diſtricts. The Swedes, about the year 1752, had greatly increaſed their exports, and diminiſhed their imports, moſt part of which arrive or are ſent off in Swediſh ſhips; the Swedes having now a kind of navigation-act, like that of the Engliſh. Thoſe promiſing appearances were, however, blaſted, by the madneſs and jealouſies of the Swediſh government; and the people ſo oppreſſed with taxes, that ſome important revolution was daily expected in that kingdom.

248 Revenues. The revenue of Sweden, ſince the unfortunate wars of Charles XII. has been greatly reduced. Her gold and ſilver ſpecies, in the late reign, aroſe chiefly from the king's German dominions. Formerly, the crown-lands, poll-money, tithes, mines, and other articles, are ſaid to have produced a million ſterling. The payments that are made in copper, which is here the chief medium of commerce, is extremely inconvenient; ſome of thoſe pieces being as large as tiles; and a cart or wheelbarrow is often required to carry home a moderate ſum. The Swedes, however, have gold ducats, and eight-mark pieces of ſilver, valued each at 5s. 2d. and the ſubſidies paid them by France help to increaſe their currency.

249 Military ſtrength. No country in the world has produced greater heroes or braver troops than the Swedes; and yet they cannot be ſaid to maintain a ſtanding army, as their forces conſiſt of a regulated militia. The cavalry is cloathed, armed, and maintained, by a rate raiſed upon the nobility and gentry, according to their eſtates; and the infantry by the peaſants. Each province is obliged to find its proportion of ſoldiers, according to the number of farms it contains; every farm of 60l. or 70l. *per annum*, is charged with a foot-ſoldier, furniſhing him with diet, lodging and ordinary cloaths, and about 20s. a-year in money; or elſe a little wooden houſe is built him by the farmer, who allows him hay and paſturage for a cow, and ploughs and ſows land enough to ſupply him with bread. When embodied, they are ſubject to military law, but otherwiſe to the civil law of the country. It may therefore literally be ſaid, that every Swediſh ſoldier has a property in the country he defends. This national army is thought to amount to above 50,000 men: and Sweden formerly could have fitted out 40 ſhips of the line; but of late years their ſhips, together with their docks, are ſuffered to run to decay.

SWEEP, in the ſea-language, is that part of the mould of a ſhip where ſhe begins to compaſs in the rung-heads: alſo when when the hauſer is dragged along the bottom of the ſea to recover any thing that is ſunk, they call this action *ſweeping for it.*

SWEET, in the wine trade, denotes any vegetable juice whether obtained by means of ſugar, raiſins, or other foreign or domeſtic fruit, which is added to wines with a deſign to improve them.

SWEIN-MOTE. See FOREST *Courts*.

SWIFT (Dr Jonathan), an eminent divine, politician, and wit, was deſcended from an ancient family; and born at Dublin in 1667, ſeven months after his father's death. He was educated at Trinity college, Dublin: but minding hiſtory and poetry more than academic learning, he was refuſed his bachelor's degree for inſufficiency, though he was at laſt admitted *ſpeciali gratia,* by favour rather than merit; a circumſtance that ſerved as a ſpur to his future ſtudies. In 1688, being then without ſupport, he was patronized by Sir William Temple, who had married a relation of his mother, by whoſe means he was introduced to the notice of king William, who offered to make him a captain of horſe; but Swift had determined on a clerical life, and after Sir William's death the king took no farther notice of him. He met with ſeveral diſappointments in his endeavours at preferment, obtaining only two ſmall livings, Laracor and Rathbigging, in the county of Meath, when he became eminent as a political writer.

While Swift reſided at Laracor, he invited to Ireland a lady, whom he has celebrated by the name of *Stella*. He became acquainted with her while he lived with Sir William Temple. She was the daughter of his ſteward, whoſe name was *Johnſon*; and Sir William, in conſideration of her father's faithful ſervices, left her at his death 1000l. She was now about eighteen: and was accompanied by Mrs Dingley, a lady who was fifteen years older, and, though related to Sir William, had only an annuity of 27l. But whatever was Swift's attachment to Mrs Johnſon, every precaution was taken to prevent ſcandal: they never lived in the ſame houſe; nor were they ever known to meet but in the preſence of a third perſon. Swift made frequent excurſions; but Mrs Johnſon was buried in ſolitude and obſcurity; ſhe was perſonally known only to a few of Swift's moſt intimate acquaintance, and Mrs Dingley was her only female companion.

In 1701 Swift took his degree of doctor of divinity. He had been educated among the Whigs; and the ſame year publiſhed a Diſcourſe of the conteſts and diſſenſions between the nobles and commons of Athens and Rome: this was in behalf of king William and his miniſters, againſt the violent proceedings of the houſe of commons. But ſoon after, he attached himſelf to the Tories; becauſe, as he ſaid, the Whigs had renounced their old principles.

In 1710, being then in England, he was commiſſioned by the primate of Ireland to ſolicit the queen to releaſe the clergy from paying the 20th part and firſt-fruits; and this brought him acquainted with Mr Harley, who, with the reſt of the miniſters, appears to have careſſed him with uncommon aſſiduity. From this time he ſupported his new friends with all his power, in pamphlets, poems, and periodical papers;

yet received no gratuity or reward until the year 1713, when he accepted the deanery of St Patrick's, Dublin. A biſhopric had been intended for him by the queen; but archbiſhop Sharp, and a certain great lady, having repreſented him as as man whoſe religious ſincerity was very doubtful, it was given to another.

It is here proper to obſerve, that among other perſons with whom he became intimately acquainted while in England, was Mrs Vanhomrigh. She was born in Ireland; and had been married to Mr Vanhomrigh, firſt a merchant of Amſterdam, then of Dublin, where king William gave him very great places: but he dying, left two ſons and two daughters; and his ſons dying ſoon after, his whole fortune, which was very conſiderable, fell to the daughters. The widow and the two young ladies came to England in 1709, where they were viſited by perſons of the firſt quality; and Swift living near them, uſed to be much there. During this familiarity, he inſenſibly became a kind of preceptor to the young ladies, particularly to the eldeſt, who was then about 20, and was fond of reading, and a great lover of poetry. Hence admiring ſuch a character as that of Swift, ſhe paſſed from admiration to love, and ventured to make him a propoſal of marriage. He at firſt affected to believe her in jeſt, then to rally her on ſo whimſical a choice, and at laſt gave her an abſolute refuſal. While he was in this ſituation he wrote his Cadenus and Vaneſſa; and then returned to the place of his exile, as he uſually called it. Soon after Mrs Vanhomrigh died, and left ſome debts; which it not being convenient for her daughters, who had debts of their own, to pay at preſent, to avoid an arreſt they followed the dean into Ireland.

The firſt remarkable event of his life after his ſettlement at the deanery, was his marriage with Mrs Johnſon, the daughter of Sir William Temple's ſteward, the celebrated Stella, after an intimate friendſhip of more than 16 years; but whatever were the motives to a marriage that was never avowed, the dean and the lady continued to live in the ſame Platonic manner they had done before. He had hitherto continued to viſit Miſs Vanhomrigh, but now his viſits were leſs frequent. Soon after, her ſiſter died; and the remains of the family-fortune centering in her, ſhe retired to Selbridge, a ſmall houſe and eſtate about 12 miles from Dublin. From thence ſhe frequently wrote to the dean, and preſſed him to marry her, but he rallied and ſtill avoided a poſitive refuſal. She preſſed him either to accept or refuſe her as a wife; upon which he wrote an anſwer, and delivered it with his own hand, and probably let her into the fatal ſecret of his being already married: this the unhappy lady did not ſurvive many weeks; however, before her death, ſhe cancelled a will ſhe had made in the dean's favour.

From 1716 to 1720, is a chaſm in the dean's life, which it has been found difficult to fill up. Lord Orrery thinks, with great reaſon, that he employed this time upon *Gulliver's Travels*. The truth is, that Swift's diſappointments had rendered him ſplenetic; and he frequently indulged himſelf in an intolerable miſanthropy, that, in the midſt of all his wit and imagination, is diſguſtful in ſeveral parts of this work.

About the year 1720, the dean diſtinguiſhed himſelf as a patriot, in his *Propoſal for the Uſe of Iriſh Manufactures*, and by his *Drapier's Letters* in oppoſition to Wood's patent for a copper coinage; which, he clearly ſhowed, was calculated to procure the patentee an exorbitant gain, to the impoveriſhment of Ireland. Theſe letters rendered him amazingly popular, and from this time the dean's influence in that iſland was almoſt without bounds; for he was conſulted in whatever related to domeſtic policy, and particularly to trade.

In 1727, died his wife, the amiable Stella, in the 44th year of her age; a lady poſſeſſed of an enchanting beauty, a muſical voice, unbounded wit, mingled with ſweetneſs of manners, and a mind adorned with every virtue. She had been declining ever ſince the year 1724; and it is generally believed that her immature death was occaſioned by the peculiarity of the dean's conduct towards her. It is ſaid the dean did at length earneſtly deſire that ſhe might be publicly owned as his wiſe; but as her health was then declining, ſhe ſaid it was too late, and inſiſted that they ſhould continue to live as they had lived before. To this the dean in his turn conſented, and ſuffered her to diſpoſe entirely of her own fortune, by her own name, to a public charity, when ſhe died.

From the death of Stella his life became much retired; the auſterity of his temper alſo increaſed, and he could not enjoy his public days: theſe entertainments were therefore diſcontinued, and he ſometimes avoided the company of his moſt intimate friends; but in time he grew more deſirous of company. In 1732, he complains, in a letter to Mr Gay, that "he had a large houſe, and ſhould hardly find one viſitor if he was not able to hire him with a bottle of wine:" and, in another to Mr Pope, "that he was in danger of dying poor and friendleſs, even his female friends having forſaken him; which," as he ſays, "vexed him moſt." Theſe complaints were afterwards repeated in a ſtrain of yet greater ſenſibility and ſelf-pity: "All my friends have forſaken me.

"*Vertiginoſus, inops, ſurdus, male gratus amicis.*
" Deaf, giddy, helpleſs, left alone,
" To all my friends a burden grown."

It is very remarkable, however, that although his mind was greatly depreſſed, and his principal enjoyment at an end when Mrs Johnſon died, yet there is an air of levity and trifling in ſome of the pieces he wrote afterwards, that is not to be found in any other: ſuch, in particular, are his Directions to Servants, and ſeveral of his letters to his friend Dr Sheridan.

The fits of giddineſs and deafneſs, to which he had been ſubjected from a ſurfeit before he was 20 years old, became more frequent and violent as he grew in years. A preſentiment which he had long entertained of that wretchedneſs which would inevitably overtake him towards the cloſe of life, by the failure of his intellects, clouded his mind with the moſt melancholy ideas, and tinged every object around him. How far this gloomy ſentiment prevailed, we may learn from the following remarkable anecdote mentioned by Mr Faulkner in his letter to lord Cheſterfield. "One time, in a journey from Drogheda to Navan, the dean rode before the company, made a ſudden ſtop, diſmounted his horſe, fell on his knees, lifted up his hands, and prayed in the moſt devout manner. When his friends came up, he deſired and inſiſted on their alighting; which they did, and aſked him the meaning. "Gentlemen," ſaid he "pray, join your hearts in fervent prayers with mine, that I may never be like this oak-tree, which is decayed and withered at top, while the other parts are ſound." In 1736, while he was writing a ſatire on the Iriſh parliament, called the *Legion Club*, he was ſeized with ſo dreadful a fit of his malady, that he left the poem unfiniſhed; and never after attempted a compoſition that required a courſe of thinking. From this time his memory gradually declined; his paſſions perverted his underſtanding; and, in 1741, he became utterly incapable of converſation.

The concluding ſcene of his life was truly affecting, and afforded a ſtriking leſſon to check the pride of human genius. Mr Faulkner's account of it is well worth notice: "Swift never was very outrageous; but his memory failed him by degrees for ſeveral years together, inſomuch that he forgot all his friends and domeſtics. He could not call any of them by their names; nor for cloaths, food, or any neceſſaries that he wanted. In ſhort, his forgetfulneſs grew ſo much upon him, he could not remember any one paſſage of his life, nor read, nor even tell his letters, for near two years before his death. He likewiſe loſt the uſe of his ſpeech, excepting now and then uttering ſome incoherent rambling words, being incapable of aſking any queſtions, or of returning anſwers; nor could he aſk for one neceſſary of life. During this melancholy ſituation great care was taken of his perſon and his food, as he was incapable of dreſſing, undreſſing, or helping himſelf to cloaths or victuals; and ſo totally was he deprived of all rational faculties, that he was treated like a new-born infant, being taken out of bed, undreſſed, and put into bed like the youngeſt child; and had the actions of one, being fond of gold and ſilver toys, which he would play with or put into his mouth." In this deplorable ſtate of inſenſibility he lingered until 1745, when the diſſolution of his bodily frame followed the extinction of his mental powers. Upon opening the ſkull, after his death, much water was found in the brain. By his will, which is dated May 1740, he left about 1200 l. in legacies; and the reſt of his fortune, which was about 11,000 l. to erect and endow an hoſpital for idiots and lunatics. His works have been often printed, and of various forms.

Swift undoubtedly was a man of native genius. His fancy was inexhauſtible. His conceptions were lively and comprehenſive; and he had the peculiar felicity of conveying them in language equally correct, free, and perſpicuous. His penetration was as quick as intuition; and he was indeed the critic of nature.

As his genius was of the firſt claſs, ſo were ſome of his virtues.—The following anecdote will illuſtrate his filial piety. His mother died in 1710, as appears by a memorandum in one of the account-books, which Dr Swift always made up yearly, and on each page entered minutely all his receipts and expences in every month, beginning his year from November 1. He obſerved the ſame method all his lifetime till his laſt illneſs. At the foot of that page which includes his expences of the month of May 1710, at the glebe-houſe of Laracor in the county of Meath, where he was then reſident, are theſe remarkable words, which ſhow at the ſame time, his filial piety and the religious uſe which he thought it his duty to make of that melancholy event. "*Mem.* On Wedneſday, between ſeven and eight in the evening, May 10. 1710, I received a letter in my chamber at Laracor (Mr Percival and Jo. Beaumont being by) from Mrs F—, dated May 9, with one incloſed, ſent by Mrs Worral at Leiceſter to Mrs F——, giving an account that my dear mother, Mrs Abigail Swift, died that morning, Monday April 24. 1710, about ten o'clock, after a long ſickneſs: being ill all winter, and lame; and extremely ill about a month or ſix weeks before her death. I have now loſt my barrier between me and death. God grant I may live to be as well prepared for it as I confidently believe her to have been! If the way to heaven be through piety, truth, juſtice, and charity, ſhe is there. J. S." He always treated his mother, during her life, with the utmoſt duty and affection; and ſhe ſometimes came to Ireland to viſit him after his ſettlement at Laracor. She lodged at Mr Brent's, the printer, in George's lane, Dublin. She aſked Mrs Brent, the landlady, "Whether ſhe could keep a ſecret?" She replied, "She could very well." Upon which ſhe enjoined her not to make the matter public, which ſhe was now going to communicate to her. "I have a ſpark in this town, that I carried on a correſpondence with whilſt I was in England. He will be here preſently to pay his addreſſes, for he hath heard by this time of my arrival. But I would not have the matter known." Soon after this a rap was heard at the door, and Dr Swift walked up ſtairs. Mrs Brent retired: but after a little time ſhe was called, and then Mrs Swift introduced her to her ſon, and ſaid, "This is my ſpark I was telling you of. This is my lover; and indeed the only one I ſhall ever admit to pay their addreſſes to me." The doctor ſmiled at his mother's humour, and afterwards paid his duty to her every day, unſuſpected by Mrs Brent, whom he invited ſome years afterwards to take care of his family-affairs, when he became dean of St Patrick's: and when Mrs Brent died, he continued her daughter, a poor widow, in the ſame office.

The liberality of the dean hath been a topic of juſt encomium with all his admirers: nor could his enemies deny him this praiſe. In his domeſtic affairs, he always acted with ſtrict œconomy. He kept the moſt regular accounts: and he ſeems to have done this chiefly with a view to increaſe his power of being uſeful. Mr Faulkner informs us, that "his income was 900 l. *per annum*, which he endeavoured to divide into three parts, for the following purpoſes. Firſt, to live upon one-third of it. Secondly, to give another third in penſions and charities, according to the manner in which perſons who received them had lived: and the other third he laid by, to build an hoſpital for the reception of idiots and lunatics." "What is remarkable in this generous man, is this, (ſays Mr F.) that when he lent money upon bond or mortgage, he would not take the legal intereſt, but one *per cent.* below it."

Fires have ſometimes happened in Dublin, by which people of all denominations have been ſufferers: upon which melancholy occaſions the dean always exerted himſelf, not only in perſon, by going from houſe to houſe to make collections for them, but wrote and recommended

mended their melancholy caſes to the public. He would go to the afflicted ſufferers, offer them his ſervice, and would be the firſt to ſubſcribe in a moſt princely and generous manner to their relief; which worthy example of his the benevolent citizens of Dublin would imitate.

His charity appears to have been a ſettled principle of duty, more than an inſtinctive effort of good-nature: but as it was thus founded and ſupported, it had extraordinary merit, and ſeldom failed to exert itſelf in a manner that contributed moſt to render it beneficial. He did not laviſh his money on the idle and the worthleſs. He nicely diſcriminated characters, and was ſeldom the dupe of impoſition. Hence his generoſity always turned to a uſeful account: while it relieved diſtreſs, it encouraged induſtry, and rewarded virtue.

We dwell with great pleaſure on this truly excellent and diſtinguiſhing part of the dean's character: and for the ſake of his charity we can overlook his oddities, and almoſt forgive his faults. He was a very peculiar man in every reſpect. Some have ſaid, "What a man he would have been, had he been without thoſe whims and infirmities which ſhaded both his genius and his character!" But perhaps the peculiarities complained of were inſeparable from his genius. The vigour and fertility of the root could not fail now and then of throwing out ſuperfluous ſuckers. What produced theſe, produced alſo the more beautiful branches, and gave the fruit all its richneſs.

It muſt be acknowledged, that the dean's fancy hurried him into great abſurdities and inconſiſtences, for which nothing but his extraordinary talents and noble virtues, diſcovered in other inſtances, could have atoned. The rancour he diſcovered on all occaſions towards the diſſenters, is totally unjuſtifiable. No ſect could have merited it in the degree in which he always ſhowed it to them; for, in ſome inſtances, it bordered on downright perſecution. He doubtleſs had his reaſons for expoſing their principles to ridicule; and might perhaps have ſufficient grounds for ſome of his accuſations againſt their principal leaders in Ireland: but nothing could juſtify his virulence againſt the whole body.

It muſt likewiſe be admitted, that when Swift's reſentment was excited, it generally aroſe to indignation. Amidſt the conſtellation of virtues which ſhed a diſtinguiſhing luſtre on his character, he wanted one that a miniſter of Chriſtianity ought to be ambitious of numbering amongſt the chief ornaments of his profeſſion, and that was *forgiveneſs*. This is a virtue that requires a great ſhare of humility; and Swift ſeemed to conſider himſelf as having a preſcriptive right to haughtineſs. His pride gave a dignity indeed to ſome parts of his conduct; but it frequently tranſgreſſed all the bounds of common civility and Chriſtian condeſcenſion. His pride was not gratified with lowering on thoſe he hated with a ſupercilious brow; it muſt trample them under his feet. He could not laugh away his reſentment. "It ſtuck to his laſt ſand;" and gained ſtrength by its duration.

Of Dr Sharp the archbiſhop of York, who hindered his promotion in the church by inſinuating ſomething to the prejudice of his religion, he never ſpoke but with a tone of indignation that marked a ſettled rancour. Dr Teniſon the archbiſhop of Canterbury, he calls, for the ſame good reaſon, "the moſt good-for-nothing prelate that ever lived." Mr Nicols, the editor of a late Supplement to Swift's works, hath tranſcribed, from an authentic MS. in the poſſeſſion of Thomas Aſtle, Eſq; a ſort of a counter-part to *Macky's Characters*, annexed to the *Memoirs of Secret Services*, in which the dean hath diſcovered his keenneſs of obſervation and ſeverity of reſentment againſt ſome of the moſt diſtinguiſhed characters of the court of George I. The following are a few inſtances.

Lord Wharton (A). "He is one of the completeſt gentlemen in England: hath a very clear underſtanding and manly expreſſion; with abundance of wit." MACKY.—"The moſt univerſal villain I ever ſaw." SWIFT, MS.

Earl of Galway. "He is one of the fineſt gentlemen in the army, with a head fitted for the cabinet as well as the camp: is very modeſt, vigilant, and ſincere: a man of honour and honeſty: without pride or affectation." MACKY.—"In all directly otherwiſe. A deceitful, hypocritical, factious knave: a damnable hypocrite: of no religion." SWIFT, MS.

Of John duke of Argyle, Swift ſays in his MS. "Ambitious, covetous, cunning Scot: has no principles but his own intereſt and greatneſs: a true Scot in his whole deportment."—Of the earl of Derby: "As arrant a ſcoundrel as his brother."—Of the duke of Grafton: "Almoſt a ſlobberer: without one good quality."—Lord Cholmondley: "Good for nothing, as far as ever I knew."—Lord Guildford: "A mighty ſilly fellow."—Duke of Marlborough: "Deteſtably covetous."—Earl of Sandwich: "As much a puppy as ever I ſaw; very ugly, and a fop."—Speaker of the houſe of commons: "A heavy man."

The natural acrimony of Swift's temper, as already obſerved, had been increaſed by repeated diſappointments. This gave a ſplenetic tincture to his writings; and amidſt the duties of private and domeſtic life, it too frequently appeared to ſhade the luſtre of his more eminent virtues.—The dean hath been accuſed of avarice, but with the ſame truth as he hath been accuſed of infidelity. In detached views, no man was more liable to be miſtaken. Even his genius and good ſenſe might be queſtioned, if we were only to read ſome paſſages of his writings. To judge fairly and pronounce juſtly of him, as a man and as an author, we ſhould examine the uniform tenor of his diſpoſition and conduct, and the general nature and deſign of his productions. In the latter, he will appear great; and in the former, good; notwithſtanding the puns and puerilities of the one, and the abſurdities and inconſiſtencies of the other.

SWIMMING, the art of ſuſpending one's ſelf on water; and at the ſame time making a progreſſive motion through it.

As ſwimming is not natural to man, it is evident, that at ſome period it muſt have been unknown among the human race. Nevertheleſs there are no accounts of its origin to be found in the hiſtory of any nation; nor are there any nations ſo barbarous but that the art of ſwimming is known among them, and that in greater perfection than among civilized people. It is probable, therefore, that the art, though not abſolutely natural, will always be acquired by people in a ſavage ſtate,

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(A) In one of his poems, he expreſsly ſays, "he hated Wharton like a toad."

ſtate from imitating the brute animals, moſt of whom ſwim naturally. Indeed, ſo much does this appear to be the caſe, that very expert ſwimmers have recommended it to thoſe who wiſhed to learn the art, to keep ſome frogs in a tub of water conſtantly beſide, and to imitate the motions by which they move through that element.

The theory of ſwimming depends upon one exceeding ſimple principle; namely, that if a force is applied to any body, it will always move towards that ſide where there is the leaſt reſiſtance. Thus, if a perſon ſtanding in a boat puſhes with a pole againſt the ſide or any other part of the veſſel in which he ſtands, no motion will enſue; for as much as he preſſes in one direction with the pole, juſt ſo much does the action of his feet, on which the preſſure of the pole muſt ultimately reſt, puſh the veſſel the other way: but if, inſtead of the ſide of the veſſel, he puſhes the pole againſt the ſhore, then only one force acts upon it, namely, that of the feet; which being reſiſted only by the fluid water, the boat begins to move from the ſhore. Now the very ſame thing takes place in ſwimming, whether the animal be man, quadruped, bird, or fiſh. If we conſider the matter ſimply, we may ſuppoſe an animal in ſuch a ſituation that it could not poſſibly ſwim: thus, if we cut off the fins and tail of a fiſh, it will indeed float in conſequence of being ſpecifically lighter than the water, but cannot make any progreſſive motion, or at leaſt but very little in conſequence of wriggling its body; but if we allow it to keep any of its fins, by ſtriking them againſt the water in any direction, the body moves the contrary way, juſt as a boat moves the contrary way to that in which the oars ſtrike the water. It is true, that as the boat is but partly immerged in the water, the reſiſtance is comparatively leſs than when a frog or even any other quadruped ſwims; but a boat could certainly be rowed with oars though it was totally immerged in water, only with leſs velocity than when it is not. When a man ſwims, he in like manner ſtrikes the water with his hands, arms, and feet; in conſequence of which the body moves in a direction contrary to the ſtroke. Upon this principle, and on this only, a man may either aſcend, deſcend, or move obliquely, in any poſſible direction in the water. One would think, indeed, that as the ſtrength of a man's arms and legs is but ſmall, he could make but very little way by any ſtroke he could give the water, conſidering the fluidity of that element. Nevertheleſs it is incredible what expert ſwimmers will perform in this way; of which Mr Forſter gives a moſt remarkable inſtance in the inhabitants of O-Taheitee; whoſe agility, he tells us, was ſuch, that when a nail was thrown overboard, they would jump after it into the ſea, and never fail to catch it before it came to the bottom.

As to the practice of ſwimming, there are but few directions which can be given. The great obſtacle is the natural dread which people have of being drowned; and this it is impoſſible to overcome by any thing but accuſtoming ourſelves to go into the water. With regard to the real danger of being drowned, it is but little; and on innumerable occaſions ariſes entirely from the terror above mentioned, as will appear from the following obſervations by Dr Franklin.

"That though the legs, arms, and head of a human body, being ſolid parts, are ſpecifically ſomewhat heavier than freſh water, yet the trunk, particularly the upper part, from its hollowneſs, is ſo much lighter than water, as that the whole of the body, taken together, is too light to ſink wholly under water, but ſome part will remain above until the lungs become filled with water; which happens from drawing water into them inſtead of air, when a perſon in the fright attempts breathing while the mouth and noſtrils are under water.

"2dly, That the legs and arms are ſpecifically lighter than ſalt-water, and will be ſupported by it; ſo that a human body would not ſink in ſalt-water though the lungs were filled as above, but from the greater ſpecific gravity of the head.

"3dly, That therefore a perſon throwing himſelf on his back in ſalt-water, and extending his arms, may eaſily lie ſo as to keep his mouth and noſtrils free for breathing; and, by a ſmall motion of his hands, may prevent turning, if he ſhould perceive any tendency to it.

"4thly, That in freſh water, if a man throws himſelf on his back near the ſurface, he cannot long continue in that ſituation, but by a proper action of his hands on the water. If he uſes no ſuch action, the legs and lower part of the body will gradually ſink till he comes into an upright poſition; in which he will continue ſuſpended, the hollow of the breaſt keeping the head uppermoſt.

"5thly, But if in this erect poſition the head is kept upright above the ſhoulders, as when we ſtand on the ground, the immerſion will, by the weight of that part of the head that is out of water, reach above the mouth and noſtrils, perhaps a little above the eyes; ſo that a man cannot long remain ſuſpended in water with his head in that poſition.

"6thly, The body continued ſuſpended as before, and upright, if the head be leaned quite back, ſo that the face looks upwards, all the back-part of the head being then under water, and its weight conſequently in a great meaſure ſupported by it, the face will remain above water quite free for breathing, will riſe an inch higher every inſpiration, and ſink as much every expiration, but never ſo low as that the water may come over the mouth.

"7thly, If, therefore, a perſon, unacquainted with ſwimming, and falling accidentally into the water, could have preſence of mind ſufficient to avoid ſtruggling and plunging, and to let the body take this natural poſition, he might continue long ſafe from drowning, till perhaps help would come: for as to the cloaths, their additional weight, while immerſed, is very inconſiderable, the water ſupporting it; though when he comes out of the water, he would find them very heavy indeed."

The method of learning to ſwim is as follows: The perſon muſt walk into water ſo deep that it will reach to the breaſt. He is then to lie down gently on the belly, keeping the head and neck perfectly upright, the breaſt advancing forward, the thorax inflated, and the back bent; then withdrawing the legs from the bottom, and ſtretching them out, ſtrike the arms forwards in uniſon with the legs. Swimming on the back is ſomewhat ſimilar to that on the belly;

but with this difference, that although the legs are employed to move the body forwards, the arms are generally unemployed, and the progreſſive motion is derived from the movement of the legs.—In diving, a perſon muſt cloſe his hands together, and, preſſing his chin upon his breaſt, make an exertion to bend with force forwards. While in that poſition, he muſt continue to move with rapidity under the ſurface; and whenever he chooſes to return to his former ſituation, he has nothing to do but bend back his head, and he will immediately return to the ſurface.

It is very common for novices in the art of ſwimming to make uſe of corks or bladders to aſſiſt in keeping the body above water. Some have utterly condemned the uſe of theſe; however, Dr Franklin allows that they may be of ſervice for ſupporting the body while one is learning what is called the *ſtroke*, or that manner of drawing in and ſtriking out the hands and feet that is neceſſary to produce progreſſive motion. "But (ſays he) you will be no ſwimmer till you can place confidence in the power of the water to ſupport you: I would therefore adviſe the acquiring that confidence in the firſt place, eſpecially as I have known ſeveral who, by a little of the practice neceſſary for that purpoſe, have inſenſibly acquired the ſtroke, taught as it were by nature.

"The practice I mean is this: Chooſing a place where the water deepens gradually, walk coolly into it till it is up to your breaſt: then turn round your face to the ſhore, and throw an egg into the water, between you and the ſhore; it will ſink to the bottom, and be eaſily ſeen there, if the water is clear. It muſt lie in the water ſo deep as that you cannot reach it to take it up but by diving for it. To encourage yourſelf in order to do this, reflect that your progreſs will be from deeper to ſhallower water; and that at any time you may, by bringing your legs under you, and ſtanding on the bottom, raiſe your head far above the water: then plunge under it with your eyes open, throwing yourſelf towards the egg, and endeavouring, by the action of your hands and feet againſt the water, to get forward till within reach of it. In this attempt you will find that the water buoys you up againſt your inclination; that it is not ſo eaſy a thing to ſink as you imagined; that you cannot, but by active force, get down to the egg. Thus you feel the power of the water to ſupport you, and learn to confide in that power; while your endeavours to overcome it, and to reach the egg, teach you the manner of acting on the water with your feet and hands; which action is afterwards uſed in ſwimming to ſupport your head higher above water, or to go forward through it."

SWINE, in zoology. See Sus.

SWITZ, or SCHITZ, the capital of one of the cantons of Switzerland, to which it gives name, ſeated on the eaſt ſide of the lake Lucern, in N. Lat. 47. E. Long. 8. 30.

SWITZERLAND, or SWISSERLAND, a country bounded to the ſouth by Savoy, the Milaneſe, and the territories of Venice; to the north, by Swabia; to the eaſt, by the country of Tyrol, a part of Auſtria and Swabia; and to the weſt by the Sandgau, Burgundy, and the country of Gex; being about 260 miles long and 100 broad.

The Swiſs were anciently called *Helvetii*; and being ſubdued by the Romans, they continued in ſubjection to that power till the empire declined, when they became a part of the kingdom of Burgundy. After that they fell under the dominion of the Franks, then of the Germans; but being oppreſſed by the latter, they threw off the yoke, and erected ſeveral ſtates and republics, which, at the treaty of Weſtphalia in 1648, were recognized as free and independent. The cantons of Switz, Uri, and Underwald, having, as early as the year 1308, entered into a confederacy in the canton of Switz, and having alſo obtained their firſt victory in 1315 over Leopold archduke of Auſtria in the ſame canton, its name was given to the whole confederacy, which it ſtill retains. The other cantons ſucceſſively acceded to this aſſociation, but ſome of them not until upwards of 100 years after. With reſpect to the government and conſtitution of theſe cantons, ſome of them are ariſtocracies and ſome democracies. In the former, both the legiſlative and executive power is lodged in the burghers or citizens of the capital of each canton; and of theſe there are ſeven, viz. Zurich, Bern, Baſil, Friburg, Solothurn, and Schauffhauſen. In the others, the legiſlative power is lodged in the whole body of the people; and every male above ſixteen, whether maſter or ſervant, has a vote in making laws, and in the choice of magiſtrates. For what concerns the whole Helvetic body, there are diets ordinary and extraordinary: the former are held annually, and the others upon particular emergencies; and both are ſummoned by the city of Zurich, which appoints the time and place of their meetings. Beſides the general diets, ſince the Reformation, there have been particular diets of the two religions, at which all public affairs of conſequence that regard the two parties are treated ſeparately; for though a ſenſe of their common intereſt obliges them to ſtudy to maintain the league and union, yet it is certain, that the mutual confidence between the cantons is in ſome meaſure loſt through the zeal of each party for their particular opinions, eſpecially of the Roman Catholics. The annual general diets are held always at Frauenfeld or Baden, principally to regulate the affairs of the common bailiages. Lucern takes the lead of the Roman Catholic cantons, being the moſt powerful of that denomination; but Zurich, though leſs powerful than that of Bern, takes the precedence of all the other cantons, both Proteſtant and Popiſh. Theſe cantons do not make one commonwealth, but are ſo many independent ſtates united together by ſtrict alliances for their mutual defence. The extraordinary diets or congreſſes are held at Aldorf. Each canton uſually deputes two envoys both to the ordinary and extraordinary, to which alſo the abbot and town of St Gall, and the town of Biel, ſend repreſentatives as allies. To the 13 cantons belong in common 21 bailiages, two towns, and two lordſhips. The allies or incorporated places, as they are called, are the abbot and town of St Gall, the three Griſon leagues, the republic of the Valais, the towns of Muhlhauſen and Biel, the principality of Neuenberg or Neufchatel, Geneva, and the biſhop of Baſil. Of theſe the abbot and town of St Gall, and the town of Biel, are regarded as members of the Helvetic body, but the reſt only as allies.

Switzerland

As to the air, ſoil, and produce of Switzerland, that part of the canton of Bern to the eaſt of the lake of Geneva, together with the cantons of Uri, Switz, Underwald, Glaris, Appenzel, and part of the canton of Lucern, conſiſt of ſtupendous mountains, whoſe tops are ſaid to be from 9000 to 12000 feet above the level of the ſea, conſiſting of craggy inacceſſible rocks, of which ſome are quite bare, while others are always covered with ice and ſnow. Among the mountains are many excellent medicinal and other ſprings, cold and warm baths, water-falls, craggy precipices, deep narrow valleys, and caverns. They yield alſo a great variety of herbs, thickets, and buſhes, in the upper parts; and in the lower rich paſtures and woods. The higheſt are thoſe in the canton of Uri. Many of the valleys are covered with lakes, or watered by brooks and rivers. In ſome of them are towns, villages, woods, vineyards, and corn-lands. Both on the mountains and in the valleys the air is extremely cold in winter; but in ſummer it is very pleaſant, cool, and refreſhing on the former, but exceſſive hot in the latter. Sometimes it is winter on the north ſide of a mountain when it is ſummer on the other; nay, flowers may be gathered ſometimes with one hand and ſnow with the other. Prodigious maſſes of ice and ſnow often fall from them in winter, and do a great deal of damage; and moſt of the ſtreams and rivers take their riſe from the thawing of the ice and ſnow on their ſides and tops. From the riſing or deſcending of the clouds, with which they are commonly enveloped, the inhabitants can, for the moſt part, pretty exactly foretel the changes of the weather; ſo that they ſerve them inſtead of weather-glaſſes. The other and lower parts of Switzerland are very pleaſant and fertile, being diverſified with vineyards, corn-fields, meadows, and paſture-grounds. The mountains in theſe are but mole-hills in compariſon of the others: there is neither ſnow nor ice on them in ſummer; and they frequently afford not only good paſturage, but arable ground. Many petrifactions are found both among theſe and the others, with a variety of foſſils. The ſands of the rivers yield gold-duſt, particularly thoſe of the Rhine, the Emmet, the Aare, the Reuſz, the Adda, and the Goldbach. The metals of this country being generally found to be brittle, the only mines that are worked are a few iron ones. In the lower parts of Switzerland they ſow rye, oats, barley, ſpelt, flax, and hemp. Wines of various ſorts are alſo produced in ſome of them, with a variety of fruits. Of wood for fuel and other uſes, there is generally plenty; in ſome places, however, they are obliged to burn ſheeps dung, and in others a kind of heath and ſmall ſhrubs. In the valleys they cultivate ſaffron with good ſucceſs. The Switzers derive their principal ſubſiſtence from their flocks and herds of cattle, which in ſummer graze upon the mountains. Their cheeſe is much eſteemed, eſpecially that of Bern and Griers in the canton of Freyburg. Great numbers of horſes alſo are bred here, and bought up for the French cavalry. Beſides the above-mentioned rivers, the Rhone and the Teſin have their ſources in this country. The lakes are very numerous; but the chief are thoſe of Geneva, Neufchatel, Biel, Zurich, Thun, Brien, Conſtance, and Lucern. Both rivers and lakes abound with fiſh, and afford a cheap water-carriage. Switzerland is not ſo populous as many other countries in Europe; and the Popiſh cantons leſs ſo than the Proteſtant. The total number of the inhabitants is computed at two millions.

Switzerland

The language generally ſpoken here is the German, in which alſo all public affairs are tranſacted; but in thoſe parts of the country that border on Italy or France, a corrupt French or Italian prevails. The two predominant religions are Calviniſm and Popery. Of the former are the cantons of Zurich and Bern, the towns of St Gall, Geneva, Muhlhauſen, and Biel, the principality of Neufchatel, the greater part of Baſil, Schaffhauſen, the country of the Griſons, the Thurgau, Toggenburg, Glaris, and the Rhine valley; the frontiers of Appenzel, with a ſmall part of Solothurn, and ſome places in the countries of Baden and Sargans. The reſt of the Swiſs cantons, allies, and dependents, are Popiſh. For the education of youth there is an univerſity at Baſil, and academies at Zurich, Bern, Lauſanne, and Geneva, beſides gymnaſiums and ſcholæ illuſtres, both in the Popiſh and Swiſs cantons. There are alſo ſocieties among them for the improvement of the German language and the ſciences.

The principal manufactures are ſnuff and tobacco, linen of ſeveral ſorts, lace, thread, ſilk and worſted ſtockings, neckcloths, cotton ſtuffs, gloves, handkerchiefs, ſilks of ſeveral ſorts, gold and ſilver brocades, a variety of woollen manufactures, hats, paper, leather of all ſorts, earthen wares, porcelain, toys, watches, clocks, and other hardwares, &c. The trade of Switzerland is greatly promoted by many navigable lakes and rivers. In ſome of the above manufactures, and in cheeſe, butter, ſheep, horſes, black cattle, hides, and ſkins, the exports are conſiderable; and as the imports are chiefly grain and ſalt, with ſome American and Aſiatic goods, there is probably a large balance in their favour. In ſome parts of Switzerland dreſs is reſtrained by ſumptuary laws.

The public revenues are in general very inconſiderable, ariſing chiefly from the uſual regalia, appropriated every where to the ſovereign, the demeſnes, and public granaries, voluntary contributions, the ſale of ſalt, and a land-tax; in the Proteſtant cantons, from the church-lands alſo that were ſeized at the Reformation. Except in Zurich, Bern, Baſil, and Schaffhauſen, where the people are more induſtrious, have a greater trade, and are richer than in the others, they defray the ordinary charges, and that is all.

The cantons never keep any ſtanding troops, except for a few garriſons; but their militia is reckoned to be the beſt regulated of any in Europe. Every male from 16 to 60 is enrolled, and about one-third of them regimented. They muſt all provide themſelves with arms, cloathing, and accoutrements, and appear on the ſtated days for exerciſe; and the ſeveral cantons and diſtricts muſt be furniſhed with a ſufficient train of artillery, and all the other implements of war. The Switzers of the ſeveral cantons are allowed to engage in the ſervice of ſuch foreign princes and ſtates as are in alliance with thoſe cantons, or with whom they have made a previous agreement. Such ſtates, paying an annual ſubſidy to the reſpective cantons, are allowed to make levies. Every man enliſts voluntarily, and for what number of years they pleaſe; at the expiration of which they are at liberty to return home. A great many thus always returning from foreign ſervice, Switzerland is never unprovided with able and experienced officers and ſoldiers. With reſpect to their character, they are a brave, honeſt, hoſpitable, hardy people; very true to their engagements, friendly, and humane. In ſhort, there is not a people in Europe whoſe national character is better. In their perſons they are generally tall, robuſt, and well-made; but their complexions are none of the beſt, and thoſe that live in the neighbourhood of the mountains are ſubject to wens. The women are ſaid to be generally handſome and well-ſhaped, ſenſible and modeſt, yet frank, eaſy, and agreeable in converſation. Few of the peaſants are miſerably poor; many of them are rich, eſpecially in the Proteſtant cantons, and that of Bern in particular.

SWORD, an offenſive weapon worn at the ſide, and ſerving either to cut or ſtab. Its parts are the handle, guard, and blade; to which may be added the bow, ſcabbard, pummel, &c.

SWORD *of State*, which is borne before the king, lords, and governors of counties, cities, or boroughs, &c. For or before the king, it ought to be carried upright; the hilt as low as the bearer's waiſt, the blade up between his eyes. For or before a duke, the blade muſt decline from the head, and be carried between the neck and the right ſhoulder. For or before an earl, the blade is to be carried between the point of the ſhoulder and the elbow: and for or before a baron, the blade is to be borne in the bend of the arm. This ceremonial form no leſs denotes the dignity of a governor than the coronet ſet on his coat of arms.

SWORD-*Fiſh*. See XIPHIAS.

SWORN BROTHERS, (*fratres jurati*), perſons who, by mutual oath, covenanted to ſhare each others fortune. Formerly, in any notable expedition to invade and conquer an enemy's country, it was the cuſtom for the more eminent ſoldiers to engage themſelves by reciprocal oaths to ſhare the rewards of their ſervice. This practice gave occaſion to the proverb of *ſworn brothers* or *brethren in iniquity*, becauſe of their dividing plunder and ſpoil.

SYCAMORE-TREE, in botany. See ACER.

SYCOPHANT, an appellation given by the ancient Athenians to thoſe who informed of the exportation of figs contrary to law: and hence it is ſtill uſed in general for all informers, paraſites, flatterers, cheats, &c.

SYDENHAM (Dr Thomas), an excellent Engliſh phyſician, was the ſon of William Sydenham of Winford Eagle in Dorſetſhire, and was born there about the year 1624. He ſtudied at Magdalen-hall, Oxford; but left that univerſity when Oxford was garriſoned for king Charles I. and went to London: where becoming acquainted with Dr Thomas Cox, an eminent phyſician, that gentleman perſuaded him to apply himſelf to the ſtudy of phyſic; and therefore, after the garriſon was delivered up to the parliament, he retired again to Magdalen-hall, entered on the medical line, and in 1648 was created bachelor of phyſic. Soon after, he was made a fellow of All-Souls college, and continued there ſeveral years: when, leaving the univerſity, he ſettled at Weſtminſter, became doctor of his faculty at Cambridge,; grew famous for his practice; and was the chief phyſician in London from the year 1660 to 1670; at which period he began to be diſabled by the gout. He died in 1689. His works are highly eſteemed both at home and abroad. He was famous for his cool regimen in the ſmall-pox; for giving the bark after the paroxyſm in agues; and for his uſe of laudanum. He regulated his practice more by his own obſervations and inquiries, than by the method either of his predeceſſors or cotemporaries.

SYLLABLE, in grammar, a part of a word conſiſting of one or more letters pronounced together.

SYLLABUS, in matters of literature, denotes a table of contents, or an index of the chief heads of a book or diſcourſe.

SYLLOGISM, in logic, an argument or term of reaſoning, conſiſting of three propoſitions; the two firſt of which are called *premiſes*, the laſt the *concluſion*. See LOGIC, n° 61, 63, 84—101; and ORATORY, n° 30.

SYMBOL, a ſign or repreſentation of ſomething moral, by the figures or properties of natural things. Hence ſymbols are of various kinds; as hieroglyphics, types, ænigmas, parables, fables, &c.

SYMMACHUS, a citizen and ſenator of ancient Rome, and conſul in the year 391, has left us ten books of epiſtles; from which, as well as from other things, we collect, that he was a warm oppoſer of the Chriſtian religion. He was baniſhed from Rome by Valentinian on ſome account or other, but afterwards recalled and received into favour by Theodoſius. Ammianus Marcellinus ſpeaks of him as a man of great learning and modeſty. Scioppius, Pareus, and other learned men, have written notes upon the epiſtles of Symmachus: we know of no later edition of them than that of Francfort, 1642, 8vo. Ambroſe biſhop of Milan wrote againſt Symmachus, and ſo did the Chriſtian poet Prudentius.

SYMMETRY, the juſt proportion of the ſeveral parts of any thing, ſo as to compoſe a beautiful whole.

SYMMETRY, in painting. See PAINTING, n° 7.

SYMPATHETIC, ſomething that acts or is acted upon by ſympathy. Thus we ſay ſympathetic diſeaſes, inks, &c.

SYMPATHETIC *Inks*. See INK *Sympathetic*.

SYMPATHY, an agreement of affections and inclinations, or a conformity of natural qualities, humours, temperaments, which make two perſons delighted and pleaſed with each other.

SYMPATHY alſo denotes the quality of being affected by the affection of another; and may ſubſiſt either between different perſons or bodies, or between different parts of the ſame body. It is either ſimilar or diſſimilar: ſimilar, when the affection or action in the ſympathiſer is ſimilar to the affection or action in the ſympathant; and diſſimilar, when thoſe are different.—Sympathy, too, is often an imitative faculty, ſometimes involuntary, frequently without conſciouſneſs: thus we yawn when we ſee others yawn, and are made to laugh by the laughing of another.

Sympathy, according to Dr Jackſon, relates to the operations of the affections of the mind, to the operations of the imagination, and to the affections of the external ſenſes.

1. The paſſions and affections of the mind produce in the body different ſenſations and impreſſions, and, as ſympathies of conſciouſneſs, determine in general the ſpirits to thoſe parts which labour moſt, or are moſt apt to be affected. Thus fear and anger determine to the heart; luſt to the eyes, &c.; joy, pity, wonder, and the like, to the head.

Jackſon on Sympathy, p. 95.

The paſſions and affections have been ſaid to impreſs and act upon the body, in the following manner: "1. Fear cauſeth paleneſs, trembling, the ſtanding of the hair upright, ſtarting, and ſcrieching. 2. Grief and pain cauſeth ſighing, ſobbing, groaning, ſcreaming, and roaring; they alſo cauſe tears, diſtorting of the face, grinding of the teeth, and ſweating. 3. Joy cauſeth a cheerfulneſs and vigour in the eyes, ſinging, leaping, dancing, and ſometimes tears. 4. Anger produces paleneſs in ſome, and the going and coming of the colour in others; alſo trembling in ſome, ſwelling, foaming at the mouth, ſtamping, and bending of the fiſt. 5. Slight, diſpleaſure, or diſlike, cauſes ſhaking of the head, frowning, and knitting of the brows. 6. Shame cauſeth bluſhing, and caſting down of the eyes. 7. Pity cauſes ſometimes tears, and a flexion or caſt of the eyes aſide. 8. Wonder cauſeth aſtoniſhment, and an immoveable poſture of the body, caſting up of the eyes to heaven, and lifting up of the hands. 9. Laughing, though hardly to be conſidered as a paſſion, ſince it is produced by an affection of the mind, cauſeth a dilatation of the mouth and lips; a continued expulſion of the breath; with a loud noiſe, which maketh the interjection of laughing, ſhaking of the breaſt and ſides, and running of the eyes with water, if it be violent and continued. 10. Luſt cauſes a flagrancy in the eyes, and priapiſm."

The affections of the mind of one perſon will often work upon the ſpirits of many. Thus whole companies are ſometimes diſpoſed to be ſad and melancholy, or merry and jovial, when any one is preſent much inclined to either of thoſe ſtates of mind; and it has been obſerved, that old people, who have loved the company of the young, and have been converſant continually with them, have generally lived long. But young people muſt not conclude from this, that the company and converſation of the grave and old will operate upon their living and ſenſitive principle, thro' the affections of their mind, and diſpoſe them to be ſhort-lived. On the contrary, by thus improving their underſtanding, they will be more enabled to fortify their conſtitution and reſiſt the ravages of youthful indulgence.

It may alſo be further obſerved, that thoſe tender ſympathetic affections which lay hold of the mind, at the repreſentation of theatrical performances, originate from the ſame principle, while they are to be conſidered as the ſureſt teſt of juſt execution in the actor, and of the expreſſive language of the author. Indeed all ſtage-effect depends on ſympathy.

The affections of the mind make the ſpirits more powerful and active, eſpecially thoſe which manifeſt themſelves by the eyes. Two in particular may be named, *love* and *envy*. As ſympathies of conſciouſneſs, their operations are more eaſily felt than deſcribed. Though oppoſite in their nature, they are equally violent in obtaining their particular ends. The one can no more ſuffer indifference and diſappointment, than the other contempt and haughtineſs.

It has been ſaid, that the paſſions of the mind are occaſionally infective, particularly ſome of them. Thus *fear* and *ſhame* are ſometimes very ſuddenly ſo. We frequently may have occaſion to ſee, that the ſtarting of one will make another ready to ſtart. Again, when one man is out of countenance in company, others will often bluſh in his behalf. However, the ſerious paſſions may ſurely be ſo under the controul of reaſon as to reſiſt infection, whatever may be the caſe of temporary, muſcular, or nervous attraction.

2. Our author is inclined to think, that a connection between the affections and ſenſations of the female mind and uterus is very materially concerned in the proceſs of generation, and probably can alone give efficacy to thoſe actions and impreſſions ſubſervient to conception, through the ſympathizing affections of the mind.

One of the firſt medical philoſophers of the preſent time, he obſerves, is of opinion that the mother has always the powers and principles of faſhioning her child within herſelf, but that they are not rouzed to action without the ſtimulating influence of the male. The principles that muſt be immediately concerned are the ſentient and living; but it is through the influence of the mental principle that the form and image of the embryo is ſtamped.

With reſpect to the depravity and force of the imagination in the production of ſympathies, they always operate moſt upon "weak minds and ſpirits, and therefore moſt on women, ſuperſtitious and fearful perſons, ſick people, children, and young creatures." "Their effects, however, ſometimes fail to appear, becauſe they are encountered and overcome by the mind and ſpirit before they work any manifeſt effects."

Such effects are obviated upon the ſame principle which eſtabliſhes the prevention of bodily diſeaſe: "for in infection and contagion from body to body (as, for example, during the plague), the miaſma may be received; but from the ſtrength and good diſpoſition of the body, it is expelled and wrought out before it has had ſufficient time to form the diſeaſe."

It has been ſaid, and many are of the opinion, that the force of imagination doth often forward the end propoſed. Thus, for inſtance, it has been put as a queſtion, "Whether a man, when he conſtantly and ſtrongly believes that ſuch a thing ſhall be (as that ſuch a one will love him, and the like), helps any thing to the effecting the thing deſired?" Certainly not in the manner which has been advanced, namely, "by a ſecret operation on the ſpirit of another." If he ſucceeds, it is either becauſe he perſevered, or becauſe his perſeverance and earneſtneſs (and not any occult operation) makes him at length be attended to.

There is not a doubt but the force of imagination often gives energy to our actions. It may, however, unleſs we are much on our guard, eaſily delude us aſide from reaſon. It has been the tree which has yielded the fruits of ſuperſtition in former times, and which has often fed the human mind with the moſt extravagant notions of ſympathy. Sympathies of this kind, ſuch as the power of charms, and the like, are now pretty generally exploded.

3. The five principal ſenſes, *hearing*, *taſting*, *ſmelling*, *feeling*, and *ſeeing*, are conſcious of a ſympathetic impreſſion from odious objects. "1. A diſagreeable ſound will ſet the teeth on edge, and make all the body ſhiver. 2. The ſwallowing of a nauſeous medicine will be attended with a ſhaking of the head and neck. 3. Diſagreeable ſmells produce nearly the ſame effect, which are leſs perceived, becauſe there is a remedy at hand by ſtopping the noſe. 4. If you come ſuddenly out of the ſun into the ſhade, the ſenſe of feeling is diſturbed by a chillneſs or ſhivering of the whole body. 5. And even ſudden darkneſs produces a propenſity to ſhivering.

Ibid. There is a very apparent reaſon why a ſympathy ſhould take place between the eyes. Hence their motions are ſynchronous. It may be ſaid, that cuſtom and habit diſpoſe the eyes to move one and the ſame way; "for when one eye moveth towards the noſe, the other eye moveth from the noſe."

Though the eyes are by nature prone to move in concert, cuſtom will, however, deſtroy this natural conſent, and produce the contrary. Thus ſome people can ſquint when they will. Our author therefore gives this caution to mothers and nurſes: "Let them not ſuffer infants to ſit with a candle placed behind them; for both their eyes will diſpoſe to move outwards, as affecting to ſee the light of the candle, which may bring on the habit of ſquinting."

It appears as a quality in the ſenſes of hearing and ſeeing, "that the inſtrument of each ſeparate ſenſe has a ſympathy and ſimilitude to that which giveth the reflection." Thus it has been obſerved, "that the eye will ſympathize with a cryſtal glaſs or water, and the ear with caves and ſuch hollow places as are ſuited to report echo."

Sympathies have been compared to uniſons of ſound in muſic. Uniſons of ſound produce agreeable ſympathetic feelings; the reverſe produce diſagreeable feelings. "All concords and diſcords of muſic are (no doubt) ſympathies and antipathies of ſound." Moreover, "they are ſaid to work as well by report of ſound as by motion."

The ſenſe of feeling may be diſturbed by any uncommon, though apparently ſlight, irritation. Thus tickling the ſides or ſoles of the feet will cauſe laughter; and again, tickling the noſtrils will raiſe ſneezing, and on a ſudden wonderfully increaſe the ſecretion of tears. Both theſe operations, as ſympathies, tend to remove both cauſe and effect, "by producing a ſudden emiſſion of the ſpirits," and the expulſion (if there ſhould be any) of the offending matter.

The moſt agreeable as well as odious objects operate in a ſecondary way, in producing thoſe ſympathetic impreſſions and actions which they commonly give riſe to. An increaſed ſecretion of ſaliva often takes place at the ſight of a favourite diſh: and the running of water from a bottle, or otherwiſe, will ſometimes affect indivduals of a particular idioſyncraſy, with an involuntary propenſity to void urine.

Many have attempted to account for the remarkable ſympathy which takes place between parts of the body ſeemingly in a great meaſure unconnected with each other. Moſt have ſuppoſed that the ſympathy took place through the brain; that the extremities of the nerves conveying a diſagreeable or painful ſenſation to the medullary part of the brain, affected ſome part of its fibres adjacent to or connected with the origin of the nerves diſtributed to ſome other parts of the body; whence the latter become alſo affected, and of conſequence that part of the body to which they are diſtributed. In a late treatiſe †, however, Dr Kirkland has endeavoured to explode this theory, and to eſtabliſh another. He denies that either the medullary part of the brain or of the nerves conſiſts, as has been commonly ſuppoſed, of fibres. No man, he ſays, ever ſaw the extremity of any nerve; nor are any fibres, diſtinct from blood-veſſels, to be ſeen even by a ſolar microſcope in the medullary ſubſtance of the brain or inſide of a nerve. He aſſerts, that the medulla of the brain is a mere mucus, which totally, or almoſt totally, evaporates with the heat of boiling water, or even in the heat of the common atmoſphere in the ſhade; that this mucus is continued through the nerves, and by them ſpread out on the muſcles, where it appears in its proper form, namely that of a fine tranſparent mucus. This he proves from obſerving, that though a muſcle may be irritated, either by pricking it or the nerve above it, yet if the mucus which lies on the ſurface be previouſly wiped off, no ſuch irritation will take place. The nerves then, according to our author, are only deſigned to convey this mucus to every part of the body, that, as the brain is the fountain of life, every part may ſhare in the common life of the whole. Hence he is of opinion, that the nervous ſympathy does not act from one part of the body through the brain to another; but from one part directly to another by means of the mucus, or ſubſtance ſimilar to the brain, with which all the muſcles are covered.

Dr Monro, in his obſervations on the ſtructure and functions of the nervous ſyſtem, gives it as his opinion, that the nerves are not entirely formed out of the ſubſtance of the brain, but receive a conſiderable addition of matter as they paſs through the body; and that the nerves have a peculiar energy of their own independent of the brain. He is alſo of opinion, that the reſt of the brain which is not ſent out in nerves ſerves as a medium between the living principle and the other parts of the body; and that the oppoſite ſides of the encephalon are joined by bundles of fibres: "ſo that (ſays he) we ſeem in a certain degree to perceive the cauſe of the ſufferance of all the parts of the nervous ſyſtem with that of any one part of it, or of the general ſympathy of the nerves."

SYMPHONY, in muſic, properly denotes a conſonance or concert of ſeveral ſounds agreeable to the ear, whether vocal or inſtrumental, called alſo *harmony*. See HARMONY.

SYMPHYSIS, in anatomy, one of the kinds of junctures or articulation of the bones. See ANATOMY, n° 2, e.

Cutting the SYMPHYSIS *of the Pubes*. See MIDWIFERY, p. 5032.

SYMPHYTUM, COMFREY; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are three ſpecies; of which the officinale, or common comfrey, is the moſt remarkable. This grows naturally in many places of Britain on the ſides of rivers and wet ditches. The roots are uſed in medicine, and are of a mucilaginous nature; the leaves give a grateful flavour to cakes and panadoes. Cows and ſheep eat the herb; horſes, goats, and ſwine, refuſe it.

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† *Inquiry into the preſent State of Medical Surgery.*

SYMPOSIARCH, in antiquity, the director or manager of an entertainment. This office was ſometimes performed by the perſon at whoſe charge the entertainment was provided; ſometimes by another named by him; and at other times, eſpecially in entertainments provided at the common expence, he was elected by lot or by the ſuffrages of the gueſts.

SYMPTOM, in medicine, is defined by Galen to be a preternatural affection which depends upon a diſeaſe or follows it. Thus ſymptoms are diſeaſes produced by an original principal diſeaſe. But ſymptoms are ſometimes the effect of ſymptoms alſo. A ſymptom may be a ſymptom and a diſorder at the ſame time; as when a ſymptomatic fever is produced by a phlegmon.—A knowledge of the origin and cauſe of ſymptoms conduces to confirm the prognoſis, and to the certain removal of the diſeaſe.

SYMPTOMATICAL, in medicine, is a term often uſed to denote the difference between the primary and ſecondary cauſes in diſeaſes: thus a fever from pain is ſaid to be ſymptomatical, becauſe it riſes from pain only.

SYNÆRESIS, Contraction, in grammar, a figure whereby two ſyllables are united in one; as *vemens* for *vehemens*.

SYNAGOGUE, a particular aſſembly of the Jews met to perform the offices of their religion: Alſo the place wherein they meet. The word is Greek, *συναγωγη*, which literally ſignifies an aſſembly or congregation.

SYNARTHROSIS, } See Anatomy, n° 2.
SYNCHONDROSIS. }

SYNCHRONISM denotes the happening of ſeveral things at the ſame time. See Chronology.

SYNCOPE, fainting; a deep and ſudden ſwooning, wherein the patient continues without any ſenſible heat, motion, ſenſe, or reſpiration, and is ſeized with a cold ſweat over the whole body; all the parts, in the mean time, turning pale and cold as if he was dead.

Syncope, in grammar, an eliſion or retrenchment of a letter or ſyllable out of the middle of a word, as *caldus* for *calidus*.

SYNDIC, in government and commerce, an officer, in divers countries, intruſted with the affairs of a city or other community, who calls meetings, makes repreſentations and ſolicitations to the miniſtry, magiſtracy, &c. according to the exigency of the caſe.

SYNECDOCHE, in rhetoric, a kind of trope frequent among orators and poets. See Oratory, n° 52.

SYNECPHONESIS, in grammar, a coalition, whereby two ſyllables are pronounced as one; being much the ſame as Synaloepha and Synæresis.

SYNEUROSIS. See Anatomy, n° 2.

SYNGENESIA, (*συν*, *together*, and *γενεσις*, *generation*), the name of the 19th claſs in Linnæus's Sexual Method, conſiſting of plants in which the antheræ or male organs of generation are united into a cylinder; the filaments on which they are ſupported being ſeparate and diſtinct.

SYNGNATHUS, or Pipe-fish, in ichthyology, a genus of fiſhes belonging to the order of amphibia nantes. There are ſeven ſpecies; of which three are found in the Britiſh ſeas, viz.

1. The barbarus, or longer pipe-fiſh. One deſcribed by Sir Robert Sibbald, was two feet in length; that examined by Mr Pennant only 16 inches. The noſe was an inch long, compreſſed ſidewiſe, and the end of the lower mandible turned up: the aperture of the mouth was very ſmall.—The irides were red; behind each eye was a deep brown line.—The body, in the thickeſt part, was about equal to a ſwan's quill, hexangular from the end of the dorſal fin; from thence to the tail, quadrangular. The belly was ſlightly carinated, and marked along the middle with a duſky line. Under the tail, commencing at the anus, is a ſulcus or groove ſix inches and a half long, covered by two longitudinal valves, which concealed a multitude of young fiſh. On cruſhing this part, hundreds may be obſerved to crawl out.

2. The acus, or ſhorter pipe-fiſh, is thicker than the former, yet it has been ſeen of the length of 16 inches. The middle of the body in ſome is hexangular, in others heptangular. The mouth is formed like that of the former: the irides are yellow: cloſe behind the head are the pectoral fins, which are ſmall and ſhort. On the lower part of the back is one narrow fin; beyond the vent the tail commences, which is long and quadrangular. At the extremity is a fin round and radiated. The body is covered with a ſtrong cruſt, elegantly divided into ſmall compartments. The belly is white; the other parts are brown.

3. The ophidion, or little pipe-fiſh, ſeldom exceeds five inches in length, is very ſlender, and tapers off to a point. It wants both the pectoral and tail fins; is covered with a ſmooth ſkin, not with a cruſt as the two former kinds are. The noſe is ſhort, and turns a little up; the eyes are prominent. On the back is one narrow fin.—This ſpecies is not viviporous: on the belly of the female is a long hollow, to which adhere the eggs, diſpoſed in two or three rows. They are large, and not numerous. The ſynonym of *ſerpent* is uſed in ſeveral languages to expreſs theſe fiſh: the French call one ſpecies *orueul*, from a ſort of ſnake not unlike the blindworm: the Germans call it *meherſchlange*; and the Corniſh the *ſea adder*.

SYNOCHA, and Synochus, in medicine, the names of two ſpecies of continued fever. See Medicine, n° 274, 279.

SYNOD, in aſtronomy, a conjunction or concourſe of two or more ſtars or planets, in the ſame optical place of the heavens.

Synod ſignifies alſo a meeting or aſſembly of eccleſiaſtical perſons concerning matters of religion.

SYNODICAL, ſomething belonging to a ſynod. Thus, ſynodical epiſtles are circular letters written by the ſynods to the abſent prelates and churches; or even thoſe general ones directed to all the faithful, to inform them of what had paſſed in the ſynod.

SYNOECIA, in Grecian antiquity, a feaſt celebrated at Athens in memory of Theſeus's having united all the petty communities of Attica into one ſingle commonwealth; the ſeat whereof was at Athens, where all the aſſemblies were to be held. This feaſt was dedicated to Minerva; and, according to the ſcholiaſt of Thucydides, it was held in the month *Metagitnion*.

SYNONIMOUS, is applied to a word or term that has the ſame import or ſignification with another.

SYNOVIA, in medicine, a term uſed by Paracelſus and his ſchool for the nutritious juice proper and peculiar to each part. Thus they talk of the ſynovia of the joints, of the brain, &c.

SYNTAX, in grammar, the proper conſtruction or due diſpoſition of the words of a language into ſentences and phraſes. See GRAMMAR, and LANGUAGE.

SYNTHETIC, or SYNTHETICAL, that part of chemiſtry by which we are taught to compound bodies from the various principles or elements into which they have been reſolved by the analytical part.

SYNTHETIC, in logic. See LOGIC, n° 117.

SYPHON. See HYDROSTATICS, n° 20, 38. Some uncommon phenomena in nature may be accounted for upon the principles of the ſyphon; as, for inſtance, that of reciprocating ſprings. See the article SPRING.

1 At what time rebuilt

2 Government originally monarchical.

3 Soon becomes democratical.

SYRACUSE, once a celebrated city of Sicily, and the capital of the iſland. It was built, according to Thucydides and Strabo, by Archias, one of the Heraclidæ, who came from Corinth into Sicily in the ſecond year of the 11th olympiad, deriving its name from a neighbouring marſh named *Syraco*. What form of government firſt prevailed in the city is not certainly known. Many have ſuppoſed it originally to have been governed by kings: but if this was the caſe, the monarchical government muſt have continued only for a very ſhort time; ſince Ariſtotle, Diodorus Siculus, and Juſtin, mention it as being very early ſubject to a democracy. The hiſtory, however, is obſcure and unimportant till the time of Gelon, when it firſt began to make a conſpicuous figure.

4 Gelon ſeizes on the ſovereignty

Gelon was born in the city of Gela in Sicily, of the family of Telines, who had been created prieſt of the infernal gods. He ſignalized himſelf in a war carried on by Hippocrates tyrant of Gela againſt the Syracuſians, whom he defeated in a pitched battle, and had well nigh taken their city afterwards. Having thus become very powerful among his countrymen, he ſoon found means to ſeize on the ſovereignty for himſelf. In a ſhort time, having put himſelf at the head of ſome Syracuſian exiles, he marched towards that place, where he was received with loud acclamations by the faction to which they belonged; and by their means obtained poſſeſſion of the city.

5 Takes ſeveral cities, and removes the inhabitants to Syracuſe.

Gelon, in order to people the capital of his new dominions, firſt demoliſhed the neighbouring city of Camarina, and tranſplanted the inhabitants to Syracuſe. Soon after, entering into a war with the Megareans, he defeated them, took and raſed their cities, and in like manner tranſplanted the people. Syracuſe thus became very powerful, and full of inhabitants; and the friendſhip of Gelon was courted both by Athens and Lacedæmon at the time of the Perſian invaſion. His aſſiſtance, however, was afterwards rejected, as he inſiſted upon being made commander in chief, or at leaſt of either the fleet or the land-army. In the mean time the Carthaginians had entered into a treaty with the Perſians; by which it was agreed, that the former ſhould attack thoſe of the Greek name in Sicily and Italy, in order to divert them from aſſiſting one another. Sicily was accordingly invaded by the Carthaginians with a vaſt army; but they were utterly overthrown by Gelon, as is related under the article CARTHAGE, n° 7—9. After this victory, the people out of gratitude obliged him to take upon himſelf the title of king; which till that time he had refuſed. A decree alſo paſſed without oppoſition, by which the crown was ſettled on his two brothers Hiero and Thraſybulus after his death.

6 Defeats the Carthaginians, and takes the title of king.

7 His excellent reign.

The new king, inſtead of keeping his ſubjects in greater awe, ſtudied the more to make them happy as he found his power increaſed; and, according to Diodorus Siculus, was the firſt man who became more virtuous by being raiſed to a throne. He was particularly famous for his honeſty, truth, and ſincerity; is ſaid never to have wronged the meaneſt of his ſubjects, nor ever to have promiſed a thing which he did not perform.

8 Gelon dies, and is ſucceeded by Hiero.

Gelon died in the year 471 B. C. after having reigned three or four years; and was ſucceeded by his brother Hiero, whoſe character is differently related by different hiſtorians. He was twice engaged in a war with the Agrigentines, and drove from their habitations the people of Catana and Naxus, ſettling in their room a colony of Syracuſians and Peloponneſians. He is highly celebrated in the odes of Pindar; and it is certain that his court was the reſort of men of wit and learning, to whom he behaved in the moſt courteous manner and with the greateſt liberality.

9 Thraſybulus, a tyrant.

10 Popular government reſtored.

11 Petaliſm introduced, but ſoon after aboliſhed.

In 459 B. C. Hiero was ſucceeded by Thraſybulus; who proving a tyrant, was in ten months driven out, and a popular government reſtored; which continued for the ſpace of 55 years. However, ſeveral perſons continued for ſome time to aſpire at the ſovereign power; and to rid themſelves of theſe aſpiring geniuſes, the inhabitants made a law not unlike that of the oſtraciſm at Athens. By this law they were to write on a leaf the names of thoſe whom they ſuppoſed to be powerful enough to aſpire at the crown; and when the leaves were counted, he who had the moſt ſuffrages againſt him was, without further inquiry, baniſhed for five years. This method of weakening the intereſts of the overgrown citizens was called *petaliſm*, from the Greek word πεταλον, ſignifying a leaf; but being found to be productive of great inconveniences, by driving out of the country all thoſe who were moſt capable of governing the commonwealth, the law was repealed ſoon after it had been enacted.

12 The Siculi ſubdued.

13 Syracuſians become haughty.

14 Invaded by the Athenians without ſucceſs.

About this time the Syracuſians entered into a war with the Siculi, which terminated in the total ſubjection of the latter; after which Syracuſe became ſo powerful, that it in a manner gave law to the whole iſland. The Greek cities indeed enjoyed a perfect liberty; but they all acknowledged Syracuſe as their metropolis: by degrees, however, the latter began to aſſume ſuch an authority over them as was totally inconſiſtent with liberty; and this occaſioned many wars, which involved them in much diſtreſs and danger. They began with the Leontines, whoſe territory they laid waſte, and reduced their city to great ſtraits. Leontini was an Athenian colony; and this furniſhed the Athenians, who had already meditated the conqueſt of Sicily, with a pretence to attack the Syracuſians with their whole force. Under colour of aſſiſting their countrymen, therefore, they ſent a fleet of 250 ſail to Sicily: but the Leontines, ſenſible that their pretended allies aimed at nothing leſs than the conqueſt of the whole iſland, concluded a peace with Syracuſe; and the diſappointed Athenians vented their rage upon thoſe who had adviſed and conducted the expedition.

15 A new invaſion.

In 416 B. C. a diſpute happening between the inhabitants of Egeſta and Selinus concerning ſome lands which the latter had ſeized, the Egeſtines applied for aſſiſtance to Agrigentum, Syracuſe, and even to Carthage. But as none of theſe ſtates choſe to intereſt themſeves in their quarrel, they applied at laſt to the Athenians, who joyfully accepted of the opportunity of again interfering in the affairs of Sicily. Though the Egeſtines were but an inconſiderable people, they had engaged to pay all the troops that ſhould be employed in the war; but this appearing doubtful to the Athenians, they ſent ambaſſadors to inquire into the ſtate of the iſland in general, and particularly that of Egeſta.

16 Athenians impoſed on by the Egeſtines.

The Egeſtines impoſed on theſe ambaſſadors by producing a great number of gold and ſilver veſſels which they had borrowed for the purpoſe; ſo that the populace of Athens, dreaming of nothing but conqueſts to be made without any expence, became obſtinately bent on the war. Nicias, a man of great influence at Athens, attempted to ſhow, that as Athens was then engaged in a dangerous war with Sparta, it was impoſſible to ſpare a force ſufficient to reduce the iſland; but the contrary opinion being eſpouſed by Alcibiades, at that time the moſt eloquent ſpeaker in Athens, Nicias was over-ruled, and obliged to engage in the expedition.

17 Ill-grounded confidence of the Athenians.

The force he required was only 5000 land-forces and 100 galleys, with which, however inadequate to the purpoſe it may ſeem, the Athenians were ſo ſure of ſucceſs, that the officers, before they ſet ſail, had a conference with the ſenate concerning the diſpoſal of the Sicilians. In this conference it was agreed, that the Selinuntines and Syracuſians their ſuppoſed allies ſhould be carried off and ſold for ſlaves, and the reſt obliged to pay an annual tribute and live according to the Athenian laws.

With theſe ſanguine expectations the Athenian forces embarked to the number of 7000; for ſuch was their eagerneſs for the expedition, that 2000 more enliſted themſelves than Nicias had required. They firſt ſailed to the iſland of Egina, and from thence to Corcyra, where they had appointed the place of rendezvous for their allies and the tranſports. On their arrival, they ſet ſail again, and landed on the coaſt of Italy, with a view to engage ſome of the Italian cities in their quarrel; but finding this impoſſible, they ſent ſome ſhips to cruiſe off the coaſt of Sicily, in order to find out a proper place for landing, and at the ſame time to know what treaſure the the Egeſtines could contribute towards carrying on the war, which had been undertaken for their ſake.

18 Find out the deceit of the Egeſtines.

Theſe, on their return, acquainted the generals, that the Egeſtines had impoſed on them, and were a poor indigent people, who had only 30 talents in their treaſury. On this information a council of war was called, in which Nicias gave it as his opinion that they ſhould ſail to Selinus, which had been the firſt occaſion of this expedition; and then, if the Egeſtines performed their promiſe, and ſupplied the army with a month's pay, to oblige the Selinuntines and Egeſtines to come to an agreement, and then return to Athens without engaging in ſuch an expenſive war. Alcibiades, however, again oppoſed Nicias; thinking it highly diſhonourable to return home without doing any thing, after having been at the expence in fitting out an armament. He therefore urged, that they ſhould ſolicit the cities of Sicily to enter into a confederecy againſt the Syracuſians and Selinuntines; and, in caſe they found them diſpoſed to come into their meaſures, to attack either Syracuſe or Selinus. Another of the Athenian generals was for laying ſiege immediately to Syracuſe; but the opinion of Alcibiades prevailing, they ſet ſail for Sicily.

19 Reduce ſeveral places.

Having accordingly landed in the iſland, they reduced ſeveral places; but Alcibiades in the mean time being recalled, Nicias and Lamachus were left to conduct the war as they beſt could.

20 Defeat the Syracuſians, and poſſeſs themſelves of a ſtrong poſt.

At firſt they were ſucceſsful, poſſeſſing themſelves of a ſtrong poſt, and put the Syracuſians to flight; ſoon after which they recived conſiderable ſupplies both of men, money, and proviſions, from Athens, as well as from their Sicilian allies. The Syracuſians alſo received aſſiſtance from the Lacedæmonians under the command of an experienced officer named *Gylippus*. Before theſe arrived, however, the Athenians had poſſeſſed themſelves of an important poſt named *Epipolæ*, which being a very ſteep hill, ſtood without the city and commanded it.

21 Syracuſe inveſted.

Immediately after this the city was inveſted in form. The inhabitants made frequent and vigorous ſallies; but were always repulſed with loſs. In one of theſe ſallies Lamachus was ſlain; and thus Nicias became ſole commander. He then cauſed the canals to be cut by which water was conveyed into the city; upon which the Syracuſians began to think of capitulating.

22 Gylippus arrives with ſome Spartans to the relief of Syracuſe.

From this, however, they were ſoon prevented by the arrival of Gylippus with the Spartan auxiliaries. On this they prepared for making vigorous ſallies, in order to facilitate the entrance of Gylippus. While they were making theſe preparations, Gylippus himſelf appeared at the head of 3000 foot and 200 horſe. Making directly for Epipolæ, where Nicias had fortified himſelf in a caſtle named *Labdalon*, he drew up his ſmall army under the walls; and ſent an herald to Nicias, letting him know that he would allow him only five days to leave Sicily.

23 Takes a fort, and enters the city.

To this meſſage Nicias returned no anſwer; but Gylippus ſoon after attacked the fort, carried it by ſtorm, and put to the ſword all the Athenians that were in it. This opened him a way into the city, where he was received with loud acclamations.

The fortune of the war was now ſoon changed. The Athenians gained an advantage by land, but were next day defeated with conſiderable loſs. The Syracuſians received freſh ſupplies from Corinth, and the Athenians from their own country. Many engagements both by ſea and land took place, in which the ſucceſs was ultimately in favour of the Syracuſians. At laſt the Athenian affairs were totally ruined by the loſs of a ſea-fight, in which 60 of their ſhips were taken or deſtroyed, and the reſt left quite unſerviceable.

24 Athenians totally defeated at ſea.

In this deſperate ſituation it was determined to abandon their ſhips, and retire that very night to the city of their confederates. The Syracuſian commander, ſuſpecting that this would be the caſe, ordered all his forces

25 Outwitted by the Syracuſian general.

26 Haraſſed in their retreat.

27 Part of the army ſurrenders.

28 The reſt defeated with great ſlaughter.

29 The remainder ſurrender, and are cruelly uſed.

forces to be in readineſs to prevent them from effecting their purpoſe. But as the people were then in the height of their rejoicing for the late victory, they refuſed to take up arms again until they had reſted for ſome days. On this Hermocrates the general ſent to the Athenian camp ſome horſemen, who were to paſs for friends, and adviſe Nicias to quit his camp, which was well fortified, ſince the Syracuſians lay in ambuſh for him, and had ſeized on all the paſſes leading to the cities of their allies. To this falſe advice Nicias gave too eaſy credit, and did not march out till the third day, when his antagoiſt Hermocrates had prevailed upon his forces to march out. The Athenians and their allies alſo marched out to the number of no leſs than 40,000; but finding themſelves ſhut up on all ſides, and being obliged to fight their way through every outlet, they ſoon ſunk into the deepeſt deſpair. Nicias did his utmoſt to encourage them; and at laſt ſucceeded ſo far that they marched out in two bodies, both drawn up in proper order. The vanguard led by Nicias continued to keep together, and advanced in good order; but half the rear, commanded by Demoſthenes, loſt their way in the night, and were obliged to ſurrender. Nicias being informed of this misfortune, offered to pay the whole expence of the war, provided he was allowed to march off with his men. But this being rejected, he ſet out, though galled all the way by ſhowers of darts from his enemies. Arriving at a river called *Aſmarus*, they ruſhed into it without any order; in which confuſion the Syracuſian cavalry attacked them ſo deſperately, that 18,000 periſhed, and the river for many miles was dyed with their blood. On this occaſion the Athenians were ſo preſſed with thirſt, that, unmindful of their danger, they drank the waters of the river all bloody as they were, which gave their enemies the better opportunity of ſlaughtering them without reſiſtance. The remainder ſurrendered, on the ſingle condition of having their lives ſaved; but the terms were ſhamefully broke by the Syracuſians. The generals were firſt ignominiouſly whipt, and then put to death: the common ſoldiers were thruſt down into quarries, where they were allowed only two ſmall meaſures of flour and one of water a day; and where, being crowded upon one another, they ſuffered inexpreſſible miſeries for many months. Moſt of them periſhed by this cruel treatment, and the few who ſurvived were ſold for ſlaves.

30 New invaſion by the Carthaginians.

The war was ſcarce ended, when a new and formidable invaſion by the Carthaginians took place; but the event of that expedition was as unfortunate to the Carthaginians as the former had been, of which a particular account is given under the article CARTHAGE, n° 12. *et ſeq.*

31 Riſe of Dionyſius.

In the mean time, however, a conſiderable revolution had happened in Syracuſe. The city of Agrigentum had been taken by the Carthaginians, and of the few inhabitants who eſcaped, ſome fled to Syracuſe, where they accuſed the Syracuſian commanders of having betrayed the city into the hands of the enemy. Dionyſius, a man of great valour and addreſs, but who had become very obnoxious to the populace, took this opportunity of attempting to retrieve his credit. He therefore ſupported the accuſations brought againſt his countrymen by the Agrigentines, and even impeached the magiſtrates as having a ſecret intelligence with the enemy, and attempting to introduce an oligarchy. As his ſpeech was entirely levelled againſt the more wealthy citizens, it was very agreeable to the lower claſs: the commanders were inſtantly degraded; and others, among whom was Dionyſius, were appointed. Having once gained this point, he began to conſider how he might get all his colleagues turned out. For this purpoſe he never joined in any council of war with the other commanders, nor imparted to them his reſolutions, giving out that he could not truſt them, and that they had more regard for their own intereſt than the welfare of their country. But while he was proceeding in this manner, the more prudent part of the citizens, perceiving what he aimed at, complained of him to the ſenate and magiſtrates, and fined him as a diſturber of the public peace. According to the laws, the fine was to be paid before he could ſpeak in public, and the circumſtances of Dionyſius did not allow him to diſcharge it. In this dilemma he was aſſiſted by Philiſtus the hiſtorian, a man of great wealth, who not only paid this fine for him, but encouraged him to ſpeak his mind freely, as it became a zealous citizen to do, promiſing to pay all the fines that ſhould be laid upon him.

32 Is choſen generaliſſimo.

33 Becomes king of Syracuſe.

Being extricated out of this difficulty, Dionyſius next proceeded to inveigh, with all the eloquence he was maſter of, againſt thoſe who by means of their power or intereſt were able to oppoſe his deſigns, and by degrees brought them into diſcredit. His next ſcheme was to get thoſe exiles recalled whom the nobility had baniſhed at different times; as thinking that they would ſupport him with all their power, as well out of gratitude as out of hatred to the oppoſite party. Having gained this point alſo, he next found means to ingratiate himſelf with the ſoldiery to ſuch a degree, that, under pretence of taking proper meaſures for reſiſting the Carthaginians, he was choſen commander in chief, with abſolute and unlimited power. This was no ſooner done, than, pretending that his life was in danger, he choſe out 1000 men for his guard, whom he attached to his intereſt by great promiſes. As no perſon durſt now oppoſe him, he poſſeſſed himſelf of the citadel, where all the arms and proviſions were kept; after which he publicly took the title of king of Syracuſe in the year 404 B. C.

The Syracuſians did not tamely ſubmit to their new maſter: but Dionyſius managed matters ſo well, that their frequent revolts anſwered no other purpoſe than more certainly to entail ſlavery on themſelves; and he was allowed to poſſeſs the throne without much oppoſition till his death, which happened in the year 366 B. C.

34 Dionyſius II.

On the death of Dionyſius, he was ſucceeded by his ſon, called alſo *Dionyſius*. He was naturally of a mild and peaceable temper, averſe from cruelty, and inclined to learning; but his father, to whom all merit, even in his own children, gave umbrage, ſtifled as far as poſſible his good qualities, by a mean and obſcure education. He no ſooner aſcended the throne, than Dion, brother to Ariſtomache the other wife of Dionyſius the elder, undertook to correct the faults of his education, and to inſpire him with thoughts ſuitable to the high ſtation in which he was placed. For this purpoſe he ſent for the philoſopher Plato, under whoſe care he immediately put the young king. This inſtantly produced a reformation on Dionyſius; but the courtiers, dreading the effects of the philoſopher's inſtructions, prevailed on him to baniſh Dion, and to keep Plato himſelf in a kind of impriſonment in the citadel. At laſt, however, he ſet him at liberty; upon which Plato returned to his own country.

35 Put under the care of Plato by his uncle Dion, whom he baniſhes.

Dion, in the mean time, viſited ſeveral of the Grecian cities, and at laſt took up his reſidence in Athens; but the honours which were every where paid him, raiſed ſuch jealouſies in the breaſt of the tyrant, that he ſtopped his revenue, and cauſed it to be paid into his own treaſury. In a ſhort time, Dionyſius again ſent for Plato; but finding it impoſſible to diſſolve the friendſhip between him and Dion, diſgraced, and placed him in a very dangerous ſituation, in the midſt of aſſaſſins who hated him. Not daring, however, to offer him any violence, he allowed him ſoon after to depart; revenging himſelf on Dion, whoſe eſtate he ſold, and gave his wife Arete in marriage to Timocrates one of his own flatterers.

36 Uſes Plato ill, and provokes Dion to revenge.

Dion now reſolved to revenge himſelf on the tyrant for the many injuries he had ſuſtained, and at once to deliver his country from the oppreſſion under which it groaned. He began with raiſing foreign troops privately, by proper agents, for the better execution of his deſign. Many Syracuſians of diſtinction entered into his ſcheme, and gave him intelligence of what paſſed in the city: but of the exiles, of whom there were upwards of 1000 diſperſed up and down Greece, only 25 joined him; ſo much were they awed by the dread of the tyrant. The troops were aſſembled at the iſland of Zacynthus, in number only about 800; but who had all been tried on many occaſions, were well diſciplined, and capable of animating by their example the forces which Dion hoped to find in Sicily. When they were about to ſet ſail, Dion acquainted them with his deſign, the boldneſs of which at firſt occaſioned no ſmall conſternation among them; but Dion ſoon removed their fears, by telling them that he did not lead them as ſoldiers, but as officers, to put them at the head of the Syracuſians and all the people of Sicily, who were ready to receive them with open arms. Having then embarked in two ſmall trading veſſels, they arrived in 12 days at Cape Pachynum near Syracuſe. Their pilot adviſed them to land immediately, leſt they ſhould be overtaken by a violent ſtorm, which he perceived was approaching; but Dion, judging it improper to land ſo near the enemy, commanded him to put to ſea again and double the Cape.—This was no ſooner done than the ſtorm came on; and the two veſſels were driven on the coaſt of Afric, where they were in great danger of being loſt. At laſt they arrived at the port of Minoa, not far from Agrigentum. Here they received intelligence that Dionyſius had ſet ſail for Italy, attended by a fleet of 80 galleys. On this Dion reſolved to take advantage of the tyrant's abſence; and immediately ſet ſail for Syracuſe. On his march he prevailed upon the inhabitants of Agrigentum, Gela, Camarina, and other cities, to join him. As ſoon as he entered the territories of Syracuſe, multitudes flocked to him; and as nobody appeared to oppoſe him, he boldly entered the city, where he quickly found himſelf at the head of 50,000 men. As ſoon as he had landed in Sicily, Timocrates, to whom his wife Arete had been given by Dionyſius, and to whom the care of the city had been left, diſpatched a courier to let the tyrant know the danger in which he was. The meſſenger, when almoſt at his journey's end, found himſelf ſo much oppreſſed by fatigue, that he could not help lying down on the ground to take ſome reſt. In the mean time, a wolf, ſmelling ſome meat which he had in his wallet, came to the place, and carried off the bag in which was the meat, together with the diſpatches. By this means Dionyſius was prevented from receiving a timely account of Dion's arrival; ſo that when he entered the citadel by ſea, ſeven days after Dion's arrival, he found his affairs in a deſperate ſituation Upon this he had recourſe to artifice; and having amuſed the Syracuſians by a feigned negociation, until he obſerved that they kept a negligent guard, he attacked them all at once with ſuch fury, that he had almoſt taken the city. But Dion encouraged the ſoldiers by his example ſo much, that he at laſt obtained a complete victory; for which they preſented him with a crown of gold.

37 Dion raiſes troops for dethroning the tyrant.

38 His force very ſlender at firſt.

39 Is in great danger.

40 Enters Syracuſe without oppoſition.

41 Dionyſius arrives, but is totally defeated.

It was not long, however, before the ungrateful Syracuſians began to think of conferring quite different rewards on their benefactor. Dionyſius had the addreſs to render him ſuſpected by the multitude; at the ſame time that Heraclides, an excellent officer, but a ſecret enemy to Dion, did all that lay in his power to ſink his credit. In a ſhort time Dionyſius was obliged to fly into Italy: after which Heraclides, in order to ingratiate himſelf with the populace, propoſed a new diviſion of lands; inſinuating, that they could never enjoy perfect liberty as long as there was ſo much inequality in wealth and power among the citizens. This ſcheme was oppoſed by Dion, in conſequence of which a general combination was formed againſt him; and he was deſerted by all, excepting the foreign troops whom he had brought with him into the iſland. The Syracuſians ſolicited even theſe to abandon the cauſe of their general: but their offers were rejected with diſdain; and Dion, with his faithful adherents, getting clear of the tumultuous and riotous populace, took the road to Leontini. The rabble purſued him, but were ſoon driven back; and Dion reſided for ſome time at Leontini, where he was received with all the reſpect due to his character.

42 Ingratitude of the Syracuſians to Dion.

43 He is obliged to leave the city.

In the mean time the citadel ſtill continued in the hands of the adherents of Dionyſius. Being blocked up on all ſides, they were reduced to great ſtraits, and were actually making propoſals of capitulation, when Nypſius, an experienced general, and greatly attached to Dionyſius, appeared with a numerous ſquadron of galleys, and a large fleet of tranſports laden with proviſions. The general landed his men, and got them into the citadel; but almoſt all his galleys and ſhips laden with corn were ſunk or taken. This victory proved the ruin of the Syracuſians; for, giving themſelves up to feaſting and debauchery, the enemy ſallied out in the night-time from the citadel, and maſſacred the citizens without mercy. Being thus made ſenſible of the error they had committed, an embaſſy was ſent to Dion, intreating him to return and ſave the city a ſecond time. To this he agreed without heſitation, and inſtantly ſet out on his march; but in the mean time,

44 A new advantage gained over the Dionyſians.

45 The inhabitants maſſacred by the garriſon of the citadel.

46 A ſecond maſſacre, and the city ſet on fire.

47 The Dionyſians defeated with great ſlaughter by Dion.

time, as the ſoldiers of Dionyſius, ſatiated with ſlaughter, had retired into their fortreſs, the ungrateful Syracuſians began to repent of their having ſent an embaſſy to Dion. The chief commanders, therefore, ſent meſſengers to ſtop his march; but as ſome of his friends ſent deputies to him at the ſame time, deſiring him to pay no regard to the former meſſage, he proceeded on his journey. The infatuated multitude ſeized the gates in order to diſpute his entrance; but they paid dear for their frenzy. The Dionyſians again ſallied out upon them, and made ſuch ſlaughter that one would have thought they had left none alive in the city. As the troops of the tyrant well knew that Dion was haſtening to the relief of the city, they uſed their utmoſt endeavours to deſtroy it entirely before his arrival; for, after they had murdered all the inhabitants they could find, they ſet fire to the houſes, by which great numbers periſhed. During this confuſion Dion unexpectedly arrived; and having briſkly attacked the enemy, at laſt defeated them with great ſlaughter, driving the remainder into the citadel. During the reſt of the night, inſtead of refreſhing themſelves after their fatigues, they aſſiſted in extinguiſhing the fire; which was not done without great danger and difficulty. The citadel ſoon after ſurrendered; and Dion allowed Apollocrates the tyrant's ſon, who commanded there, to retire with five galleys to his father. As ſoon as Dion entered the citadel, he was met by his ſiſter and wife Arete, whom he received with affection, notwithſtanding her having lived ſo long with Timocrates. He then left the Syracuſians in poſſeſſion of the citadel, rewarded his followers, diſmiſſed his guards, and continued to live like a private citizen.

48 Dion becomes melancholy, and is murdered.

As ſoon as Dion had got poſſeſſion of the city, Heraclides had ſubmitted to him, and been received into favour; but as his ſeditious and turbulent behaviour ſtill continued, Dion at laſt gave orders to put him to death. This action, however neceſſary, ſo affected the mind of Dion, that he became melancholy; and ever after imagined himſelf haunted by a frightful ſpectre, reſembling a woman of gigantic ſtature, with the haggard looks and air of a fury. In a ſhort time after, he loſt his life, through the baſe treachery of Calippus, or Gylippus, who pretended to be his intimate friend, and who immediately after cauſed his wife and ſiſter to be carried to priſon.

49 Dionyſius reſtored.

50 Surrenders to Timoleon, and keeps a ſchool at Corinth.

Calippus having thus removed Dion, ſoon made himſelf maſter of Syracuſe, where he committed all manner of cruelties; but was driven out, and forced to fly to Rhegium, where he was murdered with the ſame dagger which had killed Dion. In 350 B. C. Dionyſius again made himſelf maſter of Syracuſe; and being exaſperated by his paſt misfortunes, tyrannized worſe than ever. The Syracuſians firſt had recourſe to Icetas tyrant of Leontini; but as the Carthaginians took this opportunity to invade them with a powerful fleet and army, they were obliged to apply to the Corinthians. By them Timoleon, a celebrated commander, was ſent to the aſſiſtance of the Syracuſians, whom he found in a very diſtreſſed ſituation; Icetas being maſter of the city, the Carthaginians of the harbour, and Dionyſius of the citadel. As all parties were equally the enemies of Dionyſius, he found it impoſſible to hold out, and therefore ſurrendered himſelf to Timoleon, by whom he was ſent to Corinth; where at laſt he was reduced to the neceſſity of teaching a ſchool for his ſupport.

51 Cowardice of the Carthaginians.

After the expulſion of the tyrant, Timoleon withdrew to Catana, leaving only 400 Corinthians, under the command of an experienced officer named *Leon*, to guard the citadel. Theſe were immediately beſieged by Icetas and the Carthaginians, but Timoleon found means to relieve them in ſpite of all oppoſition; and having diſperſed emiſſaries through the army of Mago the Carthaginian general, exhorting the mercenary Greeks to forſake him, he was ſo much intimidated, that in ſpite of all the remonſtrances Icetas could make, he ſet ſail for Africa, leaving his colleague to carry on the war in the beſt manner he could.

52 Citadel of Syracuſe and other forts demoliſhed by Timoleon.

53 He repeoples the city.

54 Dies, and is honoured as a god.

The day after the departure of Mago, Timoleon aſſaulted the city ſo briſkly, that the troops of Icetas were driven from the walls, and the Corinthians became maſters of the place. Timoleon, by ſound of trumpet, invited the inhabitants to come and aſſiſt in demoliſhing the citadel and other caſtles, which he called the *neſts of tyrants;* after which he cauſed edifices to be erected in the place where the citadel had ſtood, for the adminiſtration of juſtice. He found the city in a moſt miſerable ſituation: for many having periſhed in the wars and ſeditions, and others having fled to avoid the oppreſſion of tyrants, Syracuſe, once ſo wealthy and populous, was now become almoſt a deſert; inſomuch that the horſes were fed on the graſs which grew on the market-place. Timoleon ſupplied the city with inhabitants from Corinth and other cities of Greece, at the ſame time that great multitudes from Italy and the other parts of Sicily reſorted thither. Timoleon diſtributed the lands among them *gratis;* but ſold the houſes, and with the money ariſing from the ſale eſtabliſhed a fund for the ſupport of the poor. Having thus reſtored Syracuſe, he in like manner delivered all the Greek cities of Sicily from the tyrants who had taken poſſeſſion of them, all of whom he put to death. After this he reſigned his authority, and led a retired life, honoured in the higheſt degree by the Syracuſians, and by all the cities in Sicily. After his death he was honoured as a god; the expence of his funeral was defrayed by the public; ſports, with horſe-races and gymnaſtic exerciſes, were held annually on the day of his death; and it was decreed, that whenever the Syracuſians were at war with the barbarians, they ſhould ſend to Corinth for a general.

55 Syracuſe again falls under the power of tyrants.

56 Pyrrhus king of Epirus invited into Sicily.

For 20 years the Syracuſians enjoyed the fruits of Timoleon's victories; but new diſturbances ariſing, in a ſhort time another tyrant ſtarted up, who exceeded all that had gone before him in cruelty and other vices. This was the celebrated Agathocles, of whoſe exploits againſt the Carthaginians a full account is given under the article CARTHAGE, n°33—53. He was poiſoned by one Mœnon in the year 289 B. C. after having reigned 28 years and lived 95. A ſucceſſion of tyrants followed, till at laſt the city, being held by two rivals, Tœnion and Soſiſtratus, who made war within the very walls, Pyrrhus king of Epirus was invited into Sicily, in order to put an end to theſe diſtractions. He willingly complied with the invitation; and was everywhere received with loud acclamations, as the deliverer not only of Syracuſe, but of all Sicily. As he had a

57 Conquers a great part of the iſland.

fine army of 30,000 foot and 5000 horſe, with a fleet of 200 ſail, he drove the Carthaginians from place to place, till he left them only the two ſtrong poſts of Eryx and Lilybæum. The former of theſe he took by aſſault, and was himſelf the firſt man who mounted the walls, after having killed a great number of Africans with his own hand. The Mamertines likewiſe, who had conquered a conſiderable part of the iſland, were everywhere defeated and driven out, till at laſt they were ſhut up in the city of Meſſana. The Carthaginians, alarmed at the rapidity of his conqueſts, ſent ambaſſadors with propoſals of peace upon very advantageous terms; but Pyrrhus, puffed up with the expectation of reducing the whole iſland, refuſed to hearken to any terms unleſs they would inſtantly abandon it.

58 Behaves in a haughty manner, and is obliged to return into Italy.

So firm was he in the belief of this, that he cauſed his ſon take upon him the title of *king of Sicily;* but in the mean time, having diſpleaſed the Sicilians by his arbitrary behaviour, they deſerted from him in ſuch numbers that he was glad to ſet out for Italy, for which retreat the embaſſies he received from the Samnites, Tarentines, and other Italians, furniſhed him with an honourable pretext. He embarked in the ſhips which he had brought with him from Italy; but was met at ſea by the Carthaginians, who ſunk 70 of his veſſels, and diſperſed or took the reſt; ſo that he ſaved himſelf in Italy only with 12 veſſels, the poor remains of a fleet of 200 ſail.

59 Haraſſed by the Mamertines.

No ſooner were the Mamertines appriſed of his departure, than they diſpatched a body of 18,000 men to harraſs him after his landing. Theſe, having paſſed the ſtreights before him, poſted themſelves in the road which Pyrrhus muſt take in marching by land to Tarentum; and concealing themſelves among woods and rocks, attacked him unexpectedly, and with great reſolution. But Pyrrhus behaved on this occaſion with his uſual bravery. The attack being made on his rear, he haſtened thither, and made a dreadful ſlaughter of the enemy, till a wound on his head obliged him to retire. As he was ſuppoſed to be diſabled by this wound, a proud Mamertine, of an extraordinary ſize, and ſhining in bright armour, advanced, and with a loud voice challenged the king of Epirus, if he was yet alive, to a ſingle combat.

60 Aſtoniſhing exploit of Pyrrhus.

Pyrrhus immediately turned about, and making a dreadful appearance by reaſon of the blood which ran down his face, flew at this new champion, on whoſe head he diſcharged ſuch a furious blow, that he cleft his body aſunder; one half falling to the right, and the other to the left. This incredible feat, which has ſince been aſcribed to other warriors, perhaps with as much truth as to Pyrrhus, ſo much intimidated the Mamertines, that they allowed the Epirots to continue their march unmoleſted.

61 Hiero choſen general of the Syracuſian forces.

After the departure of Pyrrhus, Hiero the ſon of Hierocles, a deſcendant of Gelon the firſt king of Syracuſe, was choſen general of the forces, along with another named *Artemidorus*. The two generals had nothing more at heart than to put an end to the confuſion and diſorder which reigned in the city; for which reaſon they entered it at the head of their forces. On this occaſion Hiero diſcovered extraordinary talents for government. By mere dint of inſinuation and addreſs, without ſhedding blood or hurting a ſingle citizen, he calmed the minds of the people; reconciled the factions; and ſo gained the affections of all, that he was inveſted with the whole civil as well as military power in the ſtate.

62 Is elected king of Syracuſe.

Soon after this, he married the daughter of one of the firſt citizens; and having diſtinguiſhed himſelf by his exploits againſt the Mamertines, was unanimouſly elected king of Syracuſe, in the year 265 B. C.

Some time after Hiero's acceſſion to the throne, he again defeated the Mamertines, and reduced them to ſuch ſtraits, that they were obliged to call in the Romans to their aſſiſtance. The conſequences of this have been fully related under the articles ROME and CARTHAGE.

63 Lives in ſtrict friendſhip with the Romans.

Hiero, who had allied himſelf with the Carthaginians, being himſelf defeated by the Romans, and finding his allies unable to protect him againſt the power of that republic, concluded an alliance with them; and continued faithful to them even in the time of the ſecond Punic war, when they were in the greateſt diſtreſs. In his reign flouriſhed the celebrated mathematician Archimedes, whoſe genius he employed in fortifying the city of Syracuſe, by innumerable machines, in ſuch a manner as rendered it abſolutely impregnable to every method of attack known at that time.

64 Hieronymus allies with the Carthaginians.

Hiero died in the year 211 B. C. and was ſucceeded by his grandſon Hieronymus; but he imprudently forſook the counſels of his grandfather, and entered into an alliance with the Carthaginians. Soon after this he was murdered, in conſequence of his tyranny and cruelty, and the greateſt diſorders took place in the city; which Hannibal, though then in Italy, found means to foment, in hopes of keeping the Syracuſians in his intereſt. This indeed he effected; but as his own affairs in Italy began to decline*, he could not prevent Marcellus from landing in Sicily with a formidable army, which the Sicilians could by no means reſiſt.

65 Syracuſe inveſted.

Syracuſe was ſoon inveſted; but the machines invented by Archimedes baffled all attempts to take it by aſſault. It was 22 miles in compaſs, and conſiſted properly of five cities in one, viz. Ortygia, Achradine, Tyche, Neapolis, and Epipolæ — Ortygia was a ſmall iſland very near the continent, and might be called the *citadel of Syracuſe*, being joined to Achradine by a bridge.

66 Great force of the Romans by ſea and land.

The immenſe preparations which the conſul had made for taking the city by ſtorm, could not have failed to accompliſh his purpoſe, had the place been otherwiſe defended than by the contrivance of Archimedes. The Roman fleet conſiſted of 60 quinqueremes, beſides a far greater number of other ſhips. The decks were covered with ſoldiers armed with darts, ſlings, and bows, to drive the beſieged from the ramparts, which on the ſide of Acradina were waſhed by the ſea, and to facilitate the approach to the walls. But a machine of Marcellus's own invention was what he chiefly depended on.

67 Machine invented by Marcellus.

He had faſtened together ſidewiſe eight galleys of different lengths, which made but one large body, and were rowed only by the oars of the outermoſt galleys. Theſe eight galleys thus joined, ſerved only as a baſis for a machine, which was raiſed up higher than the higheſt towers of the walls, and had at the top a platform guarded with parapets in front, and on each ſide. This machine was called a *ſambuca*, from its reſemblance to a muſical inſtrument of that name, not unlike an harp. The conſul's deſign was to bring his ſambuca to the foot of the walls of Acradina; but, while

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* See *Carthage*, nº 123.

68 Deſtroyed by Archimedes.

it was at a conſiderable diſtance (and it advanced very ſlow, being moved only by two ranks of rowers), Archimedes diſcharged from one of his engines a vaſt ſtone, weighing, according to Plutarch's account, 1250 pounds, then a ſecond, and immediately after a third; all which, falling upon the ſambuca with a dreadful noiſe, broke its ſupports, and gave the galleys upon which it ſtood ſuch a violent ſhock that they parted, and the machine which Marcellus had raiſed upon them at a vaſt trouble and expence, was battered to pieces.

69 Incredible effects of the machines of Archimedes.

At the ſame time ſeveral other machines, which were not viſible without the walls, and conſequently did not leſſen the confidence of the Romans in the aſſault, played inceſſantly upon their ſhips, and overwhelmed them with ſhowers of ſtones, rafters, and beams pointed with iron; inſomuch that Marcellus, being at a loſs what to do, retired with all poſſible haſte, and ſent orders to his land-forces to do the ſame; for the attack on the land-ſide was attended with no better ſucceſs, the ranks being broken and thrown into the utmoſt confuſion by the ſtones and darts, which flew with ſuch noiſe, force, and rapidity, that they ſtruck the Romans with terror, and daſhed all to pieces before them.

Marcellus, ſurpriſed, though not diſcouraged, at this artificial ſtorm, which he did not expect, held a council of war, in which it was reſolved, the next day before ſun-riſe, to come up cloſe under the wall, and keep there. They were in hopes by this means to ſecure themſelves againſt this terrible ſtorm of ſtones and darts which fell on the ſhips when at a diſtance. But Archimedes had prepared engines which were adapted to all diſtances. When the Romans therefore had brought their ſhips cloſe under the wall, and thought themſelves well covered, they were unexpectedly overwhelmed with a new ſhower of darts and ſtones, which fell perpendicularly on their heads, and obliged them to retire with great precipitation. But they were no ſooner got at ſome diſtance, than a new ſhower of darts overtook them, which made a dreadful havock of the men, while ſtones of an immenſe weight, diſcharged from other machines, either diſabled or broke in pieces moſt of their galleys. This loſs they ſuſtained, without being able to revenge it in the leaſt on the enemy. For Archimedes had placed moſt of his engines behind the walls, and not only out of the reach, but even out of the ſight, of the enemy; ſo that the Romans were repulſed with a dreadful ſlaughter, without ſeeing the hand that occaſioned it; as if they had been fighting, to uſe Plutarch's expreſſion, not with men, but with the gods themſelves. What moſt harraſſed the Romans in the attack by ſea, was a ſort of crow with iron claws, faſtened to a long chain, which was let down by a kind of lever. The weight of the iron made it fall with great violence, and drove it into the planks of the galleys. Then the beſieged, by a great weight of lead at the other end of the lever, weighed it down, and conſequently raiſed up the iron of the crow in proportion, and with it the prow of the galley to which it was faſtened, ſinking the poop at the ſame time into the water. After this the crow letting go its hold all of a ſudden, the prow of the galley fell with ſuch force into the ſea, that the whole veſſel was filled with water, and ſunk. At other times the machines, dragging ſhips to the ſhore by hooks, daſhed them to pieces againſt the points of the rocks which projected under the walls. Other veſſels were quite lifted up into the air, there whirled about with incredible rapidity, and then let fall into the ſea, and ſunk, with all that were in them. How theſe ſtupenduous works were effected, few, if any, have hitherto been able to comprehend.

The troops under the command of Appius ſuffered no leſs in this ſecond attack than the fleet. In the whole ſpace of ground which the army, when formed, took up, the laſt files as well as the firſt were overwhelmed with ſhowers of darts and flints, againſt which they could not poſſibly defend themſelves. When they had with infinite trouble brought the mantelets and covered galleries, under which they were to work the rams, near the foot of the wall, Archimedes diſcharged ſuch large beams and ſtones upon them as cruſhed them to pieces. If any brave Roman ventured to draw too near the wall, iron hooks were immediately let down from above, which, taking hold of his cloaths or ſome part of his body, lifted him up in the air and daſhed out his brains with the fall. Marcellus, though at a loſs what to do, could not however forbear expreſſing himſelf with pleaſantry: Shall we perſiſt, ſaid he to his workmen, in making war upon this Briareus, upon this giant with an hundred hands? But the ſoldiers were ſo terrified, that if they ſaw upon the walls only a ſmall cord, or the leaſt piece of wood, they immediately turned their backs and fled, crying out, that Archimedes was going to diſcharge ſome dreadful machine upon them.

70 The ſiege turned into a blockade.

71 Mr Hooke's account of the taking of Syracuſe.

The conſuls, finding themſelves thus defeated in every attempt, turned the ſiege into a blockade, reduced moſt of the other places in the iſland, and defeated the forces which were ſent againſt them; and at laſt Marcellus made himſelf maſter of Syracuſe itſelf, of which the following account is given by Mr Hooke. "He took the opportunity of a feſtival, when the ſoldiers and citizens had drunk plentifully, to make a detachment ſcale the walls of Tyche, in that part of it which was neareſt to Epipolæ, and which was ill guarded. He preſently after poſſeſſed himſelf of Epipolæ; whereupon the inhabitants of Neapolis, as well as Tyche, ſent deputies to him, and ſubmitted. Marcellus granted life and liberty to all of free condition, but gave up thoſe quarters of the city to be plundered.

"Notwithſtanding this, there was a great deal yet to do. Achradina and Ortygia, which were ſtrongly fortified, ſtill held out; Hippocrates and Himilco arrived with their troops to the relief of the beſieged; and the Romans were forced to exert all their bravery and ſkill to maintain the advantages they had gained.

"But now a plague made terrible havock in both armies. At the firſt breaking out of the peſtilence, the Sicilians, who ſerved under Hippocrates and Himilco, diſbanded themſelves, and returned to their reſpective homes; but all the Carthaginian ſoldiers periſhed, together with thoſe two generals. The Romans ſuffered leſs by the infection; becauſe, having been a long time before Syracuſe, they were ſeaſoned to the air and water of the country.

"About this time Bomilcar arrived on the coaſt of Sicily from Carthage with a fleet of 130 galleys and 700 ſhips of burden; but was long hindered by contrary

trary winds from doubling the cape of Pachynum. Epicydes, fearing the Carthaginian might ſail back to Africa, left the command of Achradina to the generals of the mercenaries, and went to Bomilcar, in order to perſuade him to fight the Roman fleet. The admiral would not engage, but ſailed away to Tarentum with all his galleys, ordering his ſhips of burden to return to Africa. Epycides, thus fruſtrated of his hopes, and knowing himſelf unable to defend a city already half taken, retired to Agrigentum; whereupon the Syracuſians maſſacred the commanders appointed by him, choſe new prætors to govern in the town, and ſent deputies to Marcellus to treat of peace. In the mean time the deſerters, fearing to be given up to the vengeance of the Romans, perſuaded the mercenaries that they alſo would have the ſame fate. Inſtantly the ſoldiers ran to arms, put to death the new prætors, together with many of the Syracuſians, and plundered part of the city. After this ſlaughter they choſe ſix generals, three to command in Achradina, and three in Ortygia. Upon the return of the deputies from Marcellus, the mercenaries finding that their caſe was different from that of the deſerters, and that there was no deſign againſt their lives, became perfectly ſatisfied, and the negociation went on. During the courſe of the treaty, Marcellus found means to corrupt Mericus, a Spaniard, one of the ſix generals choſen by the ſoldiers, and engaged him to admit the Romans into that part of the city where he commanded. Mericus, the better to accompliſh this deſign, feigned an extraordinary zeal for the preſervation of that place; pretended not to like that deputies ſhould have leave to go out and in at pleaſure; and propoſed, that for the greater ſecurity of the town, each general ſhould have a diſtinct quarter aſſigned him, and be reſponſible for any neglect of duty in it. The motion was agreed to; and upon the diviſion, that diſtrict of Ortygia which extended from the fountain of Arethuſa to the mouth of the great port fell to his care. Marcellus, informed of what was done, took his meaſures accordingly. He ſent a body of troops to that ſide where Mericus commanded, and the Spaniard admitted them at the gate of Arethuſa. At the ſame time the proconſul ordered a falſe attack to be made on Achradina; which drawing almoſt all the ſoldiers of the garriſon thither, Ortygia was in a manner left defenceleſs. Foreſeeing this, he had detached another party of ſoldiers to take advantage of it. Theſe entered Ortygia almoſt without fighting; upon which the deſerters made their eſcape, the Romans giving them way; and the Syracuſians in Achradina, thus delivered from the fear of the deſerters, immediately opened their gates to Marcellus, who thereby became maſter of the whole city.

72 The city plundered, and Archimedes killed.

“ And now the conqueror, who is ſaid to have wept during the ſiege with compaſſion for the inhabitants, gave up both Ortygia and Achradina to be plundered by his army, after he had ſecured the late king's treaſures for the uſe of his republic, and the ſtatues, paintings, and principal ornaments of Syracuſe to illuſtrate his triumph. The ſoldiers had orders to ſpare the lives of the citizens; but they were cruel in their avarice, ſlew many of them, and among the reſt the incomparable Archimides. He was very intent on a demonſtration in geometry, and calmly drawing his lines, when a ſoldier entered the room, and clapped a ſword to his throat. “ Hold! (ſaid Archemides), one moment, and my demonſtration will be finiſhed.” But the ſoldier, equally regardleſs of his prayer and his demonſtration, killed him inſtantly. There are different accounts of the manner of his death; but all agree that Marcellus regretted it extremely, and ſhowed a ſingular favour to his relations for his ſake.”

73 Syracuſe deſtroyed by the Saracens.

The city of Syracuſe continued ſubject to the weſtern empire till its declenſion, when the iſland of Sicily, being ravaged by different barbarians, the capital alſo underwent various revolutions; till at laſt, in the 9th century, it was ſo deſtroyed by the Saracens, that very few traces of its ancient grandeur are now to be ſeen.

SYRIA, a very ancient kingdom of Aſia, lying between the Mediterranean on the weſt, the Euphrates on the eaſt, and Arabia Deſerta, Phœnice, and Paleſtine on the ſouth.

74 Names, diviſions, &c. of ancient Syria.

In ancient times this country was called *Aram*, from Aram the youngeſt ſon of Shem, who ſettled here: but in proceſs of time the name came to be changed into *Syria*, from one *Syrus*, according to ſome; tho' others think it is only a contraction of the word *Aſſyria*. At firſt it was undoubtedly parcelled out into ſeveral petty ſtates; all of which ſeem afterwards to have been reduced under ſubjection to the four principal ones, Zobah, Damaſcus, Hamath, and Geſhur. Afterwards the whole country was divided into two parts only, *viz.* Cœleſyria and Phœnicia; though the Phœnicians, Idumeans, Jews, Gazites, and Azotites, or the whole country of the Philiſtines, was included. After the death of Alexander, Syria, in the great extent of the word, was divided, according to Strabo, into Comagene, Seleucis of Syria, Cœleſyria, Phœnice on the ſea-coaſt, and Judea in the mid-land. Ptolemy, however ſubdivides theſe; and in the proper Syria reckons only Comagene, Pieria, Cyrriſtica or Cyrrheſtica, Seleucis, Caſſiotes or Caſiotes, Chalybonitis, Chalcidice or Chalcidene, Apamene, Laodicene, Phœnicia Mediterranea, Cœleſyria and Palmyrene.

The hiſtory of the ancient Syrians, till the time of their being carried away by the kings of Aſſyria, is totally unknown, excepting a few particulars which may be gathered from ſcripture, and which it is needleſs here to repeat. During the continuance of the Aſſyrian, Babylonian, and Perſian monarchies, the hiſtory of this country affords nothing remarkable; but after the death of Alexander, it gave name to a very conſiderable empire, which makes a conſpicuous figure in ancient hiſtory. At this time, however, it was not confined to Syria properly ſo called, but comprehended all thoſe vaſt provinces of the Upper Aſia which formed the Perſian empire; being, in its full extent, bounded by the Mediterranean upon one ſide, and the river Indus on the other. The firſt king was Seleucus, one of the generals of Alexander the Great; who, after the death of that conqueror, being made governor of Babylon, was tempted, by the example of Alexander's other captains, to ſet up for himſelf. Eumenes, who had ſincerely at heart the intereſt of Alexander's family, ſolicited his aſſiſtance againſt

75 Seleucus the firſt king of Syria after Alexander the Great.

76
Attempts to deſtroy Eumenes.

77
Obliged by Antigonus to fly into Egypt.

againſt Antigonus, who had openly revolted; but Seleucus not only refuſed this aſſiſtance, but attempted to deſtroy Eumenes himſelf with his whole army, by cutting the ſluices of the Euphrates, and laying under water the whole plain where they were encamped. Eumenes, however, found means to eſcape the danger without the loſs of a man. Upon this Seleucus endeavoured to gain over his troops: but finding that impoſſible, he made a truce with Eumenes, and granted him a ſafe paſſage through his province; but at the ſame time ſent an expreſs to Antigonus, deſiring him to fall upon him before he was joined by the governors of Upper Aſia. Antigonus did not fail to follow his advice; but having prevailed againſt Eumenes through treachery, he next thought of bringing Seleucus himſelf under ſubjection. On his return to Babylon, therefore, after having been feaſted with his whole army by Seleucus, he demanded of him an account of the revenues of his province. Receiving an unfavourable anſwer to this queſtion, Antigonus was ſo much exaſperated, that Seleucus, not thinking himſelf a match for him at that time, thought proper to fly into Egypt.

78
Attempts the recovery of Babylon with a very ſlender force.

79
Becomes maſter of the city.

By the flight of Seleucus, Antigonus was left maſter of all his provinces; but his ſon Demetrius being afterwards defeated by Ptolemy at Gaza, Seleucus began to think of recovering what he had loſt. Being furniſhed by Ptolemy with 1000 foot and 200 horſe, he ſet out with that ſlender force to attempt the recovery of Babylon. Nothing could have a more deſperate appearance than this undertaking; yet Seleucus was not diſcouraged. On his arrival at Carrhæ in Meſopotamia, partly by force and partly by perſuaſion, he prevailed on the Macedonians who garriſoned that place to revolt from Antigonus and join him. Being thus reinforced, he entered the territories of Babylon, where new ſupplies were continually added to his army; his ancient ſubjects flocking to him from all parts, and declaring themſelves ready to ſtand by him with their lives and fortunes. This happened in conſequence of the lenity with which they had been treated by Seleucus; whereas Antigonus was univerſally deteſted on account of his ſeverity.—As he approached the city, thoſe who favoured Antigonus retired into the citadel, but were ſoon obliged to ſurrender; and in that fortreſs Seleucus found his children, friends, and domeſtics, whom Antigonus had kept priſoners ever ſince his flight into Egypt.

80
Defeats Nicanor, and reduces Media and Suſiana.

Seleucus having thus made himſelf maſter of Babylon, in the year 312 B. C. began to prepare for encountering Antigonus, who he knew would ſoon attack him with all his force. Nicanor, governor of Media under Antigonus, firſt advanced againſt him at the head of 10,000 foot and 7000 horſe; but Seleucus, with only 3000 foot and 400 horſe, having drawn him into an ambuſh, cut off almoſt the whole of his army, and ſuch of the ſoldiers as had eſcaped the ſlaughter willingly enliſted under his banner.

The conſequence of this victory was the ſubmiſſion of all Media and Suſiana; which alarming Antigonus, he ſent his ſon Demetrius with an army of 5000 Macedonian foot, 10,000 mercenaries, and 4000 horſe. Seleucus was then in Media; and Patrocles, whom he had left to take care of Babylon, finding his force inadequate to that purpoſe, compelled the inhabitants to leave the city and diſperſe themſelves in the adjacent countries, while he himſelf, with what troops he had, retired into two forts which he thought could eaſily be defended. When therefore Demetrius entered Babylon, he was ſurpriſed to find it deſerted, upon which he inſtantly attacked the forts. One was quickly reduced; but as the other held out till the expiration of the time which had been allowed him by his father, he left 5000 foot and 1000 horſe under the command of Archelaus to carry on the ſiege. With the reſt he marched away, ſuffering his ſoldiers to live at diſcretion as he went along; which ſo provocked the Babylonians, that they were ever after attached to Seleucus as if he had been their natural prince.

81
Nicanor again defeated and killed.

On the return of Seleucus to Babylon, he eaſily drove out the troops left by Antigonus, recovered the caſtle which he had garriſoned, and ſettled his authority on ſuch a firm foundation that it could never afterwards be moved. Having then marched again into Media, he defeated and killed with his own hand Nicanor, or Nicator, whom Antigonus had ſent againſt him; after which, having ſettled the affairs of Media, he reduced all Perſia, Bactria, and Hyrcania, ſubjecting to his new empire theſe and all the other provinces on this ſide the Indus which had been conquered.

82
Cedes India to Sandrocottus for 500 elephants.

83
Defeats Antigonus, and builds many cities.

Seleucus being now maſter of all the countries which lie between the Euphrates and the Indus, took the title of king of Babylon and Media. But, not ſatisfied with theſe poſſeſſions, ample as they were, he croſſed the Indus, in order to conquer thoſe regions which had ſubmitted to Alexander beyond that river. But, during the time that the generals of Alexander had been making war upon his family and upon one another, one Sandracottus, a native of India, had driven out the Macedonians, and made himſelf maſter of the whole country. He oppoſed Seleucus with an army of 600,000 men, and a prodigious number of elephants; which intimidated the Macedonian ſo much, that he offered to leave Sandrocottus in quiet poſſeſſion of his dominions, provided he would furniſh him with 500 elephants. To this Sandrocottus readily aſſented; upon which Seleucus marched back into the weſt againſt Antigonus, and, in conjunction with Lyſimachus and Ptolemy, engaged and totally defeated and killed him at Ipſus. After this Seleucus marched into Upper Syria, which he reduced entirely, and built the city of Antioch on the Orontes. In the ſame country he built ſeveral other cities; one of which he called *Seleucia*, from his own name; another *Apamea*, from his wife Apama, the daughter of one Artabazus a Perſian; and a third *Laodicea*, from his mother Laodice. He firſt entered into an alliance with Demetrius, and married Stratonice his daughter; but ſoon after aſſiſted Lyſimachus and Ptolemy to deprive him of the beſt part of his dominions. Thus Demetrius being reduced ſo low that he could give him no farther jealouſy, Seleucus betook himſelf to the building of another city, which he called likewiſe *Selucia*, and which ſtood on the place where the city of Bagdad now ſtands. Beſides theſe, he built a great many others; 16 of which he called *Antioch*, from the name of his brother Antiochus; nine *Seleucia*, from his own name; three *Apamea*,

Apamea, from Apama his firſt wife; one *Stratonicea*, from his ſecond wife Stratonice; and ſix *Laodicea*, from his mother Laodice.

84
Defeats and kills Lyſimachus.

85
Is himſelf treacherouſly murdered.

In 284 Seleucus entered into a war with Lyſimachus, with whom he had hitherto lived in ſtrict amity. Out of 36 general officers left by Alexander the Great, they two only ſurvived, and both were upwards of 70 years old. Nevertheleſs they were both filled with the ambition and animoſity of young men. The two armies met at a place called *Curopedion* in Phrygia, where an obſtinate engagement took place. Victory was long doubtful: but at laſt Lyſimachus was run through with a ſpear, and died on the ſpot; on which his troops betook themſelves to flight, and left Seleucus maſter of their baggage. This victory added to the poſſeſſions of Seleucus all thoſe provinces which had formerly been ſubject to Lyſimachus. The former exulted much in his good fortune; being chiefly pleaſed that he was now the laſt of Alexander's captains, and by this victory became, as he ſtylled it, *the conqueror of conquerors;* and on this account he is generally called *Nicator*, or *the Conqueror*. His triumph, however, on this occaſion, was but ſhort-lived; for, ſeven months after, as he was marching towards Macedon to take poſſeſſion of that kingdom, he was treacherouſly murdered by Ptolemy Ceraunus, on whom he had conferred innumerable favours. Philetærus prince of Pergamus purchaſed his body at a great price from Ptolemy, and ſent it to his ſon Antiochus; who, with extraordinary pomp, burned it in Seleucia on the ſea-coaſt, erecting on the place a magnificent chapel, which he called from his ſurname *Nicatorium*.

86
Antiochus Soter.

87
Antiochus Theos.

88
Seleucus Callinicus.

Seleucus was ſucceeded by his ſon Antiochus Soter, who held the empire 19 years. He reſigned to Antigonus Gonatus all pretenſions to the crown of Macedon; and having engaged in a war with Eumenes king of Pergamus, he was defeated by him, and obliged to yield up part of his dominions. He died in 261 B. C. and was ſucceeded by his ſon Antiochus Theos; who having engaged in a war with Ptolemy Philadelphus king of Egypt, the Parthians and Bactrians took an opportunity to revolt, and could never afterwards be reduced. In 246 B. C. he was poiſoned by his wife Laodice, whom he had divorced for Berenice daughter to Ptolemy, with whom he made peace on the revolt of the Bactrians. On the death of Ptolemy, Antiochus divorced Berenice, and took back Laodice; who, to ſecure herſelf againſt the effects of his fickle diſpoſion, poiſoned him, as we have juſt mentioned, and raiſed to the throne her own ſon, named *Seleucus Callinicus*. Not thinking herſelf ſafe, however, as long as Berenice lived, Laodice began immediately to concert meaſures for putting both her and her ſon to death. Berenice attempted to ſave herſelf by retiring to Daphne, where ſhe ſhut herſelf up in an aſylum built by Seleucus Nicator. There ſhe was cloſely beſieged by the ſons of Seleucus; of which the cities of Aſia having intelligence, formed a confederacy in her favour. Her brother the king of Egypt alſo haſtened to her relief with a conſiderable army; but before either of theſe could come to her aſſiſtance, both ſhe and her ſon were barbarouſly murdered, with all the Egyptians who attended them.

89
Great part of his dominions conquered by Ptolemy Euergetes.

90
Seleucus defeated and taken priſoner by the Parthians.

Ptolemy, on hearing the melancholy news of his ſiſter's death, determined to take the moſt ſevere vengeance on her murderers. Joining his forces to thoſe of the Aſiatics, he carried every thing before him. Having in the firſt place put an end to the life of Laodice, he made himſelf maſter of all Syria and Cilicia; then paſſing the Euphrates, he ſubdued all the country as far as Babylon and the Tigris; and had not the progreſs of his arms been interrupted by a ſedition which obliged him to return to Egypt, it is more than probable that he would have ſubdued the whole Syrian empire. As ſoon as he was returned, Seleucus attempted to revenge himſelf; but his fleet being deſtroyed by a violent ſtorm, and his land-army defeated by Ptolemy, he concluded a truce for ten years. During all this time the Parthian prince had eſtabliſhed himſelf ſo firmly on the throne, that it was in vain to think of diſpoſſeſſing him. However, as ſoon as his other affairs would permit, Seleucus undertook an expedition againſt Arſaces the Parthian monarch; by whom he was utterly defeated, taken priſoner, and carried into Parthia, where he died four years after. He was ſucceeded by his eldeſt ſon Seleucus Ceraunus, a weak prince, who was poiſoned by a conſpiracy of two of his officers, when he had reigned one year; after which his brother Antiochus, ſurnamed the *Great*, aſcended the throne in 225 B. C.

91
Antiochus the Great.

92
Undertakes an unſucceſsful expedition againſt Egypt.

93
Suppreſſes one rebellion, but is embaraſſed by another.

In the very beginning of his reign, two of his generals, Alexander and Molo, rebelled againſt him. The former had been appointed governor of Perſia, and the latter of Media; but they, deſpiſing the king's youth, refuſed to obey. The occaſion of this revolt is ſaid to have been their dread of the cruelty of Hermias the king's prime miniſter; and as they hoped to draw into their ſchemes Achæus governor of the provinces of Aſia Minor, they doubted not of ſucceſs. In this, however, they failed; but this did not diſcourage them from proceeding in their rebellion. Epigenes, the commander of the troops about the king's perſon, adviſed him to march without delay againſt the rebels; but as Hermias reproached him with treachery and a deſign to betray the king into the hands of his enemies, Antiochus ſent two of his generals into the eaſt, while he himſelf undertook an expedition againſt Ptolemy Philadelphus, with a view of recovering Cœlſyria. In this attempt, however, he was diſappointed; and the generals whom he had ſent into the eaſt were totally defeated, and their troops cut off: upon which he determined to lay aſide for the preſent his Syrian enterpriſe, and march in perſon againſt the rebels. This was again oppoſed by Hermias; but as he found it impoſſible to alter the king's mind, the treacherous miniſter found means to get Epigenes the author of this project executed, under pretence of holding a correſpondence with Molo one of the rebel chiefs. Antiochus in the mean time purſued his march againſt the rebels, whom he defeated in a pitched battle; upon which their chiefs laid violent hands on themſelves. On his return he received the ſubmiſſion of the Atropatii, a barbarous people in Media; and put to death his prime miniſter Hermias, whom he found hatching treacherous deſigns againſt him. During his lifetime, however, the traitor, by accuſing Achæus of treaſon, had obliged him to revolt in his own defence; ſo that the king had ſtill two im-

important wars on his hands, viz. that with Ptolemy king of Egypt, and the other againſt Achæus. After ſome deliberation, he reſolved to march firſt againſt the king of Egypt; and was at firſt very ſucceſsful, reducing many cities in Cæleſyria and Paleſtine, and defeating the Egyptians in a pitched battle: but in the year 217 B. C. being worſted in the battle of Raphia, he was obliged to abandon all his conqueſts; of which Ptolemy immediately took poſſeſſion, and Antiochus was obliged to cede them to him, that he might be at leiſure to purſue the war againſt Achæus.

94 Is defeated by the Egyptians, but ſuppreſſes the rebellion.

Antiochus having made vaſt preparations for his expedition, ſoon reduced Achæus to ſuch diſtreſs, that he was obliged to ſhut himſelf up in the city of Sardis, which he defended for ſome time with great bravery; till at laſt, being betrayed by two Cretans, he was delivered up to the king, and by his order put to death. Antiochus then undertook an expedition againſt the Parthians, whom he obliged to conclude a peace on very advantageous terms. He then turned his arms againſt the king of Bactria, whom he alſo compelled to agree to his terms; one of which was, that he ſhould give him up all his elephants. For the confirmation of the treaty, the king of Bactria ſent his ſon to Antiochus; who being taken with his majeſtic mien and agreeable converſation, gave him one of his daughters in marriage. He then croſſed Mount Caucaſus, and entered India; where having renewed his alliance with the king of that country, he received alſo of his elephants, which increaſed his ſtock to 150. From India he marched into Arachoſia, Drangiana, and Carmania, eſtabliſhing order and diſcipline in all thoſe countries: then paſſing through Perſia, Babylonia, and Meſopotamia, he returned to Antioch, after an abſence of ſeven years.

95 His ſucceſſes in the eaſt.

96 Enters into a league with Philip of Macedon againſt the king of Egypt.

In the year 204 B. C. Antiochus entered into a league with Philip of Macedon, on purpoſe to deprive Ptolemy Epiphanes, the infant-king of Egypt, of all his dominions. The Egyptians, however, put the young king under the tuition of the Romans; who immediately required the confederate princes to deſiſt from any enterpriſe againſt the king of Egypt, under the penalty of incurring the diſpleaſure of the republic. After delivering this meſſage, M. Emilius Lepidus, one of the ambaſſadors, repaired to Egypt, where he took upon himſelf the office of regent and guardian to the young king. Having regulated affairs there in the beſt manner he could, he returned to Rome, after having appointed one Ariſtomenes, an Acarnanian, to be chief miniſter to the king. Ariſtomenes being a man of prudence and fidelity, acquitted himſelf very well in his new ſtation. Having taken care to recruit his army as well as he could, he ſent one Scopas, a man of great authority among the Ætolians, into that country, to raiſe auxiliaries. Scopas ſoon raiſed an army of 6000 Ætolians, at that time reputed the beſt ſoldiers in the world; and having joined the Egyptian army, reduced all Judea, put a garriſon into the caſtle at Jeruſalem, and, on the approach of winter, returned to Alexandria loaded with booty. Theſe exploits, however, were performed when Antiochus was abſent in Aſia Minor; and no ſooner was he returned than the face of affairs was changed. Scopas was defeated in a pitched battle, where one half of his men were deſtroyed. He himſelf eſcaped to Sidon, where he ſhut himſelf up with 10,000 of his ſoldiers; but Antiochus having inveſted the place, Scopas was reduced to the neceſſity of ſurrendering at diſcretion. The king purſued his conqueſts; recovered all Paleſtine and Cœleſyria; after which he invaded Aſia Minor, in hopes of reducing it alſo, and reſtoring the Syrian empire to the ſame extent it had in the time of Seleucus Nicator. The free cities in Aſia Minor immediately had recourſe to the Romans, who ſent an embaſſy to Antiochus on the occaſion; but as both parties put on thoſe haughty and imperious airs to which they thought the greatneſs of their power gave them a right, no ſatisfaction was given, but every thing tended to an open rupture. While matters were in this ſituation, Hannibal the Great being obliged to leave his own country, fled to Antiochus; from whom he met with a gracious reception. As Hannibal had, while a child, ſworn perpetual enmity with the Romans, he uſed all his eloquence to perſuade Antiochus to make war with them; and as the many victories which he had gained over them left no room to doubt of his capacity, Antiochus doubted nothing of being able, by his aſſiſtance, to conquer that haughty people. Several embaſſies paſſed between the two nations; but chiefly with a deſign, on the part of Antiochus, to gain time. Hannibal endeavoured to draw his countrymen into the confederacy againſt Rome, but without effect. Antiochus having ſtrengthened himſelf by ſeveral alliances, at laſt reſolved to begin the war in earneſt. To conſult on the meaſures proper to be taken, he called a council of war; but excluded from it the only man whoſe advice he ought to have followed; namely, Hannibal the Carthaginian. The reaſon of this was, that he had become jealous of him from the too great intimacy, as he thought, which he had kept with the Roman ambaſſadors. However, in this council it was agreed that the war ſhould be immediately commenced. The king himſelf was prevailed upon by the Ætolians to paſs over into Greece, and at the ſame time entirely to reject the advice which Hannibal had formerly given, of ſending him with an army into Italy. Here he was made generaliſſimo of all the Greek forces; but made none of thoſe efforts that had formerly obtained him the title of Great. Indeed it now plainly appeared, not only that he was incapable of carrying on war againſt ſuch enemies as the Romans, but even of accepting proper advice when it was given him. In another council, into which Hannibal was admitted, that commander adviſed the king, before he undertook any thing elſe, to uſe his utmoſt endeavours to gain over Philip of Macedon; which, he ſaid, was a ſtep ſo important, that if it could be gained, they might, without much ado, become maſters of all Greece. But if Philip could not be prevailed on to make war on the Romans, he was of opinion that the king ſhould ſend his ſon Seleucus into Macedon at the head of an army, and thus prevent Philip from giving the Romans any aſſiſtance. But he ſtill maintained, that the only way to defeat the Romans was to ſend an army into Italy. This advice was again rejected; and the king imprudently became the aggreſſor, by falling on a body of 500 Romans before war had been declared. He alſo made king Philip his enemy, by entertaining the regent of Athamania,

97 Deſtroys the Egyptian army.

98 His conqueſts checked by the Romans.

99 Hannibal flies to him for protection.

100 Antiochus neglects the advice of Hannibal.

101
His ſhameful behaviour.

mania, who was a pretender to the crown of Macedon. To complete all, he himſelf fell in love, tho' above 50 years of age, with a beautiful young woman of Chalcis, whom he married; and became ſo great a ſlave to this paſſion, that he entirely neglected his affairs; the army gave themſelves up entirely to diſſipation and debauchery, and every trace of military diſcipline evaniſhed.

102
Is defeated by the Romans at Thermopylæ.

In the year 191 B. C. Antiochus was raiſed from his lethargy by a declaration of war againſt him at Rome, and ſet out for Ætolia. His army at this time amounted to no more than 10,000 foot and 500 horſe. He had been made to believe that he would receive a vaſt reinforcement in Ætolia: but when he came to make the experiment, he ſoon found his miſtake; all the troops he could raiſe there amounted to no more than 4000 men. With this force, ſo exceedingly inadequate to the purpoſe, he was obliged to oppoſe the Roman army, who were advancing in conjunction with the Macedonians, and had already made ſurpriſing progreſs. Antiochus ſeized the Straits of Thermopylæ; but was driven from them by the Romans, the king himſelf being the firſt that fled. Almoſt his whole army was deſtroyed in the battle or in the purſuit, and Antiochus returned with diſgrace into Aſia.

103
His fleet defeated by that of the Romans.

104
Meets with two other defeats, and becomes like one infatuated.

Soon after his return, Antiochus equipped a fleet of 200 ſail; on which he immediately embarked for the Thracian Cherſoneſus, now Crim Tartary, where he fortified the cities of Lyſimachia, Seſtus, and Abydos, with others in that neighbourhood, to prevent the Romans from croſſing the Helleſpont. In the mean time Polyxenidas the Syrian admiral ſent intelligence to the king that the Roman fleet had appeared off Delos; upon which he deſired him to ſeek them out and engage them at all events. He did ſo, and was defeated with the loſs of 40 ſhips taken or ſunk in the engagement. This was ſoon after revenged by the deſtruction of the Rhodian fleet by the artifice of Polyxinedas; but in the end the king's affairs went every where to wreck. Having laid ſiege to the city of Pergamus, he was obliged to raiſe it with loſs; the Phœnician fleet commanded by Hannibal was defeated by the Rhodians; and ſoon after the Syrian fleet under Polyxenidas was utterly defeated by the Romans. Antiochus was ſo much diſheartened by theſe repeated defeats, that he appeared like one infatuated. Inſtead of fortifying more ſtrongly thoſe cities which lay on the frontiers of his kingdom, he entirely deſerted them: and thus Lyſimachia and Abydos, the two keys to Aſia, fell into the hands of the Romans without the leaſt reſiſtance.

105
Sues for peace, but is refuſed.

The arrival of the Romans in Aſia ſtruck Antiochus with ſuch terror, that he inſtantly ſued for peace. The terms he offered were indeed very advantageous, but by no means agreeable to the expectations of the Romans. They therefore gave him this final anſwer: 1. That ſince he had drawn upon himſelf the war, he ſhould defray the whole expence of it; 2. that he ſhould reſtore liberty in general to all the Greek cities in Aſia; and, 3. that to prevent future hoſtilities, he ſhould relinquiſh all Aſia on this ſide Mount Taurus. Theſe terms, however, ſtill appeared to him ſo intolerable, that he reſolved to continue the war; and determined alſo to take the moſt imprudent method of carrying it on, namely, by hazarding all on the event of a general engagement. The king encamped near Magneſia, and ſtrongly fortified his camp. The Romans inſulted him in his trenches, and propoſed to attack his fortifications if he continued to decline an engagement. At laſt the king, thinking it would be ſhameful for him longer to refuſe an engagement, being at the head of an army far more numerous than that of the enemy, in a friend's country, and in the midſt of his allies, reſolved at all events to accept the challenge, and accordingly prepared for a deciſive battle.

106
Battle of Magneſia.

The Roman army conſiſted of four legions, partly Romans and partly Latins, each legion at this time containing 5500 men, and of 7000 auxiliaries ſent by the kings of Pergamus and Macedon; but of theſe 2000 were ordered to guard the camp during the action. The Romans were poſted in the centre, and the Latins in the two wings, the left of which extended to the river. On the ſide of the right wing, to cover and ſupport it, the conſul poſted the auxiliary troops of Eumenes, a ſmall body of horſe, and ſome Trallians and Cretans lightly armed. Sixteen elephants which the Romans had were placed behind the army by way of corps-de-reſerve, the conſul not thinking it proper to oppoſe them to thoſe of the enemy, which were far more numerous, being in all 52, and beſides excelled the Roman elephants in ſtrength, height, and courage, the former being brought from India and the latter from Africa. As for the Syrian army, all the nations of the eaſt ſeemed to be aſſembled to ſupport the cauſe of Antiochus. But the main ſtrength of it conſiſted in 16,000 foot, armed after the Macedonian manner, who compoſed the phalanx. This body faced every way, was armed with long pikes, and taught to fight in cloſe order, as the ſoldiers of Alexander the Great had formerly been. Antiochus did not draw up his phalanx as uſual, but divided it into 10 companies ſeparated from each other, placing, in the ſpaces between each of the companies, an elephant loaded with a tower full of armed men. On the right of the phalanx was drawn up in a line part of the cavalry, viz. 1500 Aſiatic Gauls, 3000 horſe armed cap-a-pee, and 1000 more, the flower of the Median cavalry. At ſome diſtance from theſe followed the cavalry of the king's houſehold richly cloathed, and wearing bucklers plated over with ſilver. In the ſame line twelve hundred Scythians on horſeback, armed with bows and arrows, made a great figure, being all choſen men, and of an extraordinary ſize. The light-armed troops, to the number of 3000, partly Trallians and partly Cretans, with 10,000 Myſian archers and 4000 men more, partly Cyrtœans armed with ſlings, partly Perſians armed with bows, and partly Arabians mounted on dromedaries, cloſed the right wing, which was led on by the king in perſon, ſurrounded by a body of Syrians and Lydians well mounted, but not heavily armed. The left wing was commanded by Seleucus and Antipater; the former the king's ſon, and the latter his nephew, and diſpoſed thus: Cloſe to the phalanx were poſted 1500 Galatians and 2000 Cappadocians, which king Ariarathes had ſent to the aſſiſtance of his father-in-law. Next to theſe were placed 2700 auxiliaries ſent from different countries;

theſe were followed by 3000 cuiraſſiers well mounted; and, laſtly, in the flank of this wing marched 2000 horſe lightly armed. At ſome diſtance were placed ſeveral ſmall bodies of light-armed troops both foot and horſe; among which were 2500 Galatian horſe, ſome Tarentines, Cretans, Carians, Cilicians, &c. The phalanx, which was in the centre, was commanded by three officers of diſtinction, viz. Minio, Zeuxis, and Philip. A vaſt number of chariots, armed with hooks and ſcythes, were drawn up before the firſt line, as were likewiſe a great many elephants carrying towers with ſeveral floors, all filled with ſlingers and archers; beſides many camels, animals then unknown to the Roman troops, mounted by Arabians armed with ſwords ſix feet long, that the riders might from their backs reach the enemy. The Romans had never ſeen a more numerous army, nor one more finely adorned; nevertheleſs they never ſhowed ſo great a contempt for an army as for this which they were now going to attack.

107 Gallant behaviour of Eumenes.

108 The Syrians defeated.

On the day of the battle the weather proved very favourable to the Romans; for a thick fog riſing in the morning, the day was almoſt turned into night, ſo that the Syrian commanders could not have all the corps under their command in view, on account of their great extent, nor ſend them proper orders in time; whereas the fog was not thick enough to prevent the Roman generals from ſeeing their ſeveral bodies at the greateſt diſtance, as they took up but little ground. Beſides, the damp which was occaſioned by the fog ſlackened the ſtrings of the enemy's bows, ſo that the Aſiatics who uſed them could ſhoot their darts and arrows but faintly. The whole dependence of Antiochus in the firſt attack was on his armed chariots, which were to cut their way into the Roman army. For this purpoſe they had long halberts faſtened to their poles, and ſharp hooks to their axletrees; the former were about the height of a man's head, and the latter almoſt ſwept the ground, and cut off the legs of all who ſtood in their way. But Eumenes undertook to render them uſeleſs, and even fatal to the enemy. This brave prince, putting himſelf at the head of the bowmen and ſlingers, ordered them to charge, not in a body, but divided in platoons, and to aim only at the horſes in the chariots. Accordingly, as ſoon as the chariots moved, Eumenes advanced at the head of his men, who pouring on them from every quarter, darts, ſtones, and javelins, and at the ſame time, ſhouting as loud as they could, ſo frightened the horſes that they could no longer be kept in order, but, ſcouring up and down, and turning againſt their own troops, fell on the Arabians who ſupported them, which occaſioned a great confuſion in that quarter. Thoſe in the Syrian army who were at a diſtance, hearing the noiſe and outcries, and not knowing the cauſe of them, were ſtruck with no ſmall terror. After this advantage, the Roman cavalry advanced, and fell on thoſe whom the chariots had put in diſorder. The Syrians being already intimidated, after a faint reſiſtance, gave way; and the Romans made a great ſlaughter of their men and horſes, both being borne down with the weight of their heavy armour. Eumenes charged the left-wing, in which Seleucus commanded, with ſuch vigour, that he put it to flight; and the fugitives flying to the phalanx for protection, put that body likewiſe in diſorder: which Domitius obſerving, advanced againſt it at the head of his legionaries, but could not break it till he ordered his men to attack the elephants; which, as before obſerved, were placed in the ſpaces between the companies. The Romans had learnt, in their wars with Pyrrhus and Hannibal, not to fear thoſe monſters which were once ſo terrible to them. They attacked them, therefore, with great reſolution; and driving them againſt the phalangites, put that body into diſorder, by means of thoſe very animals which had been poſted there for its defence.

109 And their camp taken.

But in the mean time advice was brought that the left-wing of the Romans was in great danger. Antiochus, who had obſerved that the flanks of the left-wing were quite open and uncovered, the four ſquadrons which covered it having joined the reſt of the cavalry to fall upon the enemy's left-wing, had charged it at the head of all his auxiliaries, not only in front but in flank. The Roman infantry, ſeeing themſelves in imminent danger of being ſurrounded and hemmed in on all ſides, fled in great diſorder to their camp, which was guarded by 2000 men under the command of a legionary tribune called *Æmilius*. This man ſeeing the Romans flying towards him, marched out at the head of all his troops to meet them; and after having bitterly reproached them for their cowardice and ignominious flight, ordered his men to draw their ſwords, and cut in pieces ſuch as ſhould advance one ſtep farther, or refuſe to face about againſt the enemy. This order, given ſo ſeaſonably, and put in execution without mercy againſt ſome, had the deſired effect. Thoſe who were flying firſt halted; and then, being both reinforced and encouraged by Æmilius, returned under his conduct to wipe off the diſhonour of their flight. At the ſame time Attalus the brother of Eumenes, having left the right-wing on his receiving advice that the left was in danger, arrived very ſeaſonably with 200 horſe. Antiochus obſerving that the troops which had fled were returning to the battle, and that the enemy's right-wing was ready to fall upon him, turned his horſe about and fled. This ſerved in a manner as a ſignal for the reſt of the troops, for the whole Syrian army immediately turned their backs. Eumenes alone purſued them at the head of the cavalry, and made a moſt dreadful havock of the fugitives. The Romans walking over heaps of dead bodies, eſpecially where the phalanx ſtood, marched up to the Syrian camp, attacked, and plundered it. The riches they found in it are not to be deſcribed: but the taking of it coſt the Romans a new battle, which proved more fatal to the Syrians than that in the field; for the Romans having, in ſpite of a moſt deſperate reſiſtance, forced the intrenchments, gave no quarter, but put all to the ſword without diſtinction. There fell this day in the battle, in the purſuit, and in the plunder of the camp, 50,000 foot, and 4000 horſe; 1500 were taken priſoners, and 15 elephants. In the conſular army there were but 300 foot killed, and 25 horſe. Eumenes had only 15 of his men killed; ſo that this victory, as we are told by the ancients, ſeemed a prodigy to all nations, both of the eaſt and weſt.

Antiochus retired to Sardis with as many of his forces that had eſcaped the ſlaughter as he could draw together. From Sardis he ſoon marched to rejoin his ſon Seleucus, who had fled to Apamea. As for the conſul, he took advantage of the king's defeat and flight, making himſelf maſter of all the neighbouring countries. Deputies haſtened to him from all parts; the cities of Thyatira, Magneſia, Trallis, Magneſia in Caria, all Lydia, and Epheſus itſelf, though highly favoured by Antiochus, declared for the Romans. Polyxenidas, upon the news of the king's defeat, left the port of Epheſus, and ſailed to Patara, where he landed with a very ſmall guard, and returned by land into Syria. The conſul took the road to Sardis, which opened its gates to him. As he ſtopped there, his brother Africanus, as ſoon as his health allowed him, came and joined him in that city, and congratulated him on the glory he had ſo lately acquired.

Antiochus finding his affairs in a bad ſituation both by ſea and land, and not daring to appear before the conſular army in the field, ſent Antipater his brother's ſon, and Zeuxis, who had been governor of Lydia and Phrygia, to ſue for a peace. They were ordered to treat chiefly with the elder brother, of whoſe clemency and good-nature Antiochus entertained a high opinion. Accordingly, on their arrival at Sardis, where the conſul then was with his brother, they addreſſed the latter, and were by him preſented to the conſul. Their ſpeech was very ſubmiſſive, and ſuch as became a vanquiſhed people.

110
Antiochus obtains peace on very hard terms.

Hereupon a council was ſummoned, and after long debates the ambaſſadors were called in; and Scipio Africanus being deſired by the conſul to acquaint the deputies with the reſolutions of the aſſembly, is ſaid to have expreſſed himſelf in the following terms: "We are ſenſible that the victory which we have lately gained is owing to the gods, and therefore ſhall treat the vanquiſhed with moderation, demanding little more of them now than we did at our firſt entering into Aſia. Antiochus ſhall obtain a peace upon the following terms: That he give up his pretenſions to Europe, confine his dominions to Aſia beyond mount Taurus: and that he pay 15,000 Euboic talents for the expences of the war; 500 down, 2500 when the ſenate and people ſhall confirm the articles, and 1000 more every year for 12 years together. We alſo inſiſt upon his ſatiſfying king Eumenes, and his paying him the 400 talents he owes him, and what remains due for the corn which his father ſent to the king of Syria. It is likewiſe the pleaſure of the council that you deliver up to us Hannibal the Carthaginian, Thoas the Ætolian, Mneſilochus the Acarnanian, and Philo and Eubulus two Chalcidians; for theſe have been the authors of our diviſions, the incendiaries who kindled the preſent war. Laſtly, the king of Syria, for a further proof of his ſincerity, ſhall give us 20 ſuch hoſtages as we ſhall chooſe, of whom Antiochus his youngeſt ſon ſhall be one."

The ambaſſadors of Antiochus had been ordered to refuſe no terms; and therefore theſe were accepted, and the whole affair concluded. So that the Syrian ambaſſadors now prepared to ſet out for Rome, to get the conditions of peace propoſed by Scipio ratified there. In the mean time, the conſul dividing his army into three bodies, put it into winter-quarters; one part continued at Magneſia, another was ſent to Trallis, and the third to Epheſus, where the Scipios took up their quarters. There they received a new embaſſy from Antiochus, with the hoſtages he had promiſed, the Roman priſoners and deſerters, and the ſtrangers which the conſul had demanded, except Hannibal, who after the king's defeat had fled out of his dominions; and Thoas the Ætolian, who, as ſoon as he heard that a treaty was on foot between Antiochus and the Romans, had returned to Ætolia, where a war was likely to break out between that republic and Rome. L. Aurelius Cotta was ſent with the ambaſſadors to Rome, to acquaint the ſenate with the particulars of the treaty. When they appeared before the conſcript fathers, they ſpoke with great ſubmiſſion, and only deſired them to ratify the articles which the Scipios had offered to their maſter. The ſenate, after examining them, ordered that a treaty of peace ſhould be concluded with Antiochus, and the articles of it engraved on braſs, and fixed up in the capitol. They only added one clauſe, which was, That the Syrians ſhould change every year all their hoſtages, except the ſon of king Antiochus, who ſhould continue at Rome as long as the republic thought fit. The peace being thus ratified, and all Aſia on this ſide mount Taurus delivered into the hands of the Romans, the Greek cities were by them reſtored to their liberty, the provinces of Caria and Lydia given to the Rhodians, and all the reſt that had belonged to Antiochus beſtowed upon Eumenes.

111
His death.

Antiochus did not long ſurvive his misfortune at Magneſia. Some tell us, that being greatly puzzled how to raiſe the ſum he had engaged to pay to the Romans, he ſeized on the riches which had for many ages been depoſited in a temple of Jupiter Belus in the province of Elymais; upon which the populace roſe in arms, and ſlew him and all his attendants. Others inform us, that he was killed at an entertainment by one of his gueſts.

112
Syria becomes a Roman province.

Antiochus the Great died in 187, and with him the glory of the Syrian empire. The Romans now gave laws to the kings of Syria, inſomuch, that when Antiochus Epiphanes the grandſon of Antiochus the Great heſitated at obeying the commands of the ſenate, one of the ambaſſadors drew a circle round him with a rod on the floor, and told him, that he ſhould not go out of that ſpot before he had told him what he was to do. The moſt remarkable tranſactions of this prince are his wars with the Jews, and perſecutions of them; of which a full account is given under the article JEWS. After a variety of uſurpers and tyrants, the kingdom of Syria fell under Tigranes king of Armenia in the year 83 B.C.; and upon his overthrow by the Romans, it became a province of the dominions of the republic. From them it was taken by the Saracens in the reign of the caliph Omar, and is now a province of Turkey in Aſia.

113
Climate, ſoil, &c. of the country.

Syria, in general, is bleſſed with a ſerene, temperate, and healthful air; being refreſhed, during the hot ſultry months of June, July, and Auguſt, by cool breezes from the Mediterranean. The face of the country is moſtly level and delighful, and the ſoil naturally deep, rich, and fertile; ſo that it would produce in the greateſt plenty, if cultivated, whatever could be wiſhed for, either for the ſuſtenance, pleaſure, or convenience of the inhabitants; but, like all the other countries poſſeſſed by the Turks, a great part of it lies waſte and uncultivated. With the little culture beſtowed upon it, it produces, in many places, abundance of corn, wine, oil, figs, lemons, oranges, melons, canes, dates, and cotton, with aromatic and medicinal herbs. In Syria alſo are bred great numbers of buffaloes and other oxen, camels, dromedaries, wild-boars, deer of all ſorts, hares, rabbits, and other game; with a kind of goats whoſe hair is long and of a beautiful colour; and a breed of ſheep, whoſe wool is very fine, and their tails ſo large that they ſometimes weigh 30 pounds.

SYREN. See Siren.

SYRINGA, lilac, in botany, a genus of the monogynia order, belonging to the diandria claſs of plants. There are two ſpecies; both of them deciduous flowering ſhrubs, adorned with oval, heart-ſhaped, and ſpear-ſhaped ſimple leaves, and large bunches of odoriferous ſmall funnel-ſhaped flowers, white, blue, and purple, in the different varieties. They are all hardy plants; and though natives of Perſia, will bear the ſevereſt winters. They are eaſily propagated, by ſeed, ſuckers, or layers.

SYRINGE, a well-known inſtrument, ſerving to imbibe or ſuck in a quantity of fluid, and to ſquirt or expel the ſame with violence. The word is formed from the Greek ςυριγξ, or the Latin *ſyrinx*, "a pipe."—A ſyringe is only a ſingle pump, and the water aſcends in it on the ſame principle as in the common ſucking pump. See Hydrostatics, n° 23, *et ſeq.*

SYRUP, in pharmacy, a ſaturated ſolution of ſugar, made in vegetable decoctions or infuſions. See Pharmacy, n° 480—500.

SYSTEM, in general, denotes an aſſemblage or chain of principles and concluſions, or the whole of any doctrine, the ſeveral parts whereof are bound together, and follow or depend on each other; in which ſenſe we ſay a *ſyſtem of philoſophy*, a *ſyſtem of divinity*, &c.—The word is formed from the Greek συϛημα, "compoſition, compages."

System, in the animal œconomy, the *vaſcular*, the *nervous*, and the *cellular*. See Anatomy.

System, in muſic, an aſſemblage of the rules for harmony deduced from ſome common principle by which they are re-united; by which their connection one with another is formed; from whence, as from their genuine ſource, they natively flow; and to which, if we would account for them, we muſt have recourſe. See the articles Chromatic, Diatonic, Enharmonic, Harmony, Interval, and Music.

System, in botany. See Botany, Sect. ii. iii. iv.

System, in aſtronomy. See Astronomy, ſect. iv.

SYSTOLE, in anatomy, the contraction of the heart, whereby the blood is drawn off its ventricles into the arteries; the oppoſite ſtate to which is called the *diaſtole*, or *dilatation, of the heart*. See Anatomy, n° 388.

SYSTYLE, in architecture, that manner of placing columns where the ſpace between the two ſhafts conſiſts of two diameters or four modules.

SYZYGY, Syzygia, in aſtronomy, a term equally uſed for the conjunction and oppoſition of a planet with the ſun.—The word is formed from the Greek, συζυγια, which properly ſignifies "conjunctio." On the phenomena and circumſtances of the ſyzygies a great part of the lunar theory depends. See Astronomy, n° 220.

T.

T, or t, the 19th letter and 15th conſonant of our alphabet, the ſound whereof is formed by a ſtrong expulſion of the breath through the mouth, upon a ſudden drawing back of the tongue from the fore-part of the palate, with the lips at the ſame time open. The proper ſound of this letter is that in *tan*, *ten*, *tin*, *tun*, *fat*, *pot*, *put*, &c. When it comes before *i*, followed by a vowel, it is ſounded like *s*, as in *nation*, *potion*, &c. When *h* comes after it, it has a two-fold ſound; one clear and acute, as in *thin*, *thief*, &c.; the other more obtuſe and obſcure, as in *then*, *there*, &c.

In abbreviations, amongſt the Roman writers, T. ſtands for *Titus*, *Titius*, &c.; Tab. for *Tabularius*; Tab. P. H. C. *Tabularius Provinciæ Hiſpaniæ Citerioris*; Tar. *Tarquinius*; Ti. *Tiberius*; Ti. F. *Tiberii filius*; Ti. L. *Tiberii libertus*; Ti. N. *Tiberii Nepos*; T. J. A. V. P. V. D. *tempore judicem arbitrumve poſtulat ut det*; T. M. P. *terminum poſuit*; T. M. D. D. *terminum dedicavit*; Tr. *trans*, *tribunus*; Tr. M. or Mil. *tribunus militum*; TR. PL. DES. *tribunus plebis deſignatus*; TR. AER. *tribunus ærarii*; TRV. CAP. *triumviri capitales*; T. P. or TRIB. POT. *tribunicia poteſtate*; Tul. H. *Tullus Hoſtilius*.

Amongſt the ancients, T. as a numeral, ſtood for *one hundred and ſixty*; and with a daſh at top, thus T̄, it ſignified *one hundred and ſixty thouſand*. In muſic, T ſtands for *tutti*, "all, or altogether."

TABANUS, the breeze-fly; a genus of inſects belonging to the order of diptera. The moſt remarkable ſpecies is the bovinus. The head of this inſect is grey; the eyes almoſt of a black brown, occupying the greateſt part of it. The thorax is of a grey colour; the abdomen is yellowiſh, with a triangular white ſpot on the middle of every ring, which conſtitutes a longitudinal band of ſpots, the point of which is directed towards the thorax. The thighs are blackiſh, and the legs yellow. The wings are ſomewhat duſky, with brown veins of a deeper dye. This inſect is the terror of horned cattle, horſes, &c. Its mouth is armed with two ſharp hooks which penetrate their hide; while with its proboſcis, which is ſhaped like a ſting, it ſucks their blood, of which it is very fond. The puncture of the tabanus is keen and painful. The inſect is very common in damp woods and meadows, eſpecially during the great heats, when it is moſt troubleſome. The horned cattle are ſometimes ſo moleſted by their ſtings, that they go mad, run down precipices, tear themſelves on the ſtumps of trees, ſtones, &c.

TABBY, in commerce, a kind of rich ſilk which has undergone the operation of tabbying.

TABBYING, the paſſing a ſilk or ſtuff under a calender the rolls of which are made of iron or copper variouſly engraven, which bearing unequally on the ſtuff renders the ſurface thereof unequal, ſo as to reflect the rays of light differently, making the repreſentation of waves thereon.

TABELLIO, in the Roman law, an officer or ſcrivener, much the ſame with our notaries-public, who are often called *tabelliones*.

TABERNACLE, among the Hebrews, a kind of building, in the form of a tent, ſet up, by expreſs command of GOD, for the performance of religious worſhip, ſacrifices, &c. during the journeying of the Iſraelites in the wilderneſs: and, after their ſettlement in the land of Canaan, made uſe of for the ſame purpoſe till the building of the temple of Jeruſalem. It was divided into two parts; the one covered, and properly called the *tabernacle;* and the other open, called the *court.* The curtains which covered the tabernacle were made of linen, of ſeveral colours, embroidered. There were ten curtains, twenty-eight cubits long and four in breadth. Five curtains faſtened together made up two coverings, which covered all the tabernacle. Over theſe there were two other coverings; the one of goat-hair, and the other of ſheep-ſkins. The holy of holies was parted from the reſt of the tabernacle by a curtain made faſt to four pillars, ſtanding ten cubits from the end. The length of the whole tabernacle was thirty-two cubits, that is, about fifty feet; and the breadth twelve cubits, or nineteen feet. The court was a ſpot of ground one hundred cubits long, and fifty in breadth, encloſed by twenty columns, each twenty cubits high and ten in breadth, covered with ſilver, and ſtanding on copper baſes, five cubits diſtant from one another; between which, there were curtains drawn, and faſtened with hooks. At the eaſt end was an entrance, twenty cubits wide, covered with a curtain hanging looſe.

Feaſt of TABERNACLES, a ſolemn feſtival of the Hebrews, obſerved after harveſt, on the fifteenth day of the month Tiſri, inſtituted to commemorate the goodneſs of GOD, who protected the Iſraelites in the wilderneſs, and made them dwell in booths, when they came out of Egypt. On the firſt day of the feaſt, they began to erect booths of the boughs of trees, and in theſe they were obliged to continue ſeven days. The booths were placed in the open air, and were not to be covered with cloths, nor made too cloſe by the thickneſs of the boughs; but ſo looſe that the ſun and the ſtars might be ſeen, and the rain deſcend through them. For further particulars as to the celebration of this feſtival, ſee LEVIT. ch. xxiii.

TABERNÆ, (anc. geog.) See TRES *Tabernæ*.

TABLE, a moveable piece of furniture, uſually made of wood or ſtone, and ſupported on pillars or the like, for the commodious reception of things placed thereon.

TABLE is alſo uſed for the fare or entertainment ſerved up.

TABLE, in mathematics, ſyſtems of numbers calculated to be ready at hand for the expediting aſtronomical, geometrical, and other operations.

Aſtronomical TABLES, are computations of the motions, places, and other phenomena of the planets, both primary and ſecondary. See ASTRONOMY.

TABLE-*Mountain*, a mountain of Africa, being the moſt weſterly cape or promontory in that part of the world, and near the Cape of Good Hope. The bay which is formed thereby is called the *Table-bay*.

Laws of the Twelve TABLES, were the firſt ſet of laws of the Romans: thus called either by reaſon the Romans then wrote with a ſtyle on thin wooden tablets covered with wax; or rather, becauſe they were engraved on tables or plates of copper, to be expoſed in the moſt noted part of the public forum. After the expulſion of the kings, as the Romans were then without any fixed or certain ſyſtem of law, at leaſt had none ample enough to take in the various caſes that might fall between particular perſons, it was reſolved to adopt the beſt and wiſeſt laws of the Greeks. One Hermodorus was firſt appointed to tranſlate them, and the decemviri afterwards compiled and reduced them into ten tables. After a world of care and application, they were at length enacted and confirmed by the ſenate and an aſſembly of the people, in the year of Rome 303. The following year they found ſomething wanting therein, which they ſupplied from the laws of the former kings of Rome, and from certain cuſtoms which long uſe had authoriſed: all theſe being engraven on two other tables made the law of the twelve tables, ſo famous in the Roman juriſprudence, the ſource and foundation of the civil or Roman law.

TABLES *of the Law*, in Jewiſh antiquity, two tables on which were written the decalogue, or ten commandments, given by GOD to Moſes on Mount Sinai.

TABOR (MOUNT). See THABOR.

TACAMAHACA, in pharmacy, a ſolid reſin, improperly called a *gum* in the ſhops. It exſudes from a ſpecies of poplar; and is in repute for mitigating pain and aches, and as a vulnerary.

TACITUS (Caius Cornelius), a celebrated Roman hiſtorian, and one of the greateſt men of his time, was raiſed for his merit to the firſt poſts in the empire. Veſpaſian and Titus gave him conſiderable employments; he became prætor under Domitian, and two years after was made conſul in the room of Virginius Rufus in the year 97. But theſe dignities gave him but a ſmall ſhare of glory, compared with that he obtained by the labour of his pen. There are ſtill extent, 1. Five books of his hiſtory. 2. His Annals. 3. A Treatiſe on the different nations which in his time inhabited Germany: and, 4. The Life of Agricola his father-in-law. There is alſo attributed to him a Treatiſe on Eloquence, which is more generally allowed to have been written by Quintilian. Tacitus's other works are loſt. Pliny the Younger, who was his friend, and the learned ſince his time, give the works of Tacitus the higheſt praiſes.

TACK, a rope uſed to confine the foremoſt lower-corners of the courſes and ſtay-ſails in a fixed poſition, when the wind croſſes the ſhip's courſe obliquely. The ſame name is alſo given to the rope employed to pull out the lower corner of a ſtudding-ſail or driver to the extremity of its boom.

The main-ſail and fore-ſail of a ſhip are furniſhed with a tack on each ſide, which is formed of a thick rope tapering to the end, and having a knot wrought upon the largeſt end, by which it is firmly retained in the clue of the ſail. By this means one tack is always faſtened to windward, at the ſame time that the ſheet extends the ſail to the leeward. See CHESTREE.

TACK, is alſo applied, by analogy, to that part of any ſail to which the tack is uſually faſtened.

A ſhip is ſaid to be on the ſtarboard or larboard tack, when ſhe is cloſe-hauled, with the wind upon the ſtarboard or larboard ſide: and in this ſenſe the diſtance which ſhe ſails in that poſition is conſidered as the length of the tack; although this is more frequently called *board*. See that article.

To TACK, to change the courſe from one board to another, or turn the ſhip about from the ſtarboard to the larboard tack, in a contrary wind. Thus the ſhip A, being cloſe-hauled on the larboard tack, and turning her prow ſuddenly to windward, receives the impreſſion of the wind on her head-ſails *a*, by which ſhe falls off upon the line of the ſtarboard-tack *a*. Tacking is alſo uſed in a more enlarged ſenſe, to imply that manœuvre in navigation by which a ſhip makes an oblique progreſſion to the windward, in a zigzag direction. This, however, is more uſually called *beating*, or *turning to winwdard*.

Plate CCLXXVI fig. 6.

Thus, ſuppoſe the ſhip A bound to a port B lying to windward, with the wind northerly, as expreſſed by the arrow. The ſails *a*, *b*, *c*, being braced obliquely with the keel, the wind alſo falls upon their ſurfaces in an oblique direction, by which the ſhip is puſhed to leeward, as explained in the article LEE-WAY. Hence, although ſhe apparently ſails W. N. W. upon the larboard-tack, as expreſſed in the doted line A*d*, and E. N. E. upon the other *df*, yet if the lee-way is only one point, (and indeed it is ſeldom leſs in the ſmootheſt water), the courſe will accordingly be W. by N. upon one tack, and E. by N. upon the other, as repreſented by the lines A*e*, and *eg*.

If the port A were directly to windward of the ſhip, it is evident that both tacks ought to be of equal length; or, in other words, that ſhe ought to run the ſame diſtance upon each tack: but as the place of her deſtination lies obliquely to windward, ſhe muſt run a greater diſtance upon one tack than the other; becauſe the extremities of both boards ſhould be equally diſtant from the line of her true courſe B A; ſo the larboard tack A*e*, croſſing the courſe more obliquely than the other *eg*, will neceſſarily be much longer.

As the true courſe, or the direct diſtance from B to A is only 12 leagues, it is evident that with a favourable wind ſhe could reach it in a few hours. On the contrary, her diſtance is conſiderably increaſed by the length of her boards, in a contrary wind; which, by its obliquity with her ſails, operates alſo to retard her velocity. Thus her firſt board A*e*, on a W. by N. courſe, is equal to 5. 7 leagues. The ſecond tack *eg* is 9. 2 leagues E by N. the third tack, parallel to A*e*, is 11. 5: the fourth, parallel to *eg*, is 9. 2: and the fifth, parallel to the firſt, 11. 7 leagues. Finally, the ſixth board is 4. 8 leagues parallel to the ſecond, which brings her to the port B. By this ſcheme it appears that ſhe has run more than four times the extent of the line A B, her primitive diſtance; and this is the moſt favourable circumſtances of a contrary wind, viz. when the ſea is ſmooth, and when ſhe may carry her full topſails. For if the wind blows ſtronger, to render it neceſſary to reef the topſails, ſhe will ſoon make two points of lee-way, and accordingly run eaſt on one board and weſt on the other. In this ſituation ſhe will neither approach nor recede from the place of her deſtination: but if the wind increaſes, the ſea will alſo be enlarged; a circumſtance that ſtill farther augments the lee-way. Hence the veſſel will gradually fall off from the port, in proportion to the augmentation of the wind and ſea, which occaſions a proportional increaſe of lee-way.

In order to explain the theory of tacking a ſhip, it may be neceſſary to premiſe a known axiom in natural philoſophy, That every body will perſevere in a ſtate of reſt, or of moving uniformly in a right line, unleſs it be compelled to change its ſtate by forces impreſſed; and that the change of motion is proportional to the moving force impreſſed, and is made according to the right line in which that force is exerted.

By this principle it is eaſy to conceive how a ſhip is compelled to turn into any direction, by the force of the wind acting upon her ſails in horizontal lines. For the ſails may be ſo arranged as to receive the current of air either directly or more or leſs obliquely. Hence the motion communicated to the ſails muſt of neceſſity conſpire with that of the wind upon their ſurfaces. To make the ſhip tack or turn round with her head to the windward, it is therefore neceſſary, after ſhe has received the firſt impreſſion from the helm, that the head-ſails ſhould be ſo diſpoſed as to diminiſh the effort of the wind in the firſt inſtant of her motion; and that the whole force of the wind ſhould be exerted on the after-ſails; which, operating on the ſhip's ſtern, carries it round like a weathercock. But ſince the action of the after-ſails to turn the ſhip will unavoidably ceaſe when her head points to the windward, it then becomes neceſſary to uſe the head-ſails, to prevent her from falling-off and returning to her former ſituation. Theſe are accordingly laid aback on the lee-ſide, to puſh the veſſel's fore part towards the oppoſite ſide, till ſhe has fallen into the line of her courſe thereon, and fixed her ſails to conform with that ſituation.

It has been obſerved above, that the firſt effort to turn the ſhip in tacking is communicated by the helm, which is then put to the lee-ſide. This circumſtance being announced by the pilot or commanding officer, who then calls out *Helm's a lee!* the head-ſails are immediately made to ſhiver in the wind, by caſting looſe their ſheets or bowlines. The pilot then calls, *Up tacks and ſheets!* which is executed by looſening all the ropes which confine the corners of the lower ſails, in order that they may be more readily ſhifted to the other ſide. When the ſhip has turned her head directly to windward, as in *d*, the pilot gives the order to turn about the ſails on the main and mizen maſts, by the exclamation, *Haul main-ſail, haul!* the bowlines and braces are then inſtantly caſt off on one ſide, and as expeditiouſly drawn in on the other ſide, ſo as to wheel the yards about their maſts. The lower corner of the main-ſail is, by means of its tack, pulled down to its ſtation at the cheſtree; and all the after-ſails are at the ſame time adjuſted to ſtand upon the other board. Finally, when the ſhip has fallen off five or ſix points, the pilot cries, *Haul off all!* or, *Let go, and haul!* then the ſails on the fore-maſt are wheeled about by their braces; and as the ſhip has then a tendency to fall off, ſhe is checked by the effort of the helm; which for that purpoſe is put hard a-lee. The fore-tack, or the lower corner of the fore-ſail, being fixed in its place, the bowlines are hauled; and the other ſails, which have been neglected in the hurry of tacking, are properly arranged to the wind; which exerciſe is called *trimming the ſails*. See Lee-way, and Sailing.

Tack, in Scots law. See Law, Nº clxvii. 8—15.

TACKLE, among ſeamen, denotes all the ropes or cordage of a ſhip uſed in managing the ſails, &c.

TACTICS, in the art of war, is the method of diſpoſing forces to the beſt advantage in order of battle, and of performing the ſeveral military motions and evolutions.

TADCASTER, a town in the Weſt Riding of Yorkſhire, noted for the great plenty of limeſtone dug up near it. W. Long. 1. 5. N. Lat. 53. 52.

TADPOLE, a young frog before it has diſengaged itſelf from the membranes that envelope it in its firſt ſtage of life.

TÆNIA, in zoology; a genus of inſects, belonging to the order of vermes zoophyta. The body is of an oblong form; and compoſed of evident joints or articulations, in the manner of the links of a chain, with a mouth and viſcera in each joint. See Plate CCLXXXII.

Simmons's Account of the Tænia.

1. The lata, long tape-worm, or ſolitary worm, infeſts the inteſtines of man and ſome other claſſes of animals, and ſeems to derive its nouriſhment from the chyle that is prepared in the ſtomach.—This worm is long and flat, compoſed of many very ſhort rings that are articulated to each other, and has a kind of vein running through its whole length, which is more or leſs apparent.—This has occaſioned the Germans to give it the name of *flat ſpinous worm*. It is not always of the ſame complexion; ſometimes it appears of a blueiſh or reddiſh, and ſometimes ſimply of a white colour; now and then it manifeſts itſelf only by a ſpot, which is to be perceived in the middle of each ring. In ſome of theſe worms this ſpot is of a blackiſh colour, in others of a colour more tending to white; and it riſes into a very ſmall prominence on each ſide, that is not eaſily apparent, however, to the naked eye. The tail or poſterior end has never been capable of examination hitherto, becauſe the worm breaks, and the patients void portions of it occaſionally, either naturally or by the means of various remedies. Its body, which is uſually ſeveral ells in length, and flattened like a ribband, becomes gradually narrow towards its upper extremity, and at length terminates in a ſmall thread-like appearance, of a foot or more in length. The point, which to the naked eye appears very minute, when examined by the lens, ſeems ſomewhat bulbous; and when viewed through a microſcope that magnifies powerfully, is found to be the head of the worm, and is terminated by four horns of unequal length, which are perhaps the channels through which the animal derives its nouriſhment. The body of the worm extends itſelf throughout the whole inteſtinal canal, and often reaches even to the anus. It has been named *ſolitary worm*, becauſe there commonly exiſts only one in the ſame ſubject: ſometimes, however, two of them are found together; and ſometimes, after the expulſion of the firſt, there regenerates a ſecond. It is by no means eaſy to remove this worm: the purgative vermifuge remedies commonly uſed in phyſic bring away portions of it, which we are always obliged to break, in order to ſeparate them from thoſe which remain behind; it ſeldom happens that they effect a complete cure.

2. The ſolium, or gourd-worm, reſembles the former in many particulars, and is equally met with in the inteſtines of animals. It will be diſtinguiſhed from the preceding one, by having neither the appearance of a head nor of a longitudinal vein: its rings are much longer than thoſe of the ſolitary worm, and are ſtriated through their whole length, being furniſhed only with a little lateral prominence. Theſe rings are eaſily detached from each other, ſo that they appear as ſo many diſtinct worms, which have each of them life and motion independent as it were of the reſt. The form of theſe rings, when viewed together, varies conſiderably. Thoſe of the upper extremity are much more complete, ſhort, narrow, and thin, than thoſe lower down; the rings gradually becoming longer as they approach the lower end. Theſe rings are in ſhape not unlike the ſeeds of gourd, and hence the name *gourd-worm*. Like the other, it is ſeveral ells in length, and is never voided whole, but by detached portions which fall of themſelves.

For the methods of deſtroying and expelling thoſe worms, ſee Medicine, nº 493.

TAFFETY, in commerce, a fine ſmooth ſilken ſtuff, remarkably gloſſy. See Silk. There are taffeties of all colours, ſome plain, and others ſtriped with gold, ſilver, &c. others chequered, others flowered, &c. according to the fancy of the workmen.

TAGUS, the largeſt river of Spain; which, taking its riſe on the confines of Arragon, runs ſouthweſt through the provinces of New Caſtile and Eſtremadura; and paſſing by the cities of Aranjuez, Toledo, and Alcantara, and then croſſing Portugal, forms the harbour of Liſbon, at which city it is about three miles over; and about eight or ten miles below this it falls into the Atlantic ocean.

TAHEITEE. See O-taheitee.

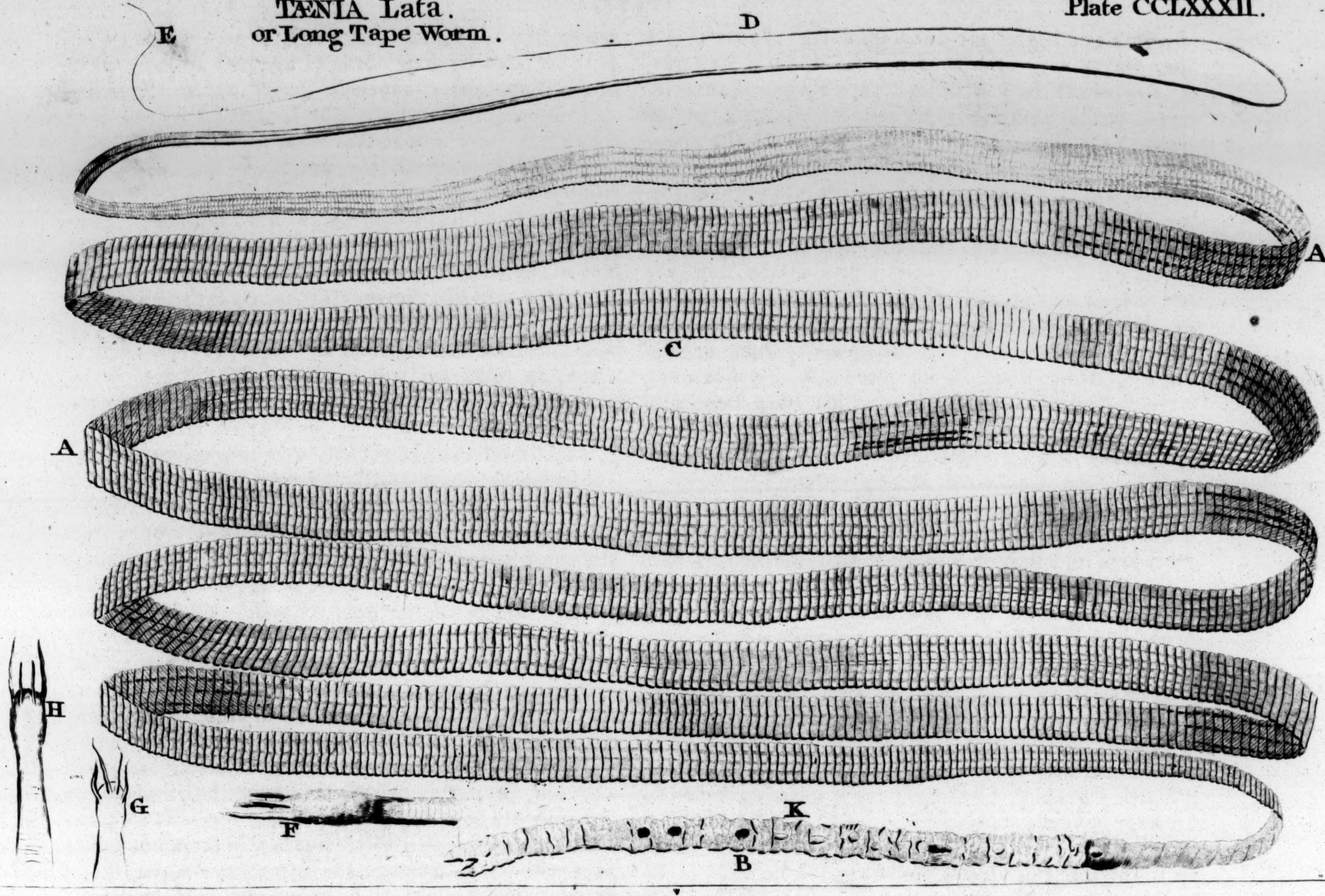
TAJACU, or Peccary, in zoology, a ſpecies of hog. See Sus.

TAIL, the train of a beaſt, bird, or fiſh; which in land-animals ſerves to drive away flies, &c. and in birds and fiſhes to direct their courſe, and aſſiſt them in aſcending or deſcending in the air or water.

Tail, or *Fee-tail*, in law, is a conditional eſtate or fee, oppoſed to *fee-ſimple*. See Fee.

A conditional fee, at the common law, was a fee reſtrained to ſome particular heirs excluſive of others: as to the heirs of a man's body, by which only his lineal deſcendants were admitted, in excluſion of collateral heirs; or to the heirs-male of his body, Plate CCLXXXII.

TÆNIA Lata.
or Long Tape Worm.


E
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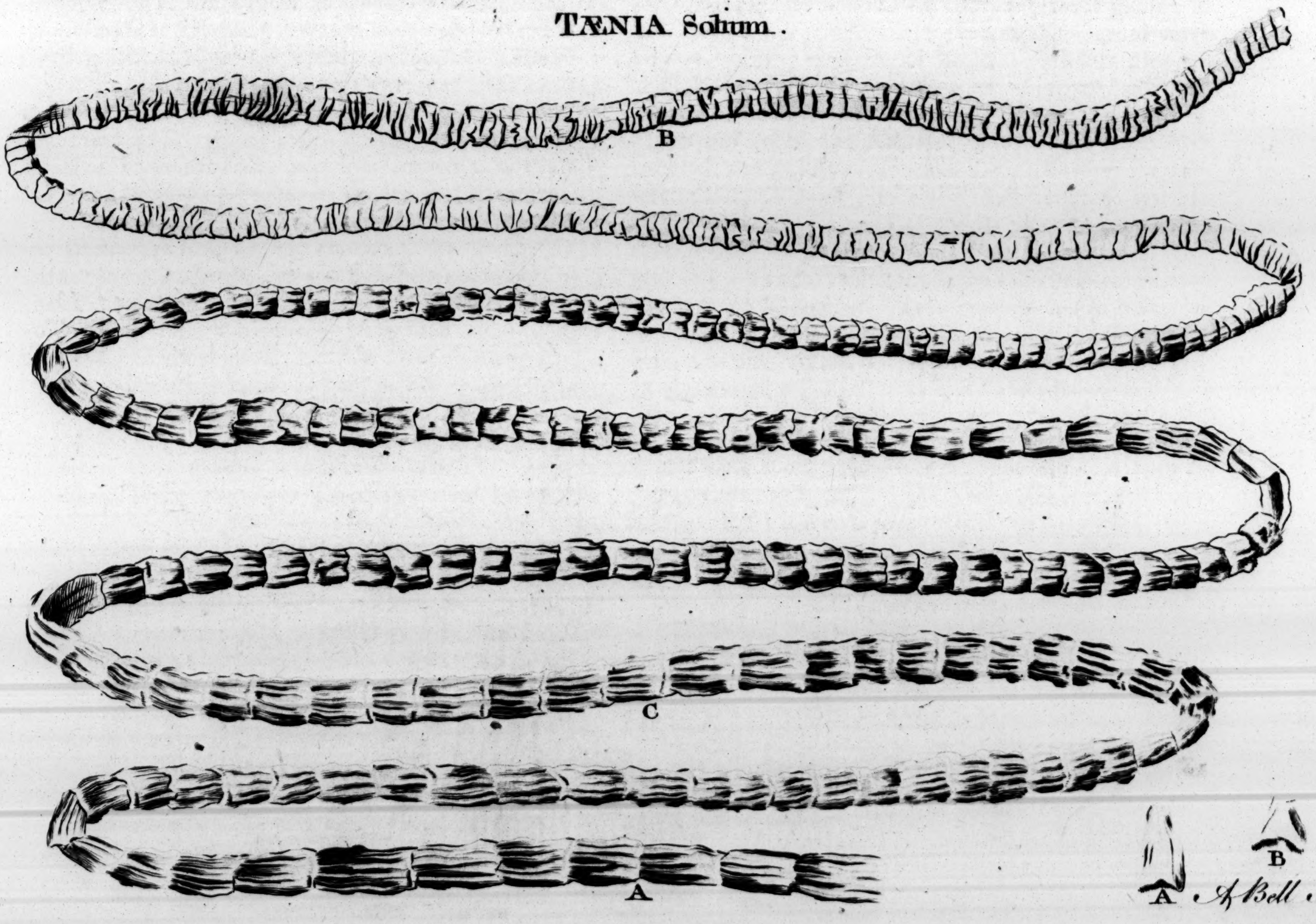
TÆNIA Solium.



A. Bell Sculpt.

body, in excluſion both of collaterals and lineal females alſo. It was called a *conditional fee*, by reaſon of the condition expreſſed or implied in the donation of it, that if the donee died without ſuch particular heirs, the land ſhould revert to the donor. For this was a condition annexed by law to all grants whatſoever, that on failure of the heirs ſpecified in the grant, the grant ſhould be at an end, and the land return to its ancient proprietor. Such conditional fees were ſtrictly agreeable to the nature of feuds, when they firſt ceaſed to be mere eſtates for life, and were not yet arrived to be abſolute eſtates in fee-ſimple.

With regard to the condition annexed to theſe fees by the common law, it was held, that ſuch a gift (to a man and the heirs of his body) was a gift upon condition that it ſhould revert to the donor if the donee had no heirs of his body; but if he had, it ſhould then remain to the donee. They therefore called it a *fee-ſimple* on condition that he had iſſue. Now we muſt obſerve, that when any condition is performed, it is thenceforth entirely gone; and the thing to which it was before annexed becomes abſolute and wholly unconditional. So that as ſoon as the grantee had any iſſue born, his eſtate was ſuppoſed to become abſolute by the performance of the condition; at leaſt for theſe three purpoſes: 1. To enable the tenant to aliene the land, and thereby to bar not only his own iſſue, but alſo the donor, of his intereſt in the reverſion. 2. To ſubject him to forfeit it for treaſon: which he could not do till iſſue born longer than for his own life, leſt thereby the inheritance of the iſſue and reverſion of the donor might have been defeated. 3. To empower him to charge the land with rents, commons, and certain other encumbrances, ſo as to bind his iſſue. And this was thought the more reaſonable, becauſe, by the birth of iſſue, the poſſibility of the donor's reverſion was rendered more diſtant and precarious: and his intereſt ſeems to have been the only one which the law, as it then ſtood, was ſolicitous to protect; without much regard to the right of ſucceſſion intended to be veſted in the iſſue. However, if the tenant did not in fact aliene the land, the courſe of deſcent was not altered by this performance of the condition: for if the iſſue had afterwards died, and then the tenant or original grantee had died, without making any alienation, the land, by the terms of the donation, could deſcend to none but the heirs of his body; and therefore, in default of them, muſt have reverted to the donor. For which reaſon, in order to ſubject the lands to the ordinary courſe of deſcent, the donees of theſe conditional fee-ſimples took care to aliene as ſoon as they had performed the condition by having iſſue; and afterwards repurchaſed the lands, which gave them a fee-ſimple abſolute, that would deſcend to the heirs general, according to the courſe of the common law. And thus ſtood the old law with regard to conditional fees: which things, ſays Sir Edward Coke, though they ſeem ancient, are yet neceſſary to be known, as well for the declaring how the common law ſtood in ſuch caſes, as for the ſake of annuities, and ſuch-like inheritances, as are not within the ſtatutes of entail, and therefore remain as the common law. The inconveniences which attended theſe limited and fettered inheritances were probably what induced the judges to give way to this ſubtle fineſſe (for ſuch it undoubtedly was), in order to ſhorten the duration of theſe conditional eſtates. But, on the other hand, the nobility, who were willing to perpetuate their poſſeſſions in their own families, to put a ſtop to this practice, procured the ſtatute of Weſtminſter the ſecond (commonly called the ſtatute *de donis conditionalibus*) to be made; which paid a greater regard to the private will and intentions of the donor, than to the propriety of ſuch intentions, or any public conſiderations whatſoever. This ſtatute revived in ſome ſort the ancient feodal reſtraints which were originally laid on alienations, by enacting, that from thenceforth the will of the donor be obſerved; and that the tenements ſo given (to a man and the heirs of his body) ſhould at all events go to the iſſue, if there were any; or if none, ſhould revert to the donor.

Upon the conſtruction of this act of parliament, the judges determined that the donee had no longer a conditional fee-ſimple, which became abſolute and at his own diſpoſal the inſtant any iſſue was born; but they divided the eſtate into two parts, leaving in the donee a new kind of particular eſtate, which they denominated a *fee-tail;* and veſting in the donor the ultimate fee-ſimple of the land, expectant on the failure of iſſue; which expectant eſtate is what we now call a *reverſion*. And hence it is that Littleton tells us, that tenant in fee-tail is by virtue of the ſtatute of Weſtminſter the ſecond. The expreſſion *fee-tail*, or *feodum talliatum*, was borrowed from the feudiſts (See Crag. *l. ſ. t.* 10. § 24, 25.) among whom it ſignified any mutilated or truncated inheritance, from which the heirs-general were cut off; being derived from the barbarous verb *taliare*, to cut; from which the French *tailler* and the Italian *tagliare* are formed, (Spelm. *Gloſſ.* 531.)

Having thus ſhown the original of eſtates-tail, we now proceed to conſider what things may or may not be entailed under the ſtatute *de donis*. Tenements is the only word uſed in the ſtatute: and this Sir Edward Coke expounds to comprehend all corporeal hereditaments whatſoever; and alſo all incorporeal hereditaments which ſavour of the realty, that is, which iſſue out of corporeal ones, or which concern or are annexed to or may be exerciſed within the ſame; as rents, eſtovers, commons, and the like. Alſo offices and dignities, which concern lands, or have relation to fixed and certain places, may be entailed. But mere perſonal chattels, which ſavour not at all of the reality, cannot be entailed. Neither can an office, which merely relates to ſuch perſonal chattels; nor an annuity, which charges only the perſon, and not the lands of the granter. But in theſe laſt, if granted to a man and the heirs of his body, the grantee hath ſtill a fee conditional at common law as before the ſtatute, and by his alienation may bar the heir or reverſioner. An eſtate to a man and his heirs for another's life cannot be entailed; for this is ſtrictly no eſtate of inheritance, and therefore not within the ſtatute *de donis*. Neither can a copyhold eſtate be entailed by virtue of the ſtatute; for that would tend to encroach upon and reſtrain the will of the lord: but, by the ſpecial cuſtom of the manor, a copyhold may be limited to the heirs of the body; for here the cuſtom aſcertains and interprets the lord's will.

As to the ſeveral ſpecies of eſtates-tail, and how they are reſpectively created; they are either general or ſpecial. Tail-general is where lands and tenements are given to one, and the heirs of his body begotten: which is called *tail-general;* becauſe, how often ſoever ſuch donee in tail be married, his iſſue in general, by all and every ſuch marriage, is, in ſucceſſive order, capable of inheriting the eſtate tail *per formam doni.* Tenant in *tail-ſpecial* is where the gift is reſtrained to certain heirs of the donee's body, and does not go to all of them in general. And this may happen ſeveral ways. We ſhall inſtance in only one; as where lands and tenements are given to a man and the heirs of his body, on Mary his now wife to be begotten. Here no iſſue can inherit but ſuch ſpecial iſſue as is engendered between them two; not ſuch as the huſband may have by another wife; and therefore it is called *ſpecial tail.* And here we may obſerve, that the words of inheritance (to him and his heirs) give him an eſtate in fee; but they being heirs to be by him begotten, this makes it a fee-tail; and the perſon being alſo limited, on whom ſuch heirs ſhall be begotten (viz. Mary his preſent wife), this makes it a fee-tail ſpecial.

Eſtates in general and ſpecial tail are farther diverſified by the diſtinction of ſexes in ſuch entails; for both of them may either be in tail male or tail female. As if lands be given to a man, and his heirs-male of his body begotten, this is an eſtate in tail male general; but if to a man, and the heirs-female of his body on his preſent wife begotten, this is an eſtate in tail female ſpecial. And in caſe of an entail male, the heirs-female ſhall never inherit, nor any derived from them; nor, *e converſo*, the heirs-male in caſe of a gift in tail female. Thus, if the donee in tail male hath a daughter, who dies leaving a ſon, ſuch grandſon in this caſe cannot inherit the eſtate-tail; for he cannot deduce his deſcent wholly by heirs-male. And as the heir-male muſt convey his deſcent wholly by males, ſo muſt the heir-female wholly by females. And therefore if a man hath two eſtates-tail, the one in tail male the other in tail female, and he hath iſſue a daughter, which daughter hath iſſue a ſon; this grandſon can ſucceed to neither of the eſtates, for he cannot convey his deſcent wholly either in the male or female line.

As the word *heirs* is neceſſary to create a fee, ſo, in farther imitation of the ſtrictneſs of the feodal donation, the word *body*, or ſome other words of procreation, are neceſſary to make it a fee-tail, and aſcertain to what heirs in particular the fee is limited. If, therefore, either the words of inheritance or words of procreation be omitted, albeit the others are inſerted in the grant, this will not make an eſtate tail. As if the grant be to a man and the iſſue of his body, to a man and his ſeed, to a man and his children or offſpring; all theſe are only eſtates for life, there wanting the words of inheritance, "his heirs." So, on the other hand, a gift to a man, and his heirs male or female, is an eſtate in fee-ſimple and not in fee-tail; for there are no words to aſcertain the body out of which they ſhall iſſue. Indeed, in laſt wills and teſtaments, wherein greater indulgence is allowed, an eſtate-tail may be created by a deviſe to a man and his ſeed, or to a man and his heirs-male, or by other irregular modes of expreſſion.

There is ſtill another ſpecies of entailed eſtates, now indeed grown out of uſe, yet ſtill capable of ſubſiſting in law; which are eſtates *in libero maritagio*, or **Frankmarriage.** See that article.

The incidents to a tenancy in tail, under the ſtatute Weſtminſter 2. are chiefly theſe: 1. That a tenant in tail may commit waſte on the eſtate tail, by felling timber, pulling down houſes, or the like, without being impeached or called to account for the ſame. 2. That the wife of the tenant in tail ſhall have her dower, or thirds, of the eſtate-tail. 3. That the huſband of a female tenant in tail may be tenant by the curteſy of the eſtate-tail. 4. That an eſtate-tail may be barred, or deſtroyed, by a fine, by a common recovery, or by lineal warranty deſcending with aſſets to the heir.

Thus much for the nature of eſtates-tail: the eſtabliſhment of which family-law (as it is properly ſtyled by Pigott) occaſioned infinite difficulties and diſputes. Children grew diſobedient when they knew they could not be ſet aſide: farmers were ouſted of their leaſes made by tenants in tail; for if ſuch leaſes had been valid, then, under colour of long leaſes, the iſſue might have been virtually diſinherited: creditors were defrauded of their debts; for, if tenant in tail could have charged his eſtate with their payment, he might alſo have defeated his iſſue, by mortgaging it for as much as it was worth: innumerable latent entails were produced to deprive purchaſers of the lands they had fairly bought; of ſuits in conſequence of which, our ancient books are full: and treaſons were encouraged, as eſtates-tail were not liable to forfeiture longer than for the tenant's life. So that they were juſtly branded as the ſource of new contentions and miſchiefs unknown to the common law; and almoſt univerſally conſidered as the common grievance of the realm. But as the nobility were always fond of this ſtatute, becauſe it preſerved their family-eſtates from forfeiture, there was little hope of procuring a repeal by the legiſlature; and therefore, by the connivance of an active and politic prince, a method was deviſed to evade it.

About 200 years intervened between the making of the ſtatute *de donis*, and the application of common recoveries to this intent, in the 12th year of Edward IV.; which were then openly declared by the judges to be a ſufficient bar of an eſtate-tail. For though the courts had, ſo long before as the reign of Edward III. very frequently hinted their opinion that a bar might be effected upon theſe principles, yet it never was carried into execution; till Edward IV. obſerving (in the diſputes between the houſes of York and Lancaſter) how little effect attainders for treaſon had on families whoſe eſtates were protected by the ſanctuary of entails, gave his countenance to this proceeding, and ſuffered Taltarum's caſe to be brought before the court: wherein, in conſequence of the principles then laid down, it was in effect determined, that a common recovery ſuffered by tenant in tail ſhould be an effectual deſtruction thereof. Theſe common recoveries are fictitious proceedings, introduced by a kind of *pia fraus*, to elude the ſtatute *de donis*, which was found ſo intolerably miſchievous, and which yet one branch of the legiſlature would not then conſent to repeal: and that theſe recoveries, however clandeſtinely begun, are now become by long uſe and acquieſcence a moſt common aſſurance of lands; and are looked upon as the legal mode of conveyance, by which tenant in tail may diſpoſe of his lands and tenements: ſo that no court will ſuffer them to be ſhaken or reflected on, and even acts of parliament have by a ſide-wind countenanced and eſtabliſhed them.

This expedient having greatly abridged eſtates-tail with regard to their duration, others were ſoon invented to ſtrip them of other privileges. The next that was attacked was their freedom from forfeitures for treaſon. For, notwithſtanding the large advances made by recoveries, in the compaſs of about threeſcore years, towards unfettering theſe inheritances, and thereby ſubjecting the lands to forfeiture, the rapacious prince then reigning, finding them frequently re-ſettled in a ſimilar manner to ſuit the convenience of families, had addreſs enough to procure a ſtatute, whereby all eſtates of inheritance (under which general words eſtates-tail were covertly included) are declared to be forfeited to the king upon any conviction of high-treaſon.

The next attack which they ſuffered, in order of time, was by the ſtatute 32 Hen. VIII. c. 28. whereby certain leaſes made by tenants in tail, which do not tend to the prejudice of the iſſue, were allowed to be good in law, and to bind the iſſue in tail. But they received a more violent blow in the ſame ſeſſion of parliament, by the conſtruction put upon the ſtatute of fines, by the ſtatute 32 Hen. VIII. c. 36. which declares a fine duly levied by tenant in tail to be a complete bar to him and his heirs, and all other perſons claiming under ſuch entail. This was evidently agreeable to the intention of Henry VII. whoſe policy it was (before common recoveries had obtained their full ſtrength and authority) to lay the road as open as poſſible to the alienation of landed property, in order to weaken the overgrown power of his nobles. But as they, from the oppoſite reaſons, were not eaſily brought to conſent to ſuch a proviſion, it was therefore couched, in his act, under covert and obſcure expreſſions. And the judges, though willing to conſtrue that ſtatute as favourably as poſſible for the defeating of entailed eſtates, yet heſitated at giving fines ſo extenſive a power by mere implication, when the ſtatute *de donis* had expreſsly declared that they ſhould not be a bar to eſtates-tail. But the ſtatute of Henry VIII. when the doctrine of alienation was better received, and the will of the prince more implicitly obeyed than before, avowed and eſtabliſhed that intention. Yet, in order to preſerve the property of the crown from any danger of infringement, all eſtates-tail created by the crown, and of which the crown has the reverſion, are excepted out of this ſtatute. And the ſame was done with regard to common recoveries, by the ſtatute 34 and 35 Hen. VIII. c. 20. which enacts, that no feigned recovery had againſt tenants in tail, where the eſtate was created by the crown, and the remainder or reverſion continues ſtill in the crown, ſhall be of any force and effect. Which is allowing, indirectly and collaterally, their full force and effect with reſpect to ordinary eſtates-tail, where the royal prerogative is not concerned.

Laſtly, by a ſtatute of the ſucceeding year, all eſtates-tail are rendered liable to be charged for payment of debts due to the king by record or ſpecial contract; as ſince, by the bankrupt-laws, they are alſo ſubjected to be ſold for the debts contracted by a bankrupt. And, by the conſtruction put on the ſtatute 43 Eliz. c. 4. an appointment by tenant in tail of the lands entailed to a charitable uſe, is good without fine or recovery.

Eſtates-tail being thus by degrees unfettered, are now reduced again to almoſt the ſame ſtate, even before iſſue born, as conditional fees were in at common law, after the condition was performed by the birth of iſſue. For, firſt, the tenant in tail is now enabled to aliene his lands and tenements by fine, by recovery, or by certain other means; and thereby to defeat the intereſt as well of his own iſſue, though unborn, as alſo of the reverſioner, except in the caſe of the crown: ſecondly, he is now liable to forfeit them for high treaſon: and, laſtly, he may charge them with reaſonable leaſes, and alſo with ſuch of his debts as are due to the crown on ſpecialties, or have been contracted with his fellow-ſubjects in a courſe of extenſive commerce.

TAILZIE, in Scots law, the ſame with Tail. See Law, N° clxxx. 9.

TALC, a claſs of foſſil bodies, compoſed of broad, flat, and ſmooth laminæ, or plates, laid evenly and regularly on one another; eaſily fiſſile according to the ſite of theſe plates, but not at all ſo in any other direction; flexile and elaſtic, bright, ſhining, and tranſparent; not giving fire with ſteel, nor fermenting with acid menſtrua; and ſuſtaining the force of a violent fire without calcining.

Venice talc is a ſoft ſmooth concrete, unctuous or ſopy to the touch, of a whitiſh or pale-greeniſh colour, with a ſilver-like luſtre, generally found in ſmall pieces. It may be ſplit into numerous fine plates or leaves; which, ſingly, prove ſomewhat flexible and elaſtic, and perfectly pellucid, though the entire maſs is commonly opake, or at moſt only ſemitranſparent. The ſmalleſt pieces are to be preferred; the larger, however white and apparently pure on the outſide, being apt to have ſpecks or veins of heterogeneous matter in the internal part. This mineral has received the epithet *Venetian*, not from its being originally the product of Venice, but probably from that city having formerly been a principal mart for it. Though it may perhaps be met with in ſome parts of the Venetian dominions, it is more common in other countries; in Muſcovy, England, Norway, Hungary, Bohemia, Spain, and the Eaſtern nations.

Mr Newman examined talc with all the mineral acids, and with alkaline lixivia, which ſome report to have a greater action on it; but without finding that either of them had any action at all; the talc remaining undiminiſhed in weight, and neither the talc or the liquors ſuffering any ſenſible alteration. He calcined it alſo with ſulphur and common ſalt, with nitre, with ſal ammoniac; without any other effect than a little change in its colour. On trying to melt it with twice its weight of borax, the talc fell to the bottom as ſoon as the borax came into fuſion. Alkaline ſalts, and cauſtic alkalies taken in four times the weight of the talc, ſucceeded no better; this refractory earth refuſing to unite with them: the ſalts being afterwards deliquiated in the air, the addition of acids occaſioned no precipitation, which they muſt have done if the alkalies had taken up in fuſion any part of the talc.

Here Dr Lewis obſerves, that Newman ſeems to have failed in theſe experiments from uſing too large a proportion of the ſalts and too weak a heat. Venice talc, with half its weight of alkaline ſalt, may, in a ſtrong fire, be brought into perfect fuſion, though not to perfect tranſparency: with equal its weight, or leſs, of borax, it runs into a beautiful, pellucid, greeniſh yellow glaſs. Talc does not melt with any other earth, nor even bake or cohere with any but the argillaceous: Mixtures of it with them all are nevertheleſs brought into fuſion by a remarkably leſs quantity of ſaline matter than the ingredients ſeparately would require. Thus equal parts of talc and chalk, with only one-fourth their weight of borax, melt in no very vehement heat, into a fine tranſparent greeniſh glaſs, of conſiderable hardneſs and great luſtre. On ſubſtituting gypſeous earths, as the lapis ſpecularis, to chalk, the fuſion was as eaſy, and the glaſs as beautiful; in colour not green, but yellow, like the topaz. Talc, with half its weight of ſand, and a quantity of nitre equal to both, yielded alſo a tranſparent topaz-yellow glaſs. Several further experiments on talc may be ſeen in a Memoir by Mr Pott in the Mem. de l'Acad. de Berlin, 1746.

Talc is employed, in thoſe places where it is found in any conſiderable quantity, in compoſitions for earthen veſſels; and by ſome for teſts and cupels. From its ſmoothneſs, unctuoſity, and brightneſs, it has been greatly celebrated as a coſmetic; and the chemiſts have ſubmitted it to a variety of operations, for procuring from it oils, ſalts, tinctures, magiſteries, &c. for that intention. But all their labours have been in vain; and all the preparations ſold under the name of *talc* have either contained nothing of that mineral, or only a fine powder of it.

The pulverization of this mineral is attended with ſome difficulty. The more brittle pieces may be pulverized pretty eaſily; but the very tough and flexible ſcarce at all; nor is heating the mortar and peſtle red-hot, which ſome recommend, of any advantage. The moſt commodious method of reducing it into fine powder, is, by cautiouſly filing or grating it with a fiſh-ſkin.

Beſides the white and greeniſh talcs treated of, there are yellow, red, and black foliaceous concretes, diſtinguiſhed by the ſame name; but theſe are in general rather of the gypſeous than talcy kind. Thus the black talc mentioned by Hoffman, which laid on burning coals falls into leaves and acquires a golden colour, ſeems to be a ſpecies of lapis ſpecularis. Thoſe of a yellow colour have been called *ſolar talcs*, and imagined to be impregnated with a ſulphur of gold; which ſome of the chemiſts have pretended to extract by ſpirit of ſalt or aqua regis. But the yellow tincture which theſe minerals communicate, and the red ſublimate which ariſes on diſtilling the ſolutions, proceed entirely from a ferruginous matter, common to theſe with other coloured earths.

TALENT, a money of account among the ancients. See COIN, and MONEY.—Among the Jews a talent in weight was equal to 60 maneh, or 113 lb. 10 oz. 1 dwt. and 10½ grains.

TALIACOTIUS (Gaſpar), chief ſurgeon to the great duke of Tuſcany, was born at Bononia in Italy in 1553. He wrote a Latin treatiſe intitled *Chirurgia nota de curtis membris*, in which he teaches the art of engrafting noſes, ears, lips, &c. giving repreſentations of the inſtruments and proper bandages; tho' many are of opinion that he never put his art in practice. However, his doctrine is not ſingular; for he ſhows that Alexander Benedictus, a famous chirurgical writer, deſcribed the operation before.

TALIO, (*lex talionis*,) a ſpecies of puniſhment in the Moſaic law, whereby an evil is returned ſimilar to that committed againſt us by another; hence that expreſſion, "Eye for eye, tooth for tooth." This law was at firſt inſerted in the 12 tables amongſt the Romans; but afterwards ſet aſide, and a power given to the prætor to fix upon a ſum of money for the damage done.

TALISMANS, magical figures cut or engraved with ſuperſtitious obſervations on the characteriſms and configurations of the heavens, to which ſome aſtrologers have attributed wonderful virtues, particularly that of calling down celeſtial influences. The taliſmans of Samothrace, ſo famous of old, were pieces of iron formed into certain images, and ſet in rings; theſe were eſteemed preſervatives againſt all kinds of evils. There were likewiſe taliſmans taken from vegetables, and others from minerals.

TALLAGE (*tallagium*), from the French *taille*, is metaphorically uſed for a part or ſhare of a man's ſubſtance carved out of the whole, paid by way of tribute, toll, or tax.

TALLOW, in commerce, the fat of certain animals melted down and clarified, ſo as to be fit for making candles, &c.

TALLY, is a ſtick cut in two parts, on each whereof is marked, with notches or otherwiſe, what is due between debtor and creditor, as now uſed by brewers, &c. And this was the ancient way of keeping all accounts, one part being kept by the creditor, the other by the debtor, &c. Hence the tallier of the exchequer, whom we now call the *teller*. But there are two kinds of tallies mentioned in our ſtatutes to have been long uſed in the exchequer. The one is termed *tallies of debt*, which are in the nature of an acquittance for debts paid to the king, on the payment whereof, theſe tallies are delivered to the debtors, who carrying them to the clerk of the pipe-office, have there an acquittance in parchment for their full diſcharge. The other are *tallies of reward* or allowance, being made to ſheriffs of counties as a recompence for ſuch matters as they have performed to their charge, or ſuch money as is caſt upon them in their accounts of courſe, but not leviable, &c. In the exchequer there is a tally-court, where attend the two deputy chamberlains of the exchequer, and the tally-cutter: and a tally is generally the king's acquittance for money paid or lent, and has written on it words proper to expreſs on what occaſion the money is received.

TALLY-*Man*, a perſon that ſells or lets goods, clothes, &c. to be paid by ſo much a-week.

TALMUD, among the Jews, a collection of the doctrines of their religion and morality. It is the *corpus juris*, or body of the laws and cuſtoms of the Jews, who eſteem it equal to the Scriptures themſelves.

TALPA, the MOLE; a genus of quadrupeds belonging to the order of feræ. There are ſix fore-teeth in the upper jaw, and eight in the under jaw; with one large dog-tooth, and four ſmaller ones. There are two ſpecies, viz. 1. The caudata, or common mole, with a tail, and five toes on each foot. It is a native of Europe; lives under ground; burrows with vaſt rapidity with its fore-feet, flinging the earth back with its hind feet: has the ſenſe of ſmelling exquiſite, which directs it to its food, worms, inſects, and roots. It does vaſt damage in gardens, by flinging up the ſoil and looſening the roots of plants. It is moſt active before rain, and in winter before a thaw, worms being then in motion. It breeds in the ſpring, and brings four or five young at a time: it makes its neſt of moſs, a little beneath the ſurface of the ground, under the greateſt hillock: raiſes no hillocks in dry weather, being then obliged to penetrate deep after its prey. It makes a great ſcream when taken. *Palma chriſti* and white hellebore, made into a paſte, and laid in their holes, deſtroys them. None in Ireland.

2. The aſiatica has no tail, and but three toes on the feet. It is of a beautiful green and gold colour, variable with the light. It is a native of Aſia.

TAMANDAU, in zoology. See MYRMECOPHAGA.

TAMARINDUS, the TAMARIND-TREE; a genus of the monogynia order, belonging to the triandria claſs of plants. There is but one ſpecies, viz. the Indica, a native of both the Indies, growing to a great ſize in thoſe places where it is native. The ſtem is very large, covered with a brown bark, and dividing into many branches at the top. The branches are garniſhed with winged leaves, conſiſting of 16 or 18 pair of lobes, without a ſingle one at the end. The lobes are about half an inch long, and $\frac{1}{6}$th of an inch broad; of a bright green colour, a little hairy, and ſit cloſe to the midrib. The flowers come out from the ſide of the branches, five, ſix, or more together upon the ſame footſtalk in looſe bunches. They are compoſed of five petals, one of which is reflexed upwards like the ſtandard in ſome of the butterfly-flowers; two others ſtand on each ſide like wings, and the other two are turned downwards. The flowers are ſucceeded by thick compreſſed pods, two, three, four, or five inches long; having a double ſkin or cover, and ſwell in every part where the ſeeds are lodged; full of an acid ſtringy pulp, which ſurrounds ſmooth compreſſed angular ſeeds. The plants are eaſily propagated by ſeeds, in the countries where they grow; but in this country require the treatment of other exotics. The pulp is much uſed in medicine as an agreeable cooling purgative. The tamarinds which come from the Eaſt Indies are black and preſerved without ſugar, whence they are leſs agreeable to the taſte than the brown ones which are brought from the Weſt Indies, and require ſugar to preſerve them.

TAMERLANE, the name of a celebrated conqueror among the Moguls. He was originally the ſon of a ſhepherd, but by degrees raiſed himſelf to be the greateſt monarch of the age. See MOGULS, n° 15. *et ſeq.*

TAMUS, BLACK BRIONY; a genus of the hexandria order, belonging to the diœcia claſs of plants. There are two ſpecies; the moſt remarkable of which is the communis, or common black briony, growing naturally about hedges and in rough places in England. The young ſhoots are good eating when dreſſed like aſparagus. The root is acrid and ſtimulating.

TAN, the bark of the oak chopped and ground in a tanning mill into a coarſe powder, to be uſed in the tanning of leather. See TANNING.

TANACETUM, TANSY; a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants. There are eight ſpecies; the moſt remarkable of which is the vulgare, or common yellow tanſy, which grows naturally on the borders of fields and on dry banks in many places of Scotland and England. The ſtalk is three or four feet high, erect, ſtiff, and branched; the flowers are yellow, and terminate the branches in flat umbels. It has a bitter taſte and aromatic ſmell. It is eſteemed good for warming and ſtrengthening the ſtomach; for which reaſon the young leaves have obtained a place among the culinary herbs, their juice being an ingredient in puddings, &c. It is rarely uſed in medicine, though extolled as a good emmenagogue. A drachm of the dried flowers has been found very beneficial in hyſteric diſorders ariſing from ſuppreſſions. The ſeeds and leaves were formerly in conſiderable eſteem for deſtroying worms in children, and are reckoned good in cholics and flatulencies. In ſome parts of Sweden and Lapland, a bath with a decoction of this plant is made uſe of to aſſiſt parturition.

TANGENT *of an* ARCH, is a right line drawn perpendicularly from the end of a diameter, paſſing to one extremity of the arch, and terminated by a right line drawn from the centre through the other end of that arch, and called the *ſecant.* See GEOMETRY.

TANGIER, a port-town of Africa, in the empire of Morocco and kingdom of Fez, ſituated at the entrance of the Straits of Gibraltar, in W. Long. 7°. N. Lat. 35. 40. In 1662, this place belonged to the Portugueſe, and was given to king Charles II. upon his marriage with the Infanta of Portugal: but he, growing weary of the charge of keeping it, cauſed it to be blown up and deſtroyed in 1684; ever ſince which time it has been only a poor fiſhing town. Anciently it was called *Tingis*, and gave name to the province of Mauritania Tingitana.

TANNER, one who dreſſes hides by tanning them. See TANNING.

TANNER (Dr Thomas), an Engliſh prelate and celebrated antiquarian, born in 1674. He was admitted of Queen's college Oxford, where a ſimilarity of taſte for antiquities produced a cloſe friendſhip between him and Edmund Gibſon afterwards biſhop of London. In 1697, he was choſen fellow of his college; and having already publiſhed ſome ſpecimens of his ſkill in the antiquarian way, ſoon after became known to Dr Moore biſhop of Norwich, who made him chancellor of his dioceſe. In 1722, he was made archdeacon of Norwich, and in 1731 biſhop of St Aſaph. He died at Oxford in 1735; and after his death was publiſhed an elaborate work, ſaid to have employed him for 40 years, under this title, *Bibliotheca Britannica Hibernica, ſive de Scriptoribus qui in Anglia, Scotia et Hibernia, ad ſæculi* XVII. *initium floruerunt, &c.*

TANNING, is the the art of preparing raw hides or ſkins for the hand of the currier, or for immediate uſe without any further operation.

The former part of this definition includes all leather uſed for the upper part of ſhoes, coaches, coach-harneſs, ſadler-leather, &c. and the latter the manufacture of bin or backs, &c.

A conſiderable improvement has been made in the method of tanning leather by the late Dr Macbride of Dublin, from whoſe account of his diſcovery in the Philoſophical Tranſactions, the following is extracted.

"The uſe of tanning is two-fold; firſt, to preſerve the leather from rotting; and, ſecondly, to render it impervious to water.

"An infuſion of any ſtrongly-aſtringent vegetable will ſerve to tan leather, ſo far as to prevent its rotting; but if this vegetable does not contain a good deal of gum-reſin, it will not anſwer for enabling it to keep out water: and hence it is that oak-bark, which is more abundant in the gummy-reſinous part than any of our common indigenous aſtringents, is preferred to all other ſubſtances for the purpoſe of tanning.

"The tanners prepare their bark by gently drying it on a kiln, and grinding it into a very coarſe powder. They then either uſe it in the way of infuſion, which is called *ooze;* or they ſtrew the dry powder between the layers of hides and ſkins, when theſe are laid away in the tan-pits.

"The ooze is made by macerating the bark in common water, in a particular ſet of holes or pits, which, to diſtinguiſh them from the other holes in the tan-yard, are termed *letches.*

"The firſt operation of the tanner is to cleanſe his hides from all extraneous filth, and remove any remains of fleſh or fat which may have been left behind by the butcher.

"The hair is next to be taken off; and this is accompliſhed either by ſteeping the hides for a ſhort time in a mixture of lime and water, which is termed *liming;* or by rolling them up cloſe and piling them in heaps, where they quickly begin to heat and putrify. The hair being looſened, is ſcraped off; and the tanner proceeds to the operation called *fleſhing,* which conſiſts in a further ſcraping with a particular kind of knife contrived for the purpoſe, and cutting away the jagged extremities and offal parts, ſuch as the ears and noſtrils.

"The raw leather is then put into an alkaline ley, in order to diſcharge the oil or fat, and render its pores more capable of imbibing the ooze. The tanners of Ireland generally make their ley of pigeon's dung: but a more active one may be prepared from kelp or pot-aſh; taking care, however, not to make it too ſtrong of the aſhes, nor to allow the leather to remain too long in the ley.

"The oil being ſufficiently diſcharged, the leather is ready for the ooze, and at firſt is thrown into ſmaller holes, which are termed *handlers;* becauſe the hides or ſkins, during this part of the proceſs, are taken up from time to time, and allowed to drain: they continue to work the leather in theſe handlers, every now and then ſtirring it up with the utenſil called a *plunger,* which is nothing more than a pole with a knob at the end of it, until they think proper to lay it away in the vatts. In theſe holes, which are the largeſt in the tan-yard, the leather is ſpread out ſmooth, whereas they toſs it into the handlers at random; and between each layer of leather they ſprinkle on ſome powdered bark, until the pit is filled by the leather and bark thus laid in *ſtratum ſuper ſtratum:* ooze is then poured on, to fill up interſtices; and the whole crowned with a ſprinkling of bark, which the tanners call a *heading.*

"In this manner the leather is allowed to macerate, until the tanner ſees that it is completely penetrated by the ooze; when this is accompliſhed (which he knows by cutting out a bit of the thickeſt part of the hide) the manufacture is finiſhed, ſo far as relates to tanning, ſince nothing now remains but to dry the goods thoroughly, by hanging them up in airy lofts built for the purpoſe. Such in general is the proceſs for tanning calf-ſkins, and thoſe lighter ſorts of hides which are called *butts;* but the large, thick, heavy hides, of which the ſtrongeſt and moſt durable kind of ſole-leather is made, require to have their pores more thoroughly opened before the ooze can ſufficiently penetrate them. For this purpoſe, while the hides are in the putreſcent ſtate, from being allowed to heat in the manner already mentioned, and well ſoaked in an alkaline ley, they are thrown into a ſour liquor, generally brewed from rye, in order that the efferveſcence which neceſſarily enſues may open the pores.

"The tanners term this operation *raiſing,* as the leather is conſiderably ſwelled, in conſequence of the conflict between the acid and alkali. This is an Engliſh invention; for it appears from M. De la Lande, who was employed by the Royal Academy of Sciences to write on the art of tanning, that the foreign tanners know nothing of this branch of the buſineſs: indeed, their whole proceſs, according to his account, is ſlovenly, and even more tedious than our common method, and muſt make but very indifferent leather.

"When the raiſing is accompliſhed, the leather is put into the handlers, and worked in them for the requiſite time; then laid away in the vatts, and there left to macerate until the tanning is found to be completely finiſhed, which, for the heavieſt kind of leather, ſuch as this of which I am now ſpeaking, requires from firſt to laſt full two years.

"It is this tediousneſs of the proceſs which enhances the value of leather; and the returns being ſo ſlow, the trade of tanning never can be carried on to advantage but by perſons poſſeſſed of a large capital: therefore, one ſure way of increaſing the number of tanners, and of courſe of bringing down the price of their manufacture, is to ſhorten the proceſs; and if at the ſame time we can improve the quality of the leather, and ſave ſomewhat in the expence of tanning materials, the public will be eſſentially benefited in reſpect to one of the neceſſary articles of life.

"All this can be done by purſuing the following method, which may be introduced into any common tan-yard.

"With reſpect to time, it is poſſible, in the way that I have found out, to finiſh leather in a fourth part of what is required in the ordinary proceſs; for I have repeatedly had calf-ſkins tanned in a fortnight or four weeks, which in the common way could not be done in leſs than from two to four months.

"I ſhall not pretend, however, to affirm, that that buſineſs can be carried on in the large way with ſuch expedition; becauſe a great deal of this abridgment of time was probably owing to frequent handling and working of the leather: but I am confident, and know it from four years experience, that in the ordinary courſe of buſineſs, and in a common tan-yard, the tanner may ſave at leaſt four months out of twelve, produce better leather, and find his bark go much farther than in the old way of tanning.

"As the new method of tanning depends on this principle, 'That lime-water extracts the virtues of oak-bark more completely than plain water;' the firſt thing in which the tanner is to be inſtructed, is the making of lime-water.

"1. Provide a large veſſel, in the nature of a ciſtern, whoſe depth ſhall be at leaſt twice its diameter, and of a capacity adapted to the extent of the tan-yard.

"2. This ciſtern muſt be fixed in a convenient corner of the yard, under a ſhed; and ſhould ſtand ſo as that the liquor which is to be drawn off from it may run freely into the letches.

"3. There muſt be a cock fixed in the ſide of the ciſtern, about a foot from the bottom, to let off the contents; and there muſt be a hole in the bottom of it, of five or ſix inches diameter, which is to be ſtopped with a plug. Let this hole open over a gutter.

"4. The ciſtern muſt be covered with a flooring of boards, ſtrong enough to bear a man's weight; and from ſide to ſide of this lid there muſt be an opening of two or three feet wide.

"5. If it can be ſo contrived that a water-pipe may be led into the ciſtern, it will ſave the ſervants a good deal of trouble; but if this cannot be done, a pump muſt be fixed in the moſt convenient way, for the purpoſe of filling it from time to time.

"6. The ciſtern being once fixed (which is all the additional apparatus that the new method of tanning requires) the making of lime-water will be found extremely ſimple and eaſy.

"7. You are firſt to fill the ciſtern with water; and then, for every hogſhead that it may contain, throw in ten or a dozen pounds weight of unſlaked lime.

"8. Mix the lime thoroughly with the whole body of the water, by ſtirring it exceedingly well from the bottom, with a bucket and plunger, until you perceive that the lime is completely diffuſed, and the whole mixture grows as white as milk; leave it then to ſettle for a couple of days, that the undiſſolved part of the lime may entirely ſubſide, and the water become perfectly limpid, and clear as rock-water. Your lime-water will then be fit for immediate uſe.

"9. The cock, as already mentioned, is to be fixed at leaſt twelve inches from the bottom of the ciſtern, in order that only the limpid part of the lime-water may run off; and the uſe of the hole in the bottom, which is ordered to be ſtopped with a plug, is to let off the groſs and inſoluble remains of the lime, as often as it may be found neceſſary to clean out the ciſtern.

"10. When the firſt brewing (as it may be termed) of lime-water is all expended, you are to fill up the ciſtern with water a ſecond time; ſtir up the lime from the bottom with the bucket and plunger, ſo as to mix it thoroughly with the whole body of the water, as before directed, and then leave it to ſubſide for the requiſite time. Thus you will have a ſecond brewing of lime-water; and you may go on in the ſame manner to make a third, fourth, fifth, or perhaps a ſixth or more brewings, from the original quantity of lime; provided you ſhall find the lime-water continue ſufficiently ſtrong.

"11. There are two ways of knowing when lime-water is ſufficiently ſtrong. The one is by the taſte, and this a little practice will teach you to diſtinguiſh; the other is, by obſerving a certain ſolid ſcum, like the flakes of very thin ice, which collects and forms itſelf on the ſurface of the lime-water.—As long as you find this ſolid ſcum floating on the top of the water in the ciſtern, ſo long you may conclude that there is no neceſſity for throwing in freſh lime.

"12. But when the ſcum ceaſes to appear, or you find from the taſte that the lime-water is not ſo ſtrong as it ought to be, you muſt then take out the plug from the bottom of the ciſtern, and clear it by ſweeping away the groſs remains of lime: and after you have cleaned the ciſtern, begin your brewings of lime-water anew, and proceed in the manner already directed, as to ſtirring up the lime, and leaving it to ſettle for the neceſſary time, ſo as to have your lime-water perfectly limpid. In this manner you may go on from year to year, and conſtantly keep yourſelf in ſtock with reſpect to lime-water.

"13. It is this lime-water which is now to be uſed in making your ooze inſtead of the plain common water; and this is all the difference between the old and the new method of tanning; for when your ooze is prepared, by ſteeping your bark in lime-water (in the letches, as you do at preſent, only running it through two letches) you are to make uſe of it in the very ſame way that you have hitherto uſed the common ooze, there not being the leaſt variation required with reſpect to any of the previous management before the ſkins or hides are fitted for the ooze. Every thing that relates to cleaning, liming, fleſhing, &c. is to be conducted preciſely as in the old or common method of tanning; and the goods are to be worked in the handlers for the requiſite time, and then laid away in the vatts, with layers and headings of bark, juſt as you now practiſe; and when you obſerve that the leather is ſufficiently penetrated with the ooze, that is to ſay, completely tanned, you will take it up, dry it, and afterwards dreſs it according to the different uſes for which it is intended. You are always to obſerve, however, that the ooze is to be turned from one letch on another before it is uſed, otherwiſe it will be apt to blacken the leather.

"14. What has been hitherto ſaid relates only to butts and calf-ſkins: as to ſoal-leather, which is prepared for the ooze by ſteeping it in ſome ſour liquor, in order to open its pores, and raiſe it (according to the tanner's phraſe), the new method requires a different practice from the old one.

" 15. In the old method, the tanners made uſe of ſourings brewed generally from rye or ſome other grain. But theſe liquors are not only troubleſome to brew and to ferment, but they are always uncertain as to the degree of ſourneſs or ſtrength, which depends on the ſtate of the weather and other variable circumſtances: theſe liquors are moreover exceedingly apt to rot the leather; and, without great care, may injure it very materially in its texture.

" 16. To obviate theſe inconveniences, your are to imitate the bleachers of linen, who make uſe of a ſour prepared by diluting the ſtrong ſpirit of vitriol (vulgarly, but improperly, termed *oil of vitriol*) with a ſufficient quantity of plain water.

" 17. It was not without much difficulty that the bleachers could be prevailed on to quit their old ſourings, made either, like yours, of rye or barley, or of ſour butter-milk, from a groundleſs fear that the vitriolic ſouring would corrode their cloth; but the experience of many years has convinced them of their error, and now no other ſouring is uſed. In like manner the tanners at firſt may ſome of them be afraid to uſe the vitriol; but a little practice will ſhow how far ſuperior this ſouring is to what they have hitherto uſed. They will never find it ſubject to any change, in reſpect to ſtrength, from variations of weather or different degrees of heat; and ſo far from tending to rot the leather, it gives unuſual firmneſs; and the ſoals which are raiſed by the vitriolic ſourings are remarkably ſound, and always free from the ſlighteſt degree of rottenneſs. Beſides, the ſame ſour may do for many parcels of leather, by adding a little vitriol to it; and it need only be thrown away, when it becomes too dirty for uſe by the frequent ſucceſſion of hides.

" 18. A wine-pint of the ſtrong ſpirit of vitriol, which will not coſt more than nine or ten pence, is ſufficient for fifty gallons of water to prepare the ſouring at firſt: therefore all you have to do, in raiſing the ſoals, is only to prepare them before-hand in the uſual way; and, when they are fitted for the ſouring, mix up a quantity of vitriol and water, according to the number of hides that you require to have raiſed, ſtill obſerving the proportion of a pint to fifty gallons, which will be enough if the vitriol be of the due degree of ſtrength. The hides may lie in the ſouring till you find them ſufficiently raiſed: for they will be in no danger of rotting, as they would be in the common corn-ſourings, which in time might turn putrid, and rot the leather; whereas the vitriolic ſouring keeps off putrefaction.

" 19. When you find your hides ſufficiently raiſed, put them directly into the ooze, and go on with the tanning as in the old way; and you will ſee that the lime-water ooze penetrates raiſed leather even faſter than it does butts or calf ſkins, allowance being made for their different degrees of thickneſs.

" 20. Let it be now ſuppoſed that you have your ciſtern fixed, your lime-water prepared, and ſome letches full of lime-water ooze, which has been run through two letches in order that the lime-water may completely ſpend its force on the bark; you are not to throw away what common ooze you have in ſtock in the yard, but only as it ſhall be ſpent; then, indeed, you are to throw it away, and ſupply its place with the lime-water ooze.

" 21. In a very few days you will perceive the difference between the activity of the two oozes, the new and old, with reſpect to penetrating the leather: and thus, without any kind of loſs or waſte, you will get rid of all your old liquors, and come ſpeedily into a full ſtock of the ooze made with lime-water; and after you have got the new method eſtabliſhed, your buſineſs will go in a regular courſe, and one parcel of goods will ſucceed another, as faſt as you can manufacture and diſpoſe of them.

" 22. Though it is poſſible to tan ſmall parcels of leather, by way of experiment, by the uſe of lime-water ooze, in a fourth part of the time which is required if only common ooze be made uſe of; yet the buſineſs of a large tan-yard cannot be carried on with ſo much expedition: but even in large works, and in the common courſe of buſineſs, ſoal-leather can be completely tanned and finiſhed in from eleven to fifteen months, according to the different weight and thickneſs of the hides; butts, in from eight to twelve months; and calf-ſkins, in from ſix to twelve weeks: in general, the tanner may ſave at leaſt a third of the time that has hitherto been required.

" 23. The leather which is manufactured in the new way is of a ſuperior quality to that of the old tannage, eſpecially the ſoal-leather, which wears remarkably well, and never ſhows the leaſt ſign of rottenneſs.

" 24. Let it always be remembered, that the lime-water is never to be uſed but when it is ſufficiently ſtrong, and as clear as rock-water.

" 25. Whenever you make freſh ooze, you muſt always uſe freſh lime-water, and run the ooze through two letches; and the lime-water ooze, when ſpent from laying on the leather, is never to be returned back upon the bark which is in the letches, (as you now return your ſpent ooze), but muſt always be thrown away, as being entirely uſeleſs; for which purpoſe you muſt contrive a gutter in the tan-yard to carry off the ſpent ooze.

" 26. The letches ought to be under cover, leſt the rain get into them and weaken the ooze; and if the handlers are ſheltered, it will be ſo much the better; but it is of no importance to cover the vatts, provided, when the leather is laid away in them, they are kept conſtantly full to the brim.

" 27. You muſt always take care to have a ſufficient ſtock of unſlaked lime by you, (for if it be ſlaked it will not anſwer to make lime-water): therefore get your lime freſh, if poſſible, from the kiln, and immediately pack it in any kind of old dry caſks. Weigh one of theſe caſks, and it will enable you to aſcertain the quantity of lime neceſſary to be thrown into the ciſtern each time you begin a freſh brewing of your lime-water, and thus ſave you the trouble of repeated weighings; not that there need be much nicety about the quantity of lime, a ſcore of pounds over or under making no ſenſible difference in the ſtrength of the lime-water.

" 28. Any expence you may be at in procuring lime, which even in the largeſt tan-yards can amount but to a trifle, will be amply compenſated by the ſaving of bark; becauſe that lime-water ſo completely exhauſts the bark, and makes it go ſo much farther than when the ooze is made only of plain water. As a proof of this, you may make a pretty ſtrong ooze from the tan or ſpent bark, which you now conſider as completely exhauſted, by infuſing in it lime-water."

The leather, when only tanned, is not ſufficiently ſoft and pliable to anſwer a number of purpoſes. The currier's province is to reduce the leather to the proper thickneſs, pliableneſs, and colour, requiſite for the different uſes to which it is applied: and though there is a material difference in the method of manufacturing the ſeveral kinds, and a good deal of dexterity required; yet what could be here ſaid of them would be of little uſe to thoſe who are unacquainted with the buſineſs. We ſhall therefore reduce all we are to ſay on this ſubject to a general detail of the proceſs.

The leather, after it has driped ſome time from the tan-pit, is ſhaven on an upright beam with a knife whoſe edge is turned on the one ſide, and with which the currier can take down the leather in the ſame manner as a wright can take a ſhaving from a piece of wood with his plane. After the currier has thus levelled the hide or ſkin to his purpoſe, (which is always done on the fleſh-ſide), he ſpreads it out on a ſtone or table made for the purpoſe, and there ſcours it on the grain-ſide from all the looſe tan, and other ſtuff that may hurt the beauty of the grain. He then puts on a certain quantity of oil on both grain and fleſh-ſide, for the purpoſe of ſoftening the fibres, and at the ſame time making them tough, and hangs it up to dry. When it is ſufficiently dry, there is a thin ſhaving again taken off the fleſh-ſide, in order to clean or brighten it up; and then it is rubbed backward and forward upon a table by the currier with a nicked or furrowed board, keeping the leather always doubled at the place where he rubs, till it be made ſoft and pliable to his intention. This laſt part of the operation is properly called *currying*, and it is from this that the buſineſs gets its name. As to the colour, the leather is fair or dark in proportion to the quantity of oil laid on, if the tanning has been properly performed, and the currier do not neglect ſome material part of his duty. Curriers ſeldom dye any colour but black, which is done with copperas and a very little logwood.

TANTALUS, in fabulous hiſtory, king of Phrygia and Paphlagonia, was the ſon of Jupiter and the nymph Plota. He one day entertained the gods at his table; when, to prove their divinity, he ſerved up his ſon Pelops cut in pieces. All the deities, except Ceres, perceived his cruelty and impiety, and would not touch his proviſions. That goddeſs, whoſe thoughts were ſolely employed about her daughter Proſerpine, inadvertently eat a part of his left ſhoulder. Pelops, however, was reſtored to life; and an ivory ſhoulder given him in the room of that which had been eaten; while Tantalus was thrown into Tartarus, where he was puniſhed with perpetual hunger and thirſt. He was chained in a lake, the water of which reached up to his chin, but retired when he attempted to drink. The branch of a tree loaded with fruit hung down even to his lips, but on his attempting to pluck the fruit the branch ſprung upwards.

TANTALUS, in ornithology, a genus of birds belonging to the order of grallæ. The bill is long, ſubulated, and ſomewhat crooked; the noſtrils oval, the fore-part of the head bald from the eyes; the feet have four toes palmated on the under-part. There are ſeven ſpecies; of which the moſt remarkable is the ibis of the Egyptians. Mr Haſſelquiſt informs us that it is of the ſize of a raven-hen. This bird is found in Lower Egypt, and is ſeen in great numbers during the overflowing of the Nile, in thoſe places which the water does not reach, and afterwards in the places the water has deſerted. It feeds on inſects and ſmall frogs, which abound in Egypt during the inundation of the Nile and for ſome time after, being by this means of great ſervice to the country. They often aſſemble, eſpecially mornings and evenings, in the gardens, in ſuch numbers as to cover whole palm-trees. When this bird reſts, it ſits upright, ſo as to cover its feet with its tail, and raiſes the breaſt and neck.

TANTALUS's *Cup*. See HYDROSTATICS, n° 38.

TANZY, or TANSY, in botany. See TANACETUM.

TAPE-WORM. See TÆNIA.

TAPESTRY, a curious kind of manufacture, ſerving to adorn a chamber or other apartment, by covering or lining the walls thereof. It is a kind of woven hangings of wool and ſilk, frequently raiſed and enriched with gold and ſilver, repreſenting figures of men, animals, landſcapes, hiſtories, &c.

The invention of tapeſtry is ſaid to have come to us from the Levant; and this ſeems the more probable, in that the workmen concerned in it were called, at leaſt in France, *ſarraſins*, or *ſarraſinois*. It is ſuppoſed that the Engliſh and Flemiſh, who were the firſt that excelled in making tapeſtry, might bring the art with them from ſome of the croiſades, or expeditions againſt the Saracens. Be this as it will, it is certain that theſe two nations, eſpecially the Engliſh, were the firſt who ſet on foot this noble and rich manufacture in Europe, now one of the fineſt ornaments of palaces, churches, &c. and therefore, if they may not be allowed the inventors, they have at leaſt the glory of being the reſtorers of this ſo curious and admirable an art, as gives a kind of life to wools and ſilks, ſcarce inferior to the paintings of the beſt maſters.

Tapeſtry-work is diſtinguiſhed by the workmen into two kinds, viz. that of high and that of low warp; though the difference is rather in the manner of working than in the work itſelf; which is in effect the ſame in both: only the looms, and conſequently the warps, are differently ſituated; thoſe of the low warp being placed flat and parallel to the horizon, and thoſe of the high warp erected perpendicularly. The Engliſh anciently excelled all the world in the tapeſtry of the high warp; and they ſtill retain their former reputation, tho' with ſome little change: their low warps are ſtill admired; but as for the high ones, they are quite laid aſide by the French. The French have three conſiderable tapeſtry-manufactures, beſides that of the Gobelins; the firſt at Aubuſſon in Auvergne, the ſecond is at Felletin in the Upper Marche, and the third at Beauvais. They were all equally eſtabliſhed for the high and the low warp; but they have all laid aſide the high warp excepting the Gobelins. There are admirable low warps in Flanders, generally exceeding thoſe of France; the chief and almoſt only Flemiſh manufactures are at Bruſſels, Antwerp, Oudenard, Liſle, Tournay, Bruges, and

Valenciennes.

The uſual widths of tapeſtries are from two ells to three ells Paris-meaſure.

The Manufacture of Tapestry *of the High Warp.* The loom whereon it is wrought is placed perpendicularly: it conſiſts of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are ſet upright, and the beams acroſs them, one at the top, and the other at the bottom or about a foot diſtance from the ground. They have each their trunnions, by which they are ſuſpended on the planks, and are turned with bars. In each roller is a groove from one end to the other, capable of containing a long round piece of wood, faſtened therein with hooks. The uſe of it is to tie the ends of the warp to. The warp, which is a kind of worſted, or twiſted woollen thread, is wound on the upper roller; and the work, as faſt as wove, is wound on the lower. Withinſide the planks, which are ſeven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, ſerving to ſuſtain the coat-ſtave: theſe pieces of iron have alſo holes pierced, by putting a pin in which, the ſtave is drawn nearer or ſet further off; and thus the coats or threads are ſtretched or looſened at pleaſure. The coat-ſtave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats or threads, which make the threads of the warp croſs each other. It has much the ſame effect here as the ſpring-ſtave and treddles have in the common looms. The coats are little threads faſtened to each thread of the warp with a kind of ſliding knot, which forms a ſort of maſh or ring. They ſerve to keep the warp open for the paſſage of broaches wound with ſilks, woollens, or other matters uſed in the piece of tapeſtry. In the laſt place, there are a number of little ſticks of different lengths, but all about an inch in diameter, which the workman keeps by him in baſkets, to ſerve to make the threads of the warp croſs each other, by paſſing them acroſs; and, that the threads thus croſſed may retain their proper ſituation, a packthread is run among the threads above the ſtick.

The loom being thus formed, and mounted with its warp, the firſt thing the workman does, is to draw on the threads of this warp, the principal lines and ſtrokes of the deſign to be repreſented on the piece of tapeſtry; which is done by applying cartoons, made from the painting he intends to copy, to the ſide that is to be the wrong ſide of the piece, and then, with a black-lead pencil, following and tracing out the contours thereof on the thread of the right ſide; ſo that the ſtrokes appear equally both before and behind.

As for the original deſign the work is to be finiſhed by, it is hung up behind the workmen, and wound on a long ſtaff from which a piece is unrolled from time to time as the work proceeds.

Beſides the loom, &c. here deſcribed, there are three other principal inſtruments required for working the ſilk or the wool of the woof within the threads of the warp; theſe are a broach, a reed, and an iron-needle.

The broach is made of a hard wood, ſeven or eight inches long, and two-thirds of an inch thick, ending in a point with a little handle. This ſerves as a ſhuttle; the ſilks, woollens, gold, or ſilver, to be uſed in the work being wound on it.

The reed or comb is alſo of wood, eight or nine inches long, and an inch thick on the back, whence it grows leſs and leſs to the extremity of the teeth, which are more or leſs apart, according to the greater or leſs degree of fineneſs of the intended work. Laſtly, the needle is made in form of the common needle, only bigger and longer. Its uſe is to preſs cloſe the wool and ſilks when there is any line or colour that does not fit well.

All things being prepared for the work, and the workman ready to begin, he places himſelf on the wrong ſide of the piece, with his back towards the deſign; ſo that he works as it were blindfold, ſeeing nothing of what he does, and being obliged to quit his poſt, and go to the other ſide of the loom whenever he would view and examine the piece, to correct it with his preſſing-needle. To put ſilk, &c. in the warp, he firſt turns and looks at the deſign; then, taking a broach full of the proper colour, he places it among the threads of the warp, which he brings croſs each other with his fingers, by means of the coats or threads faſtened to the ſtaff; this he repeats every time he is to change his colour. Having placed the ſilk or wool, he beats it with his reed or comb; and when he has thus wrought in ſeveral rows over each other, he goes to ſee the effects they have, in order to reform the contours with his needle, if there be occaſion. As the work advances, it is rolled upon the lower beam, and they unroll as much warp from the upper-beam as ſuffices them to continue the piece: the like they do of the deſign behind them. When the pieces are wide, ſeveral workmen may be employed at once.

We have but two things to add: the firſt is, that the high-warp tapeſtry goes on much more ſlowly than the low warp, and takes up almoſt twice the time and trouble. The ſecond is, that all the difference that the eye can perceive between the two kinds, conſiſts in this, that in the low warp there is a red fillet, about one-twelfth of an inch broad, running on each ſide from top to bottom, which is wanting in the high-warp.

TAPIR, in zoology, by ſome accounted a ſpecies of hippopotamus, has the fore-hoofs divided into four, and the hind-hoofs into three parts. The noſe extends far beyond the lower jaw, is ſlender, and forms a ſort of proboſcis; it is capable of being contracted or extended at pleaſure, and its ſides are ſulcated. The extremities of both jaws end in a point, and there are ten cutting teeth in each. Between them and the grinders there is a vacant ſpace; and there are 10 grinders in each jaw. The ears are erect, the eyes ſmall, and the body is ſhaped like that of a hog. The back is arched; the legs are ſhort; and the hoofs ſmall, black, and hollow. The tail is very ſmall. The animal grows to the ſize of a heifer half a year old. The hair is ſhort: when young, it is ſpotted with white; when old, of a duſky colour.—It inhabits the woods and rivers of the eaſtern ſide of South America, from the Iſthmus of Darien to the river of Amazons. It ſleeps during day, in the darkeſt and thickeſt foreſts adjacent to the banks; and goes out in the night-time in ſearch of food. It lives on graſs, ſugar-gar-canes, and on fruits. If diſturbed, it takes to the water; ſwims very well; or ſinks below, and, like the hippopotame, walks on the bottom as on dry ground. It makes a ſort of hiſſing noiſe. The Indians ſhoot it with poiſoned arrows: they cut the ſkin into bucklers; and eat the fleſh, which is ſaid to be very good. It is a ſalacious, ſlow-footed, and ſluggiſh animal. Gumila ſays, it will make a vigorous reſiſtance if attacked, and ſcarce fails flaying the dogs which it can lay hold of.—Dampier and Bancroft give very faulty deſcriptions of this beaſt, imagining it to be the ſame with the hippopotame.

TAPPING, in general, the act of piercing a hole in a veſſel, and applying a tube or canula in the aperture, for the commodious drawing off the liquor contained therein.

Tapping, in ſurgery. See there, n° 487, 488.

TAR, a thick, black, unctuous ſubſtance obtained chiefly from old pines and fir-trees by burning them with a cloſe ſmothering heat, much uſed in coating and caulking ſhips, &c. It is prepared in different parts of Germany, in North America, and in all countries where there is much wood. The wood is incloſed in a large oven, to the quantity of ten or more loads at a time: this ſtands within another oven called the *mantle*, the ſpace between them receiving the fire. From the bottom of the inner oven there runs a gutter, by which the tar is conveyed off in proportion as it melts out from the wood. Along with the tar there runs out an acid ſpirit or juice, by means of which part of the oily matter becomes ſoluble in water; and it is owing to this that tar infuſed in water communicates to it a medical virtue. Tar when diſtilled yields a kind of eſſential oil called *oleum pini* and *oleum tædæ*, which is greatly valued by painters, varniſhers, &c. on account of its drying quality: it ſoon thickens of itſelf almoſt to the conſiſtence of a balſam.

Of late it has been found that the empyreumatic oil produced from pitcoal or culm anſwers the purpoſes of tar diſtilled from wood. There is, however, the ſame difference between the two that there is between a vegetable and a bituminous empyreumatic oil. The proceſs is much the ſame as when wood is uſed.

TARANTO, a ſea-port town of Italy, in the kingdom of Naples, and in the Terra de Otranto. It is a ſtrong and populous place, with an archbiſhop's ſee, and the title of a principality. It is ſeated on a peninſula, and is defended by a ſtrong caſtle; but the harbour is choaked up, which has hurt it very much. From this town the ſpiders called *tarantalus* have their name, whoſe bite it was ſaid could not be cured but by muſic and dancing; but this is now found to be falſe †. E. Long. 17. 25. N. Lat. 40. 45.

† See *Aranea*.

TARACON, an ancient, populous, and large town of France, in Provence, with a well-built caſtle, and a chapter compoſed of 15 canons; ſeated on the river Rhone, in a pleaſant fertile country, over-againſt Beaucaire, with which it communicates by a bridge of boats. E. Long. 4. 45. N. Lat. 43. 48.

TARAZONA, a ſtrong town of Spain, in the kingdom of Arragon, and on the frontiers of Old Caſtile, with a biſhop's ſee. It is ſeated partly on a rock, and partly in a fertile plain, on the river Chiles. It was taken from the Moors in 1110. W. Long. 1. 29. N. Lat. 41. 55.

TARE, is an allowance for the outſide package, that contains ſuch goods as cannot be unpacked without detriment: or for the papers, threads, bands, &c. that incloſe or bind any goods imported looſe; or tho' imported in caſks, cheſts, &c. yet cannot be unpacked and weighed neat.

TARGET, a kind of ſhield or weapon of defence made uſe of by the ancients.

TARGUM, a name whereby the Jews call the Chaldee paraphraſes or expoſitions of the Old Teſtament in the Chaldee language. See Bible.

TARIF, a table or catalogue containing the names of different ſorts of merchandize, with the duties to be paid as ſettled by authority amongſt trading nations.

TARPA (Spurius Mecius), a Latin critic in the time of Julius Cæſar and Auguſtus. He had his tribunal in the temple of Apollo, where, with four aſſiſtants, he paſſed ſentence on the works of the poets. Cicero and Horace make honourable mention of this critic.

TARPAULIN, a piece of canvas, well tarred over, to keep off the rain from any place. The term is alſo often applied in a burleſque ſenſe to a perſon that has been all his life bred to the ſea.

TARPEIAN, in Roman antiquity, an appellation given to a ſteep rock in Rome; whence, by the law of the twelve tables, thoſe guilty of certain crimes were precipitated.

The rock took its name from Tarpeia, a veſtal virgin who was killed by the Sabines, as related under the article Rome, n° 24.

TARQUIN *the* Elder, king of Rome, ſucceeded Ancus Martius 615 B. C. He inſtituted a new order of ſenators, under the title of *Patres minorum gentium*. He ſignalized himſelf as a general, and diſcovered great taſte and magnificence in embelliſhing the city of Rome. Pliny, who lived 800 years after him, ſpeaks with aſtoniſhment of the ſubterraneous aqueducts which he cauſed to be conſtructed to carry off the filth from the city. Aſſaſſinated by the ſons of Ancus Martius, 577 B. C. See Rome, n° 35–40.

Tarquin *the Proud*, a tyrant and uſurper, had rendered himſelf odious to the Romans by his pride and cruelty, when his ſon, Sextus Tarquinius, having raviſhed Lucretia, occaſioned that well-known revolution which put an end to the monarchy, and eſtabliſhed the republic of Rome. See the article Rome, n° 49. 51, &c.

TARTAR, the ſaline incruſtation depoſited on the inſides of caſks in which wine is kept. See Chemistry, n° 291.

Tartar *Chalybeated*. See Chemistry, n° 299.

Tartar *Emetic*. See Chemistry, n° 455.

Tartar *Soluble*. See Chemistry, n° 294.

Tartar *Vitriolated*. See Chemistry, n° 119.

TARTARY, or Tatary, a very large country of Aſia, ſituated between 57° and 160° of E. Long. reckoning from the weſt end of the iſle of Ferro, and between 37° and 55° of Lat. It is bounded on the north by Siberia, or that part of Aſia which belongs to Ruſſia; on the weſt by the rivers Don, the Wolga, and Kama, which ſeparate it from Ruſſia; on the ſouth by the Euxine and Caſpian Seas, Karazm, the two Buckarias, China, and Korea; and on the eaſt, by the Oriental or Tartarian ocean. It extends from eaſt to weſt the ſpace of 104 degrees in longitude, or 4145 geographical miles; but its breadth is not proportionable, being not above 960 miles where broadeſt, and where narroweſt 330.

This vaſt region is divided into two great parts; the one called the *Weſtern*, the other the *Eaſtern Tartary*.

Weſtern Tartary, which is much more extenſive than the Eaſtern, containing 139 degrees of longitude out of 161, is inhabited by a great number of nations, or tribes of people, who are called *Mungls*, or *Mungals*, by themſelves; and *Moguls* or *Tartars*, indifferently, by other nations.

The principal mountains, or rather chains of mountains, found in this part of Great Tartary, may be divided into three claſſes: firſt, thoſe which run along the northern borders of it; and though, perhaps, not always contiguous, or of the ſame denomination, go under the general name of *Ulug Tâg*, or *Dag*, that is, the *Great Mountain*. Secondly, thoſe which make the ſouthern bounds, and are called *Kichug Tâg*, or the *Leſſer Mountain*. The third great chain is called *Mount Altay*, lying nearly in the middle, between the Caſpian Sea and Eaſtern Tartary, and extending between the other two, in about the 110th degree of longitude.

The principal rivers of Weſtern Tartary, beſides the Dnieper, Don, and Wolga, are the Jaïk, or Yaïk, and Yem, both deſcending from the Ulug Tâg, and falling into the Caſpian Sea on the north ſide: the river Ili, or Khonghis, which riſes out of the Kichug Tâg, on the borders of Little Buckaria, and runs north-weſt into the lake Palkaſi, which is about 40 miles long, and 30 broad, in latitude 48°, longitude 97°, reckoning from the iſle of Ferro: on this river the khan of the Eluths, or Kalmuks, uſually reſides: the river Irtiſh, Irtis, or Erchis, which riſes in Mount Altay, and runs weſtard, inclining to the north, between two branches of it, into the lake Sayſan, Saſſan, or Iſan, called alſo *Honhotu-Nor*, 90 miles long from weſt to eaſt, and 40 broad, in latitude 47° 30′, longitude 104°; from whence iſſuing again, it paſſes north-weſt, through part of Siberia, and falls into the Obi, which has its ſource in the ſame mountain, about one degree to the north of that of the Irtiſh; and ſeven or eight degrees to the north-eaſt riſes the Kem, or Jeniſea, which runs weſtward for the ſpace of ſeven or eight degrees, and then turning northward enters Siberia. The next river of note is the Selinga, which riſes out of the lake Koſogol, Hutûktu, or Khûtûktû, which is 70 miles long from ſouth to north, and 20 broad, in latitude 52°, longitude 118°, not far from the ſource of the Janiſea, and taking a ſweep ſouthward, round by the eaſt, falls northward into the lake Baykâl in Siberia, about 30 leagues north-weſt of the city Selinghinſkoy, which ſtands upon it. Into the Selinga runs the Orkon, coming from the ſouth-weſt; and into the Orkon the Tula, riſing eaſtward in Mount Kentey. On the ſame mountain riſes alſo two other rivers, viz. the Onon, called alſo by the Tartars *Saghalian Ula*, or the Dragon river, and by the Ruſſians *Amûr*; which running north-eaſtward, and then taking a large ſweep by the ſouth, rolls along the bounds of Eaſtern Tartary, and falls into the eaſtern Ocean. On its banks ſtand two cities; Nerchinſkoy, or Nipchew, a frontier of the Ruſſians, almoſt due north of Pekin in China; and Saghalian Ula, poſſeſſed by the Chineſe. Another large river in the Kerlon, or Kerulon, which running north-eaſtward, falls into the lake Kulon, or Dalay, which is 60 miles long from ſouth-weſt to north-eaſt, and 27 broad, in latitude 48° 30′, longitude 135°, and iſſuing out again under the name of *Ergona*, or *Argun*, joins the Saghalian Ula, about 170 miles beyond Nerchinſkoy. To theſe let us add the river Kalka, from whence, tho' ſmall, the Kalka-Moguls, or Mongols, take their name. It riſes in the mountains, ſeparating Eaſtern from Weſtern Tartary, and, running weſtward, falls into the lake Puir, and then into that of Kulon, before ſpoken of.

In the middle of a deſart, on the banks of the river Irtiſh, is a remarkable piece of antiquity called SEDMY PALATY, or *the ſeven palaces*. See that article.

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This vaſt region is divided into two great parts; the one called the *Weſtern*, the other the *Eaſtern Tartary*.

Weſtern Tartary, which is much more extenſive than the Eaſtern, containing 139 degrees of longitude out of 161, is inhabited by a great number of nations, or tribes of people, who are called *Mungls*, or *Mungals*, by themſelves; and *Moguls* or *Tartars*, indifferently, by other nations.

The principal mountains, or rather chains of mountains, found in this part of Great Tartary, may be divided into three claſſes: firſt, thoſe which run along the northern borders of it; and though, perhaps, not always contiguous, or of the ſame denomination, go under the general name of *Ulug Tâg*, or *Dag*, that is, the *Great Mountain*. Secondly, thoſe which make the ſouthern bounds, and are called *Kichug Tâg*, or the *Leſſer Mountain*. The third great chain is called *Mount Altay*, lying nearly in the middle, between the Caſpian Sea and Eaſtern Tartary, and extending between the other two, in about the 110th degree of longitude.

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The government of Kirin-ula-hotun is bounded weſtward by the paliſade of Lyau-tong; on the eaſt, by the Eaſtern Ocean; ſouthward, by the kingdom of

Korea; and on the north by the great river Saghalian: ſo that it extends no fewer than 12 degrees, and almoſt 20 degrees in longitude, being 750 miles in length, and 600 in breadth.

This vaſt country abounds in millet and oats, with a ſort of grain unknown in Europe, called by the Chineſe *may-ſem-mi*, as being of a middle kind between wheat and rice. It is wholeſome, and much uſed in thoſe cold regions. There is but little wheat or rice here; but whether that is the fault of the ſoil or the inhabitants, we cannot aſſert. The cold begins much ſooner in theſe parts than at Paris, whoſe latitude is near 50 degrees. The foreſts, which are very thick and large the nearer you advance to the Eaſtern Ocean, contribute not a little to bring it on and keep it up. The banks of the rivers here, in ſummer, are enamelled with a variety of flowers common in Europe, excepting the yellow lilies, which are of a moſt lively colour, in height and ſhape exactly reſembling our white lilies, but are of a much weaker ſcent. But the plant which is moſt eſteemed, and draws a great number of herbaliſts into theſe deſerts, is the gin-ſeng*, called by the Manchews *orhota*; that is, the chief or queen of plants. It is highly valued for its virtues in curing ſeveral diſeaſes, and all decays of ſtrength proceeding from exceſſive labour of body or mind. For this reaſon it has always been the principal riches of Eaſtern Tartary; what is found in the north of Korea being conſumed in that kingdom.

Formerly the Chineſe uſed to get into the gin-ſeng country among the mandarins and ſoldiers continually paſſing; but, in 1700, the emperor Kang-hi, that his Manchews might reap this advantage, ordered 10,000 of his ſoldiers, encamped without the great wall, to go and gather it, on condition that each ſhould give him two ounces of the beſt, and take an equal weight of fine ſilver for the remainder: by which means the emperor got in that year 20,000 pounds of it for leſs than one-fourth of the price it bears at Pekin. The root is the only part that is uſed medicinally. Its value is enhanced by its age, for the largeſt and firmeſt are the beſt. This country abounds alſo in fine ſables, grey ermines, and black foxes.

One of the tribes of Tartars inhabiting this country are called the *Yu-pi Tartars*, whoſe manner of life is ſomewhat extraordinary. All the ſummer they ſpend in fiſhing: one part of what they catch is laid up to make oil for their lamps; another ſerves for their daily food; and the reſt, which they dry in the ſun, without ſalting, for they have no ſalt, is laid up for their winter's proviſions, whereof both men and cattle eat when the rivers are frozen. Notwithſtanding this diet, a great deal of ſtrength and vigour appears in moſt of theſe poor people. Their raiment conſiſts of the ſkins of fiſh, which, after dreſſing and dyeing of three or four colours, they ſhape and ſew in ſo delicate a manner, that one would imagine they made uſe of ſilk, till, on ripping a ſtitch or two, you perceive an exceeding fine thong, cut out of a very thin ſkin. When the rivers are frozen, their ſledges are drawn by dogs trained up for the purpoſe, and highly valued.

Although the Manchew language is as much uſed at the court of Pekin as the Chineſe, and all public acts are drawn up in the one as well as the other; yet it began to decline, and would probably have been loſt, had not the Tartars taken great pains to preſerve it, by tranſlating Chineſe books, and compiling dictionaries, under the emperor's patronage. Their language is ſingular in this reſpect, that the verb differs as often as the ſubſtantive governed by it: or, which is the ſame thing, to every different ſubſtantive they uſe a different verb; as for inſtance, when they would ſay, *make a verſe*, *a picture*, *a ſtatue*; for tho' the repetition of the ſame verb in diſcourſe might be excuſable, it is with them unpardonable in writing, as making a monſtrous grating to their ears.

Another ſingularity of their language is the copiouſneſs of it: for inſtance, beſides names for each ſpecies of animals, they have words to expreſs their ſeveral ages and qualities. *Judagon* is the general name for a dog; but *tayha* ſignifies a dog who has very long and thick hair both on his ears and tail; and *yolo*, a dog with a long thick muzzle and tail, large ears, and hanging lips. The horſe, as more ſerviceable to them, has 20 times more names than the dog; almoſt every motion of him giving occaſion to a different name. Where they could get that aſtoniſhing multitude of names and terms, is not eaſy to determine.

On the weſt are the Mungls, but in the two languages there are ſcarcely eight words alike. They underſtand nothing of the language of a few ſavage nations on the eaſt and north. As to the Koreans, their language and letters being Chineſe, have no reſemblance to the Manchews. It is ſaid, they have above 60 letters in their alphabet, but only one ſort of character. They write from the top to the bottom of the paper, like the Chineſe, but four different ways, according to the occaſion, as in other countries. They commonly write with a pencil, though ſome uſe a kind of bamboo pen; but the pencil holds ink better, and moves more freely on the paper. The Manchews think their language the moſt elegant, as well as the moſt copious, in the world; and imagine there is no rendering the ſenſe of it, much leſs the majeſty of its ſtyle, in any other language: yet they cannot expreſs all ſounds, as they want the letters B and D, uſing P and T in their ſtead; nor can write words in which two conſonants come together, without inſerting a vowel between them. Their tranſitions likewiſe are ſo few, that they are much puzzled how to connect their written diſcourſes. In other reſpects it muſt be allowed to be a maſterly language, and as full of terms perhaps as the Arabic itſelf.

This country is but thinly peopled, and contains only four cities, namely, Kirinula-hotun or Khotun, Pedne or Petuna, Ningûta, and Putay-ula-hotun, which are very ill-built, and encompaſſed with no better than mud-walls. The firſt ſtauds on the river Songari, and is the reſidence of the Manchew general, who has all the privileges of a viceroy, and commands the mandarines as well as the troops. Ningûta, which the family now reigning in China conſiders as its antient patrimony, is ſituated on the Hûrkapira, which runs northward into the Songari. Its name is compounded of two Tartarian words which ſignify ſeven chiefs, to expreſs the riſe of the Manchew kingdom, which was firſt eſtabliſhed by ſeven brothers of the late emperor Kanghi's great-grandfather's father.

The tribe of the Manchews, who inhabit a part of

* See Panax.

of Eaſtern Tartary, and are lords of all the other inhabitants thereof, are called by the Ruſſians *Bogdoy;* and the emperor of China, *Bogdoy khan*, and *Amulon Bogdoy khan*.

The third government into which Eaſtern Tartary is divided, is that of Tſitſikar. It is 740 miles long, and 600 broad; and belongs partly to China, and partly to Ruſſia. The people are great hunters, dexterous archers, and pay their tribute in ſable-ſkins; each family being aſſeſſed two or three, or more a-year, according to the numbers of able perſons.

This province is inhabited chiefly by three ſorts of Tartars, the Manchews, the Solons, and Tagûri, of whom the firſt are maſters. The Tagûri are a large robuſt people, but not very numerous. They live in houſes or huts, and cultivate barley, oats, and millet. Their cattle are principally horſes, dromedaries, oxen, cows, and ſheep. They make much uſe of their oxen to ride on.

The Solons alſo are a brave robuſt people. Their dreſs is a ſhort jacket of wolves ſkins, with a cap of the ſame; and they have long cloaks, made of fox or tigers ſkins, to defend them againſt the cold, eſpecially of the night. They hang their bows at their backs. Their women ride on horſeback, drive the plough, hunt ſtags and other game.

Beſides the country towns or villages, there are three cities in the province of Tſitſikar, namely, Tſitſikar, Merghen, and Saghalian-ula-hotun. The garriſon of Tſitſikar, the capital, conſiſts of Manchews; but the inhabitants are moſtly Chineſe. According to their own account, they are all ſhammans, or conjurors, and invoke the devil with frightful cries. They give their dead two burials, firſt leaving a hole at top of the grave, where the relations daily bring victuals, which they convey to the mouth of the deceaſed with a ſpoon, and leave drink in ſmall tin cups, ſtanding round the grave. This ceremony holds for ſeveral weeks, after which they bury the body deeper in the ground.

Several rivers in this country produce pearls, which, tho' much cried up by the Tartars, would be little valued by Europeans, on account of their defects in ſhape and colour.

The kingdoms or countries of Corea, Lyau-tong, and Nyu-che, forming a part of Katay, Kitay, or Cathay, and by ſome included under Eaſtern Tartary, are more properly provinces of China, tho' they lie without the great wall.

Uſbeck TARTARY. To the north and north-eaſt of Perſia lie the countries of Karaſm, and Great and Little Bukharia, which being moſtly ſubject to and inhabited by the tribe of Uſbeck Tartars, are commonly known by the general name of *Uſbeck Tartary*.

The kingdom of Karaſm was known to the ancient Greeks, as appears from Herodotus, Ptolemy, and other authors of that nation, by the name of *Khoraſmia*. At preſent it is bounded on the north by the country of Turkeſtan, and the dominions of the great khan of the Eluths or Kalmuks; on the eaſt, by Great Bukharia, from which it is ſeparated partly by the mountains of Irdar, and partly by the deſarts of Karak and Gaznah; on the ſouth, by the provinces of Aſterabad and Khoraſſan, belonging to Iran, or Perſia at large, from which it is divided by the river Iihun or Amu, and ſundry deſerts of a vaſt extent; and on the weſt by the Caſpian Sea.

It may be about 440 miles in length from ſouth to north, and 300 from weſt to eaſt; being ſituated between the 39th and 46th degrees of north latitude, and the 71ſt and 77th degrees of eaſt longitude. The country conſiſts, for the moſt part, of vaſt ſandy plains, ſome of which are barren deſarts, but others afford excellent paſture. There is good land in ſeveral of the provinces, where vines grow, and wine is made; but water being ſcarce, a great part of the country turns to no account.

Karaſm owes all its fertility to three rivers and a lake. The rivers are the Amu, Kheſil, and Sir. The Amu, as it is called by the Uſbecks and Perſians, is the Jihun of the Arabs, and Oxus of the ancient Greeks. It has its ſource in thoſe high mountains which ſeparate Little Bukharia from the dominions of the Great Mogul; and, after paſſing through Great Bukharia and Koraſm, divides into two branches, one of which falls into the Kheſil, and the other into the Caſpian Sea, towards the borders of the province of Aſtarabad. The Amu abounds with all ſorts of excellent fiſh, and its banks are the moſt charming in the world. Along them grows thoſe excellent melons and other fruits ſo much eſteemed in Perſia, the Indies, and Ruſſia.

The river Kheſil riſes in the mountains to the north-eaſt of the province of Samarkant, and falls into the lake of Aral or Eagles, 50 or 60 miles below its junction with a branch of the Amu. Its banks are exceeding fertile wherever they are cultivated.

The Sir, or Daria, riſes in the mountains to the eaſt of Little Bukharia, and after a long courſe weſtward, along the borders of the Bukharias and Karaſm, falls at laſt into the lake Aral.

Karaſm is at preſent inhabited by three ſorts of people, the Sarts, Turkmans, and Uſbeck Tartars. With regard to the firſt of theſe, we are told, that they are the ancient inhabitants of the country, or thoſe who were ſettled there before the Uſbecks became maſters of it; and that they ſupport themſelves like the Turkmans, by their cattle and huſbandry. The Turkmans, or Turkomans, came originally from Turkeſtan, or the parts of Tartary to the north of Karaſm and Great Bukharia, towards the 11th century. They divided into two parties; one of which went round the north ſide of the Caſpian Sea, and ſettled in the weſtern parts of the Greater Armenia, from thence called *Turkomania*, or *the country of the Turkomans*. The ſecond party turned ſouth, and reſted about the banks of the river Amu and the ſhores of the Caſpian Sea, where they ſtill poſſeſs a great many towns and villages, in the countries of Karaſm and Aſtarabad.

The name of *Uſbecks*, which the ruling tribe of the Tartars of Karaſm and Great Bukharia bear at preſent, is derived from one of their khans. The Uſbecks of Karaſm are divided into ſeveral hords, and live for the moſt part by rapine; reſembling in all reſpects thoſe of Great Bukharia, excepting that they are much more rude and uncivilized. Like the Turkmans, they dwell in winter in the towns and villages which are towards the middle of Koraſm; and in ſummer the greater part of them encamp in the neigh-

Tartary, Tartini.

bourhood of the Amu, or in other places where they can meet with paſture for their cattle, always watching for ſome convenient opportunity to rob and plunder. They never ceaſe making incurſions upon the adjacent territories of Perſia or Great Bukharia, and are to be reſtrained by no treaties or engagements whatſoever. Although they have fixed habitations, yet, in travelling from one place to another, they carry with them all their effects of value, conformable to the way of living in uſe among their anceſtors before they had ſettled dwellings.

Theſe Tartars, it is ſaid, never ride without their bow, arrows, and ſword, although it be in hawking or taking any other diverſion. They have no arts or ſciences among them, neither do they till or ſow. They are great devourers of fleſh, which they cut in ſmall pieces, and eat greedily by handfuls, eſpecially horſe-fleſh.

Their chief drink is ſour mare's milk, like that in uſe with the Nogays. They eat their victuals upon the ground, ſitting with their legs double under them; which is their poſture alſo when they pray.

All theſe tribes have abundance of camels, horſes, and ſheep, both wild and tame. Their ſheep are extraordinary large, with great tails weighing 60 or 80 pounds. There are many wild horſes in the country, which the Tartars frequently kill with their hawks. Theſe birds are taught to ſeize upon the head or neck of the beaſt, which being tired with toiling to get rid of this cruel enemy, the hunter, who follows his game, comes up and kills him. Some travellers tell us, that the inhabitants of this country have not the uſe of gold, ſilver, or any other coin, but barter their cattle for neceſſaries. Others tell us, that they have money, particularly a piece of ſilver called *tanga*, the value near the fourth-part of a crown. It is round, and has on one ſide the name of the country, and on the other that of the khan with the year of the hejirah. There are alſo, it is ſaid, ſmall pieces of copper, of different ſizes, which anſwer to our pence, half-pence, and farthings.

As to the government of Karaſm, the Uſbecks being maſters, it is commonly veſted in divers princes of that tribe of the ſame houſe; of whom, notwithſtanding, only one has the title of *khan*, with a kind of ſuperiority over the others. This khan has no ſort of dependence on him of Great Bukharia, or any other prince.

Bukharia, *Bokharia*, *Bokaria*, *Bogaria*, or *Boharia*, is the name given to all that region or tract of land lying between Karaſm and the Great Kobi, or Sandy Deſert, bordering on China. It is divided into the Great and Little Bukharia; for an account of which ſee the article BUKHARIA.

TARTINI (Signior), a very celebrated Italian compoſer and performer on the violin, was born at Pirano in Iſtria in 1692; where, having in his early youth manifeſted an attachment to an unworthy object, his father ſhut him up: it was during this confinement, that, amuſing himſelf with muſical inſtruments, he accidentally diſcovered the ſeeds of his muſical talents. He was engaged in 1722 as a performer in the church of St Anthony at Padua, in which capacity he officiated as long as he lived; and wrote ſeveral treatiſes on muſic. A ſingular anecdote is related of him, which ſerves to ſhow to what a degree his imagination was animated by a genius for compoſition. He dreamed one night, in 1713, that he had made a compact with the devil, who promiſed to be at his ſervice on all occaſions; and in the courſe of their acquaintance preſented his new friend with his violin to try what kind of a muſician he was. To his great aſtoniſhment, he heard the devil play a ſolo ſo exquiſitely beautiful, that he awaked in a tranſport, and, ſeizing his fiddle, endeavoured in vain to expreſs what he thought he had juſt heard: however, he then compoſed a piece, which is perhaps the beſt of all his works; and called it *The devil's ſonata*. He died in 1770; and left to the profeſſor Colombo the care of a poſthumous work, of which, as Dr Burney relates, though it is chiefly mathematical, the theory of ſound makes a conſiderable part.

Taſſo.

TASSO (Torquato), a juſtly celebrated Italian poet, was born at Sorrento in the kingdom of Naples, in 1544. He was the ſon of Bernardo Taſſo, the author of ſeveral ingenious compoſitions both in verſe and proſe; and of Portia de Roſſi, a lady of an illuſtrious family of Naples.

His father being obliged to accompany the prince of Salerno to the emperor Charles V. upon a deputation from Naples to remonſtrate againſt erecting the inquiſition there, committed the care of his ſon, then three years old, to Angeluzza, a man of great learning; who, we are told, at this tender age began to teach him grammar: at four he was ſent to the Jeſuits college, and at ſeven was well acquainted with Latin and Greek. At 12 years of age he went from Rome to Mantua, where his father had entered into the ſervice of the duke Guglielmo Gonzaga: he had then compleated his knowledge of the Latin and Greek languages; he was well acquainted with rhetoric and poetry, and a maſter of Ariſtotle's ethics; he had alſo ſtudied the precepts of Mauritio Cataneo with particular attention, and ever after reverenced him as a ſecond father.

He was ſoon after ſent to the univerſity of Padua; and, in his 18th year, publiſhed his Rinaldo, a poem written upon the plan of Homer's Odyſſey. This extended his reputation throughout all Italy; but greatly diſpleaſed his father, who foreſaw that it would ſeduce him from ſtudies of more advantage. He went to Padua, to remonſtrate againſt his apparent purpoſe of giving himſelf up to philoſophy and poetry, and made uſe of many very harſh expreſſions, which Taſſo heard with a patience and tranquillity that made the old gentleman ſtill more angry: "Of what uſe is that philoſophy on which you value yourſelf ſo much?" "It has enabled me (replied Taſſo) to endure the harſhneſs of your reproofs."

He ſoon after went to Bologna, by the invitation of the city and college; but in a little time returned to Padua at the preſſing inſtances of Scipio Gonzaga, who had been elected prince of the academy that had been eſtabliſhed in that city by the name of the *Ætherei*. He was incorporated into this ſociety, and took upon himſelf the name of *Pentito*.

In this retreat he formed the deſign of his *Jeruſalem Delivered*, invented the fable, diſpoſed the parts, and determined to dedicate it to the houſe of Eſte; but whether to Alphonſo II. the laſt duke of Ferrara,

rara, or his brother the cardinal Luigi, to whom he had already dedicated his *Rinaldo*, he was yet in doubt. Being preſſed by both the brothers to reſide with them at Ferrara, he conſented. The duke gave him an apartment in his palace, where he lived in peace and affluence, and proſecuted his work; which he now determined to dedicate to the duke, and which was publiſhed by his patrons, book by book as he finiſhed them.

When he was about 27, he publiſhed a paſtoral comedy called *Aminta;* which was received with univerſal applauſe, as a maſter-piece in its kind, and is the original of the *Paſtor Fido* and *Filli di Sciro*.

In the 30th year of his age he finiſhed his *Jeruſalem*, and the whole was reprinted and publiſhed together: the ſucceſs of it was aſtoniſhing; it was tranſlated into Latin, French, Spaniſh, and even the Oriental languages, almoſt as ſoon as it appeared.

But it was Taſſo's fate to become wretched from the moment that he gained the ſummit of reputation: very ſoon after his *Jeruſalem* was publiſhed, he loſt his father, who died at Oſtia upon the Po, the government of which place had been given him by the duke of Mantua; his *Jeruſalem* was attacked by a ſwarm of ignorant, but petulant critics, who gave the preference to the rhapſodies of Pulci and Boyardo; and the perfidy of a friend drew upon him much greater miſfortunes.

This friend was a gentleman of Ferrara, to whom Taſſo had indiſcreetly communicated ſome tranſactions of a very delicate nature concerning his patron the duke, with whom he lived. This ſecret being betrayed, Taſſo reproached his friend for his treachery; and this reproach was retorted in ſuch a manner as provoked Taſſo to ſtrike him. A challenge immediately enſued, and the opponents met and engaged; but during the rencounter, three brothers of Taſſo's antagoniſt came up, and all fell upon him together: Taſſo defended himſelf ſo well, that he wounded two of them, and kept his ground againſt the others till ſome people came up and parted them. This made a great noiſe at Ferrara, where nothing was talked of but the valour of Taſſo; and it became a kind of proverb, "That Taſſo, with his pen and his ſword, was ſuperior to all men."

The duke being informed of the quarrel, baniſhed the brothers from his dominions, confiſcated their eſtates, and Taſſo himſelf he ſhut up in priſon under pretence of ſecuring him from any future attacks of his enemies.

Taſſo found means to eſcape from this confinement, after having ſuffered it about a year; and, being now about 34 years of age, retired to Turin, where he was ſoon known and recommended to the duke of Savoy, who ſhowed him many marks of eſteem and affection: but Taſſo, fearing that the duke of Ferrara would require him to be delivered up, and that then the duke of Savoy would chooſe rather to comply than forfeit the friendſhip of that prince, precipitately ſet out for Rome alone, and without proper neceſſaries for ſuch a journey.

He got ſafe, however, to Rome; where he went directly to his friend Mauritio Cataneo, who received him with great kindneſs, and the whole city ſeemed to rejoice at the preſence of ſo extraordinary a perſon. He was viſited by princes, cardinals, prelates, and all the learned in general. But being impatient of exile, he took meaſures to make his peace with the duke, and ſucceeded.

The duke received him with great appearance of ſatisfaction, and gave him freſh marks of his eſteem. But Taſſo having made ſome attempts on the princeſs Leonora, whom he has celebrated in ſeveral of his verſes, the duke her brother, believing, or pretending to believe, that his ill conduct proceeded from a diſordered underſtanding, cauſed him to be ſtrictly confined in the hoſpital of St Anne. Taſſo applied to the duke, by every friend he had, to releaſe him from this confinement; but the duke coldly anſwered, that inſtead of endeavouring to procure the enlargement of a perſon in his condition, they ought rather to exhort him to ſubmit patiently to ſuch remedies as was judged proper for him. Taſſo was certainly diſordered in his mind, whether as the effect or cauſe of this confinement: he was conſcious that he laboured under ſome diſtemper, and he believed the cauſe of it to be ſupernatural, and fancied himſelf haunted by a ſpirit that continually diſordered his books and papers; to which, however, the tricks played him by his keepers might contribute. He continued, notwithſtanding, to ſolicit the interpoſition of all the powers in Italy, to whom he could find means to apply, particularly the emperor and the pope; but without ſucceſs. At laſt, after he had been a priſoner ſeven years, Vincentio Gonzaga prince of Mantua came to Ferrara among other great perſonages, during the feſtivals and rejoicings that were held there on the marriage of Cæſar of Eſte with Virginia of Medicis, procured his liberty, and took him with him to Mantua, he being then in the 42d year of his age.

At Mantua he lived about a year in great favour with the prince, and in all the ſplendour and affluence which the favour of great princes confers: but he was weary of a ſtate of dependence, however ſplendid and luxurious; and therefore reſolved to go to Naples, and endeavour to recover his mother's jointure, which had been ſeized by her relations when he went into exile with his father Bernardo. With this view, he procured letters of recommendation to the viceroy; and having taken leave of the prince of Mantua, he went firſt to Bergamo, where he ſtaid ſome time, and from thence proceeded to Naples.

At Naples he immediately commenced a ſuit at law for the recovery of his right, and divided his time between a proſecution of that and his ſtudies. But during the ſummer he retired to Biſaccio, with one Giovanni Batiſta Manſo, with whom he had contracted an intimate friendſhip.

Taſſo, who was now in his 45th year, appeared to Manſo, while they were at Biſaccio, to be affected with a melancholy, which had very ſingular effects: he therefore very frequently queſtioned him about them; and Taſſo told him that he had a familiar ſpirit, with whom he frequently and freely converſed. Manſo treated this as an illuſion, but Taſſo ſtill affirmed it to be real; and telling him that the ſpirit would meet and converſe with him the next day, invited him to be preſent. Manſo coming at the hour appointed, ſaw Taſſo fix his eyes with great earneſtneſs upon a window, and perceiving him to continue without motion, he called him ſeveral times by his name; Taſſo made no reply, but at length cried out with great vehemence, "There is the friendly ſpirit that is come to converſe with me; look, and be convinced that what I have ſaid is true." Manſo looked, not without ſome ſurpriſe, but ſaw nothing except the ſunbeams which ſhone through the window: he was juſt going to aſk where the pretended ſpirit was, when he was prevented by Taſſo's ſpeaking with great earneſtneſs to ſome imaginary being, ſometimes putting queſtions, and ſometimes giving anſwers, in a manner ſo pleaſing, and with ſuch elevation of expreſſion, that Manſo had no deſire to interrupt him: the converſation at laſt ended by the ſuppoſed departure of the ſpirit; when Taſſo, turning round to his friend, aſked if his doubts were removed; to which he made no reply, being ſo much amazed that he gladly waved all farther converſation on the ſubject.

Finding his law-ſuit not likely to be ſoon determined, he went from Naples to Rome, where he continued about a year, in high favour with Pope Sextus Quintus; and then went to Florence, at the preſſing invitation of Ferdinando grand duke of Tuſcany, who had been cardinal at Rome when Taſſo firſt reſided there.

Having ſpent about another year at Florence, he returned again to Naples; and there applied himſelf to correct his *Jeruſalem Delivered.* Soon after the publication of this work, Hippolito Aldrobandini ſucceeded Sextus Quintus to the papacy, by the name of *Clement the VIIth*; and his two nephews, Cynthio and Pietro Aldrobandini, were created cardinals. Cynthio, who was a great patron of learning and genius, and had known Taſſo when he laſt reſided at Rome, prevailed with him once more to leave his retreat at Naples, and live with him in that city. Here he continued till his 50th year; and being then again weary of his ſituation, and deſirous to proſecute his law-ſuit, he obtained permiſſion to retire once more to Naples, where he took up his abode with the Benedictine fathers, in the convent of St Severin. Cardinal Cynthio, however, found means to recal him again to Rome, after a very ſhort abſence, by having prevailed with the Pope to confer upon him the honour of being publicly and ſolemnly crowned with laurel in the Capitol.

He ſet out from Naples to receive this honour, with a preſage that he ſhould never return; and arrived at Rome in the beginning of the year 1595, being then about 51 years old: he was met at the entrance of the city by many prelates and perſons of diſtinction, and was introduced by the two cardinals to the Pope, who complimented him by ſaying, "That his merit would confer as much honour on the laurel he was about to receive, as the laurel had formerly conferred on others." Orders were immediately given to decorate not only the Pope's palace and the Capitol, but all the principal ſtreets through which the proceſſion was to paſs: but Taſſo, whether from an habitual dejection of mind, or a ſecret ſenſation of the firſt approaches of a diſeaſe which he apprehended would be fatal, declared that all theſe pompous preparations would be in vain.

It happened, that while they were waiting for fair weather to celebrate the ſolemnity, cardinal Cynthio fell ſick; and, before he was perfectly recovered, Taſſo himſelf was taken ill, and died on the 15th day of his ſickneſs, aged 51. His poems have acquired him an immortal reputation. The principal of them are, 1. Jeruſalem delivered. 2. Jeruſalem conquered. 3. Rinaldo. 4. The Seven Days of the Creation. 5. The tragedy of Torimond. 6. Aminta, &c. All Taſſo's works were printed together at Florence in 1724, in ſix volumes folio, with the pieces for and againſt his Jeruſalemn delivered. A pompous edition of this laſt poem was printed at Venice in 1745, in folio. The beſt edition of Mirebaud's French tranſlation is that of Paris in 1735, in two volumes duodecimo. His *Aminta* and *Gieruſalemme liberata*, have been tranſlated into Engliſh.

TASSEL, a ſort of pendant ornament at the corners of a cuſhion or the like.—In building, taſſels denote thoſe pieces of board that lie under the ends of the mantlet-trees.

TASTE, in phyſiology, a peculiar ſenſation excited by means of the organs of taſte, viz. the papillæ on the tongue. See Anatomy, n° 403.

Intellectual Taste. See Morals, n° 179—183.

The external ſenſe with which nature has furniſhed us, and by which we diſhinguiſh and reliſh the various kinds of nouriſhment that are adapted to health and pleaſure, has in all languages given occaſion to the metaphorical word *taſte*, by which we expreſs our perception of beauty, deformity, or defect, in the ſeveral arts. Taſte then, in general, is a quick diſcernment, a ſudden perception, which, like the ſenſation of the palate, anticipates reflection; like the palate, it reliſhes what is good with an exquiſite and voluptuous ſenſibility, and rejects the contrary with loathing and diſguſt; like the palate alſo, it is often doubtful, and, as it were, bewildered, not knowing whether it ſhould reliſh or reject certain objects, and frequently requires the influence of habit to give it a fixed and uniform determination.

To have a taſte, ſuppoſes ſomething more than merely to perceive, and to diſcern with accuracy the beauty of any work or object. This beauty muſt be felt, as well as perceived; the mind muſt be touched and affected by it in a lively and ſenſible manner. This feeling however, in order to conſtitute true taſte, muſt not be a vague and confuſed ſenſation; but muſt be attended with a diſtinct view, a quick and comprehenſive diſcernment of the various qualities, in their ſeveral relations and connections, which enter into the compoſition of the object we contemplate. And in this we ſee another ſtriking reſemblance between the intellectual taſte and the ſenſual one: for as a nice palate perceives immediately the mixture of different wines, ſo the man of taſte will quickly diſcern the motley mixture of different ſtyles in the ſame production; and, let the beauties and defects be ever ſo cloſely blended in an object, will always be capable of diſtinguiſhing the former from the latter.

As the corruption of the ſenſual taſte diſcovers itſelf by a reliſh for only thoſe delicate and high-ſeaſoned diſhes, in which all the refinements of art have been employed to excite a forced ſenſation of pleaſure; ſo the depravity of the intellectual taſte manifeſts itſelf by an attachment to far-fetched and ſtudied ornaments, and by a want of reliſh for thoſe beauties which are unaffected and natural. The corruption of the ſenſual taſte, which makes us delight in ſuch aliments as are diſguſting to thoſe whoſe organs are in a good ſtate, is in reality a kind of diſeaſe; nor is that depravity of the intellectual taſte which makes many prefer the burleſque to the ſublime, and the laboured ſtiffneſs of art to the beautiful ſimplicity of nature, leſs a diſeaſe in our mental frame.

The intellectual taſte is much more formed by education and culture, than the ſenſual one: for though the latter may be brought, by habit, to reliſh what at firſt excited loathing and diſguſt; yet it does not ſeem to have been the intention of nature, that the generality of mankind ſhould acquire by cuſtom and experience thoſe ſenſations and perceptions which are neceſſary to their preſervation. It is otherwiſe with the intellectual taſte: its formation requires time, inſtruction, and experience. A young man uninſtructed in the arts of muſic and painting, let his natural ſenſibility be ever ſo quick and lively, will not immediately diſtinguiſh, in a grand concert of muſic, the various parts whoſe connection and relation conſtitute the eſſence and charm of the compoſition; nor will he perceive in a picture the gradations of light and ſhade, that harmony of colours, that correctneſs of deſign, which characteriſe a finiſhed piece: but in proceſs of time, and alſo by degrees, he learns both to hear and to ſee in a more perfect manner. The ſame uninſtructed perſon will find a variety of emotions ariſe in his mind the firſt time he is preſent at the repreſentation of a fine tragedy: but he will neither perceive the dexterity of the author in maintaining the unities; nor that exquiſite art by which the drama is ſo managed, that no perſon enters upon the ſcene nor quits it without an evident reaſon; nor yet that ſtill more nice and difficult art of making the various ſubordinate intereſts terminate and centre in one, which abſorbs them all. It is only by the force of habit and reflection that he will diſtinguiſh theſe ſeveral objects of taſte, and feel delightful ſenſations from circumſtances of which formerly he had little or no idea.

Elegant and able artiſts may communicate their feelings and their diſcernment to others, and thus excite taſte in a nation, which, without them, had never known its refined pleaſures. By frequently contemplating the works of great and eminent maſters in the various arts, the powers of nature ariſe into taſte; and we imbibe, as it were, the ſpirit of theſe illuſtrious men, ſo as to come at length to look at a gallery of paintings with the eyes of a Le Brun, a Pouſſin, or a Le Sueur; nay, we even read works of learning and genius with a portion of that ſpirit that appears in their compoſition.

If, in the firſt periods of the culture of the arts and ſciences, it has ſometimes happened, that a whole nation have been unanimous in the praiſe of authors full of defects, and whom ſucceeding ages have beheld with indifference, and even with comtempt; the reaſon is, that theſe authors had natural beauties which were perceived by all, while that juſt diſcernment that was neceſſary to diſtinguiſh their numerous defects, and which is leſs the gift of nature than the reſult of time, habit, and reflection, was as yet acquired by none. Thus Lucilius, who had been in the higheſt reputation among the Romans, ſunk into oblivion when Horace aroſe; and Regnier was univerſally admired by the French, until Boileau appeared; and if there are ſeveral ancient authors who have maintained their credit, notwithſtanding the abſurdities that are to be found in every page of their writings, it muſt be the authors of thoſe nations among whom no judicious and correct writer has appeared to open their eyes, like Horace among the Romans, and Boileau among the French.

It is a common ſaying, that there is no diſputing about taſtes: and if by the taſte here be underſtood the palate, which loaths certain aliments and reliſhes others, the maxim is juſt; becauſe it is needleſs to diſpute about what cannot be corrected, or to attempt reforming the conſtitution and mechaniſm of organs merely corporeal. But the maxim is falſe and pernicious, when applied to that intellectual taſte which has for its objects the arts and ſciences. As theſe objects have real charms, ſo there is in reality a good taſte which perceives them, and a bad one which perceives them not; and there are certain methods by which we may often correct thoſe mental defects which produce a depraved taſte. But it muſt be granted, at the ſame time, that there are certain phlegmatic ſpirits which nothing can enflame; and alſo certain diſtorted intellects which it is impoſſible to rectify: with ſuch, therefore, it is in vain to diſpute about taſte, becauſe they have none at all.

In many things taſte ſeems to be of an arbitrary nature, and without any fixed or uniform direction; ſuch as in the choice of dreſs and equipage, and in every thing that does not come within the circle of the finer arts. In this low ſphere it ſhould be diſtinguiſhed by the name of *fancy;* for it is fancy, rather than taſte, that produces ſuch an endleſs variety of new and contradictory modes.

The taſte of a nation may degenerate and become extremely depraved; and it almoſt always happens, that the period of its perfection is the forerunner of its decline. Artiſts, through the apprehenſion of being regarded as mere imitators, ſtrike out into new and uncommon paths, and turn aſide from the beautiful ſimplicity of nature, which their predeceſſors invariably kept in view. In theſe efforts there is a certain degree of merit, which ariſes from induſtry and emulation, and caſts a veil over the defects which accompany their productions. The public, fond of novelty, applauds their invention; but this applauſe is ſoon ſucceeded by ſatiety and diſguſt. A new ſet of artiſts ſtar up, invent new methods to pleaſe a capricious taſte, and depart ſtill further from nature than thoſe who firſt ventured from its paths into the wilds of fancy. Thus the taſte of a people degenerates into the groſſeſt corruption. Overwhelmed with new inventions, which ſucceed and efface each other with incredible rapidity, they ſcarcely know where they are, and caſt back their eager and anxious deſires towards the period when true taſte reigned under the empire of nature. But they implore its return in vain; that happy period cannot be recalled; it depoſits, however, in the cuſtody of certain choice ſpirits, the ſublime pleaſures of true taſte, which they cheriſh and enjoy in their little circle, remote from the profane eye of the depraved and capricious multitude.

There are vaſt countries where taſte has not yet been able to penetrate. Such are thoſe uncultivated waſtes, where civil ſociety has never been brought to any degree of perfection, where there is little intercourſe between the ſexes, and where all repreſentations of living creatures in painting and ſculpture are ſeverely prohibited by the laws of religion. Nothing renders the mind ſo narrow, and ſo little, if we may uſe that expreſſion, as the want of ſocial intercourſe; this confines its faculties, blunts the edge of genius, damps every noble paſſion, and leaves in a ſtate of languor and inactivity every principle that could contribute to the formation of true taſte. Beſides, where ſeveral of the finer arts are wanting, the reſt muſt neceſſarily languiſh and decay, ſince they are inſeparably connected together, and mutually ſupport each other. This is one reaſon why the Aſiatics have never excelled in any of the arts; and hence alſo it is that true taſte has been confined to certain countries in Europe.

TASTES *of ſubſtances, particularly Vegetables.* The ancients, particularly Ariſtotle, and Theophraſtus, enumerate only ſeven primitive taſtes: 1. Sweet. 2. Fat. 3. Acid. 4. Acrid. 5. Auſtere or harſh. 6. Acerb. 7. Salt, and bitter. Theſe laſt are by Theophraſtus counfounded.—To theſe ſeven primitive taſtes of Ariſtotle and Theophraſtus, Pliny has added the following ſix, which, however, appear to be rather intermediate ſteps of thoſe already enumerated, than ſimple taſtes. 8. Agreeable *(ſuavis)*, a mode of ſweet. 9. Poignant or tart *(acutus)*, a leſs degree of acid. 10. Bitter *(amarus)*, a ſimple taſte, confounded by the Greek naturaliſt, as was obſerved above, with a ſalt taſte. 11. Vinous, a compoſition, according to Pliny, of ſweet, agreeable, poignant, and auſtere. 12. Milky taſte, compoſed of agreeable and fat. 13. Watery, which is almoſt inſipid.

The ſchool of Salernum diſtinguiſhed nine ſimple taſtes, which they characterized by their different temperaments, as follows. I. Acrid, bitter, and alkaline ſalt: WARM. II. Watery or inſipid, ſweet, and fat: TEMPERATE. III. Acid, harſh or acerb, and acid ſalt: COLD. The moderns, by diſtinguiſhing auſtere from acerb, adding ſome things, and retrenching others, have increaſed the number of ſimple taſtes to ten; which ſtand thus oppoſed to each other.

I. Inſipid or watery,	oppoſed to	VI. Acid, or alkaline ſalt.
II. Sweet,		VII. Acrid.
III. Fat,		VIII. Auſtere.
IV. Viſcous,		IX. Acerb.
V. Acid,		X. Bitter.

Taſtes are diſtinguiſhed by their quantum of force or intenſity into ſteps or degrees, which are likewiſe, ſometimes, by writers on the materia medica, uſed for expreſſing the different temperaments of thoſe taſtes. Thus the ſimple taſte bitter has been divided into ten degrees; and we ſay, that the root of turmerick is bitter in the firſt or loweſt degree, the ſeed of blue clematis in the tenth or higheſt. In the ſame manner, as a bitter taſte indicates a warm temperament, other degrees or diviſions ariſe from the intenſity of warmth in the inſtances in queſtion; and we ſay, that one is warm in ſuch a degree, and the other in a different.

Some taſtes affect the organ of ſenſation ſooner than others which are of a greater degree of intenſity. Acid and bitter taſtes, as vinegar and wormwood, are ſoon felt, and quickly gone. Acrid taſtes are not felt ſo ſoon, and laſt longer. Thus the ſharpneſs of the ſeeds of clematis, although in the tenth degree, is not ſo quickly perceived as the bitterneſs of roſes, although only in the ſecond degree. Hot taſtes are ſlower in affecting the organ of ſenſe, and laſt longer than others. Thus the bitterneſs of the roots of black hellebore, which is in the ſecond degree, is perceived on the ſlighteſt contact; but its heat, though in the third or fourth degree, is not felt till after two minutes; in like manner, the bitterneſs of elecampane although only in the fourth degree, is ſooner felt than its heat, which is in the eighth.

The climax or increaſe which is obſerved in the ſenſation or perception of taſtes, during its continuance, is different in different objects. The heat of galangal cauſes, at firſt, a ſlight ſenſation, but it is not till the end of one minute that its greateſt force is perceived. Black hellebore does not attain its higheſt ſenſation till four minutes after its firſt contact.

The duration of the greateſt force of the ſenſation is likewiſe different as the ſubſtances differ; thus the heat of black hellebore comes to its greateſt intenſity and diminiſhes in one minute; that of the root of garden-creſs in the ſame time; that of the root of aſarabacca in two minutes.

The leaves of milfoil, which are bitter in the fourth degree, and warm in the firſt, loſe at firſt their bitterneſs, whilſt their heat ſtill continues. Acorus, or ſweet ruſh, is hot in the firſt degree, aromatic in the third, and bitter in the fourth; yet its bitterneſs is preſently extinguiſhed; its heat laſts two minutes, and its aromatic ſenſation ſeven or eight. The heat of garden-creſs endures ſeven or eight minutes; the bitterneſs of elaterium a quarter of an hour; the heat of euphorbium and black hellebore half an hour; the acrid ſenſation occaſioned by the root of arum, or cuckowpint, often laſts 12 hours. From theſe familiar examples it appears, that the ſenſation acquires its greateſt force in four or ſix minutes at moſt from the time of contact; its duration in its decreaſe is often 30 or 40 minutes and upwards.

Taſtes, conſidered with relation to the parts which they affect, are either, 1. fixed and local; 2. extend themſelves to the parts in the neighbourhood of that which is firſt affected, without, however, relinquiſhing their former ſtation; as the bitterneſs of the dried roots of black hellebore, which ſpreads from the end of the tongue to its middle; and that of the leaves of elaterium, which ſpreads from the tip of the tongue to its root; or, 3. are tranſlated from one part to another, as in the roots of gentian, the bitterneſs of which ſoon relinquiſhes the tip of the tongue, the part firſt affected, and tranſlates itſelf to the middle.

Sapid bodies affect differently the parts which they touch, as the lips, tongue, palate, throat, and gullet.

The lips are affected more ſtrongly by the heat of the root of white hellebore, than any of the other parts.

The tip of the tongue is affected by moſt plants; gentian and coloquintida affect chiefly the middle; the leaves of elaterium, the root.

The palate is affected by the root of deadly nightſhade; its impreſſion laſt four minutes.

The throat is more affected than the other parts by the roots of mercury, aſparagus, and jalap.

The œſophagus or gullet is particularly affected with heat by the roots of wormwood; the leaves make no impreſſion of this kind; on which account they are not ſo ſtomachic as the roots.

As the taſte of the ſame individual undergoes ſeeming alterations, according to the perfect or morbid ſtate of the external organ; ſo different individuals of the ſame ſpecies are liable to real variations from climate, ſoil, and culture. Apples and pears which grow naturally in the woods, are extremely harſh and acid; wild ſuccory is bitter; wild lettuce diſagreeable; culture renders them all ſweet and eſculent, and moreover produces ſuch variety in the atticle of taſte, that of 172 diſtinct kinds of pears, and 200 of apples, enumerated by authors, each kind has a peculiar taſte.

All the parts of a plant have not the ſame taſte; in ſome, the fruit has an acid and agreeable taſte, whilſt the leaves or roots are bitter and diſagreeable; in others, the reverſe of this happens. It is for this reaſon that plants can never be properly arranged by their ſenſible qualities; the different parts of the ſame plant poſſeſſing different qualities, muſt neceſſarily be disjoined and arranged under ſeparate articles.

All plants act either by their ſmell upon the nerves, by their taſte upon the muſcular fibres, or by both upon the fluids. Sapid bodies never act upon the nerves, nor odoriferous bodies upon the muſcular fibres. The former act upon the fluids and ſolids, and change the fluids, which are evacuated by both ſapid and odoriferous ſubſtances.

The virtues and qualities of plants are commonly indicated by their taſte, ſmell, and colour.

Inſipid plants, and ſuch as have no ſmell, have rarely any medicinal virtue.

Sapid and odoriferous plants, on the contrary, always poſſeſs very ſtrong powers. In fact, to deprive a plant of its taſte and ſmell is to rob it of its virtue, as is evident from the change effected in the fœculæ and extracts of arum, calla, caſſada, and elaterium.

Sweet-ſmelling plants are generally of innocent quality; ſuch as are nauſeous, and of a rank heavy diſagreeable ſmell, are noxious.

The plants of the following liſt are ſtriking examples of the latter. Many muſhrooms, elder, herb-chriſtopher, aconite, hellebore, aſarabacca, ſtinking bean trefoil, thorn-apple, tobacco, hen-bane, coloquintida, and hounds-tongue.

TATE (Nahum), an Engliſh poet, born about the middle of the reign of Charles II. in Ireland, where he received his education. He was made poet-laureat to king William upon the death of Shadwell, and held that place until the reign of George I. whoſe firſt birth-day ode he lived to write, and executed it with unuſual ſpirit. He died in the mint in 1716, and was ſucceeded in the laurel by Mr Euſden. He was the author of nine dramatic performances, a great number of poems, and a verſion of the Pſalms in conjunction with Dr Nicholas Brady.

TATIAN, a writer of the primitive church in the ſecond century. He was born in Aſſyria, and trained up in the Heathen religion and learning. Coming over to Chriſtianity, he became the diſciple of Juſtin Martyr, whom he attended to Rome. While Juſtin lived, he continued ſteadily orthodox: but after Juſtin's death he made a ſchiſm, and became the author of a new ſect, condemning marriage, enjoining abſtinence from wine and animal-food, and ſuffering only water to be uſed in the holy myſteries; whence his followers were called *Encratitæ* and *Hydroparaſtatæ*. None of his works are now extant but his piece againſt the Gentiles; or, as it is uſually intitled, his *Oration to the Greeks*.

TATIUS (Achilles), a native of Alexandria, was the author of a book on the ſphere, which father Petau tranſlated into Latin. There is alſo attributed to him a Greek romance on the loves of Leucippe and Clitophon, of which Salmaſius has given a beautiful edition in Greek and Latin, with notes. Suidas ſays, that this Achilles Tatius was a Pagan, but that he afterwards embraced the Chriſtian religion, and became biſhop. Photius mentions him in his Bibliotheca.

TATTOU, a beat of a drum at night to advertiſe the ſoldiers to retreat, or repair to their quarters in the garriſon, or to their tents in a camp.

TATTOOING, an operation in uſe among the iſlanders in the South Sea for marking their bodies with figures of various kinds which they conſider as ornamental. It is performed by puncturing the ſkin, and rubbing a black colour into the wounds. The inſtrument uſed ſomewhat reſembles a comb, the teeth of which are repeately ſtruck into the ſkin by means of a ſmall mallet. It is very painful; but the children are forced by their relations to ſubmit to it.

TAVERNIER (John Baptiſt), a famous French traveller, was born in 1605. In the courſe of 40 years he travelled ſix times to Turkey, Perſia, and the Eaſt Indies, and viſited all the countries in Europe, travelling moſtly on foot. His travels have been frequently reprinted in ſix vols 12mo. He died on his ſeventh journey to the eaſt, at Moſcow, in 1609.

TAVISTOCK, a town of Devonſhire in England, ſituated on the river Tavey or Tave, W. Long. 4. 26. N. 50. 37. It ſends two menbers to parliament, and gives the title of *marquis* to the noble family of Ruſſels dukes of Bedford.

TAUNTON, a town of Somerſetſhire in England, ſituated in W. Long. 3. 10. N. Lat. 51. 6. It is pleaſantly ſeated on the river Thone; is reckoned the beſt town in the county; and ſends two members to parliament.

TAURIS, or TEBRIS, a town of Perſia, and capital of Aderbeitzan. It was formerly the capital of Perſia, and is now the moſt conſiderable next to Iſpahan; for it contains 15,000 houſes, beſides many ſeparate ſhops, and about 200,000 inhabitants. It is about five miles in circumference, and carries on a prodigious trade in cotton, cloth, ſilks, gold and ſilver brocades, fine turbants, and ſhagreen leather. There are 300 caravanſeras, and 250 moſques. Some travellers ſuppoſe it to be the ancient Ecbatana; but of this there is no certainty. It is ſeated in a delightful plain, ſurrounded with mountains, from whence a ſtream proceeds, which runs through the city. E. Long. 46. 50. N. 38. 28.

TAURUS, a great chain of mountains in Aſia, which begin at the eaſtern part of Little Carimania, and extend very far into the India. In different places they have different names.

Taurus, in aſtronomy. See there, n° 206.

TAUTOLOGY, a needleſs repeating of the ſame thing in different words.

TAWING, the art of dreſſing ſkins in white, ſo as to be fit for divers manufactures, particularly gloves, &c.

All ſkins may be tawed; but thoſe chiefly uſed for this purpoſe are lambs, ſheeps, kid, and goat ſkins.

The method of tawing is this: Having cleared the ſkins of wool or hair, by means of lime, they are laid in a large vatt of wood or ſtone, ſet on the ground full of water, in which quicklime has been ſlaked; wherein they are allowed to lie a month or ſix weeks, according as the weather is more or leſs hot, or as the ſkins are required to be more or leſs ſoft and pliant.

While they are in the vatt, the water and lime is changed twice, and the ſkins are taken out and put in again every day: and when they are taken out for the laſt time, they are laid all night to ſoak in a running water, to get out the greateſt part of the lime; and in the morning are laid together by ſixes one upon another, upon the wooden leg, and are ſcraped ſtoutly one after another, to get the fleſh off from the fleſhy ſide, with a cutting two-handled inſtrument called a knife; and then they cut off the legs (if they are not cut off before) and other ſuperfluous parts about the extremes. Then they are laid in a vatt or pit with a little water, where they are fulled with wooden peſtles for the ſpace of a quarter of an hour; and then the vatt is filled up with water, and they are rinſed in it.

In the next place, they are thrown on a clean pavement to drain, and afterwards caſt into a freſh pit of water, out of which they rinſe them well, and are laid again on the wooden leg, ſix at a time, with the hair-ſide outermoſt: over which they rub a kind of whetſtone very briſkly, to ſoften and fit them to receive four or five more preparations, given them on the leg both on the fleſh-ſide and the hair-ſide, with the knife, after the manner above-mentioned.

After this they are put into a pit of water and wheaten-bran, and ſtirred about in it with wooden poles, till the bran is perceived to ſtick to them, and then they are left: as they riſe of themſelves to the top of the water by a kind of fermentation, they are plunged down again to the bottom; and at the ſame time fire is ſet to the liquor, which takes as eaſily as if it were brandy, but goes out the moment the ſkins are all covered.

They repeat this operation as often as the ſkins riſe above the water; and when they have done riſing they take them out, lay them on the wooden leg, the fleſhy ſide outwards, and paſs the knife over them to ſcrape off the bran.

Having thus cleared them of the bran, they lay the ſkins in a large baſket, and load them with huge ſtones to promote their draining: and when they have drained ſufficiently, they give them their feeding, which is performed after the manner following.

For one hundred of large ſheep-ſkins, and for ſmaller in proportion, they take eight pounds of alum, and three of ſea-ſalt, and melt the whole with water in a veſſel over the fire, pouring the ſolution out, while yet lukewarm, into a kind of trough, in which is twenty pounds of the fineſt wheat-flower, with the yolks of eight dozen of eggs; of all which is formed a kind of paſte, a little thicker than children's pap; which, when done, is put into another veſſel, to be uſed in the following manner.

They pour a quantity of hot water into the trough in which the paſte was prepared, mixing two ſpoonfuls of the paſte with it; to do which they uſe a wooden ſpoon, which contains juſt as much as is required for a dozen of ſkins: and when the whole is well diluted, two dozen of the ſkins are plunged into it; but they take care that the water be not too hot, which would ſpoil the paſte and burn the ſkins.

After they have lain ſome time in the trough, they take them out, one after another, with the hand, and ſtretch them out; this they do twice; and after they have given them all their paſte, they put them into tubs, and there full them afreſh with wooden peſtles.

Then they put them into a vat, where they are ſuffered to lie for five or ſix days, or more; then they take them out in fair weather, and hang them to dry on cords or racks: and the quicker they are dried the better; for if they be too long a-drying, the ſalt and alum within them are apt to make them riſe in a grain, which is an eſſential fault in this kind of dreſſing.

When the ſkins are dry, they are made up into bundles, and juſt dipt in fair water, and taken out and drained: they are then thrown into an empty tub, and after having lain ſome time are taken out and trampled under foot.

Then they draw them over a flat iron inſtrument, the top of which is round like a battledore, and the bottom fixed into a wooden block, to ſtretch and open them; and having been opened, they are hung in the air upon cords to dry; and being dry, they are opened a ſecond time, by paſſing them again over the ſame inſtrument.

In the laſt place they are laid on a table, pulled out, and laid ſmooth, and are then fit for ſale.

TAX, (*Taxa* from the Greek ταξις, i. e. *ordo, tributum;*) a tribute or impoſition laid upon the ſubject for the ſupport of government. See Revenue.

It is the ancient indiſputable privilege and right of the houſe of commons, that all grants of ſubſidies or parliamentary aids do begin in their houſe, and are firſt beſtowed by them; although their grants are not effectual to all intents and purpoſes until they have the aſſent of the other two branches of the legiſlature. See Commons. The general reaſon given for this excluſive privilege of the houſe of commons, is, that the ſupplies are raiſed upon the body of the people, and therefore it is proper that they alone ſhould have the right of taxing themſelves. This reaſon would be unanſwerable, if the commons taxed none but themſelves: but it is notorious, that a very large ſhare of property is in the poſſeſſion of the houſe of lords; that this property is equally taxable, and taxed, as the property of the commons; and therefore the commons not being the ſole perſons taxed, this cannot be the reaſon of their having the ſole right of raiſing and modelling the ſupply. The true reaſon, ariſing from the ſpirit of our conſtitution, ſeems to be this. The lords being a permanent hereditary body, created at pleaſure by the king, are ſuppoſed more liable to be influenced by the crown, and when once influenced to continue ſo, than the commons, who are a temporary elective body, freely nominated by the people. It would therefore be extremely dangerous to give the lords any power of framing new taxes for the ſubject; it is ſufficient that they have a power of rejecting, if they think the commons too laviſh or improvident in their grants. But ſo reaſonably jealous are the commons of this valuable privilege, that herein they will not ſuffer the other houſe to exert any power but that of rejecting. They will not permit the leaſt alteration or amendment to be made by the lords to the mode of taxing the people by a money-bill: under which appellation are included all bills by which money is directed to be raiſed upon the ſubject, for any purpoſe or in any ſhape whatſoever; either for the exigencies of government, and collected from the kingdom in general, as the land-tax; or for private benefit, and collected in any particular diſtrict, as by turnpikes, pariſh-rates, and the like. Yet Sir Matthew Hale mentions one caſe, founded on the practice of parliament in the reign of Henry VI. wherein he thinks the lords may alter a money-bill: and that is, if the commons grant a tax, as that of tonnage and poundage, for four years; and the lords alter it to a leſs time, as for two years; here, he ſays, the bill need not be ſent back to the commons for their concurrence, but may receive the royal aſſent without farther ceremony; for the alteration of the lords is conſiſtent with the grant of the commons. But ſuch an experiment will hardly be repeated by the lords, under the preſent improved idea of the privilege of the houſe of commons; and, in any caſe where a money-bill is remanded to the commons, all amendments in the mode of taxation are ſure to be rejected.

The commons, when they have voted a ſupply to his majeſty, and ſettled the *quantum* of that ſupply, uſually reſolve themſelves into what is called *a committee of ways and means*, to conſider the ways and means of raiſing the ſupply ſo voted. And in this committe every member (though it is looked upon as the peculiar province of the chancellor of the exchequer) may propoſe ſuch ſcheme of taxation as he thinks will be leaſt detrimental to the public. The reſolutions of this committee (when approved by a vote of the houſe) are in general eſteemed to be (as it were) final and concluſive. For though the ſupply cannot be actually raiſed upon upon the ſubject till directed by an act of the whole parliament, yet no monied man will ſcruple to advance to the government any quantity of ready caſh, on the credit of a bare vote of the houſe of commons, tho' no law be yet paſſed to eſtabliſh it.

The taxes which are raiſed upon the ſubject are either annual or perpetual.

I. The uſual annual taxes are thoſe upon land and malt. See LAND and MALT.

II. The perpetual are, 1. The cuſtoms. 2. The exciſe-duty. 3. The ſalt-duty. 4. The poſt office. 5. The ſtamp duty. 6. Houſe and window duty. 7. The duty on hackney-coaches and chairs. 8. That on offices and penſions.—See the articles CUSTOMS, EXCISE, SALT, POST, STAMP, HOUSE, HACKNEY, and OFFICES *and Penſions*.

As to the application of all theſe, ſee the articles REVENUE, NATIONAL *Debt*, FUNDS, and *Civil* LIST.

TAXATION. See REVENUE, TAX, and FEODAL SYSTEM.

TAXUS, the YEW-TREE; a genus of the monodelphia order, belonging to the diœcia claſs of plants. There are two ſpecies; of which the moſt remarkable is the baccata, or common yew, growing naturally in many places of England and Scotland. It is found here and there in the Highlands, in a truly wild ſtate. At Glenlure, near Glen-Creran, in Upper-Lorn, are the remains of an old wood of it. The place takes its name from the trees which grow in it; for *Glenlure*, in the Gaelic language, is no other than a corruption of *Gleaniuir*, i. e. "The valley of yew-trees."

It is an evergreen tree, of no great height; but the trunk grows to a large ſize. Mr Pennant has taken notice of a very remarkable decayed one in Fortingal church-yard, whoſe remains meaſured 56 feet and an half in circumference. The leaves are of a dark ſhining green, linear and acute, divided by a longitudinal nerve, and grow in a double ſeries, oppoſed to each other, on the ſame plane. The flowers, both male and female, grow from the alæ of the leaves. The berry is red and mucilaginous, of a ſingular ſtructure, being formed out of the receptacle, which ſwells and becomes ſucculent, but does not cover the top of the ſeed. It has a ſweet mawkiſh taſte. The wood is red and veined, very hard and ſmooth, and much uſed by turners and cabinet-makers. The tree is very patient of the ſheers, and will aſſume almoſt any figure. It has generally been ſuppoſed to have a poiſonous quality. We have repeated accounts of horſes and cows that have died by eating it; but whether the yew was the immediate cauſe of their death, is a matter of ſome doubt. The berries are certainly not poiſonous.

Our anceſtors eſteemed the wood of this tree as ſuperior to any other for making bows. For this intent it was planted in almoſt every church-yard, for the convenience and ready uſe of the ſeveral pariſhioners.

TAY, called by the Romans *Tavus* or *Taus*, the largeſt river in Scotland. It riſes in Braidalbin, on the frontiers of Lorn; and having in the paſſage of a few miles augmented its ſtream by the acceſſion of ſeveral ſmall rills, ſpreads itſelf into a lake called *Loch Dochart*; out of which having run but a little ſpace, it expands itſelf again. Leaving this ſecond lake, it rolls ſome miles with a conſiderable body of water, and then diffuſes itſelf abroad in the ſpacious Loch Tay; which, reckoning from the ſources of the river, is 24 miles in length, though, ſtrictly ſpeaking, the lake is but 13: almoſt as ſoon as it iſſues from hence, it receives the river Lion, coming out of Loch Lion, and running through Glen Lion; which, having travelled in a manner parallel to it, from its ſource, for the ſpace of 25 miles, at length joins the Tay as it enters Athol, which it next traverſes, and, directing its courſe in a manner due eaſt, receives almoſt all the waters of that country. Bending then to the ſouth, at the diſtance of ſix miles, it reaches Dunkeld; which, in the language of our anceſtors, ſignifies "the hill of hazels," was the very centre of the old Caledonia, and is at preſent eſteemed the heart of the Highlands. The river is very broad here, inſomuch that there is a ferry-boat over it at each end of the town. Declining ſtill to the ſouth-eaſt, with a winding courſe, for above

12 miles, the Tay receives a large ſupply of waters from the county of Angus; and then running ſouth-weſt for eight miles more, is joined in that ſpace by ſeveral rivers, the moſt conſiderable of which is the Almond. Turning then to the ſouth-eaſt, at the diſtance of about three miles, this copious river comes with a ſwelling ſtream to Perth, or St Johnſton's, which is the capital of the ſhire of that name.

The Tay, continuing ſtill a ſouth-eaſt courſe, receives, a few miles below Perth, the river Erne; which, iſſuing from a loch of the ſame name, traverſes the county of Strathern, and paſſes by Abernethy, once the capital of the Pictiſh kingdom: ſwelled by the waters of this laſt river, the Tay, running next directly eaſt, enlarges itſelf till it becomes about three miles broad; but contracts again before the town of Dundee; ſoon after which it opens into the German ocean. At the entrance of the frith, there are ſands both on the north and on the ſouth ſide, the former ſtyled *Goa*, latter *Aberlay* and *Drumlan*; and before theſe, in the very mouth of the frith, thoſe which are called the *Croſs Sands*. At Buttonneſs, which is the northern promontory, there are two light-houſes. The ſpace between the north and the ſouth ſands may be near a mile, with about three fathoms water; but being within the frith, it grows deeper, and in the road of Dundee is full ſix fathoms. The frith of Tay is not indeed ſo large or ſo commodious as that of Forth, but from Buttonneſs to Perth it is not leſs than 40 miles; and the whole may be, without any great impropriety, be ſtyled a harbour, which has Fife on one ſide, and the ſhires of Perth and Angus on the other, both very fertile and pleaſant countries.

TAYLOR (Dr Jeremy), biſhop of Down and Connor in Ireland, was the ſon of a barber at Cambridge, and there had his education. Upon entering into orders, he became divinity-lecturer of St Paul's in London; and was, by the intereſt of archbiſhop Laud, elected fellow of All-ſouls college, Cambridge, in 1636. Two years after he became one of the chaplains of the archbiſhop, who beſtowed on him the rectory of Uppingham in Rutlandſhire. In 1642, he was chaplain to the king; and a frequent preacher before him and the court at Oxford. He afterward attended in the king's army in the condition of a chaplain. Upon the declining of his majeſty's cauſe, he retired into Wales, where he was permitted to officiate as miniſter, and to keep a ſchool, in order to maintain himſelf and his children. In this retirement he wrote ſeveral of his works. Having ſpent ſeveral years there, his family was viſited with ſickneſs; and he loſt three ſons of great hopes, within the ſpace of two or three months. This affliction touched him ſo ſenſibly, that it made him deſirous to leave the country; and, going to London, he for a time officiated in a private congregation of loyaliſts to his great hazard. At length meeting with Edward lord Conway, that nobleman carried him over with him into Ireland, and ſettled him at Portmore, where he wrote his *Ductor Dubitantium*. Upon the reſtoration he returned to England: ſoon after, he was advanced to the biſhopric of Down and Connor in Ireland; and had the adminiſtration of the ſee of Dromore granted to him. He was likewiſe made privy-counſellor, and vice-chancellor of the univerſity of Dublin, which place he held till his death. He died of a fever at Liſnegarvy in 1667, and was interred in a chapel of his own erecting on the ruins of the old cathedral of Dromore.

TAYLOR (Dr John), a learned diſſenting miniſter, born in Lancaſhire. He ſettled firſt at Kirkſtead in Lincolnſhire, where he preached to a ſmall congregation and taught a grammar-ſchool for near 20 years. Afterward he removed to Norwich, where he preached many years in great repute, until he was invited to ſuperintend the academy formed at Warrington in Lancaſhire: but a few idle differences on formal punctilios and uncertain doctrines kindled into ſuch a flame there, as ſubjected him to much ſcurrility and ill treatment, and endangered the very being of the academy. He died in 1761; and among ſeveral other judicious performances, his Hebrew and Engliſh Concordance, 2 vols. folio, will remain a monument of his critical ſkill and indefatigable induſtry.

TAYLOR-*Bird*. See MOTACILLA.

TEA, or THEA, the *Tea-plant*; a genus of the monogynia order, belonging to the polyandria claſs of plants.

This ſhrub, formerly deſcribed by Dr Breynius, in his Century of Exotic Plants, publiſhed at Dantzick in 1678, is of a very ſlow growth, and diminutive ſize. It has a black, woody, irregularly branched root. The riſing ſtem ſoon ſpreads into many irregular branches and twigs. Theſe at the lower end and near the ground often ſeem to be more in number than they really are; for ſeveral ſeeds being put together in one hole, it frequently happens that two, three, or more ſhrubs grow up together, and ſo cloſe to one another, as to be eaſily miſtaken for one, by ignorant or leſs attentive obſervers. The bark is dry, thin, weak, cheſnut-coloured, firm, and adheres cloſely to the wood. It is covered with a very thin ſkin; which being removed, the bark appears, of a greeniſh colour, a bitter, nauſeous, and aſtringent taſte, with a ſmell much like the leaves of the hazel-nut tree, only more diſagreeable and offenſive. The wood is hard, fibrous, of a greeniſh colour, inclining to white, and of a very offenſive ſmell when green. The pith is very ſmall, and adheres cloſe to the wood. The branches and twigs are ſlender, of different ſizes, irregularly beſet with ſimple leaves, ſtanding on very ſmall, fat, green footſtalks; and reſembling, when full grown, the leaves of the garden cherry-tree; but when young, tender, and gathered for uſe, thoſe of the common ſpindle-tree, the colour only excepted. The leaves are ſmooth on both ſides, cloſely and unequally ſawed on the edge, of a dirty dark green colour, which is ſomewhat lighter on the back, where the nerves being raiſed conſiderably, leave ſo many hollows or furrows on the oppoſite ſide. They have one very conſpicuous nerve in the middle, which is branched out on each ſide into five, ſix, or ſeven thin tranſverſe ribs, of different lengths, and bent backwards near the edges of the leaves; between theſe tranſverſe ribs, run a number of ſmall veins. The leaves when freſh have no ſmell at all; and though aſtringent and bitteriſh, as we obſerved above, are not nauſeous, as the bark. They differ very much in ſubſtance, ſize, and ſhape, according to their age and the ſituation and nature of the ſoil in which the ſhrub is planted. From the wings of the leaves come forth the flowers in autumn. Theſe continue to grow till late in winter; and are compoſed of ſix petals, one or two of which are generally ſhrunk, and fall far ſhort of the largeneſs and beauty of the others. The footſtalk of the flower is about half an inch long, and ends in ſix very ſmall green leaves, which ſerve inſtead of the calix or flower-cup. This deſcription, applied by Kæmpfer to the ſhrub, which, as he pretends, produces all the different ſorts or preparations of tea, correſponds, ſays Linnæus, to a particular ſpecies only, termed by him *bohea;* for ſome tea-plants, he obſerves after Dr Hill, produce flowers compoſed of nine petals, which muſt therefore conſtitute a diſtinct ſpecies from ſuch as have only ſix. From this circumſtance is conſtructed the other ſpecies of that author, *thea viridis*, or green-tea, the flowers of which have always nine petals. The leaves alſo are much larger than thoſe of the bohea, and of a brighter green.

To proceed in our deſcription. Within the petals, which are of a very unpleaſant bitteriſh taſte, are placed many white ſtamina, exceeding ſmall, as in the wild roſe, with yellow heads, in ſhape not unlike a heart. Kæmpfer reckoned in one flower 230 of theſe ſtamina. To the flowers ſucceed the fruits in great plenty; theſe are compoſed of one, two, but moſt commonly of three, capſules, of the bigneſs of wild-plums, adhering, like the ſeed-veſſels of the palma chriſti, to one common footſtalk as to a centre, but divided into three pretty deep partitions. Each capſule contains a huſk, nut, and ſeed. The kernel or ſeed is reddiſh, of a firm ſubſtance like filberds, contains a great quantity of oil, and is very apt to grow rank, which is the reaſon why there are ſcarce two in ten that will germinate when ſown. The natives make no manner of uſe of either the flowers or kernels.

The ſhrub muſt be, at leaſt, of three years growth before the leaves, which it then bears in plenty, are fit to be plucked. In ſeven years time, or thereabouts, it riſes to a man's height; but as it then grows ſlowly, and bears but few leaves, the natives generally cut it down quite to the ſtem, after having firſt gathered what few leaves it produced. The next year, out of the remaining ſtem, proceed many young twigs and branches, which bear ſuch abundance of leaves, as will ſufficiently compenſate for the loſs of the former ſhrub. Some defer the operation of cutting down to the ſtem till the ſhrub is of ten years growth.

The leaves muſt not be tore off by handfuls, but plucked carefully, one by one; and are not be gathered all at once, but at different times. Thoſe who pluck their ſhrubs thrice a-year, begin their firſt gathering about the end of February. The ſhrub then bears but a few leaves, which are very tender and young, and not yet fully opened, as being ſcarce above two or three days growth. Theſe ſmall and tender leaves are reckoned much better than the reſt, and, becauſe of their ſcarcity and price, are diſpoſed of only to princes and rich people; for which reaſon they are called *Imperial-tea*, and by ſome the *flower of tea*. The ſecond gathering, and the firſt of thoſe who gather but twice a-year, is made about the latter end of March or beginning of April: ſome of the leaves are then already come to perfection, others are but half-grown: both, however, are plucked off promiſcuouſly; though care is afterwards taken, previous to the uſual preparation, to arrange them into claſſes, according to their ſize and goodneſs. The third and laſt gathering, which is alſo the moſt plentiful, is made in the end of May, when the leaves have attained their full growth, both in number and ſize. The leaves of this gathering are arranged in like manner as the former, according to their ſize and goodneſs, into different claſſes, the loweſt of which contains the coarſeſt leaves of all, being full two months grown, and that ſort which is commonly drank by the vulgar.

The preparation of the leaves conſiſts in drying or roaſting them when freſh gathered, over the fire in an iron pan, and rolling them when hot with the palm of the hand on a mat till they become curled. The particulars of this preparation, as related by the ingenious author from whom this deſcription is extracted, are much too tedious for our purpoſe. The reader is therefore referred to the work itſelf. Vide Kæmpfer's Hiſtory of Japan, vol. ii. appendix 1.

The tea, after having undergone a ſufficient roaſting and curling, muſt, when cold, be put up and carefully kept from the air. In this, indeed, the whole art of preſerving it chiefly conſiſts; becauſe the air, in thoſe hot climates, diſſipates its extremely ſubtile and volatile parts much ſooner than it would in our colder European countries. The Chineſe put it up in boxes of a coarſe tin, which, if they be very large, are incloſed in wooden caſes of fir, all the clefts being firſt carefully ſtopped both within and without. After this manner alſo it is ſent abroad into foreign countries. The Japaneſe keep their ſtock of the common tea in large earthen pots, with a narrow mouth. The better ſort of tea, namely, that which the emperor himſelf and the great men make uſe of, is kept in porcelain pots or veſſels, which are ſuppoſed to improve its virtues. The coarſe tea of the third gathering is not ſo eaſily injured by the air as the other ſorts; for tho' its virtues are comparatively fewer and leſs ſenſible, yet are they more conſtant and fixed. The country people keep it, as well as the other ſorts which they uſe, in ſtraw-baſkets, made like barrels, which they put under the roofs of their houſes, near the hole which lets out the ſmoke; being of opinion that nothing is better than ſmoke to preſerve the virtues of the leaves, and even improve them. Some put it up with common mugwort flowers, or the young leaves of a plant called *ſaſanqua*, which they believe renders it much more agreeable. Other odoriferous and aromatic ſubſtances are found, upon trial, to produce no ſuch beneficial effect.

The tea, as it is taken inwardly, is prepared in two different ways. The firſt uſed by the Chineſe, and now all over Europe, is nothing elſe but a ſimple infuſion of the leaves in hot water. The other way, which is peculiar to the Japaneſe, is by grinding. In this preparation, the leaves are, by means of a hand-mill made of a black-greeniſh ſtone called *ſerpentine ſtone*, reduced into a fine delicate powder, which being mixed with hot water into a thin pulp is afterwards ſipped. This tea is called *thick tea*, to diſtinguiſh it from the ſimple infuſion, and is drank every day by all the rich people and great men in Japan.

The narcotic quality of the freſh unprepared leaves of tea, mentioned above, is deſtroyed in a great meaſure by a repeated and gradual roaſting. This operation renders it exhilarating, refreſhing, and cleanſing. Kæmpfer obſerves, that tea is particularly ſerviceable in waſhing away that tartarous matter which is the efficient cauſe of calculous concretions, nephritic and gouty diſtempers; and affirms, that among the great tea-drinkers of Japan, he never met with any who were troubled with the gout or ſtone.

The leaves of tea, ſay writers on the Materia Medica, are much more uſed for pleaſure than as medicine: the Bohea, however, is eſteemed ſoftening, nouriſhing, and proper in all inward decays; the green is diuretic, carries an agreeable roughneſs with it into the ſtomach, which gently aſtringes the fibres, and gives them ſuch a tenſity as is neceſſary for a good digeſtion. Improper or exceſſive uſe may no doubt render this or any thing elſe prejudicial; but, in general, there are very few herbs employed, either in food or medicine, which, uſed with moderation, are better, pleaſanter, or ſafer, than tea.

We do not find that the tea-plant grows naturally beyond the 35th degree of north latitude on the one hand, and the 45th degree on the other.

Tea-*Tree* of New Zealand, is a ſpecies of myrtle, of which an infuſion was drank by Captain Cook's people in their voyages round the world. Its leaves were finely aromatic, aſtringent, and had a particular pleaſant flavour at the firſt infuſion; but this went off at the next filling up of the tea-pot, and a great degree of bitterneſs was then extracted; for which reaſon it was never ſuffered to be twice infuſed. In a fine ſoil in thick foreſts this tree grows to a conſiderable ſize; ſometimes 30 or 40 feet in height, and one foot in diameter. On a hilly and dry expoſure, it degenerates into a ſhrub of five or ſix inches; but its uſual ſize is about eight or ten feet high, and three inches in diameter. In that caſe its ſtem is irregular and unequal, dividing very ſoon into branches which riſe at acute angles; and only bear leaves and flowers at top. The flowers are white, and very ornamental to the whole plant.

TEAL, in ornithology. See Anas.

TEARS, a lymph or aqueous humour, which is ſubtile, limpid, and a little ſaltiſh: it is ſeparated from the arterial blood by the lachrymal glands and ſmall glandulous grains on the inſide of the eyelids.

TEBETH, the tenth month of the Jewiſh eccleſiaſtical year, and fourth of the civil. It anſwers to our month of December.

TECKLENBURG, a town of Germany, in the circle of Weſtphalia, capital of a county of the ſame name, with a caſtle built on a hill. It was bought by the king of Pruſſia in 1707. E. Long. 8. 7. N. Lat. 52. 20.

TECHNICAL, expreſſes ſomewhat relating to arts or ſciences: in this ſenſe we ſay technical terms. It is alſo particularly applied to a kind of verſes wherein are contained the rules or precepts of any art, thus digeſted to help the memory to retain them; an example whereof may be ſeen in the article Memory.

TE deum, the name of a celebrated hymn, uſed in the Chriſtian church, and ſo called becauſe it begins with theſe words, *Te Deum laudamus*, We praiſe thee, O God. It is ſung in the Romiſh church, with great pomp and ſolemnity, upon the gaining of a victory, or other happy event.

TEES, a river which riſes on the confines of Cumberland, and running eaſtward divides the county of Durham from Yorkſhire, and falls into the German ſea below Stockton.

TEETH. See Anatomy, n° 26.

TEETHING in Children. See Medicine, p. 4867.

TEFLIS, the capital of Perſian Georgia in Aſia, ſituated on the river Kur or Cyrus, in E. Long. 47. 20. N. Lat. 43°. It is not large; but, according to Sir John Chardin, one of the fineſt cities in the eaſt, with ſtrong walls on all ſides, except on the eaſt, where it is covered by the river Kur. On the ſouth ſide of it ſtands a large caſtle or fortreſs, built by the Turks in 1576, when they made themſelves maſters of the city and country, under the command of the famed Muſtapha Pacha. The city is very populous, and a place of great trade, eſpecially in furs, which are conveyed hence to Conſtantinople by the way of Erzerum. As for the ſilks of this country, they are bought up on the ſpot by the Armenians, and conveyed to Smyrna and other ports of the Mediterranean; but the greateſt part is firſt ſent to Erzerum to be manufactured, the Georgians being very ignorant and unſkilful in that reſpect. From hence, likewiſe, great quantities of a root called *boya*, is ſent to Erzerum and Indoſtan, for the uſe of the linen dyers. There are ſome magnificent caravanſeras, bazars, and palaces, in the city. Of the laſt, thoſe of the viceroys of Carthuel and Caket are the chief. They reckon no leſs than 14 churches in the city; one half of them belonging to the Georgians, and the other to the Armenians. As for moſques, the Georgians, it is ſaid, have never ſuffered any to be built, tho' they are under a Mohammedan government; but have always riſen up in arms as often as any attempts have been made to erect ſuch, and deſtroyed them. Here are ſome Romiſh Capuchins, as miſſionaries; but they go under the denomination of phyſicians, ſurgeons, or chemiſts, which three profeſſions are in great eſteem in the eaſt. The great cures they make, and the ſmall fees they take, which are generally in wine, meal, cattle, or young ſlaves, procure them ſome eſteem, though they are often expoſed to the inſults of the people, eſpecially when they attempt to make any proſelytes to their church. The inhabitants of Teflis are computed at near 20,000; viz. 4000 Armenians, 3000 Mohammedans, 2000 Georgians, and about 500 Romiſh Armenians, who are much hated by the others: the reſt are Perſians or ſtrangers, that are continually coming and going.

TEGUMENT, any thing that ſurrounds or covers another.

TEINTS, and Semi-teints, in painting, denote the ſeveral colours uſed in a picture, conſidered as more or leſs high, bright, deep, thin, or weakened and diminiſhed, &c. to give the proper relievo, ſoftneſs, or diſtance, &c. of the ſeveral objects.

TELESCOPE, an inſtrument formed by a combination of optical glaſſes or metallic ſpeculums with lenſes, by which diſtant objects may be viewed diſtinctly. See (*Index* ſubjoined to) Optics.

TELL (William,) an illuſtrious Swiſs patriot, chief in-

inſtrument of the revolution which delivered the Swiſs Cantons from the German yoke in 1307. Griſler, the governor of theſe provinces for the emperor Albert, having ordered him, under pain of death, to ſhoot at an apple placed on the head of one his children, he had the dexterity, though the diſtance was very conſiderable, to ſtrike it off without hitting the child. The tyrant, perceiving he had another arrow concealed under his cloak, aſked him for what purpoſe? To which he boldly replied, "To have ſhot you thro' the heart, if I had had the misfortune to kill my ſon." The enraged governor now ordered him to be hanged: but his fellow-citizens, animated by his fortitude and patriotiſm, flew to arms; attacked and vanquiſhed Griſler, who was ſhot to death by Tell; and the aſſociation for the independecy took place that inſtant.

TELLER, an officer of the exchequer, in ancient records called *tallier*. There are four of theſe officers, whoſe duty is to receive all ſums due to the king, and to give the clerk of the pells a bill to charge him therewith. They likewiſe pay all money due from the king, by warrant from the auditor of the receipt; and make weekly and yearly books both of their receipts and payments, which they deliver to the lord treaſurer.

TEMPE, (anc. geog.), a moſt pleaſant place or valley of Theſſaly. That there it was, appears from the epithets *Theſſalica*, (Livy); *Theſſala*, (Ovid); but in what particular diſtrict is the queſtion. From the Phthiotica of Catullus, it ſhould ſeem to be of Phthiotis: but the Peneus, which ran through Tempe, was at too great a diſtance, being ſeparated from it by Mount Othrys and others. Firſt, however, we ſhall define Tempe, previous to the determining the particular diſtrict in which it lay. The Peneus, according to Pliny, running down between Oſſa to the ſouth and Olympus to the north, for 500 ſtadia, is for half that ſpace navigable: in the direction of this courſe lies what is called *Tempe*, extending in length for five miles, in breadth for almoſt an acre and an half, with gentle convexities riſing on the right and left, beyond ken of human ſight. Within glides the Peneus in its verdant light, green in its pebbles, charming in the graſs on its banks, harmoniouſly vocal with the muſic of birds. In this deſcription Strabo and Ælian agree; the laſt adding, that it has an agreeable variety of places of retreat; and that it is not the work of man's hand, but the ſpontaneous production of nature; and Strabo, that formerly the Peneus formed a lake in this ſpot, being checked in its courſe by the higher grounds about the ſea; but that an opening being made by an earthquake, and Mount Oſſa torn from Olympus, the Peneus gained a free courſe between them. But Livy, who calls Tempe a grove, remarks a degree of horror rather than amenity, with which the Roman army was ſtruck in marching over the narrow paſs; for, beſides the defile, difficult to go over, which runs on for five miles, there are ſteep rocks on each hand, down which the proſpect is apt to cauſe a dizzineſs heightened by the noiſe and depth of the interfluent Peneus. Hence it appears that Tempe was in the Pelaſgiotis, whoſe extremity was formerly the Peneus, but afterwards, as is probable, allotted to Magneſia; and thus Pliny places the mouth of the Peneus not in Theſſaly itſelf, but in the Magneſia of Theſſaly. The name is properly *Temenos*, a ſacred grove; whence the Romans formed *Tempus*, and the diminutive *Tempulum*, or *Templum*. The name *Tempe* became at length an appellative to denote any pleaſant ſpot.

TEMPERAMENT, among phyſicians, the ſame with conſtitution, or a certain diſpoſition of the ſolids and fluids of the human body, by which it may be properly denominated ſtrong, weak, lax, &c.

In every perſon there are appearances of a temperament peculiar to himſelf, tho' the ancients only took notice of four, and ſome have imagined theſe were deduced from the theories of the four humours or four cardinal qualities; but it is more probable that they were firſt founded on obſervation, and afterwards adapted to thoſe theories, ſince we find that they have a real exiſtence, and are capable of receiving an explanation. The two that are moſt diſtinctly marked, are the ſanguineous and melancholic, viz. the temperaments of youth and age.

1. *Sanguineous*. Here there is laxity of ſolids, diſcoverable by the ſoftneſs of hair and ſucculency; large ſyſtem of arteries, redundancy of fluids, florid complexion; ſenſibility of the nervous power, eſpecially to pleaſing objects; irritability from the plethora; mobility and levity from lax ſolids. Theſe characters are diſtinctly marked, and are proved by the diſeaſes incident to this age, as hæmorrhagies, fevers, &c. but theſe, as they proceed from a lax ſyſtem, are more eaſily cured.

2. *Melancholic Habit*. Here greater rigidity of ſolids occurs, diſcoverable by the hardneſs and criſpature of the hair; ſmall proportion of the fluids, hence dryneſs and leanneſs; ſmall arteries, hence pale colour; venous plethora, hence turgeſcency of theſe, and lividity; ſenſibility, frequently exquiſite, but with great accuracy; moderate irritability, with remarkable tenacity of impreſſions; ſteadineſs in action and ſlowneſs of motion, with great ſtrength; for exceſs of this conſtitution in maniacs gives the moſt extraordinary inſtance of human ſtrength we know. This temperament is moſt diſtinctly marked in old age, and in males. The ſanguineous temperament of youth makes us not diſtinguiſh the melancholic till the decline of life, when it is very evident, from diſeaſes of the veins, hæmorrhoids, apoplexy, cachexy, obſtructions of the viſcera, particularly of the liver, dropſies, affections of the alimentary canal, chiefly from ſlower and weaker influence of the nervous power. So much for the ſanguineous and melancholic temperaments; the other two are not ſo eaſily explained.—The choleric temperament takes place between youth and manhood. In the

3. *Choleric*, the diſtribution of the fluids is more exactly balanced; there is leſs ſenſibility, and leſs obeſity, with more irritability, proceeding from greater tenſion, leſs mobility and levity, and more ſteadineſs in the ſtrength of the nervous power. As to the

4. *Phlegmatic*: This temperament cannot be diſtinguiſhed by any characters of age or ſex. It agrees with the ſanguineous in laxity and ſucculency. It differs from that temperament, and the melancholic, by the more exact diſtribution of the fluids. Again, it differs from the ſanguineous, by having leſs ſenſibility, irritability, mobility, and perhaps ſtrength, tho'

ſometimes indeed this laſt is found to be great.

Theſe are the ancient temperaments. The temperaments, indeed, are much more various; and very far from being eaſily marked and reduced to their genera and ſpecies, not only on account of variety of temperaments themſelves, but alſo on account of idioſyncraſy.

Temperament, in muſic, is defined by Rouſſeau to be an operation, which, by means of a ſlight alteration in the intervals, cauſes the difference between two contiguous ſounds to diſappear, makes each of theſe ſounds ſeem identical with the other, which, without offending the ear, may ſtill preſerve their reſpective intervals or diſtances one from the other. By this operation, the ſcale is rendered more ſimple, and the number of ſounds which would otherwiſe be neceſſary retrenched. Had not the ſcale been thus modified, inſtead of twelve ſounds alone which are contained in the octave, more than 60 would be indiſpenſably required to form what we properly call *modulation* in every tone.

It is proved by computation, that upon the organ, the harpſichord, and every other inſtrument with keys, there is not, and there ſcarcely can be, any chords properly in tune, ſave the octave alone. The cauſe is this, that though three thirds major, or four thirds minor, ought to form a juſt octave, thoſe are found to ſurpaſs, and theſe not to reach it.

TEMPERING, in the mechanic arts, the preparing of ſteel and iron, ſo as to render them more compact, hard, and firm; or even more ſoft and pliant, according to the reſpective occaſions. See **Iron** and **Steel**.

TEMPLARS, or **Templers**, a religious order inſtituted at Jeruſalem about the year 1118. Some religious gentlemen put themſelves under the government of the patriarch of Jeruſalem, renounced property, made the vow of celibacy and obedience, and lived like canons regular. King Baldwin aſſigned them an apartment in his palace. They had likewiſe lands given them by the king, the patriarch, and the nobility, for their maintenance. At firſt there were but nine of this order, and the two principal perſons were Hugo de Paganis and Geoffry of St Omers. About nine years after their inſtitution, a rule was drawn up for them, and a white habit aſſigned them, by Pope Honorius II. About 20 years afterwards, in the popedom of Eugenius III. they had red croſſes ſewed upon their cloaks as a mark of diſtinction; and in a ſhort time they were increaſed to about 300 in their convent at Jeruſalem. They took the name of *Knights Templars*, becauſe their firſt houſe ſtood near the temple dedicated to our Saviour at Jeruſalem. This order, after having performed many great exploits againſt the infidels, became rich and powerful all over Europe; but the knights, abuſing their wealth and credit, fell into great diſorders and irregularities. Many crimes and enormities being alleged againſt them, they were proſecuted in France, Italy, and Spain; and at laſt the Pope, by his bull of the 22d of May 1312, given in the council of Vienna, pronounced the extinction of the order of Templars, and united their eſtates to the order of St John of Jeruſalem.

Temple.

TEMPLE, a general name for places of public worſhip, whether Pagan, Chriſtian, or otherwiſe But the word, in a reſtrained ſenſe, is uſed to denote the places or edifices in which the Pagans offered ſacrifice to their falſe gods. The word is formed from the Latin *templum*, which ſome derive from the Greek τεμενος †, ſignifying the ſame thing; and others from τεμνω, *abſcindo*, "I cut off, I ſeparate," in regard a temple is a place ſeparated from common uſes. Others derive it from the old Latin word *templare*, "to contemplate." It is certain, the ancient augurs gave the name *templa* to thoſe parts of the heavens which they marked out for the obſervation of the flight of birds.—Their formula was this: *Templa teſqua ſunto.* See **Augur**.

Temples, among us, denote two inns of court in London, thus called, becauſe anciently the dwelling-houſe of the knights-templars. At the ſuppreſſion of that order, they were purchaſed by the profeſſors of the common law, and converted into *hoſpitia* or inns. They are called the *inner* and *middle temple*, in relation to Eſſex-houſe; which was alſo a part of the houſe of the templars, and called the *outer temple*, becauſe ſituate without Temple-Bar. In the middle temple, during the time of the templars, the king's treaſure was kept: as was alſo that of the kings of France in the houſe of templars at Paris. The chief officer was the maſter of the temple, who was ſummoned to parliament in 47 Hen. III. and from him the chief miniſter of the temple-church is ſtill called *maſter of the temple.*

TEMPLES, in anatomy, a double part of the head, reaching from the forehead and eyes to the two ears. The temples are chiefly formed of two bones called *oſſa temporis*. Theſe parts, according to phyſicians, were called *tempora*, from their ſhowing the age or time of man by the colour of the hair, which turns white in this part before any other; which Homer ſeems to have been aware of, by his calling men *poliocrotaphi*, *q. d.* "grey-templed."

TEMPLE (Sir William), grandſon of Sir William Temple ſecretary to the famous earl of Eſſex in queen Eliſabeth's time, who was a younger ſon of the ancient Temples of Temple-Hall in Leiceſterſhire, was born about 1629. From his youth he diſcovered a ſolid penetrating genius, and a wonderful deſire of knowledge, which his father Sir John took care to cultivate by all the advantages of a liberal education. His political principles would not ſuffer him to enter upon any public affairs till the way was made open for the king's reſtoration in 1660. He then made a diſtinguiſhed figure at court; and was ſent on ſeveral embaſſies, particularly in 1668 to the States-General, when he brought about the triple league between England, Holland, and Sweden. He had a great ſhare in the marriage of the prince of Orange with the lady Mary the duke of York's daughter; and was alſo one of the plenipotentiaries at the peace of Nimeguen in 1678. But the French intereſt gaining the aſcendant at court, he reſigned his public employments, and retired into the country, where he lived in retirement, ſolely employed in ſtudy and the cultivation of his gardens. Mr Swift, afterwards dean of St Patrick's, Dublin, lived with Sir William as his amanuenſis, and aſſiſted in preparing his works for the preſs. Sir Wil-

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† See Tempe, and Templum.

liam died toward the end of the year 1700, at Moor-Park near Farnham in Surry, where, according to his expreſs directions in his will, his heart was buried in a ſilver box under the ſun-dial in his garden, oppoſite to the window from whence he uſed to contemplate the works of nature. He wrote, 1. Obſervations upon the United Provinces. 2. *Miſcellanea*. 3. Memoirs. 4. An introduction to the Hiſtory of England. 5. Letters on the moſt important tranſactions, 3 vols. Mr Boyer tells us, that he was "an accompliſhed gentleman, a ſound politician, a patriot, and a great ſcholar. And if this great idea ſhould perchance be ſhaded by ſome touches of *vanity* any *ſpleen*, the reader will be ſo candid as to conſider, that the greateſt, wiſeſt, and the beſt of men, have ſtill ſome failings and imperfections which are inſeparable from human nature." Sir William Temple had one ſon, John Temple, Eſq; a man of great abilities and accompliſhments, who on the revolution was appointed ſecretary at war by king William: but he had ſcarcely been a week in office when, on ſome ſecret diſcontent, he took a boat and drowned himſelf at London Bridge. This gentleman had married mademoiſelle Du Pleſſis Rombouillet, a French lady, who had by him two daughters, to whom Sir William bequeathed the bulk of his eſtate; but with this expreſs condition, that they ſhould not marry Frenchmen: "A nation," ſays Boyer, "to whom Sir William ever bore a general hatred, upon account of their imperiouſneſs and arrogance to foreigners."

TEMPLUM, in antiquity, in general a place ſequeſtered or ſet apart; from *Temenos*, called in the Æolic dialect *Tempos*. In a ſtricter ſenſe, places allotted for religious purpoſes; and in a ſtill ſtricter, for a ſpace or quarter of the heavens marked out by the augur with his *lituus*; where he carefully obſerved the motion and ſinging of the birds, and in what part of this *Templum* they made their appearance. And hence a place walled round, and deſtined for the worſhip of any deity, and conſecrated by the augurs, was called *Tempulum Auguſtum*; and the act itſelf *inauguration* or *conſecration*.

TEMPORAL, a term generally uſed for ſecular, as a diſtinction from eccleſiaſtical. Thus we ſay temporal lords, and ſpiritual or eccleſiaſtical lords.

TEMPORALTIES *of* BISHOPS, are the revenues, lands, tenements, and lay-fees, belonging to biſhops, as they are barons and lords of parliament.

The cuſtody of the temporalties of biſhops forms a branch of the king's ordinary revenues; (ſee REVENUE.)—Theſe, upon the vacancy of the biſhopric, are immediately the right of the king, as a conſequence of his prerogative in church-matters; whereby he is conſidered as the founder of all archbiſhoprics and biſhoprics, to whom during the vacancy they revert. And for the ſame reaſon, before the diſſolution of abbeys, the king had the cuſtody of the temporalties of all ſuch abbeys and priories as were of royal foundation (but not of thoſe founded by ſubjects), on the death of the abbot or prior. Another reaſon may alſo be given why the policy of the law hath veſted this cuſtody in the king; becauſe, as the ſucceſſor is not known, the lands and poſſeſſions of the ſee would be liable to ſpoil and devaſtation if no one had a property therein. Therefore the law has given the king, not the temporalties themſelves, but the cuſtody of the temporalties till ſuch time as a ſucceſſor is appointed; with power of taking to himſelf all the intermediate profits, without any account of the ſucceſſor; and with the right of preſenting (which the crown very frequently exerciſes) to ſuch benefices and other preferments as fall within the time of vacation. This revenue is of ſo high a nature, that it could not be granted out to a ſubject, before or even after it accrued: but now, by the ſtatute 15 Edw III. ſt. 4. c. 4 & 5. the king may, after the vacancy, leaſe the temporalties to the dean and chapter; ſaving to himſelf all advowſons, eſcheats, and the like. Our ancient kings, and particularly William Rufus, were not only remarkable for keeping the biſhoprics a long time vacant, for the ſake of enjoying the temporalties, but alſo committed horrible waſtes on the woods and other parts of the eſtate; and to crown all, would never, when the ſee was filled up, reſtore to the biſhop his temporalties again, unleſs he purchaſed them at an exorbitant price. To remedy which, king Hen. I. granted a charter at the beginning of his reign, promiſing neither to ſell, nor let to farm, or take any thing from, the domains of the church, till the ſucceſſor was inſtalled. And it was made one of the articles of the great charter, that no waſte ſhould be committed in the temporalties of biſhoprics, neither ſhould the cuſtody of them be ſold. The ſame is ordained by the ſtatute of Weſtminſter the firſt; and the ſtatute 14 Edw. III. ſtat. 4. c. 4. (which permits a leaſe to the dean and chapter) is ſtill more explicit in prohibiting the other exactions. It was alſo a frequent abuſe, that the king would, for trifling or no cauſes, ſeize the temporalties of biſhops, even during their lives, into his own hands: but this is guarded againſt by ſtatute 1 Edw. III. ſt. 2. c. 2.

This revenue of the king, which was formerly very conſiderable, is now by a cuſtomary indulgence almoſt reduced to nothing: for, at preſent, as ſoon as the new biſhop is conſecrated and confirmed, he uſually receives the reſtitution of his temporalties quite entire and untouched from the king; and then, and not ſooner, he has a fee-ſimple in his biſhopric, and may maintain an action for the profits.

TENAILLES, in fortification, are low works made in the ditch before the curtains. There three ſorts. The firſt are the faces of the baſtions produced till they meet, but much lower; the ſecond have faces, flanks, and a curtain; and the third have only faces and flanks.

TENANT, one that holds lands or tenements of ſome lord or landlord, by rent, fealty, &c. See TENURE.

TENCH, in ichthyology. See CYPRINUS.

TENDER, a ſmall ſhip in the ſervice of men of war, for carrying men, proviſions, or any thing elſe that is neceſſary.

TENDONS, in anatomy, are white, firm, and tenacious parts, continuous to the muſcles, and uſually forming their extremities. See ANATOMY, n° 83, c.

TENEBRIO, a genus of inſects belonging to the order of coleoptera. The laſt joint of the antennæ is roundiſh; the breaſt is ſomewhat convex, and marginated; the head is ſtretched forward, and the elytra are ſtiff. There are 33 ſpecies, principally diſtinguiſhed by their colour. The larvæ of ſome live in damp places under ground among rubbiſh; of others in flour and different kinds of food, where they perform their metamorphoſis. The perfect inſects are very troubleſome in houſes; eating bread, meat, &c. They precipitately avoid the light; reſorting in troops to dark damp cellars, where putrefaction allures and nouriſhes them. They are all of a very dark gloomy appearance, from which circumſtance they take their name.

TENEDOS (anc. geog.), an iſland on the coaſt of Troas, at the diſtance of 40 ſtadia from the continent, and 80 in compaſs; with a cognominal Æolian town, and a temple of Apollo Smintheus. It was no inconſiderable town, as appears from its coins, inſcribed *Tenedii*, the people. Its origin is derived from Tennes, or Tenes, who being expoſed in a coffer or bog by his father Cygnus the Thracian, at the inſtigation of the mother-in-law, was by fate carried to this iſland, made king of it, and at length worſhipped as a god on account of his virtues. The iſland was famous for its earthen ware, for which purpoſe it had an excellent red clay; and hence Bochart would derive the appellation from *tinedom*, a "red clay." *Tenedia ſecuris*, is a proverbial ſaying to denote ſeverity; from a law there paſſed, that perſons found in the act of adultery ſhould be put to death; a ſeverity executed on the king's ſon; and therefore, in the coins of Tenedos, on one ſide are two heads in memorial of the king and his ſon, and on the reverſe an ax, (Ariſtotle.) This iſland ſtill retains its ancient name; and is one of the ſmalleſt iſlands of the Archipelago, ſituated near the coaſt of Leſſer Aſia, weſt of the ruins of Troy. It belongs to the Turks, and is remarkable for producing the beſt muſcadine wine in the Levant. On the eaſtern ſide is a pretty large town, ſeated at the foot of a mountain, with a fine harbour commanded by a caſtle. E. Long. 27. 0. N. Lat. 29. 30.

TENERIFF, the moſt conſiderable of the Canary iſlands, being about 45 miles in length and 20 in breadth, abounding with wine, different ſorts of fruit, cattle, and game. It is ſubject to earthquakes; and in 1704 there happened one that deſtroyed ſeveral towns and many thouſand people. It is remarkable for a very high mountain called the *Peak*, which in a clear day may be ſeen 100 miles off. It was formerly a volcano, and ſtill emits hot ſulphureous ſteams from chinks in different parts. Its height has been computed by Dr Heberden at 15,396 feet, which is but 148 yards leſs than three miles. On the top is found the natron, or foſſil fixed alkali, and likewiſe ſome very pure natural ſulphur. W. Long. 16. 22. N. Lat. 28. 30.

TENESMUS, in medicine, a name given by medical writers to a complaint which is a continual deſire of going to ſtool, but without any ſtool being ready to be voided. This is properly no primary diſeaſe, but merely a ſymptomatic one, and differs in degree according to the diſeaſe on which it is an attendant.

TENIERS (David) the Elder, a Flemiſh painter, born at Antwerp in 1582. He received the firſt rudiments of his art from the famous Rubens, who highly eſteemed him for his promiſing genius, and with great ſatisfaction examined and commended his deſigns. From the ſchool of that celebrated painter Teniers went to finiſh his ſtudies at Rome: he attached himſelf to Adam Elſheimer for ſix years; and from the inſtructions of two ſuch incomparable maſters, he formed to himſelf a peculiar ſtyle, which his ſon cultivated ſo happily afterward as to bring it to the utmoſt perfection. His pictures were ſmall; and his ſubjects uſually ſhops, elaboratories, humourous converſations, and rural feſtivities. The demand for his pieces was univerſal; and even his maſter Rubens thought them an ornament to his cabinet. He died at Antwerp in 1649.

TENIERS (David) the Younger, alſo an admirable painter, was the ſon of the former, and was born at Antwerp in 1610. He obtained the name of *Ape of Painting*, from his imitating the manner of different painters with ſuch exactneſs, as to deceive even the niceſt judges. He improved greatly under his father, and obtained ſuch reputation as introduced him to the favour of the great. The archduke Leopold William made him gentleman of his bed-chamber; and all the pictures of his gallery were copied by Teniers, and engraved by his direction. The king of Spain and Don Juan of Auſtria ſet ſo high a value on his pictures, that they built a gallery on purpoſe for them. William prince of Orange honoured him with his friendſhip; and Rubens not only eſteemed his works, but aſſiſted him with his advice. His principal talent lay in landſcapes adorned with ſmall figures. He alſo painted men drinking and ſmoking, chemiſts elaboratories, country fairs, and the like. His ſmall figures are ſuperior to his large ones. He died in 1694.

The works of the father and ſon are thus diſtinguiſhed: The latter diſcover a finer touch and freſher pencil, greater variety of attitudes, and a better diſpoſition of the figures. The father retained ſomething of the tone of Italy in his colouring, which was ſtronger than the ſon's; beſides, the ſon uſed to put at the bottom of his pictures, David Teniers, junior.

Abraham, another ſon of David the Elder, was equal, if not ſuperior, to his father and brother in the expreſſion of his characters, and his underſtanding the *claro obſcuro*; though he was inferior in the ſprightlineſs of his touch, and the lightneſs of his pencil.

TENISON (Dr Thomas), archbiſhop of Canterbury, was born at Cottenham in Cambridgeſhire in 1636; and ſtudied at Corpus Chriſti college in Cambridge. In his youth, while the fanatical government laſted, he applied himſelf to phyſic; but afterward went into orders, and was ſome time miniſter of St Andrew's church, Cambridge; where he attended the ſick during the plague in 1665, which his pariſhioners acknowledged by the preſent of a piece of plate. He ſhowed himſelf very active againſt the growth of Popery by his writings both in king Charles and king James's reigns: in 1680 he was preſented to the vicarage of St Martin's in the Fields, London, to which pariſh he made ſeveral donations; and among others, endowed a free ſchool, and built a handſome library, which he furniſhed with uſeful books. King William and queen Mary, in 1689, preſented him to the archdeaconry of London; in 1691, he was nominated to the ſee of Lincoln, and in 1694 he ſucceeded Dr Tillotſon as archbiſhop of Canterbury. He performed all the duties of a good primate for 20 years, and died in 1715.

TENOR, or TENOUR, the purport or content of a writing or inſtrument in law, &c.

Tenor, in muſic, the firſt mean, or middle part, or that which is the ordinary pitch of the voice, when neither raiſed to a treble nor lowered to a baſs.

TENSE, in grammar, an inflection of verbs, whereby they are made to ſignify or diſtinguiſh the circumſtance of time in what they affirm. See Grammar.

TENT, in war, a pavilion or portable houſe. They are made of canvaſs, for officers and ſoldiers to lie under when in the field. The ſizes of the officers tents are not fixed; ſome regiments have them of one ſize, and ſome of another: a captain's tent and marquee is generally 10½ feet broad, 14 deep, and 8 high: the ſubalterns are a foot leſs; the major's and lieutenant-colonel's a foot larger; and the colonel's two feet larger. The ſubalterns of foot lie two a tent, and thoſe of horſe but one. The tents of private men are 6½ feet ſquare, and 5 feet high; and hold five ſoldiers each. The tents for horſe are 7 feet broad, and 9 feet deep: they hold likewiſe five men and their horſe accoutrements.—The word is formed from the Latin *tentorium*, of *tendo*, "I ſtretch," in regard tents are uſually made of canvas ſtretched out, and ſuſtained by poles, with cords and pegs.

Tent, in ſurgery, a roll of lint made into the ſhape of a nail with a broad flat head, chiefly uſed in deep wounds and ulcers. They are of ſervice, not only in conveying medicines to the moſt intimate receſſes and ſinuſes of the wound, but to prevent the lips of the wound from uniting before it is healed from the bottom; and by their aſſiſtance grumous blood, ſordes, &c. are readily evacuated.

TENTHREDO, the saw-fly; a genus of inſects belonging to the order of hymenoptera. The mouth is furniſhed with jaws, but has no proboſcis; the wings are plain and tumid; the ſting conſiſts of two ſerrated laminæ, and the ſcutellum of two grains placed at a diſtance. The ſpecies are very numerous, differing from one another in colour and ſize. They are not very ſhy. Some, by means of their ſaw, depoſit in the buds of flowers, others on the twigs of trees or ſhrubs, eggs from which are produced falſe caterpillars. The implement with which they are armed is nowiſe formidable; as it appears only deſtined to the purpoſe of depoſiting their eggs.

The ſylvatica is a beautiful ſpecies. The antennæ are ſetaceous, and have more than 20 joints. The head is blue; the trunk grey mottled with yellow; the body is black; the lines dividing the rings are browniſh; the ſix terminatory ſegments are amber-coloured. The wings are brown, with a duſky edge. The legs are yellow. This delicate fly is found in damp woods and moors in Auguſt and September. When the female lays her eggs, there goes with them an acrid mucilaginous juice, which perverts the courſe of the ſap in the plant, and makes it grow into a kind of gall; this operates as ſoon as emitted, and ſcarifies the part the ſaw has wounded. One may ſee bubbles of this ſoft and clammy juice always left upon the plant; the wound is oblong and crooked, and the part becomes black as if burnt. The egg increaſes in bigneſs to twice its ſize, or more, after it is lodged in the plant; nor is this ſtrange, ſince it has no hard covering. The larvæ may eaſily be known by the number of their feet, which are always more than 16; by which they differ from caterpillars, which have 16 at moſt, and never fewer than 8. In order to accompliſh their metamorphoſe, they hide themſelves in the ground, ſpin their cod, the inſide of which is lined with a very fine down, and admit through the netted texture that moiſture from the earth which they have need of in the ſtate of chryſalids.

TENTHS, and first-fruits *of Spiritual Preferments*, a branch of the king's revenue. See Revenue.

Theſe were originally a part of the Papal uſurpations over the clergy of this kingdom; firſt introduced by Pandulph the pope's legate, during the reigns of king John and Henry III. in the ſee of Norwich; and afterwards attempted to be made univerſal by the popes Clement V. and John XXII. about the beginning of the 14th century. The firſt-fruits, *primitiæ*, or *annates*, were the firſt year's whole profits of the ſpiritual preferment, according to a rate or *valor* made under the direction of pope Innocent IV. by Walter biſhop of Norwich in 38 Hen. III. and afterwards advanced in value by commiſſion from pope Nicholas III. A. D. 1292, 20 Edw. I.; which valuation of pope Nicholas is ſtill preſerved in the exchequer. The tenths, or *decimæ*, were the tenth part of the annual profit of each living by the ſame valuation; which was alſo claimed by the holy ſee, under no better pretence than a ſtrange miſapplication of that precept of the Levitical law, which directs, that the Levites "ſhould offer the tenth part of their tithes as a heave-offering to the Lord, and give it to Aaron the high-prieſt." But this claim of the pope met with vigorous reſiſtance from the Engliſh parliament; and a variety of acts were paſſed to prevent and reſtrain it, particularly the ſtatute 6 Hen. IV. c. 1. which calls it a *horrible miſchief and damnable cuſtom*. But the Popiſh clergy, blindly devoted to the will of a foreign maſter, ſtill kept it on foot; ſometimes more ſecretly, ſometimes more openly and avowedly: ſo that in the reign of Henry VIII. it was computed, that in the compaſs of 50 years 800,000 ducats had been ſent to Rome for firſt-fruits only. And as the clergy expreſſed this willingneſs to contribute ſo much of their income to the head of the church, it was thought proper (when in the ſame reign the papal power was aboliſhed, and the king was declared the head of the church of England) to annex this revenue to the crown; which was done by ſtatute 26 Hen. VIII. c. 3. (confirmed by ſtatute 1 Eliz. c. 4.); and a new *valor beneficiorum* was then made, by which the clergy are at preſent rated.

By theſe laſt-mentioned ſtatutes all vicarages under ten pounds a-year, and all rectories under ten marks, are diſcharged from the payment of firſt-fruits: and if, in ſuch livings as continue chargeable with this payment, the incumbent lives but half a year, he ſhall pay only one quarter of his firſt-fruits; if but one whole year, then half of them; if a year and a half, three quarters; and if two years, then the whole, and not otherwiſe. Likewiſe by the ſtatute 27 Henry VIII. c. 8. no tenths are to be paid for the firſt year, for then the firſt-fruits are due: and by other ſtatutes of queen Anne, in the fifth and ſixth years of her reign, if a benefice be under 50l. *per annum* clear yearly value, it ſhall be diſcharged of the payment of firſt-fruits and tenths.

Thus the richer clergy being, by the criminal bigotry of their Popiſh predeceſſors, ſubjected at firſt to a foreign exaction, were afterwards, when that yoke was ſhaken off, liable to a like miſapplication of their revenues, through the rapacious diſpoſition of the then reigning monarch; till at length the piety of queen Anne reſtored to the church what had been thus indirectly taken from it. This ſhe did, not by remitting the tenths and firſt-fruits entirely; but, in a ſpirit of the trueſt equity, by applying theſe ſuperfluities of the larger benefices to make up the deficiences of the ſmaller. And to this end ſhe granted her royal chatrer, which was confirmed by the ſtatute 2 Ann. c. 11. whereby all the revenue of firſt-fruits and tenths is veſted in truſtees for ever, to form a perpetual fund for the augmentation of poor livings. This is uſually called *queen Anne's bounty;* which has been ſtill farther regulated by ſubſequent ſtatutes.

TENURE, in law, ſignifies the manner whereby lands or tenements are held, or the ſervice that the tenant owes to his lord.

Of this kingdom almoſt all the real property is by the policy of our laws ſuppoſed to be granted by, dependent upon, and holden of, ſome ſupperior lord, by and in conſideration of certain ſervices to be rendered to the lord by the tenant or poſeſſor of this property. The thing holden is therefore ſtyled a *tenement*, the poſſeſſors thereof *tenants*, and the manner of their poſſeſſion a *tenure*. Thus all the lands in the kingdom is ſuppoſed to be holden, mediately or immediately, of the king; who is ſtyled the *lord paramount*, or above all. Such tenants as held under the king immediately, when they granted out portions of the lands to inferior perſons, became alſo lords with reſpect to thoſe inferior perſons, as they were ſtill tenants with reſpect to the king; and, thus partaking of a middle nature, were called *meſne* or *middle lords*. So that if the king granted a manor to A, and he granted a portion of the land to B, now B was ſaid to hold of A, and A of the king; or, in other words, B held his lands immediately of A, but mediately of the king. The king therefore was ſtyled *lord paramount;* A was both tenant and lord, or was a meſne lord; and B was called *tenant paravail*, or the *loweſt tenant*, being he who was ſuppoſed to make avail, or profit of the land. In this manner are all the lands of the kingdom holden which are in the hands of ſubjects: for according to Sir Edward Coke, in the law of England we have not properly *allodium;* which we have ſees in the name by which the feudiſts abroad diſtinguiſh ſuch eſtates of the ſubject as are not holden of any ſuperior. So that at the firſt glance we may obſerve, that our lands are either plainly feuds, or partake very ſtrongly of the feodal nature.

All tenures being thus derived, or ſuppoſed to be derived, from the king, thoſe that held immediately under him, in right of his crown and dignity, were called his *tenants in capite*, or *in chief*; which was the moſt honourable ſpecies of tenure, but at the ſame time ſubjected the tenants to greater and more burdenſome ſervices than inferior tenures did. And this diſtinction ran through all the different ſorts of tenure.

There ſeem to have ſubſiſted among our anceſtors four principal ſpecies of lay-tenures, to which all other may be reduced: the grand criteria of which were the natures of the ſeveral ſervices or renders that were due to the lords from their tenants. The ſervices, in reſpect of their quality, were either free or baſe ſervices; in reſpect of their quantity and the time of exacting them, were either certain or uncertain. Free ſervices were ſuch as were not unbecoming the character of a ſoldier or a freeman to perform; as to ſerve under his lord in the wars, to pay a ſum of money, and the like. Baſe ſervices were ſuch as were fit only for peaſants or perſons of a ſervile rank; as to plough the lord's land, to make his hedges, to carry out his dung, or other mean employments. The certain ſervices, whether free or baſe, were ſuch as were ſtinted in quantity, and could not be exceeded on any pretence; as, to pay a ſtated annual rent, or to plough ſuch a field for three days. The uncertain depended upon unknown contingencies: as, to do military ſervice in perſon, or pay an aſſeſſment in lieu of it when called upon; or to wind a horn upon the appearance of invaders; which are free ſervices: or to do whatever the lord ſhould command; which is a baſe or villein ſervice.

From the various commbinations of theſe ſervices have ariſen the four kinds of lay-tenure which ſubſiſted in England till the middle of the laſt century; and three of which ſubſiſt to this day. Of theſe Bracton (who wrote under Henry the third) ſeems to give the cleareſt and moſt compendious account, of any author ancient or modern, of which the following is the outline or abſtract: "Tenements are of two kinds, frank-tenement, and villenage. And, of frank-tenements, ſome are held freely in conſideration of homage and knight-ſervice; others in free-ſocage, with the ſervice of fealty only. And again, of villenages, ſome are pure, and others privileged. He that holds in pure villenage ſhall do whatſoever is commanded him, and always be bound to an uncertain ſervice. The other kind of villenage is called *villein-ſocage;* and theſe villein-ſocmen do villein-ſervices, but ſuch as are certain and determined." Of which the ſenſe ſeems to be as follows: firſt, where the ſervice was free, but uncertain, as military ſervice with homage, that tenure was called the *tenure in chivalry*, *per ſervitium militare*, or by knight-ſervice. Secondly, where the ſervice was not only free, but alſo certain, as by fealty only, by rent and fealty, &c. that tenure was called *liberum ſocagium*, or *free ſocage*. Theſe were the only free holdings or tenements; the others were villenous or ſervile: as, thirdly, where the ſervice was baſe in its nature, and uncertain as to time and quantity, the tenure was *purum villenagium*, abſolute or pure villenage. Laſtly, where the ſervice was baſe in its nature, but reduced to a certainty, this was ſtill villenage, but diſtinguiſhed from the other by the name of *privileged villenage*, *villenagium privilegiatum;* or it might be ſtill called *ſocage* (from the certainty of its ſervices), but degraded by their baſeneſs into the inferior title of *villanum ſocagium*, villein-ſocage.

1. The miltary tenure, or that by knight-ſervice, was done away by ſtat. 12 Car. II. For an account of this ſpecies of tenure, ſee FEODAL *Syſtem*, and KNIGHT-*Service;* and for its incidents, ſee AIDS, RELIEF, PRIMER-SEISIN, WARDSHIP, MARRIAGE, FINES, and ESCHEAT (in APPENDIX).

2. The ſecond ſpecies of tenure or free-ſocage, not only ſubſiſts to this day, but has in a manner abſorbed

bed and ſwallowed up (ſince the ſtatute of Charles the ſecond) almoſt every other ſpecies of tenure. See SOCAGE.

The other grand diviſion of tenure, mentioned by Bracton is that of villenage, as contradiſtinguiſhed from *liberum tenementum*, or frank-tenure. And this (we may remember) he ſubdivides into two claſſes, pure and privileged villenage: from whence have ariſen two other ſpecies of our modern tenures.

3. From the tenure of pure villenage have ſprung our preſent copyhold-tenures, or tenure by copy of court-roll at the will of the lord; in order to obtain a clear idea of which it will be previouſly neceſſary to conſult the articles MANOR and VILLENAGE.

As a farther conſequence of what has been there explained, we may collect theſe two main principles, which are held to be the ſupporters of a copyhold-tenure, and without which it cannot exiſt; 1. That the lands be parcel of and ſituate within that manor under which it is held. 2. That they have been demiſed, or demiſable, by copy of court-roll immemorially. For immemorial cuſtom is the life of all tenures by copy; ſo that no new copyhold can, ſtrictly ſpeaking, be granted at this day.

In ſome manors, where the cuſtom hath been to permit the heir to ſucceed the anceſtor in his tenure, the eſtates are ſtyled *copyholds of inheritance*; in others, where the lords have been more vigilant to maintain their rights, they remain coypholds for life only; for the cuſtom of the manor has in both caſes ſo far ſuperſeded the will of the lord, that, provided the ſervices be performed or ſtipulated for by fealty, he cannot in the firſt inſtance refuſe to admit the heir of his tenant upon his death; nor, in the ſecond, can he remove his preſent tenant ſo long as he lives, though he holds nominally by the precarious tenure of his lord's will.

The fruits and appendages of a copyhold-tenure, that it hath in common with free tenures, are fealty, ſervices (as well in rents as otherwiſe), reliefs, and eſcheats. The two latter belong only to copyholds of inheritance; the former to thoſe for life alſo. But, beſides theſe, copyholds have alſo heriots, wardſhip, and fines. Heriots, which are agreed to be a Daniſh cuſtom, are a render of the beſt beaſt or other good (as the cuſtom may be) to the lord on the death of the tenant. This is plainly a relic of villein-tenure; there being originally leſs hardſhip in it, when all the goods and chattels belonged to the lord, and he might have ſeized them even in the villein's lifetime. Theſe are incident to both ſpecies of copyhold; but wardſhip and fines to thoſe of inheritance only. Wardſhip, in copyhold-eſtates, partakes both of that in chivalry and that in ſocage. Like that in chivalry, the lord is the legal guardian; who uſually aſſigns ſome relation of the infant tenant to act in his ſtead: and he, like guardian in ſocage, is accountable to his ward for the profits. Of fines, ſome are in the nature of primer-ſeiſins, due on the death of each tenant, others are mere fines for alienation of the lands; in ſome manors, only one of thoſe ſorts can be demanded, in ſome both, and in others neither. They are ſometimes arbitrary and at the will of the lord, ſometimes fixed by cuſtom: but, even when arbitrary, the courts of law, in favour of the liberty of copyholders, have tied them down to be reaſonable in their extent; otherwiſe they might amount to diſheriſon of the eſtate. No fine therefore is allowed to be taken upon deſcents and alienations, (unleſs in particular circumſtances) of more than two years improved value of the eſtate. From this inſtance we may judge of the favourable diſpoſition that the law of England (which is a law of liberty) hath always ſhown to this ſpecies of tenants, by removing, as far as poſſible, every real badge of ſlavery from them, however ſome nominal ones may continue. It ſuffered cuſtom very early to get the better of the expreſs terms upon which they held their lands; by declaring, that the will of the lord was to be interpreted by the cuſtom of the manor: and, where no cuſtom has been ſuffered to grow up to the prejudice of the lord, as in this caſe of arbitary fines, the law itſelf interpoſes in an equitable method, and will not ſuffer the lord to extend his power ſo far as to diſinherit the tenant.

4. There is yet a fourth ſpecies of tenure, deſcribed by Bracton under the name ſometimes of *privileged villenage*, and ſometimes of *villein-ſocage*. See *Privileged* VILLENAGE.

Having in the preſent article and thoſe referred to, taken a compendious view of the principal and fundamental points of the doctrine of tenures, both ancient and modern, we cannot but remark the mutual connection and dependence that all of them have upon each other. And upon the whole it appears, that, whatever changes and alterations theſe tenures have in proceſs of time undergone, from the Saxon æra to the 12 Car. II. all lay-tenures are now in effect reduced to two ſpecies; free-tenure in common ſocage, and baſe-tenure by copy of court-roll. But there is ſtill behind one other ſpecies of tenure, reſerved by the ſtatute of Charles II. which is of a ſpiritual nature, and called the tenure in FRANK-*Almoign*; ſee that article.

TEPID, a term uſed by writers on mineral waters, &c. to expreſs ſuch of them as have a leſs ſenſible cold than common water.

TERCERA, one of the largeſt iſlands of the Azores, or Weſtern Iſlands, lying in the Atlantic Ocean. It is about 40 miles in circumference; and ſurrounded with craggy rocks, which render it almoſt inacceſſible. The ſoil is fertile, abounding in corn, wine, and fruits; and they have ſuch plenty of cattle, that they ſupply the ſhips therewith that call there. However, their principal trade is wood. The inhabitants are lively and well made; and they pretend to a great deal of religion and gallantry at the ſame time. They pique themſelves upon points of honour, and are extremely revengeful. It is their cuſtom to rove about in the night-time in queſt of intrigues, and ſeldom fail in finding women for their purpoſe. It is ſubject to Portugal; and Angra is the capital town.

TEREBINTHUS, in botany. See PISTACIA.

TEREDO, the PIERCER; a genus of inſects belonging to the order of vermes teſtacea. There is but one ſpecies, viz. the navalis, with a ſlender bending ſhell. It inhabits the Indian ſeas, whence it was imported into the European. It penetrates eaſily into the ſtouteſt oak-planks, and produces dreadful deſtruction to the ſhips by the holes it makes in their ſides; and it is to avoid the effects of this inſect that veſſels require ſheathing.

TERENCE, or Publius Terentius Afer, a celebrated comic poet of ancient Rome, was born at Carthage in Africa. He was ſlave to Terentius Lucanus the ſenator; who gave him his liberty on account of his wit, his good mien, and great abilities. Terence, on his becoming a freed man, applied himſelf to the writing of comedies; in the execution of which he imitated Menander and the other celebrated comic poets of Greece. Cicero gives him the moſt pompous elogiums, both for the purity of his language and the perſpicuity and beauty of his compoſitions, which he conſiders as the rule and ſtandard of the Latin tongue; and obſerves, that they were eſteemed ſo fine and elegant, that they were thought to have been written by Scipio and Lelius, who were then the greateſt perſonages and the moſt eloquent of the Roman people. Terence died while on a voyage into Greece, about the 15th year before the Chriſtian æra. There are ſix of the comedies extant, of which the beſt editions are the Elzevir one 1635, 12mo; that *cum integris notis Donati, et ſelectis variorum*, 1686, 8vo; Weſterhovius's, in two vols 4to 1726; and that of Bentley the ſame year, 4to. Madam Dacier has given a beautiful French verſion of this author; and an ingenious and correct Engliſh tranſlation was publiſhed in 4to, 1768, by Mr Colman.

TERM, in law, is generally taken for a limitation of time or eſtate; as, a leaſe for term of life or years.

Term, however, is more particularly uſed for that time wherein our courts of juſtice are open; in oppoſition to which, the reſt of the year is called *vacation*.

Term, in grammar, denotes ſome word or expreſſion of a language.

Term *in the Arts*, or Term *of Art*, is a word which, beſides the literal and popular meaning which it has or may have in common language, bears a further and peculiar meaning in ſome art or ſcience.

TERMES, a genus of inſects belonging to the order of aptera. The antennæ are ſetaceous, the mouth armed with jaws; the feet are ſix, formed for running. There are two ſpecies.

1. The fatale, or white ant, of a yellowiſh colour, is a native of both the Indies; makes its neſt of wood, which it draws out into a cylindrical form as it moves along; inhabits dark and ſhady places, never appearing in the open air. It is in the higheſt degree pernicious, deſtroying every thing of wood or cloth, whether of animal or vegetable materials, penetrating into its ſubſtance and devouring it, while the ſurface is left entire. It can only be deſtroyed by quicklime.

Of the white ants of India and Africa we have a very curious account, publiſhed in the 71ſt volume of the Philoſophical Tranſactions by Mr Henry Smeathman of Clement's Inn. According to this account, the works of theſe inſects ſurpaſs thoſe of the bees, waſps, beavers, and another animals, as much at leaſt as thoſe of the moſt poliſhed European nations excel thoſe of the leaſt cultivated ſavages. And, even with regard to man, his greateſt works, the boaſted pyramids, fall comparatively far ſhort, even in ſize alone, of the ſtructures raiſed by theſe inſects. The labourers among them employed in this ſervice are not a quarter of an inch in length; but the ſtructures which they erect riſe to 10 or 12 feet and upwards above the ſurface of the earth. Suppoſing the height of a man to be ſix feet, the author calculates, that the buildings of theſe inſects may be conſidered, relatively to their ſize and that of a man, as being raiſed to near five times the height of the greateſt of the Egyptian pyramids; that is, correſponding with conſiderably more than half a mile. We may add, that, with reſpect to the interior conſtruction, and the various members and diſpoſitions of the parts of the building, they appear greatly to exceed that or any other work of human conſtruction.

The moſt ſtriking parts of theſe ſtructures are—the royal apartments, the nurſeries, magazines of proviſions, arched chambers and galleries, with their various communications; the ranges of Gothic-ſhaped arches, projected, and not formed by mere excavation, ſome of which are two or three feet high, but which diminiſh rapidly, like the arches of ailes in perſpectives; the various roads, ſloping ſtair-caſes, and bridges, conſiſting of one vaſt arch, and conſtructed to ſhorten the diſtance between the ſeveral parts of the building, which would otherwiſe communicate only by winding paſſages. Theſe aſtoniſhing ſtructures are the works of an inſect only a quarter of an inch long, and 25 of which weigh only one grain—But theſe and many other curious inſtances of the great ſagacity and powers of theſe inſects cannot be underſtood, without viewing the plates in which their feeble frames, and comparatively ſtupendous works, are delineated.

The œconomy of theſe induſtrious inſects appears to have been very attentively obſerved by the ingenious author, as well as their buildings. There are three diſtinct ranks or orders among them, conſtituting a well-regulated community. Theſe are, firſt, the *labourers*, or working inſects; next the *ſoldiers*, or fighting order, who do no kind of labour, and are about twice as long as the former, and equal in bulk to about 15 of them; and laſtly, the winged or perfect inſects, who may be called the *nobility* or *gentry* of the ſtate; for they neither labour nor fight, being ſcarcely capable even of ſelf-defence.—"Theſe only are capable of being elected *kings* or *queens*; and nature has has ſo ordered it, that they emigrate within a few weeks after they are elevated to this ſtate, and either eſtabliſh new kingdoms, or periſh within a day or two."

This laſt-mentioned order differs ſo much from the other two, that they have not hitherto been ſuppoſed to belong to the ſame community. In fact, they are not to be diſcovered in the neſt till juſt before the commencement of the rainy ſeaſon; when they undergo the laſt change, which is preparative to the formation of new colonies. They are equal in bulk to two ſoldiers and about 30 labourers; and are furniſhed with four wings, with which they are deſtined to roam about for a few hours; at the end of which time they loſe their wings, and become the prey of innumerable birds, reptiles, and inſects: while probably not a pair out of many millions of this unhappy race get into a place of ſafety, fulfil the firſt law of nature, and lay the foundation of a new community. In this ſtate many fall into the neighbouring waters, and are eat with avidity by the Africans. The author found them delicate, nouriſhing, and wholeſome; without ſauce or other help from cookery, than merely roaſting them in the manner of coffee.

The few fortunate pairs who happen to ſurvive this annual maſſacre and deſtruction, are repreſented by the author as being caſually found by ſome of the labourers, that are continually running about on the ſurface of the ground, and are elected kings and queens of new ſtates. Thoſe who are not ſo elected and preſerved, certainly periſh, and moſt probably in the courſe of the following day. By theſe induſtrious creatures the king and queen elect are immediately protected from their innumerable enemies, by incloſing them in a chamber of clay; where the buſineſs of propagation ſoon commences. Their “voluntary ſubjects” then buſy themſelves in conſtructing wooden nurſeries, or apartments entirely compoſed of wooden materials, ſeemingly joined together with gums. Into theſe they afterwards carry the eggs produced from the queen; lodging them there as faſt as they can obtain them from her. The author even furniſhes us with plauſible reaſons to believe, that they here form a kind of garden for the cultivation of a ſpecies of microſcopical muſhroom; which Mr Konig (in an eſſay on the Eaſt Indian termites, read before the Society of Naturaliſts of Berlin) conjectures to be the food of the young inſects. But perhaps the moſt wonderful, and at the ſame time beſt authenticated, part of the hiſtory of theſe ſingular inſects is that which relates to the queen or mother of the community, in her pregnant ſtate.

After impregnation, a very extraordinary change begins to take place in her perſon, or rather in her abdomen only. It gradually increaſes in bulk, and at length becomes of ſuch an enormous ſize as to exceed the bulk of the reſt of her body 1500 or 2000 times. She becomes 1000 times heavier than her conſort; and exceeds 20,000 or 30,000 times the bulk of one of the labourers. In this ſtate, the matrix has a conſtant periſtaltic or undulating motion; the conſequence of which is (as the author has counted them) the protruſion of 80,000 eggs in 24 hours.

Theſe eggs, ſays the author, “are inſtantly taken from her body by her attendants (of whom there always are, in the royal chamber and the galleries adjacent, a ſufficient number in waiting) and carried to the nurſeries—which are ſometimes four or five feet diſtant in a ſtraight line.—Here, after they are hatched, the young are attended and provided with every thing neceſſary, until they are able to ſhift for themſelves, and take their ſhare of the labours of the community.”

Many curious and ſtriking particulars are related of the great devaſtations committed by this powerful community; who conſtruct roads, or rather covered ways, diverging in all directions from the neſt, and leading to every object of plunder within their reach. Though the miſchiefs they commit are very great, ſuch is the œconomy of nature, that it is probably counterbalanced by the good produced by them; in quickly deſtroying dead trees and other ſubſtances, which, as the author obſerves, would, by a tedious decay, ſerve only to encumber the face of the earth. Such is their alacrity and diſpatch in this office, that the total deſtruction of deſerted towns is ſo effectually accompliſhed, that in two or three years a thick wood fills the ſpace; and not the leaſt veſtige of a houſe is to be diſcovered.

From the many ſingular accounts here given of the police of theſe inſects, we ſhall ſelect and abridge only one; reſpecting the different functions of the labourers and ſoldiers, or the civil and military eſtabliſhments in this community, on an attempt to examine their neſt or city.

On making a breach in any part of the ſtructure with a hoe or pick-axe, a ſoldier immediately appears, and walks about the breach; as if to ſee whether the enemy is gone, or to examine whence the attack proceeds. In a ſhort time he is followed by two or three others, and ſoon afterwards by a numerous body, who ruſh out as faſt as the breach will permit them; their numbers increaſing as long as any one continues to batter the building. During this time they are in the moſt violent buſtle and agitation; while ſome of them are employed in beating with their forceps upon the building, ſo as to make a noiſe that may be heard at three or four feet diſtance. On ceaſing to diſturb them, the ſoldiers retire, and are ſucceeded by the labourers, who haſten in various directions towards the breach; each with a burden of mortar in his mouth, ready tempered. Though there are millions of them, they never ſtop or embaraſs each other; and a wall gradually ariſes that fills up the chaſm. A ſoldier attends every 600 or 1000 of the labourers, ſeemingly as a director of the works; for he never touches the mortar, either to lift or carry it. One in particular places himſelf cloſe to the wall which they are repairing, and frequently makes the noiſe above-mentioned; which is conſtantly anſwered by a loud hiſs from all the labourers within the dome: and at every ſuch ſignal, they evidently redouble their pace, and work as faſt again.

The work being completed, a renewal of the attack conſtantly produces the ſame effects. The ſoldiers again ruſh out, and then retreat, and are followed by the labourers, loaded with mortar, and as active and diligent as before. “Thus,” ſays the author, “the pleaſure of ſeeing them come out to fight or to work alternately may be obtained, as often as curioſity excites or time permits: and it will certainly be found, that the one order never attempts to fight, or the other to work, let the emergency be ever ſo great.” The obſtinacy of the ſoldiers is remarkable. “They fight to the very laſt, diſputing every inch of ground ſo well as often to drive away the negroes, who are without ſhoes, and make white people bleed plentifully through their ſtockings.”

Such is the ſtrength of the buildings erected by theſe puny inſects, that when they have been raiſed to little more than half their height, it is always the practice of the wild bulls to ſtand as centinels upon them, while the reſt of the herd is ruminating below. When at their full height of 10 or 12 feet, they are uſed by the Europeans as places to look out from, over the top of the graſs, which here grows to the height of 13 feet upon an average. The author has ſtood with four men on the top of one of theſe buildings,

ings, in order to get a view of any veſſel that might come in ſight.

2. The pulſatorium, or death-watch, varies in colour and ſize; being ſometimes quite white or grey, at others of a lead colour. In ſome the abdomen is marked with a brown annular band, after which, near the tail, is found a brown ſpot. The inſect is commonly found in old wood, decayed tables, or books not often looked into. It runs and even leaps a little when touched. Thoſe met with in houſes are whiter than thoſe which may be ſeen in gardens and in the fields, on walls, and the trunks of trees, which are more of a brown colour, and ſomewhat hairy. This inſect imitates the ticking of a watch, which ſome imagine it does by ſtriking its head againſt the wainſcot; and hence Linnæus has given it the name of *pulſatorium*. But this noiſe is occaſioned by one of the *ptini*, and is an amorous invitation. By ſuperſtitious people it is thought to be a prognoſtic of death.

TERMINALIA, in antiquity, feaſts celebrated by the Romans in honour of the god Terminus †.

TERMINI, in architecture, denote a kind of ſtatues or columns, adorned a-top with the figure of a man's, woman's, or ſatyr's head, as a capital; and the lower part ending in a kind of ſheath or ſcabbard.

TERMINUS, in Pagan worſhip, an ancient deity among the Romans, who preſided over the ſtones or land-marks called *termini*, which were held ſo ſacred that it was accounted ſacrilege to move them; and as the criminal became devoted to the gods, it was lawful for any man to kill him. The worſhip of this deity was inſtituted by Numa Pompilius, who, to render land-marks, and conſequently the property of the people, ſacred, erected a temple on the Tarpeian mount to Terminus.

TERN, in ornithology. See Sterna.

TERNATE, the moſt northerly of the Molucca or Clove Iſlands in the Eaſt Indies. It abounds in cocoa-nuts, bananas, citrons, oranges, almonds, and other fruit proper to the torrid zone; but cloves are the moſt valuable produce. It is in the poſſeſſion of the Dutch. Malaya is the capital town. E. Long. 125. 10. N. Lat. 1. 15.

TERNI, a town of Italy in the Pope's territories, and in the duchy of Spoleto, with a biſhop's ſee. It is but a ſmall place; though there are very beautiful ruins of antiquity, it having been a very conſiderable Roman colony. It is ſituated on the top of a high mountain, and to the weſt of it are fields which are extremely fertile. E. Long. 12. 50. N. Lat. 42. 4.

TERPANDER, a celebrated Greek poet and muſician. The Oxford marbles tell us that he was the ſon of Derdeneus of Leſbos, and that he flouriſhed in the 381ſt year of theſe records; which nearly anſwers to the 27th olympiad, and 671ſt year B. C. The marbles inform us likewiſe, that he taught the *nomes*, or airs, of the lyre and flute, which he performed himſelf upon this laſt inſtrument, in concert with other players on the flute. Several writers tell us that he added three ſtrings to the lyre, which before his time had but four; and in confirmation of this, Euclid and Strabo quote two verſes, which they attribute to Terpander himſelf.

The tetrachord's reſtraint we now deſpiſe,
The ſeven-ſtring'd lyre a nobler ſtrain ſupplies.

If the hymn to Mercury, which is aſcribed to Homer, and in which the ſeven-ſtringed lyre is mentioned, be genuine, it robs Terpander of this glory. The learned, however, have great doubts concerning its authenticity. But if the lyre had been before his time furniſhed with ſeven ſtrings in other parts of Greece, it ſeems as if Terpander was the firſt who played upon them at Lacedæmon.

Among the many ſignal ſervices which Terpander is ſaid to have done to muſic, none was of more importance than the notation that is aſcribed to him for aſcertaining and preſerving melody, which before was traditional, and wholly dependent on memory. The invention, indeed, of muſical characters has been attributed by Alypius and Gaudentius, two Greek writers on muſic, and upon their authority, by Boethius, to Pythagoras, who flouriſhed full two centuries after Terpander. But Plutarch, from Heraclides of Pontus, aſſures us that Terpander, the inventor of nomes for the cithara, in hexameter verſe, ſet them to muſic, as well as the verſes of Homer, in order to ſing them at the public games: And Clemens Alexandrinus, in telling us that this muſician wrote the laws of Lycurgus in verſe, and ſet them to muſic, makes uſe of the ſame expreſſion as Plutarch; which ſeems clearly to imply a written melody.

After enumerating the airs which Terpander had compoſed, and to which he had given names, Plutarch continues to ſpeak of his other compoſitions; among which he deſcribes the proems, or hymns for the cithara, in heroic verſe. Theſe were uſed in after-times by the Rhapſodiſts, as prologues or introductions to the poems of Homer and other ancient writers. But Terpander rendered his name illuſtrious, no leſs by his performance both upon the flute and cithara, than by his compoſitions. This appears by the marbles already mentioned; by a paſſage in Athenæus, from the hiſtorian Hellanicus, which informs us that he obtained the firſt prize in the muſical conteſts at the Carnean games; and by the teſtimony of Plutarch, who ſays, that "no other proof need be urged of the excellence of Terpander in the art of playing upon the cithara, than what is given by the regiſter of the Pythic games, from which it appears that he gained four prizes ſucceſſively at thoſe ſolemnities.

Of the works of this poet only a few fragments are now remaining.

TERRA australis incognita, a name for a large unknown continent, ſuppoſed to lie towards the South Pole, and which for a long time was ſought after by navigators. The late voyages of Captain Cook have aſcertained this matter as much as it probably ever will be; and though this celebrated navigator does not deny the exiſtence of ſuch a climate, it is by no means probable that ever it will become inhabited, or that any valuable commodity can be produced from it. On this ſubject Captain Cook expreſſes himſelf as follows. "I had now made the circuit of the Southern Ocean in a high latitude, and traverſed it in ſuch a manner as to leave not the leaſt room for the poſſibility of there being a continent, unleſs near the pole, and out of the reach of navigation. By twice viſiting the tropical ſea, I had not only ſettled the ſituation of ſome old diſcoveries, but made there many new ones, and left, I conceive, very little more to be done even in that

† See *Terminus*.

that part. Thus I flatter myſelf, that the intention of the voyage has in every reſpect been fully anſwered; the ſouthern hemiſphere ſufficiently explored; and a final end put to the ſearching after a ſouthern continent, which has at times ingroſſed the attention of ſome of the maritime powers for near two centuries paſt, and been a favourite theory amongſt the geographers of all ages. That there may be a continent, or large tract of land near the pole, I will not deny: on the contrary, I am of opinion there is; and it is probable that we have ſeen a part of it. The exceſſive cold, the many iſlands and vaſt floats of ice, all tend to prove that there muſt be land to the ſouth; and for my perſuaſion that this ſouthern land muſt lie or extend fartheſt to the north, oppoſite to the Southern Atlantic and Indian Oceans, I have already aſſigned ſome reaſons; to which I may add the greater degree of cold experienced by us in theſe ſeas than in the Southern Pacific Ocean under the ſame parallels of latitude."

Terra *del Fuego*. See Tierra *del Fuego*.

Terra *Firma*, in geography, is ſometimes uſed for a continent, in contradiſtinction to iſlands.

Terra *Firma*, otherwiſe called *New Caſtile*, or *Caſtilla del Oro*, a country of America, bounded on the north by the North Sea and part of the Atlantic Ocean, by the ſame ſea and Guiana on the eaſt, by the country of the Amazons and Peru on the ſouth, and by the Pacific Ocean and Veragua on the weſt. It lies between 62 and 83 degrees of weſt longitude, and between the equator and 12 degrees of north latitude; being upwards of 1200 miles in length from eaſt to weſt, and 800 in breadth from north to ſouth. It had the name of *Caſtilla del Oro* from the quantities of gold found in the diſtrict of Uraba and other parts; and was firſt diſcovered by the celebrated Columbus in his third voyage.

The climate is neither pleaſant nor healthy; the inhabitants one part of the year being ſcorched by the moſt intenſe and burning heat, and the other almoſt drowned with perpetual floods of rain, pouring from the ſky with ſuch violence as if a general deluge was to enſue.

In ſo large a tract of country the ſoil muſt neceſſarily vary. Accordingly, in ſome parts it is a barren ſand, or drowned mangrove land, that will ſcarce produce any kind of grain; in others it yields Indian corn, balms, gums, and drugs, almoſt all manner of fruits as well of Old as of New Spain, ſugar, tobacco, Braſil wood, and ſeveral kinds of dyeing woods; a variety of precious ſtones, particularly emeralds and ſapphires; veniſon, and other game. The plantations of cacao, or chocolate nuts, in the diſtrict of the Caraccas, are eſteemed the beſt in America. The mountains abound with tygers, and, according to ſome, with lions, and great numbers of other wild beaſts. The rivers, ſeas, and lakes, teem with fiſh, and alſo with alligators; and the bowels of the earth were once furniſhed with the richeſt treaſures, now almoſt exhauſted. The ſame may be ſaid of the pearl-fiſheries on the coaſt, which are far from being ſo profitable now as formerly.

Terra Firma is a very mountainous country. Terra Firma Proper, in particular, conſiſts of prodigious high mountains, and deep valleys flooded more than half the year. The mountains in the provinces of Carthagena and St Martha, according to Dampier, are the higheſt in the world; being ſeen at ſea 200 miles off: from theſe run a chain of hills of almoſt equal height, quite through South America, as far as the Straits of Magellan, called the *Cordilleras des Andes*. The province of Venezuela alſo, and diſtrict of the Caraccas, the moſt northerly parts of South America, are almoſt a continued chain of hills, ſeparated by ſmall valleys, pointing upon the coaſt of the North Sea. A chain of barren mountains, almoſt impaſſable, runs through the province of Popayan from north to ſouth, ſome whereof are volcanos; but towards the ſhores of the Pacific Ocean it is a low country, flooded great part of the year.

The principal rivers of Terra Firma are the Darien, Chagtre, Santa Maria, Conception, Rio Grande or Magdalena, Maricaibo, and Oroonoko.

Terra Firma contains the provinces of Terra Firma Proper or Darien, of Carthagena, St Martha, Rio de la Hacha, Venezuela, Comana, New Andaluſia or Paria, New Granada, and Popayan.

Terra-Firma Proper lies in the form of a creſcent, about the ſpacious bay of Panama, being the iſthmus which joins South and North America; and extending in length between the two ſeas 300 miles, but in breadth, where the iſthmus is narroweſt, only 60. Here are found gold mines, gold ſands, and fine pearls; and though the land is generally rough, there are ſome fruitful valleys, watered by rivers, brooks, and ſprings. The chief places are Panama and Porto Bello.

The inhabitants of Terra Firma have never been thoroughly ſubdued, and in all probability never will; as they are a brave and warlike people, have retreats inacceſſible to Europeans, and bear an inveterate enmity to the Spaniards.

Terra *Japonica*, or *Japan Earth*, improperly ſo called; being neither an earth nor the produce of Japan; but an inſpiſſated vegetable juice, prepared in the Eaſt Indies from the fruit, as is ſuppoſed, of the areca palm-tree. It is dry and pulverable, outwardly of a reddiſh colour, inwardly of a ſhining dark brown, almoſt black, with ſome caſt of red. When pure, it diſſolves totally in water, and almoſt totally in rectified ſpirit; as we uſually meet with it, a conſiderable quantity of ſandy matter is left by both theſe menſtrua. This medicine is a mild aſtringent, and frequently employed as ſuch in alvine fluxes, uterine profluvia, in laxity and debility of the viſcera in general, and in coughs proceeding from thin acrid defluxions. Its taſte is more agreeable than that of moſt other ſubſtances of this claſs; chewed for ſome time, it leaves a ſweetiſhneſs in the mouth. The troches and tincture kept in the ſhops are very elegant preparations of it.

Terræ *Filius*, *Son of the Earth*, a ſtudent of the univerſity of Oxford, formerly appointed in public acts to make ſatyrical and jeſting ſpeeches againſt the members thereof, to tax them with any growing corruptions, &c.

TERRACE, a walk or bank of earth, raiſed in a garden or court to a due elevation for a proſpect. The name is alſo given to the roofs of houſes that are flat, and whereon we may walk.

TERRAQUEOUS, in geography, a name given to our globe, becauſe conſiſting of land and water.

TERRASSON (Abbe John), a French writer born at Lyons in 1669. He diſtinguiſhed himſelf in the diſpute concerning Homer, between La Motte and Madam Dacier, by writing a *Diſſertation contre l'Iliade*; he wrote a political and moral romance called *Sethos*, full of learning and philoſophy; and another capital work of his is a French tranſlation of Diodorus Siculus. He died in 1750.

TERRESTRIAL, ſomething partaking of the nature of earth, or belonging to the globe of earth; thus we ſay, the terreſtrial globe, &c.

TERRIER, a ſmall hound, to hunt the fox or badger; ſo called, becauſe he creeps into the ground, as ferrets do into the coney-burrows after the fox, &c.

TERRITORY, in geography, denotes an extent or compaſs of land, within the bounds or belonging to the juriſdiction of any ſtate, city, or other ſubdiviſion of a country.

TERROR, or FRIGHT. The general effects of terror are a great contraction of all the ſmall veſſels, and a revulſion of the blood in the large and internal ones; hence the ſuppreſſion of perſpiration, the general oppreſſion, trembling, and anguiſh, from the heart and lungs being overcharged with blood, &c. After great frights, perſons rarely recover their vivacity; and epilepſies that are cauſed by frights are rarely, if ever, cured. When a perſon is affected with terror, or ſudden or great frights, the principal endeavours ſhould be to reſtore the circulation to its due order, to promote perſpiration, and to allay the agitation or commotion in which the patient is obſerved to be. The cuſtom of giving cold water in theſe caſes is bad. Place the affrighted perſon in a quiet ſituation; a little warm liquor, ſuch as camomile tea, or the like, ſhould be given him to drink; the legs may be put into warm water, and there continue for ſome time; they ſhould be rubbed, and the camomile tea repeated every ſix or eight minutes: when the ſkin becomes warm, and there is a tendency to perſpiration, ſleep may be promoted by a gentle opiate.

TERTIAN FEVER. See MEDICINE, n° 134. 237—248. and p. 4643.

TERTULLIAN, or QUINTUS SEPTIMUS FLORENS TERTULLIANUS, a celebrated prieſt of Carthage, was the ſon of a centurion in the militia, who ſerved as proconſul of Africa. He was educated in the Pagan religion; but being convinced of its errors, embraced Chriſtianity, and became a zealous defender of the faith. He married, it is thought, after his baptiſm. Afterwards he took orders, and went to Rome; where, during the perſecution under the emperor Severus, he publiſhed his Apology for the Chriſtians, which is, in its kind, a maſterpiece of eloquence and learning; and at the beginning of the third century he embraced the ſect of the Montaniſts. He lived to a very great age, and died under the reign of Antoninus Caracalla about the year 216. Many of his works are ſtill extant, in all of which he diſcovers a great knowledge of the Holy Scriptures, a lively imagination, a ſtrong, elevated, and impetuous ſtyle, great eloquence and ſtrength of reaſoning; but is ſometimes obſcure. His Apology and Preſcriptions are moſt eſteemed. The beſt editions of his works are thoſe of Rigault; eſpecially that of Venice in 1746, folio. Pamelius and Alix, Mr Thomas, and the Sieur du Foſſé, have written his life; and Rigault, M. de l'Aube Epine, Father Petau, and other learned men, have publiſhed notes on his works.

TESSELATED PAVEMENTS, thoſe of rich Moſaic work made of curious ſquare marbles, bricks, or tyles; called *teſſelæ*, from their reſembling dice.

TESSON, or TESTOON, commonly called *Teſter*, a ſort of money which among the French bore the value of 18d.; but being made of braſs lightly gilt with ſilver, in the reign of king Henry VIII. it was reduced to 12d. and afterwards to 6d.

TEST, a large kind of cupel formed of the ſame materials with the ſmall ones.—Some of the German writers recommend, both for teſts and cupels, a ſort of friable opake ſtone, called *white ſpath*, which appears to be a ſpecies of gypſum, or of the ſtones from which plaſter-of-paris is prepared. The ſpath is directed to be calcined with a gentle fire, in a covered veſſel, till the ſlight crackling, which happens at firſt, has ceaſed, and the ſtone has fallen in part into powder: the whole is then reduced into ſubtile powder, which is paſſed through a fine ſieve, and moiſtened with ſo much of a weak ſolution of green vitriol as is ſufficient for making it hold together. Gellert, however, finds, that if the ſtone is of the proper kind, which can be known only by trials, calcination is not neceſſary. Scheffer obſerves, that theſe kinds of teſts are liable to ſoften or fall aſunder in the fire, and that this inconvenience may be remedied by mixing with the uncalcined ſtone ſomewhat leſs than equal its weight, as eight-ninths of ſuch as has been already uſed and is penetrated by the ſcoria of the lead, taking only that part of the old teſt which appears of a green-grey colour, and rejecting the red cruſt on the top. Teſts or cupels made of the ſpath are ſaid not to require ſo much caution in nealing and heating them as the common ones: it appears, however, from Scheffer's account, that they are leſs durable than thoſe made of the aſhes of bones, though greatly ſuperior to thoſe of wood-aſhes. Vegetable aſhes, which ſtand pretty well the teſting of ſilver, can ſcarcely bear any great quantity of gold, this metal requiring a conſiderably ſtronger fire than the other; but bone-aſhes anſwer ſo effectually, and are among us ſo eaſily procurable, that it is not needful for the refiner to ſearch for any other materials; though thoſe who work off large quantities of lead, in order to gain a little ſilver or gold contained in it, may poſſibly, in places remote from populous cities, avail themſelves of ſubſtances ſimilar to the ſpath above-mentioned.

The teſt, for its greater ſecurity, is fixed in the mould in which it was formed; which is ſometimes a ſhallow veſſel made of crucible earth or caſt-iron, more commonly an iron hoop, with three bars arched downwards acroſs the bottom, about two inches deep, and of different widths, from three or four inches to fifteen or more, according to the quantity of metal to be teſted at once. The aſhes or earthy powder, moiſtened as for making cupels, are preſſed down in the mould ſo as to completely fill it or riſe a little above the ſides; with care to make the maſs equally ſolid, and to put in at once, or at leaſt after the bottom has been preſſed cloſe, as much of the matter as will be ſufficient for the whole; for any additional quantity will not unite thoroughly with the reſt, but be apt to part from it in the fire. The edges are pared ſmooth, and a portion cut out from the middle with a bent knife, ſo as to leave a proper cavity, which is ſmoothed by ſtrewing ſome dry powder on the ſurface, and rolling on it a wooden or rather a glaſs ball.

The proceſs of teſting is often performed in the ſame manner as that of cupellation: but where great quantities of baſe metal are to be worked off from a little gold, recourſe is had to a more expeditious method, that of teſting before the bellows.

An oval teſt is placed in a cavity, made in a hearth of a convenient height, and ſome moiſtened ſand or aſhes preſſed round it to keep it ſteady: the noſe of a bellows is directed along its ſurface, in ſuch a manner, that if aſhes are ſprinkled in the cavity of the teſt, the bellows may blow them completely out: ſome have an iron plate fixed before the bellows, to direct the blaſt downwards. To keep the ſurface of the teſt from being injured in putting in the metal, ſome cloths or pieces of paper are interpoſed. The fuel conſiſts of billets of barked oak, laid on the ſides of the teſt, with others laid croſswiſe on theſe: the bellows impels the flame on the metal, clears the ſurface of aſhes or ſparks of coal, haſtens the ſcorification of the lead, and blows off the ſcoria, as faſt as it forms, to one end of the teſt, where it runs out through a notch made for that purpoſe. About two-thirds of the ſcorified lead may thus be collected; the reſt being partly abſorbed by the teſt, and partly diſſipated by the action of the bellows. Care muſt be taken not to urge the blaſt too ſtrongly, leſt ſome portion of the gold ſhould be carried away by the fumes impetuouſly forced off from the lead, and ſome minute particles of it entangled and blown off with the ſcoriæ.

Test-*Act*, a ſtatute 25 Car. II. cap. 2. which requires all officers, both civil and military, to take the oaths and teſt, viz. the ſacrament according to the rites and ceremonies of the church of England; for the neglect whereof, a perſon executing any office mentioned in that ſtatute, forfeits the ſum of 500 l. recoverable by action of debt.

TESTACEOUS, in natural hiſtory, an epithet given to a ſpecies of fiſh which are covered with a ſtrong thick ſhell, as tortoiſes, oyſters, pearl-fiſh. &c.

TESTAMENT, or last will. Teſtaments both Juſtinian and Sir Edward Coke agree to be ſo called, becauſe they are *teſtatio mentis:* an etymon which ſeems to ſavour too much of conceit; it being plainly a ſubſtantive derived from the verb *teſtari*, in like manner as *juramentum, incrementum*, and others, from other verbs. The definition of the old Roman lawyers is much better than their etymology; *voluntatis noſtræ juſta ſententia de eo, quod quis poſt mortem ſuam fieri velit:* which may be thus rendered into Engliſh, "the legal declaration of a man's intentions, which he wills to be performed after his death." It is called *ſententia*, to denote the circumſpection and prudence with which it is ſuppoſed to be made: it is *voluntatis noſtræ ſententia*, becauſe its efficacy depends on its declaring the teſtator's intention, whence in Engliſh it is emphatically ſtyled his *will:* it is *juſta ſententia;* that is, drawn, atteſted, and publiſhed with all due ſolemnities and forms of law: it is *de eo, quod quis poſt mortem ſuam fieri velit*, becauſe a teſtament is of no force till after the death of the teſtator.

Theſe teſtaments are divided into two ſorts; written, and verbal or nuncupative: of which the former is committed to writing; the latter depends merely upon oral evidence, being declared by the teſtator *in extremis* before a ſufficient number of witneſſes, and afterwards reduced to writing.

But as nuncupative wills and codicils (which were formerly more in uſe than at preſent when the art of writing is become more univerſal), are liable to great impoſitions, and may occaſion many perjuries, the ſtatute of frauds, 29 Car. II. c. 3. enacts, 1. That no written will ſhall be revoked or altered by a ſubſequent nuncupative one, except the ſame be in the lifetime of the teſtator reduced to writing, and read over to him, and approved; and unleſs the ſame be proved to have been ſo done by the oaths of three witneſſes at the leaſt, who, by ſtatute 4 & 5 Anne c. 16. muſt be ſuch as are admiſſible upon trials at common law. 2. That no nuncupative will ſhall in anywiſe be good, where the eſtate bequeathed exceeds 30 l. unleſs proved by three ſuch witneſſes, preſent at the making thereof, (the Roman law requiring ſeven), and unleſs they or ſome of them were ſpecially required to bear witneſs thereto by the teſtator himſelf; and unleſs it was made in his laſt ſickneſs, in his own habitation or dwelling-houſe, or where he had been previouſly reſident ten days at the leaſt, except he be ſurpriſed with ſickneſs on a journey, or from home, and dies without returning to his dwelling. 3. That no nuncupative will ſhall be proved by the witneſſes after ſix months from the making, unleſs it were put in writing within ſix days. Nor ſhall it be proved till fourteen days after the death of the teſtator, nor till proceſs hath firſt iſſued to call in the widow, or next of kin, to conteſt it if they think proper. Thus hath the legiſlator provided againſt any fraud in ſetting up nuncupative wills, by ſo numerous a train of requiſites, that the thing itſelf is fallen into diſuſe; and hardly ever heard of, but in the only inſtance where favour ought to be ſhown to it, when the teſtator is ſurpriſed by ſudden and violent ſickneſs. The teſtamentary words muſt be ſpoken with an intent to bequeath, not any looſe idle diſcourſe in his illneſs; for he muſt require the by-ſtanders to bear witneſs of ſuch his intention: the will muſt be made at home, or among his family or friends, unleſs by unavoidable accident, to prevent impoſitions from ſtrangers: it muſt be in his laſt ſickneſs; for, if he recovers, he may alter his diſpoſitions, and has time to make a written will: it muſt not be proved at too long a diſtance from the teſtator's death, leſt the words ſhould eſcape the memory of the witneſſes; nor yet too haſtily and without notice, leſt the family of the teſtator ſhould be put to inconvenience, or ſurpriſed.

As to written wills, they need not any witneſs of their publication. We ſpeak not here of deviſes of lands, which are entirely another thing, a conveyance by ſtatute, unknown to the feodal or common law, and not under the ſame juriſdiction as perſonal teſtaments. But a teſtament of chattels, written in the teſtator's own hand, though it has neither his name nor ſeal to it, nor witneſſes preſent at its publication,

tion, is good; provided ſufficient proof can be had that it is his hand-writing. And though written in another man's hand, and never ſigned by the teſtator, yet if proved to be according to his inſtructions and approved by him, it hath been held a good teſtament of the perſonal eſtate. Yet it is the ſafer and more prudent way, and leaves leſs in the breaſt of the eccleſiaſtical judge, if it be ſigned or ſealed by the teſtator, and publiſhed in the preſence of witneſſes: which laſt was always required in the time of Bracton; or rather he in this reſpect has implicitly copied the rule of the civil law.

No teſtament is of any effect till after the death of the teſtator; *Nam omne teſtamentum morte conſummatum eſt, et voluntas teſtatoris eſt ambulatoria uſque ad mortem.* And therefore, if there be many teſtaments, the laſt overthrows all the former; but the republication of a former will revoke one of a later date, and eſtabliſhes the firſt again.

Regularly, every perſon hath full power and liberty to make a will, that is not under ſome ſpecial prohibition by law or cuſtom: which prohibitions are principally upon three accounts; for want of ſufficient diſcretion; for want of ſufficient liberty and free-will; and on account of their criminal conduct.

1. In the firſt ſpecies are to be reckond infants, under the age of 14 if males, and 12 if females; which is the rule of the civil law. For though ſome of our common lawyers have held that an infant of any age (even four years old) might make a teſtament, and others have denied that under 18 he is capable; yet as the eccleſiaſtical court is the judge of every teſtator's capacity, this caſe muſt be governed by the rules of the eccleſiaſtical law. So that no objection can be admitted to the will of an infant of 14, merely for want of age: but if the teſtator was not of ſufficient diſcretion, whether at the age of 14 or 24, that will otherthrow his teſtament. Madmen, or otherwiſe *non compotes*, idiots or natural fools, perſons grown childiſh by reaſon of old age or diſtemper, ſuch as have their ſenſes beſotted with drunkenneſs,—all theſe are incapable, by reaſon of mental diſability, to make any will ſo long as ſuch diſability laſts. To this claſs alſo may be referred ſuch perſons as are born deaf, blind, and dumb; who, as they have always wanted the common inlets of underſtanding, are incapable of having *animum teſtandi*, and their teſtaments are therefore void.

2. Such perſons as are inteſtable for want of liberty or freedom of will, are by the civil law of various kinds; as priſoners, captives, and the like. But the law of England does not make ſuch perſons abſolutely inteſtable; but only leaves it to the diſcretion of the court to judge upon the conſideration of their particular circumſtances of dureſs, whether or no ſuch perſons could be ſuppoſed to have *liberum animum teſtandi*. And, with regard to feme-coverts, our laws differ ſtill more materially from the civil. Among the Romans there was no diſtinction; a married woman was as capable of bequeathing as a feme-ſole. But with us a married woman is not only utterly incapable of deviſing lands, being excepted out of the ſtatute of wills, 34 & 35 Hen. VIII. c. 5. but alſo ſhe is incapable of making a teſtament of chattels, without the licence of her huſband. For all her perſonal chattels are abſolutely his own; and he may diſpoſe of her chattels real, or ſhall have them to himſelf if he ſurvives her: it would be therefore extremely inconſiſtent to give her a power of defeating that proviſion of the law, by bequeathing thoſe chattels to another. The queen-conſort is an exception to this general rule, for ſhe may diſpoſe of her chattels by will, without the conſent of her lord; and any feme-covert may make her will of goods which are in her poſſeſſion *in auter droit*, as executrix or adminiſtratrix; for theſe can never be the property of the huſband: and if ſhe has any pin-money or ſeparate maintenance, it is ſaid ſhe may diſpoſe of her ſavings thereout by teſtament, without the controul of her huſband. But if a feme-ſole makes her will, and afterwards marries, ſuch ſubſequent marriage is eſteemed a revocation in law, and entirely vacates the will.

3. Perſons incapable of making teſtaments, on account of their criminal conduct, are in the firſt place all traitors and felons, from the time of conviction; for then their goods and chattels are no longer at their own diſpoſal, but forfeited to the king. Neither can a *felo de ſe* make a will of goods and chattels, for they are forfeited by the act and manner of his death; but he may make a deviſe of his lands, for they are not ſubjected to any forfeiture. Outlaws alſo, though it be but for debt, are incapable of making a will ſo long as the outlawry ſubſiſts, for their goods and chattels are forfeited during that time. As for perſons guilty of other crimes, ſhort of felony, who are by the civil law precluded from making teſtaments, (as uſurers, libellers, and others of a worſe ſtamp), at the common law their teſtaments may be good. And in general the rule is, and has been ſo at leaſt ever ſince Glanvil's time, *quod libera ſit cujuſcunque ultima voluntas*.

Teſtaments may be avoided three ways: 1. If made by a perſon labouring under any of the incapacities before-mentioned; 2. By making another teſtament of a later date; and, 3. By cancelling or revoking it. For tho' I make a laſt will and teſtament irrevocable in the ſtrongeſt words, yet I am at liberty to revoke it: becauſe my own act or words cannot alter the diſpoſition of law, ſo as to make that irrevocable which is in its own nature revocable. For this, ſaith lord Bacon, would be for a man to deprive himſelf of that which of all other things is moſt incident to human condition; and that is, alteration or repentance. It hath alſo been held, that, without an expreſs revocation, if a man, who hath made his will, afterwards marries and hath a child, this is a preſumptive or implied revocation of his former will which he made in his ſtate of celibacy. The Romans were alſo wont to ſet aſide teſtaments as being *inofficioſa*, deficient in natural duty, if they diſinherited or totally paſſed by (without aſſigning a true and ſufficient reaſon) any of the children of the teſtator. But if the child had any legacy, though ever ſo ſmall, it was a proof that the teſtator had not loſt his memory or his reaſon, which otherwiſe the law preſumed; but was then ſuppoſed to have acted thus for ſome ſubſtantial cauſe: and in ſuch caſe no *querela inofficioſi teſtamenti* was allowed. Hence probably has ariſen that groundleſs vulgar error of the neceſſity of leaving the heir a ſhilling, or ſome other expreſs legacy, in order to diſinherit him effectually: whereas, the law of England makes no ſuch wild ſuppoſition of forgetfulneſs or inſanity; and therefore, though the heir or next of kin be totally omitted, it admits no *inofficioſi* to ſet aſide ſuch a teſtament.

Testament, in Scots law. See Law, N° clxxxi. 2, &c.

Testament, (Old and New). See Bible.

TESTATOR, the perſon who makes his will and teſtament.

TESTER. See Tesson.

TESTES, in anatomy, the teſticles. See the next article.

TESTICLE (*teſtis*), a double part in animals of the male kind, ſerving for the office of generation.—See Anat. n° 371. They are called *teſticles*, by diminution of *teſtes*, "witneſſes;" as giving teſtimony of virility. The Greeks call them *didymi*, or *twins*.

In man and moſt animals, the teſticles are exterior; in ſome, as fowls, interior. Some men have only one, ordinarily they have two; ſome have naturally had three; nay, anatomiſts aſſure us they have known four.

TESTIMONY. See Logic, n° 29. and Metaphysics, n° 253.—260.

Testimony, in law. See Evidence.

TESTUDO, the tortoise, in zoology, the name of a genus belonging to the order of amphibia reptilia. It has four legs and a tail, and the body is covered with a ſtrong ſhell. There are 15 ſpecies, principally diſtinguiſhed by peculiarities in their feet. The midas, or common turtle, is found on the Aſcenſion Iſle, and on many other ſouthern iſlands. The ſhell is ſo ſtrong, that ſeveral men may ſtand on it without doing it any injury. It digs round holes in the ſand, in which it lays ſeveral membranaceous eggs. It grows to a very large ſize; ſome having been found weighing 480 lb. Theſe creatures are ſaid to continue ſeveral weeks in the act of copulation.

The Americans find ſo good account in catching turtle, that they have made themſelves very expert at it: they watch them from their neſts on ſhore, in moon-light nights; and, before they reach the ſea, turn them on their backs, and leave them till morning; when they are ſure to find them, ſince they are utterly unable to recover their former poſture: at other times they hunt them in boats, with a peculiar kind of ſpear, ſtriking them with it through the ſhell; and as there is a cord faſtened to the ſpear, they are taken much in the ſame manner as the whales.

Testudo, in antiquity, was particularly uſed among the poets, &c. for the ancient lyre; by reaſon it was originally made by its inventor Mercury, of the black or hollow of the teſtudo aquatica, or ſea-tortoiſe, which he accidentally found on the banks of the river Nile. See Lyre.

Testudo, in the military art of the ancients, was a kind of cover or ſcreen which the ſoldiers, *e. gr.* a whole company, made themſelves of their bucklers, by holding them up over their heads, and ſtanding cloſe to each other. This expedient ſerved to ſhelter them from darts, ſtones, &c. thrown upon them, eſpecially thoſe thrown from above, when they went to the aſſault.

Testudo, was alſo a kind of large wooden tower which moved on ſeveral wheels, and was covered with bullock-hides, ſerving to ſhelter the ſoldiers when they approached the walls to mine them, or to batter them with rams. It was called *teſtudo*, from the ſtrength of its roof, which covered the workmen as the ſhell does the tortoiſe.

TETANUS, a dreadful ſpaſmodic diſorder, in which the whole body becomes rigid and inflexible. It moſt commonly proves mortal. See Medicine, n° 387. 389.

TETHYS, a genus of inſects belonging to the order of vermes molluſca. The body is oblong, fleſhy, and without feet; the mouth conſiſts of a cylindrical proboſcis under the duplicature of a lip; and there are two foramina at the left ſide of the neck. The ſpecies are two, both inhabitants of the ocean.

TETRADYNAMIA, (τεσσαϱες "four," and δυναμις "power"), four powers; the name of the 15th claſs in Linnæus's Sexual Syſtem, conſiſting of plants with hermaphrodite flowers, having ſix ſtamina, four of which are long, and two ſhort; it correſponds to the *ſiliquoſæ* of Ray, and *cruciformes* of Tournefort. See Botany, p. 1296.

TETRAGYNIA, (τεσσαϱες, "four," and γυνη "a woman"); the name of an order, or ſecondary diviſion in the 4th, 5th, 6th, 8th, and 13th claſſes in the Sexual Syſtem; conſiſting of plants which, to the claſſic character, whatever it is, add the circumſtance of having four ſtyles or female organs. Herb-paris and graſs of Parnaſſus furniſh examples.

TETRANDRIA, (τεσσαϱες "four," and ανηϱ "a man or huſband"); the name of the fourth claſs in Linnæus's Sexual Syſtem, conſiſting of plants with hermaphrodite flowers, which have four ſtamina or male organs that are of equal length. In this laſt circumſtance conſiſts the main difference, according to Linnæus, between the plants of the claſs in queſtion and thoſe of the 14th claſs, didynamia, in which the four ſtamina are of unequal length, two of them being long, and two ſhort.—The orders in this numerous claſs are three, founded upon the number of ſtyles or female organs. Scabious, teazel, barren-wort, the ſtarry plants of Ray, and the greater number of genera in this claſs, have one ſtyle; dodder, and hypecoum have two; holly, and a few others, have four.

TETRAO, in ornithology, a genus of birds, belonging to the order of gallinæ, diſtinguiſhed by having the part of the forehead near the eyes naked and papilloſe. There are many ſpecies, diſtinguiſhed principally by their colour, their having rough or naked feet, &c. The following are found in Britain, viz.

1. The urogallus, or wood-cock, inhabits wooded and mountainous countries; in particular, foreſts of pines, birch-trees and junipers; feeding on the tops of the former and berries of the latter; the firſt infects often the fleſh with ſuch a taſte as to render it ſcarcely eatable. In the ſpring it calls the females to its haunts with a loud and ſhrill voice; and is at that time ſo very inattentive to its ſafety, as to be very eaſily ſhot. It ſtands perched on a tree, and deſcends to the females on their firſt appearance. They lay from 8 to 16 eggs; eight at the firſt, and more as they advance in age.

Theſe birds are common to Scandinavia, Germany, France, and ſeveral parts of the Alps.—It is found in no other part of Great Britain than the Highlands of Scotland, north of Inverneſs; and is very rare even in thoſe parts. It is there known by the name of *capercalze*, *auer-calze*, and in the old law books *caperkally;* the laſt ſignifying the horſe of the woods: this ſpecies being, in compariſon of others of the genus, pre-eminently large.

The length of the male is two feet eight inches; its weight ſometimes 14 pounds. The female is much leſs, the length being only 26 inches. The ſexes differ alſo greatly in colours. The bill of the male is of a pale yellow; the head, neck, and back, are elegantly marked, ſlender lines of grey and black running tranſverſely. The upper part of the breaſt is of a rich gloſſy green; the reſt of the breaſt and the belly black, mixed with ſome white feathers; the ſides are marked like the neck; the coverts of the wings croſſed with undulated lines of black and reddiſh brown; the exterior webs of the greater quill-feathers are black: the tail conſiſts of 18 feathers, the middle of which is the longeſt; theſe are black, marked on each ſide with a few white ſpots. The legs are very ſtrong, and covered with brown feathers; the edges of the toes are pectinated.—Of the female, the bill is duſky; the throat red: the head, neck, and back, are marked with tranverſe bars of red and black: the breaſt has ſome white ſpots on it, and the lower part is of a plain orange colour: the belly is barred with pale orange and black; the tips of the feathers are white. The tail is of a deep ruſt-colour barred with black, tipped with white, and conſiſts of 16 feathers.

2. The tetrix, or black-cock, like the former ſpecies, is fond of wooded and mountainous ſituations; feeding on bilberries and other mountain fruits, and in the winter on the tops of the heath. In the ſummer they frequently deſcend from the hills to feed on corn. They never pair: but in the ſpring the male gets upon ſome eminence, crows and claps his wings; on which ſignal all the females within hearing reſort to him. The hen lays ſeldom more than ſix or ſeven eggs. When the female is obliged, during the time of incubation, to leave her eggs in queſt of food, ſhe covers them up ſo artfully, with moſs or dry leaves, that it is very difficult to diſcover them. On this occaſion ſhe is extremely tame and tranquil, however wild and timorous in ordinary. She often keeps to her neſt, though ſtrangers attempt to drag her away. As ſoon as the young ones are hatched, they are ſeen running with extreme agility after the mother, though ſometimes they are not entirely diſengaged from the ſhell. The hen leads them forward for the firſt time into the woods, to ſhow them ants eggs and the wild mountain-berries, which, while young, are their only food. As they grow older their appetites grow ſtronger, and they then feed upon the tops of heather and the cones of the pine-tree. In this manner they ſoon come to perfection: they are an hardy bird, their food lies every where before them, and it would ſeem that they ſhould increaſe in great abundance. But this is not the caſe; their numbers are thinned by rapacious birds and beaſts of every kind, and ſtill more by their own ſalacious conteſts.—As ſoon as the clutching is over, which the female performs in the manner of an hen, the whole brood follows the mother for about a month or two; at the end of which the young males entirely forſake her, and keep in great harmony together till the beginning of ſpring. At this ſeaſon they begin for the firſt time to feel the genial acceſs; and then adieu to all their former friendſhips! They begin to conſider each other as rivals; and the rage of concupiſcence quite extinguiſhes the ſpirit of ſociety. They fight each other like game-cocks; and at that time are ſo inattentive to their own ſafety, that it often happens that two or three of them are killed at a ſhot. It is probable, that in theſe conteſts the bird which comes off victorious takes poſſeſſion of the female ſeraglio, as it is certain they have no faithful attachments.

An old black cock is in length 22 inches, and weighs near four pounds. The bill is duſky; and the plumage of the whole body black, gloſſed over the neck and rump with a ſhining blue. The coverts of the wings are of a duſky brown; the inner coverts white; the thighs and legs are covered with dark brown feathers; the toes reſemble thoſe of the former ſpecies. The tail conſiſts of 16 black feathers, and is much forked; the exterior feathers bend greatly outwards, and their ends ſeem as if cut off.—The female weighs only two pounds; and its length is one foot ſix inches. The head and neck are marked with alternate bars of dull red and black; the breaſt with duſky black and white; but the laſt predominates. The back, coverts of the wings, and tail, are of the ſame colours as the neck, but the red is deeper. The tail is ſlightly forked; it conſiſts of 18 feathers variegated with red and black. The feathers under the tail are white, marked with a few bars of black and orange. This bird hatches its young late in the ſummer. It lays from ſix to eight eggs, of a dull yellowiſh white colour, marked with numbers of very ſmall ferruginous ſpecks; and towards the ſmaller end with ſome blotches of the ſame hue.

3. The red game, or moor-fowl, is peculiar to the Britiſh iſlands. The male weighs about 19 ounces; and is in length 15½ inches. The bill is black; the irides hazel-coloured. The throat is red. The plumage on the head and neck is of a light tawny red; each feather is marked with ſeveral tranſverſe bars of black. The back and ſcapular feathers are of a deeper red, and on the middle of each feather is a large black ſpot; the breaſt and belly are of a dull purpliſh brown, croſſed with numerous narrow duſky lines; the quill-feathers are duſky; the tail conſiſts of 16 feathers of an equal length, all of them (except the four middlemoſt) are black, and the middle feathers are barred with red: the thighs are of a pale red, barred obſcurely with black; the legs and feet cloathed to the very claws with thick ſoft white feathers. The claws are whitiſh, very broad and ſtrong. The female weighs only 15 ounces. The colours in general are duller than thoſe of the male: the breaſt and belly are ſpotted with white; and the tips of ſome of the coverts of the wings are of the ſame colour.—Theſe birds pair in the ſpring, and lay from ſix to ten eggs. The young brood follow the hen the whole ſummer; in the winter they join in flocks of 40 or 50, and become remarkably ſhy and wild; they always keep on the tops of the hills, are ſcarce ever found on the ſides, and never deſcend into the valleys. Their food is the mountain-berries and tops of the heath.

4. The lagopus, or ptarmigan, is 15 inches in length, and weighs 19 ounces. Its plumage is of a pale brown or aſh colour, elegantly croſſed or motled with ſmall duſky ſpots, and minute bars; the head and neck with

broad bars of black, ruſt-colour, and white: the belly and wings are white, but the ſhafts of the greater quill-feathers black. In the male, the grey colour predominates, except on the head and neck, where there is a great mixture of red, with bars of white. The females and young birds have a great deal of ruſt-colour in them. The tail conſiſts of 16 feathers; the two middle of which are aſh-coloured, motled with black, and tipped with white; the two next black, ſlightly marked with white at their ends, the reſt wholly black: the feathers incumbent on the tail are white, and almoſt entirely cover it.

Ptarmigans are found in theſe kingdoms only on the ſummits of the higheſt hills of the Highlands of Scotland and of the Hebrides; and a few ſtill inhabit the lofty hills near Keſwick in Cumberland. They live amidſt the rocks, perching on the grey ſtones, the general colour of the ſtrata in thoſe exalted ſituations. They are very ſilly birds; ſo tame as to bear driving like poultry; and, if provoked to riſe, take very ſhort flights, making a ſmall circuit like pigeons. Like the grous, they keep in ſmall packs; but never, like thoſe birds, take ſhelter in the heath, but beneath looſe ſtones. To the taſte they ſcarce differ from a grous.

Theſe birds are called by Pliny, *lagopi*, their feet being cloathed with feathers to the claws, as the hare's are with fur: the nails are long, broad, and hollow. The firſt circumſtance guards them from the rigour of the winter; the latter enables them to form a lodge under the ſnow, where they lie in heaps to protect them from the cold. The feet of the grous are cloathed in the ſame manner; but thoſe of the two firſt ſpecies here deſcribed, which perch upon trees, are naked, the legs only being feathered, not being in want of ſuch a protection.—In Scotland, they inhabit from the hill of Ben Lomond to the naked mountain of Scaroben in Caithneſs, the iſle of Arran, many of the Hebrides and the Orkneys.

5. The perdrix, or partridge, is ſo well known, as to render any technical deſcription unneceſſary.

“ Theſe birds (ſays Willoughby) hold the principal place in the feaſts and entertainments of princes; without which their feaſts are eſteemed ignoble, vulgar, and of no account. The Frenchmen do ſo highly value, and are ſo fond of the partridge, that if they be wanting, they utterly ſlight and deſpiſe the beſt ſpread tables; as if there could be no feaſt without them.” But however this might be in the times of our hiſtorian, the partridge is now too common in France to be conſidered as a delicacy; and this, as well as every other ſimple diſh, is exploded for luxuries of a more compound invention. In England, where the partridge is much ſcarcer, and a great deal dearer, it is ſtill a favourite delicacy at the tables of the rich; and the deſire of keeping it to themſelves has induced them to make laws for its preſervation, no way harmoniſing with the general ſpirit of Engliſh legiſlation.

The partridge ſeems to be a bird well known all over the world, as it is found in every country and in every climate; as well in the frozen regions about the pole, as the torrid tracks under the equator. It even ſeems to adapt itſelf to the nature of the climate where it reſides. In Greenland, the partridge, which is brown in ſummer, as ſoon as the icy winter ſets in, begins to take a covering ſuited to the ſeaſon: it is then cloathed with a warm down beneath; and its outward plumage aſſumes the colour of the ſnow amongſt which it ſeeks its food. Thus it is doubly fitted for the place, by the warmth and the colour of its plumage; the one to defend it from the cold, the other to prevent its being noticed by the enemy. Thoſe of Barakonda, on the other hand, are longer legged, much ſwifter of foot, and chooſe the higheſt rocks and precipices to reſide in.—They all, however, agree in one character, of being immoderately addicted to venery; and, as ſome writers affirm, often to an unnatural degree. It is certain, the male will purſue the hen even to her neſt; and will break her eggs rather than not indulge his inclinations. Though the young ones have kept together in flocks during the winter, when they begin to pair in ſpring their ſociety diſperſes; and combats, very terrible with reſpect to each other, enſue. Their manners in other circumſtances, reſemble all thoſe of poultry in general; but their cunning and inſtinct ſeem ſuperior to thoſe of the larger kinds. Perhaps, as they live in the very neighbourhood of their enemies, they have more frequent occaſion to put their little arts in practice, and learn by habit the means of evaſion or ſafety. Whenever therefore a dog or other formidable animal approaches their neſt, the female uſes every means to draw him away. She keeps juſt before him, pretends to be incapable of flying, juſt hops up, and then falls down before him, but never goes off ſo far as to diſcourage her purſuer. At length, when ſhe has drawn him entirely away from her ſecret treaſure, ſhe at once takes wing, and fairly leaves him to gaze after her in deſpair. After the danger is over, and the dog withdrawn, ſhe then calls her young, who aſſemble at once at her cry, and follow where ſhe leads them. There are generally from 10 to 15 in a covey; and, if unmoleſted, they live from 15 to 17 years. There are ſeveral methods of taking them, as is well known; that by which they are taken in a net with a ſetting dog, is the moſt pleaſant, as well as the moſt ſecure. The dog, as every body knows, is trained to this exerciſe by a long courſe of education: by blows and careſſes he is taught to lie down at the word of command; a partridge is ſhown him, and he is then ordered to lie down; he is brought into the field, and when the ſportſman perceives where the covey lies, he orders his dog to crouch: at length the dog, from habit, crouches wherever he approaches a covey; and this is the ſignal which the ſportſman receives for unfolding and covering the birds with his net. A covey thus caught, is ſometimes fed in a place proper for their reception; but they can never be throughly tamed like the reſt of our domeſtic poultry.

6. The coturnix, or quail, is not above half the ſize of the partridge. The feathers of the head are black, edged with ruſty brown; the breaſt is of a pale yellowiſh red, ſpotted with black; the feathers on the back are marked with lines of pale yellow, and the legs are of a pale hue. Except in the colours thus deſcribed, and the ſize, it every way reſembles a partridge in ſhape, and, except that it is a bird of paſſage, all others of the poultry kind in its habits and nature.

The quail is by all known to be a bird of paſſage; and yet, if we conſider its heavy manner of flying, and its ſcantineſs of plumage with reſpect to its corpulence, we ſhall be ſurpriſed how a bird ſo apparently ill qualified for migration, ſhould take ſuch extenſive journeys. This, however, is aſſerted: "When we ſailed from Rhodes to Alexandria (ſays Bellonius) about autumn, many quails, flying from the north to ſouth, were taken in our ſhip; and ſailing at ſpring-time the contrary way, from the ſouth to the north, I obſerved them on their return, when many of them were taken in the ſame manner." The ſame account is given by many others; who aver, that they chooſe a north wind for theſe adventures; the ſouth wind being very unfavourable, as it retards their flight by moiſtening their plumage. They then fly two by two; continuing, when their way lies over land, to go faſter by night than by day; and to fly very high, to avoid being ſurpriſed or ſet upon by birds of prey. However, it ſtill remains a doubt whether quails take ſuch long journeys as Bellonius has made them perform. It is now aſſerted by ſome, that the quail only migrates from one province of a country to another. For inſtance, in England they fly from the inland counties to thoſe bordering on the ſea, and continue there all the winter. If froſt or ſnow drive them out of the ſtubble-fields or marſhes, they then retreat to the ſea-ſide, ſhelter themſelves among the weeds, and live upon what is thrown up from the ſea upon ſhore. Particularly in Eſſex, the time of their appearance upon the coaſts of that country exactly coincides with their diſappearance from the more internal parts of the kingdom; ſo that what has been ſaid of their long flights, is probably not ſo well founded as is generally ſuppoſed.—Theſe birds are much leſs prolific than the partridge; ſeldom laying more than ſix or ſeven whitiſh eggs, marked with ragged ruſt-coloured ſpots. But their ardour in courtſhip yields ſcarce to any other bird, as they are fierce and cruel at that ſeaſon to each other, fighting moſt deſperately, and (a puniſhment they richly deſerve) being at that time very eaſily taken. Quail-fighting was a favourite amuſement among the Athenians. They abſtained from the fleſh of this bird, deeming it unwholeſome, as ſuppoſing that it fed upon the white hellebore: but they reared great numbers of them for the pleaſure of ſeeing them fight; and ſtaked ſums of money, as we do with regard to cocks, upon the ſucceſs of the combat. Faſhion, however, has at preſent changed with regard to this bird; we take no pleaſure in its courage, but its fleſh is conſidered as a very great delicacy.—Quails are eaſily caught by a call: the fowler early in the morning having ſpread his net, hides himſelf under it among the corn; he then imitates the voice of the female with his quail-pipe, which the cock hearing, approaches with the utmoſt aſſiduity; when he has got under the net, the fowler then diſcovers himſelf, and terrifies the quail, who attempting to get away, entangles himſelf the more in the net, and is taken.

TETRAODON, a genus of fiſhes, belonging to the order of amphibia nantes. The jaws are bony, ſtretched out, and cloven at the point: there is a linear aperture; no ventral fins. There are ſeven ſpecies; of which the moſt remarkable is the lineatus, called by Mr Haſſelquiſt *fahaka*, which is the Egyptian and Arabic name. It has of late been found in the Nile about Cairo, but was never known in former times. It is ſaid to grow to a prodigious ſize. When juſt caught, it pricks the ſkin if it is taken in the bare hands, and produces ſmall puſtules in the ſame manner as nettles. The fleſh is poiſonous. Mr Forſter confirms the account of the poiſonous nature of a ſpecies of tetraodon, in his account of *New* CALEDONIA.

TETRARCH, a prince who holds and governs a fourth part of a kingdom. Such originally was the import of the title *tetrarch*; but it was afterwards applied to any petty king or ſovereign.

TETRASTYLE, in the ancient architecture, a building, and particularly a temple, with four columns in its front.

TETUAN, an ancient and pleaſant town of Africa, in the kingdom of Fez, and in the province of Habata. It is pretty well built, and the inhabitants are about 15,000 in number, who call themſelves *Andaluſians*, and almoſt all ſpeak Spaniſh; but they are great pirates. Some ſay there are 30,000 Mooriſh inhabitants, and 5000 Jews. W. Long. 5. 18. N. Lat. 35. 25.

TEUCRIUM, TREE GERMANDER, a genus of the gymnoſpernia order, belonging to the didynamia claſs of plants.

There are many ſpecies; of which the moſt remarkable are, 1. The flavum, yellow ſhrubby teucrium, commonly called *tree gemander*; riſing with erect ſhrubby ſtalks and branches, only a foot and a half or two feet high; having ſmall heart-ſhaped, obtuſely ſerrated, foot-ſtalked leaves, hoary underneath, with the floral leaves concave and entire; and numerous flowers by threes, in whorls, along the upper part of the branches, of different colours in the varieties. This ſhrub is durable in root, ſtem, and branches, foliated moſt part of the year, and produces flowers ornamentally in July, ſucceeded by ripe ſeed in autumn. It is an exotic from Spain and Italy, long ſince introduced into our gardens; formerly kept as a green-houſe plant, but now is ſufficiently naturalized to this climate to ſucceed in the open air all the year. 2. The ſcordium, or common water-germander, hath creeping perennial roots, ſending up many ſquare, procumbent, or trailing ſtalks, branching diffuſely; oblong, indented, ſerrated, cloſe-ſitting, oppoſite leaves; and ſmall rediſh flowers, generally two together, from the ſides of the ſtalks and branches, in July and Auguſt. This is a medicinal herb, and ſmells ſtrongly of garlic. It grows naturally in marſhy places, in the iſle of Ely and other parts of England, and moſt parts of Europe; and ſometimes admitted in gardens, in moiſt places, for variety, and as a medical plant. 3. The chamædrys, or ſmaller creeping germander, hath fibrous, very creeping, ſpreading roots; many four-cornered, very branchy, trailing ſtalks, near a foot long; oval, cuneiform, cut, crenated leaves on ſhort foot-ſtalks; and reddiſh flowers, growing almoſt in a verticillus, or whorls, round the ſtalk, three on each peduncle; appearing in June and July. Is a native of Germany, France, &c. 4. The polium, or common yellow mountain-poly, hath a fibrated perennial root; herbaceous, trailing, branchy ſtalks, proſtrate on the ground; oblong, obtuſe, crenated, downy, ſeſſile leaves; and the branches terminated by roundiſh heads of yellow and other coloured flowers in the varieties; appearing in June and July. There are many varieties of this ſpecies, diſtinguiſhed by ſome little variation in their growth, having all roundiſh heads of flowers; moſtly, however, either white or yellow. It grows naturally in Spain and Portugal, &c. 5. The montanum, mountain-poly, with lavender leaves, hath a fibrous, tough, ligneous root; ſomewhat ligneous, weak, procumbent ſtalks; ſpear-ſhaped entire leaves, hoary underneath; and ſmall white flowers in a corymbus at the termination of the branches, in June and July. They are all perennial plants, durable in root; and ſome of the ligneous kinds are alſo abiding in ſtalk, more particularly ſome of the poliums. The leaves and ſeed of the chamædrys have been recommended as diuretic, ſudorific, and emmenagogue; but are now very little uſed.

TEUTONES, or Teutoni, (anc. geog.) a people always by hiſtorians joined with the Cimbri; both ſeated, according to Mela, beyond the Elbe, on the Sinus Codanus, or Baltic; and there, it is ſuppoſed, lay the country of the Teutones, now *Ditmarſh*; diverſity of dialects producing the different terms *Teut*, *Tnt*, *Dit*, *Tid*, and *Thod*, which in the ancient German language ſignified *people*. Of theſe Teutones, Virgil is to be underſtood in the epithet *Teutonicus*, an appellation which more lately came to be applied to the Germans in general, and later ſtill the apellation *Alemanni*.

The Teutones, in conjunction with the Cimbri and Ambrones, made war on the Romans, and marched towards Italy in the year 101 B. C. We are told, that the Teutones alone were ſo numerous, that they were ſix whole days without intermiſſion in paſſing by the Roman camp. In Tranſalpine Gaul they engaged the Roman conſul Marius; but were defeated with incredible ſlaughter; 100,000 of them, according to the loweſt calculations, being killed on the ſpot. According to others, the number of thoſe killed and taken priſoners amounted to 290,000. The inhabitants of the neighbouring country made fences for vineyards of their bones. Their king Teutobochus, ſaid to be a monſtrous giant, was taken priſoner and carried to Rome. See the article Giant.

TEUTONIC, ſomething belonging to the Teutones. The Teutonic is ſuppoſed to have been the language of the ancient Germans, and hence is reckoned amongſt the mother-tongues. The German or Dutch is ſtill called the *Teutonic*.

Teutonic *Order*, an order of military knights, eſtabliſhed towards the cloſe of the twelfth century, on the following occaſion.—When the emperor Barbaroſſa engaged in a cruſade for the recovery of the Holy Land out of the hands of Saladin, he was followed by great numbers of German volunteers, who from various motives enliſted under his banners. After the death of Barbaroſſa, the Germans, who had ſignalized themſelves before Acre or Ptolemais, reſolved to chooſe another leader; and at laſt fixed their choice upon Frederic duke of Suabia, ſecond ſon to the emperor and Henry duke of Brabant. Under theſe generals they behaved with ſo much bravery, that Henry king of Jeruſalem, the patriarch, and ſeveral other princes, determined to reward their valour by inſtituting an order of knighthood in their favour. This was accordingly done; and our new knights had at firſt the title of the *knights of St George*; afterwards it was thought proper to put them under the tutelage of the Virgin Mary, to whom there was already an hoſpital dedicated on Mount Zion, for the relief of German pilgrims. From this time they were called *Equites Mariani*, or knights of St Mary. Laws, regulations, and ſtatutes, were drawn up for them by the Chriſtian kings in Syria and the patriach; and among other obligations it was required, that every perſon admitted to the privileges of the order ſhould be of noble parentage; that the order ſhould defend the Chriſtian religion, and the Holy Land; that they ſhould exerciſe hoſpitality towards the Chriſtians in general, but particularly thoſe of their own country; and that they ſhould with all their power endeavour to propagate and extend the Chriſtian faith and the religion of Jesus. In the year 1190, having become rich by donations from the ſuperſtitious, they elected their firſt grandmaſter, Henry Walpot, a German, who had diſtinguiſh himſelf by his zeal and valour; and their choice was confirmed by the emperor. The following year, pope Celeſtine III. confirmed their privileges already granted, giving them the title of the *Teutonic knights of the hoſpital of St Mary the Virgin*. By the conditions of this bull, they vowed perpetual continence, obedience, and poverty; obligations which it may well be imagined were not very ſtrictly kept.

TEWKSBURY, a town in Glouceſterſhire, formerly noted for its monaſtery. It is now a large handſome corporation, containing about 500 houſes, with a magnificent church. It is ſeated at the confluence of of the rivers Severn and Avon, has a cotton manufactory, and ſends two members to parilment. W. Long. 2. 15. N. Lat. 52. 0.

TEXEL, a town of the United Provinces, in N. Holland, ſeated at the mouth of the Zuyder-Zee, with a good harbour, and a ſtrong fort. It is ſeated in an iſland, which is ſeparated from the continent of Holland by a narrow channel, through which moſt of the ſhips paſs that are bound to Amſterdam. E. Long. 4. 25. N. Lat. 53. 12.

TEXT, a relative term, contradiſtinguiſhed to gloſs or commentary, and ſignifying an original diſcourſe excluſive of any note or interpretation. This word is particularly uſed for a certain paſſage of ſcripture, choſen by a preacher to be the ſubject of his ſermon.

TEXTURE, properly denotes the arrangement and coheſion of ſeveral ſlender bodies or threads interwoven or entangled among each other, as in the webs of ſpiders, or in the cloths, ſtuffs, &c.

Texture is alſo uſed in ſpeaking of any union or conſtituent particles of a concrete body, whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compreſſing, attracting, or any other way. In which ſenſe we ſay, a cloſe compact texture, a lax porous texture, a regular or irregular texture, &c.

THABOR, or Tabor, (anc. geog.) a mountain of Galilee, ſituated in a plain, aad equally terminated or defined on every ſide; lying in the middle between the Campus Magnus or Great Plain, and Scythopolis. This mountain was the boundary of Iſſachar to the north, on the borders of Zabulon; and, according to Lightfoot, was diſtant about 10 miles to the north-weſt of Capernaum; which agrees with the relations of travellers. The moſt beautiful mountain in the world, both in itſelf, and in the proſpect it affords. Seen on the eaſt and weſt ſides, it exactly reſembles a ſugar-loaf; on the north and ſouth ſides, it appears of an oval round, with a deep valley running about it, ſo as to lie detached from, though near to, the other mountains, which it overtops. To the north-eaſt, the eaſt, and ſouth-eaſt, it has the plain of Galilee lying before it, and to the ſouth and ſouth-weſt the incomparably beautiful plain of Eſdrelon; quite round, it riſes equally high and ſteep, and appears green on every ſide, (Korte). A top, it has an oval plain about three miles in compaſs. Over the plain of Eſdrelon there is a view of the mountains of Gilboa; to the ſouth and to the ſouth-weſt, that of Mount Carmel; to the weſt, a proſpect of the mountains of Nazareth, and over them of the Mediterranean; and to the north that of the beginning of Lebanon, and then that of Baſhan, (*Ibid.*) At this mountain Barak collected the army he raiſed againſt Siſera, and in the plain below fought with him. Whether this was the high mountain on which our Saviour's transfiguration happened, mentioned by the evangeliſts, though affirmed by the generality, is however queſtioned by ſome. Ancient tradition is for it: whereas Lightfoot will have it to be a mountain near Cæſarea Philippi; probably that very high one which, according to Joſephus, hangs over the ſprings of the Jordan, and at the foot of which ſtood Cæſarea.

THALES, a celebrated Greek philoſopher, and the firſt of the ſeven wiſe men of Greece, was born at Miletum, about 640 B. C. In order to improve himſelf in the knowledge of the ſciences, he travelled into Egypt, where he diſcourſed with the prieſts and other learned men. Some ſay that he married: but others obſerve, that he eluded the ſolicitations of his mother on this head, by telling her, when he was young, that it was too ſoon; and afterwards, that it was too late. Thales acquired great reputation by his wiſdom and learning: he was the firſt among the Greeks who foretold eclipſes of the ſun, and made extraordinary diſcoveries in aſtronomy. Thales was the author of the Ionian ſect of philoſophers, who were thus called from his being born at Miletum, a city of Ionia. He maintained, that water was the principle of which all the bodies in the univerſe are compoſed; that the world was the work of God; and that God ſees the moſt ſecret thoughts in the heart of man. He ſaid, That "the moſt difficult thing in the world is to know ourſelves; the moſt eaſy, to adviſe others; and the moſt ſweet, to accompliſh our deſires. That, in order to live well, we ought to abſtain from what we find fault with in others. That bodily felicity conſiſts in health; and that of the mind in knowledge. That the moſt ancient of beings is God, becauſe he is uncreated: that nothing is more beautiful than the world, becauſe it is the work of God; nothing more extenſive than ſpace quicker than ſpirit, ſtronger than neceſſity, wiſer than time." It was alſo one of his ſentences, That "we ought never to ſay that to any one that may be turned to our prejudice; and that we ſhould live with our friends as with perſons that may become our enemies." He thanked God for three things; that he was born of the human, not of the brute ſpecies; a man, and not a woman; a Greek, and not a barbarian. None of the ancient philoſophers ever applied themſelves more earneſtly to the ſtudy of aſtronomy than Thales. Diogenes Laertius reports, that leaving his lodging with an old woman to contemplate the ſtars, he fell into a ditch; on which the good woman cried, "How canſt thou know what is doing in the heavens, when thou canſt not perceive what is at thy feet?" He went to ſee Crœſus, who was marching with a powerful army into Cappadocia, and enabled him to paſs the river Halys without making a bridge. Thales died ſoon after, at above 90 years of age. He compoſed ſeveral treatiſes in verſe, on meteors, the equinoxes, &c. but they are all loſt.

THALETAS, an ancient Greek poet and muſician, was, according to Plutarch, cotemporary with Lycurgus the Spartan legiſlator, and lived about 300 years after the Trojan war. Plutarch alſo informs us, that though Thaletas was only ſtyled a lyric poet and muſician, he was likewiſe a great philoſopher and politician; inſomuch, that Lycurgus brought him from Crete when he returned from his travels to Sparta, in order to have aſſiſtance from him in eſtabliſhing his new form of government. His odes, continues Plutarch, were ſo many exhortations to obedience and concord, which he enforced by the ſweetneſs of his voice and melody. Plato likewiſe deſcribes his captivating manner of ſinging; and Plutarch, in his Dialogue on Muſic, aſcribes to Thaletas many muſical compoſitions and inventions: ſuch as *pæans*, and new meaſures in verſe, as well as *rhythms* in muſic, which he had acquired from the flute-playing of Olympus, whom he at firſt had imitated. Porphyry, in his life of Pythagoras, ſays, that this philoſopher uſed to amuſe himſelf with ſinging the old Pæans of Thaletas; and Athenæus likewiſe tells us, that the Spartans long continued to ſing his airs; and according to the Scholiaſt on Pindar, this poet-muſician was the firſt who compoſed the hyporchemes for the armed or military dance.

There was another poet and muſician of the name of *Thaletas*, who was likewiſe a Cretan, that flouriſhed much later than the cotemporary and friend of Lycurgus. Sir Iſaac Newton has named him among the early victors at the Pythic games; and Dr Blair places him 673 years B. C. This is the Thaletas whom Plutarch makes cotemporary with Solon, and of whom it is related that he delivered the Lacedæmonians from the peſtilence by the ſweetneſs of his lyre.

THALIA, in Pagan mythology, one of the nine muſes. She preſided over Comedy; and is repreſented crowned with a garland of ivy, holding a maſk in her hand, and wearing buſkins on her feet.

THAMES, a celebrated river of England, being the largeſt in the iſland. The ſources of this river are four rivulets, that riſe in different parts of Cotſwold hill in Gloceſterſhire, viz. the Lech, the Churne, and the Iſis; theſe having touched Wiltſhire, and joined their waters in one channel a little below Lechlade, a town on the borders of Oxfordſhire, form a deep and copious ſtream, which there becomes navigable for very large barges, and is conſtantly, after it leaves this place, whatever poetical writers may pretend, called the *Thames*. Thence it proceeds into Oxfordſhire; and having viſited the city of Oxford, continues to divide that county from Berkſhire; rolling by Abington, Wallingford, Reading, Henley, Maidenhead, Windſor, and ſo to Staines, becoming there the boundary of the two counties of Middleſex and Surry; and having paſſed by Chertſey and Kingſton in the latter, and Brentford in the former, it comes to the capital of the Britiſh monarchy, London; and having traverſed that imperial city, and her ſiſter city of Weſtminſter, purſues its courſe towards the ſea: in its future progreſs it divides Eſſex from Kent, viſiting in its paſſage Deptford, Greenwich, Woolwich, Grays, and Graveſend: at length it opens into the ſea with a mouth between the Naze and the North Foreland, near ſixty miles broad. In its paſſage it receives no fewer than ſix conſiderable rivers that are not navigable, and eleven that are, which affords a vaſt communication within land; its courſe has been computed about 140 miles, of which it is navigable near 100 from its mouth. In what is called the *Pool*, and which is properly the port of London, though, in the cuſtom-houſe language, that is extended to the whole river below London bridge, has been known to lie upwards of 1000 ſhips commodiouſly; and it is univerſally allowed, that in no haven in Europe veſſels lie more ſafely, take in their ladings with greater eaſe, or are delivered with ſuperior dexterity and diſpatch; ſo that an immenſe commerce is carried on with ſuch order and facility as moſt aſtoniſhes thoſe to whom it is moſt thoroughly known and by whom it is beſt underſtood.

THAMYRIS, an ancient poet and muſician. He is called by Homer Κιθαριϛης, "one who ſings to the cithara." Plutarch, in his Dialogue on Muſic, tells us that he was born in Thrace, the country of Orpheus, and had the ſweeteſt and moſt ſonorous voice of any bard of his time. Homer, in his catalogue of ſhips, where he ſpeaks of the cities under the dominion of Neſtor, mentions Dorion as the place where Thamyris contended with the Muſes, whom he had the arrogance to challenge to a trial of ſkill in poetry and muſic. The conditions and conſequences of this contention are fully deſcribed by the poet.

> And Dorion, fam'd for Thamyris' diſgrace,
> Superior once of all the tuneful race,
> Till, vain of mortals empty praiſe, he ſtrove
> To match the ſeed of cloud-compelling Jove!
> Too daring bard! whoſe unſucceſsful pride
> Th' immortal Muſes in their art defy'd:
> Th' avenging Muſes of the light of day
> Depriv'd his eyes, and ſnatch'd his voice away;
> No more his heav'nly voice was heard to ſing,
> His hand no more awak'd the ſilver ſtring.

Pauſanias informs us, that the painter Polygnotus, in his celebrated picture of Ulyſſes's deſcent into hell, which was preſerved in the temple of Delphos, had repreſented the wretched Thamyris with his eyes put out, his hair and beard long and diſhevelled, and his lyre, broken and unſtrung, lying at his feet. It is certain too, according to Pauſanias, that this bard was not only the ſubject of painting and poetry, but of ſculpture; for he tells us, that among the ſtatues with which mount Helicon was decorated, he ſaw one of Thamyris, repreſented blind, and holding a broken lyre in his hand.

According to Diodorus Siculus, he learnt muſic at the ſchool of Linus; and if we may credit Suidas, he was generally regarded as the eighth among the epic poets who preceded Homer. As to his works, which are wholly loſt, antiquity has preſerved the names of ſeveral. Tzetzes mentions a coſmogony, or creation of the world, in 500 verſes, and Suidas a theogony in 3000: perhaps both theſe writers ſpeak of one and the ſame poem. He was ſaid chiefly to have excelled in the compoſition of hymns: on which account the fanciful philoſopher Plato compares him with Orpheus; and as he makes the ſoul of this bard after death paſs into that of a ſwan, he fixes the reſidence of that of Thamyris in a nightingale. We only know his poem upon the War of the Titans by what Plutarch tells us of it from Heraclides of Pontus.

THANE, or Thain, *Thanus*, a name of an ancient dignity among the Engliſh and Scots, or Anglo-Saxons. Skene makes thane to be a dignity equal to the ſon of an earl. Cambden will have it, that thanes were only dignified by the offices they bore. There were two kinds or orders of thanes; the king's thanes, and ordinary thanes. The firſt were thoſe who attended the king in his courts, and who held lands immediately of the king. The ordinary thanes, or the *thani minores*, were the lords of the manors, who had particular juriſdiction within their limits and over their own tenants; theſe changed their names for that of *barons*, and hence their courts are called *courts-baron* to this day.

THANET, an iſland of the county of Kent, ſurrounded by the ſea except on the north-eaſt ſide, where it is bounded by the branches of the river Stour, now inconſiderable to what they were formerly. It contains ſeveral villages, and the ſea-port towns of Margate and Ramſden, and has the title of an earldom.

THAPSIA, the deadly carrot; a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſix ſpecies; the moſt remarkable is the fœtida, with many pointed lobes, narrowed at their baſe. It is a native of Italy and Spain. The leaves are cut into many narrow ſegments, almoſt as ſmall as thoſe of the garden-carrot, but rough and hairy; their ſegments are always oppoſite, and are narrower at their baſe than at their points. The ſtalks riſe about two feet high, and are terminated by umbels of ſmall yellow flowers, which appear in July: theſe are ſucceeded by flat-bordered ſeeds, which ripen in the beginning of September. The roots of this ſpecies were formerly ordered in medicine, but is now entirely diſuſed; a ſmall doſe operating with extreme violence both upwards and downwards.

THAWING, the reſolution of ice into its former fluid ſtate by the warmth of the air. See Freezing.

THEA, in botany. See Tea.

THEATINES, a religious order in the Romiſh church, ſo called from their principal founder John Peter Caraffa, then biſhop of Theate, or Chieti, in the kingdom of Naples, and afterwards pope, under the name of *Paul* IV. The names of the other founders were Gaetan, Boniface, and Conſiglieri. Theſe four pious men deſiring to reform the eccleſiaſtical ſtate, laid the foundation of an order of regular clerks at Rome in the year 1524. Pope Clement VII. approved the inſtitute, and permitted the brethren to make the three religious vows, to elect a ſuperior every three years, and to draw up ſtatutes for the regulation of the order. They firſt endeavoured, by their example, to revive among the clergy the poverty of the apoſtles and firſt diſciples of our Saviour, and were the firſt who aſſumed the title of *regular clerks*.

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7 War with Sparta.

8 The Spartans defeated by Pelopidas.

Theſe tranſactions ſo much exaſperated the Spartans, that they immediately ſent their king Cleombrotus againſt them, though it was then the depth of winter. The Athenians, in the mean time, who had hitherto aſſiſted the Thebans, declined any farther connection, leſt they ſhould draw upon themſelves the reſentment of the Spartans. However, they were ſoon after determined to act again on the ſame ſide, by an attempt which the Spartan general, Sphodnas, had raſhly made on the Pyræum or harbour of Athens. Thus, by means of the Athenians, a powerful diverſion was made in favour of the Thebans, who gradually recovered all the towns of Bœotia, and at length began to act offenſively againſt their enemies, and made a powerful invaſion in Phocis. They had now many ſharp encounters with them; which, though they did not amount to deciſive battles, yet did not fail to raiſe their courage, and diſtreſs that of the Spartans. In theſe encounters Pelopidas always ſignalized himſelf; and in the battle of Tanagra, where the Lacedæmonians were entirely defeated by the Athenians and their allies, Pelopidas had a principal ſhare in the victory, and killed the Spartan general with his own hand. Soon after this, with a body of only 300 Thebans, he entirely routed and diſperſed near 1000 Spartans: which was the greateſt diſgrace the latter had ever known; for till that time, whether in war with the Greeks or Barbarians, they had never been overcome by an equal, much leſs by ſuch an inferior number of troops.

9 Platæa and Theſpia raſed by the Thebans.

Theſe ſucceſſes of the Thebans greatly alarmed the Athenians, who continually ſought to oppoſe their growing power. In this oppoſition they were joined by the Platæans, who by that means became extremely obnoxious to the Thebans, ſo that they at laſt came to a reſolution to ſurpriſe their city. This they accompliſhed, and entirely deſtroyed it, together with Theſpia,

10
Account of Epaminondas.

11
His difference with Ageſilaus king of Sparta.

Theſpia, another city extremely well affected to Athens. Soon after this, the Thebans, encouraged by their ſucceſs, began to think of enlarging their territories, and making encroachments on their neighbours, as they ſaw other ſtates had done before them. This ſpirit of conqueſt is ſaid to have been raiſed by their general Pelopidas; in which he was ſeconded by Epaminondas, a perſon who, though like him endowed with all the neceſſary qualities to make a complete captain or patriot, had till then preferred a private life, and lived in a conſtant courſe of virtue and the ſtudy of philoſophy. He had as yet ſeldom appeared in public, except to get himſelf excuſed from thoſe ſtate-employments which were ſo eagerly courted by others. This, however, had not hindered him from contracting an intimate friendſhip with Pelopidas, which had been daily improved by the correſpondence of their tempers and principles, as well as by that zeal which both diſplayed for the good of their country; which laſt had made them, even before this time, appear together in action, and to ſuch advantage, that Epaminondas's merit could be no longer concealed, nor indeed ſuffer him to continue longer in his beloved retirement: ſo that he ſaw himſelf, at length, deſervedly placed at the head of the Theban troops; where he gave ſuch early proofs of his future proweſs and abilities, as juſtly gave him the next rank to Pelopidas. Both came now to be conſidered in the ſame light, as generals in the field, as governors at home, and as complete ſtateſmen in the council. When the general treaty for reſtoring peace to Greece came to be propoſed by the Athenians, and was upon the point of being executed by the reſt of the ſtates, the Thebans refuſed to agree to it, unleſs they were comprehended in it under the name of *Bœotians*. This demand was as ſtrenuouſly oppoſed by the other contracting powers as inſiſted on by Epaminondas, who was there as ambaſſador on the part of the Thebans. Ageſilaus, in particular, told him in plain terms, that the Thebans ought to evacuate Bœotia, and leave the cities of it free and independent. To which he was anſwered by him, that the Lacedæmonians would do well to ſet them the example, by reſtoring Meſſenia to its ancient proprietors, and Laconia to its ancient freedom; for that the pretenſions of the city of Thebes to Bœotia were as well founded, at leaſt, as thoſe of Sparta to thoſe two countries. After this he went on, and ſhowed how far Sparta had aggrandized herſelf at the expence of her neighbours: that peace might be indeed obtained, and upon a ſolid and laſting footing; but that this could not be otherwiſe done than by bringing all to an equality. This bold, though juſt remonſtrance, in which not only Thebes, but Greece in general, was concerned, failed not, however, to exaſperate the haughty Spartan monarch; and the Athenians, who had till now looked upon the Thebans as dependents either on them or on the Macedonians, were not a little offended to hear their ambaſſadors talk in ſuch high terms. The reſult of the conference was, that Ageſilaus ſtruck the name of *Thebes* out of the treaty and declared war againſt them, about the year 371 B. C.

12
The Spartans declare war againſt Thebes.

13
Are entirely defeated at Leuctra.

The Thebans were in no ſmall conſternation to ſee themſelves engaged in a war with the powerful Spartans, without any ally to aſſiſt them; and the reſt of the Grecian ſtates having made peace with the latter, began to look upon the ruin of the former as unavoidable. However, they reſolved to make the beſt defence they could; and put their army under the command of Epaminondas, aſſigning him, at his own requeſt, ſix others to act as counſellors or aſſiſtants. The Theban army conſiſted at moſt but of 6000 men, whereas that of the enemy was at leaſt thrice that number; but Epaminondas truſted moſt in his horſe, wherein he had much the advantage both in their quality and good management: the reſt he endeavoured to ſupply by the diſpoſition of his men, and the vigour of the attack. He even refuſed to ſuffer any to ſerve under him in the engagement, but ſuch as he knew to be fully reſolved to conquer or die. The two armies met at LEUCTRA, where the Spartans were defeated with great ſlaughter, as related under that article.

14
The Athenians jealous of the Thebans.

17
The Thebans invade Peloponneſus with a formidable army, but are repulſed.

The victorious general, deſirous to improve this great victory, ſent an herald, crowned with garlands, to communicate it in form to the Athenians, in hopes that this would be an effectual means to re-unite them to the Theban intereſt. But it proved quite otherwiſe. Athens, which now looked upon them with a jealous eye, and had then in view the ſovereignty of Greece, choſe rather, if they could not wholly obtain it, to ſhare it with Sparta, than to let the Thebans into the whole; and therefore declined even giving their herald audience. However, the Thebans took care to ſtrengthen themſelves by alliances; and, beſides the Arcadians and Eleans, had got the Phocians Locrians, Acarnanians, Eubœans, and other ſtates, under their dependence: ſo that they were now in a condition to act offenſively againſt the Spartans. Accordingly, under pretence of aſſiſting the Arcadians, they entered Peloponneſus with a gallant army, with Epaminondas and Pelopidas at their head. Here they were joined by the Arcadian and other confederate forces; ſo that the whole amounted to 40,000, ſome ſay 50,000, men, beſides great numbers of thoſe who followed the camp, rather for plunder than fighting, and were computed about 20,000 more. The army was divided into four columns, and moved ſtraight towards Sellaſia, the place of their rendezvous, from which they purſued their march with fire and ſword towards Sparta. But here they were repulſed by Ageſilaus, who was then returned to that metropolis.

18
The Meſſenians reſtored to their ancient dominions.

To repair, in ſome meaſure, this diſgrace, and at the ſame time to leave ſome laſting monument which ſhould redound as much to his glory as to the mortification of the Spartans, Epaminondas left not their territories till he had reſtored the poſterity of the old Meſſenians to their ancient dominions, out of which they had been baniſhed near 300 years; rebuilt their capital, and left a ſtrong garriſon for its defence. He was, however, like to have been ſtopped in his return by Iphicrates, whom the Athenians had ſent with 12,000 men to intercept him: but this laſt loitered ſo long at Corinth, that the Thebans had paſſed the defiles of Cenchreæ, the chief place where he could have obſtructed his retreat had he taken poſſeſſion of it time enough. Epaminondas continued his march till he came in full view of the city of Corinth. However, he found the roads choaked up with trees, rocks, ſtones, and every thing that could render them impaſſable; and the Corinthians well fortified, and reſolute on a ſtout were the firſt who aſſumed the title of *regular clerks*.

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8
The Spartans defeated by Pelopidas.

Theſe tranſactions ſo much exaſperated the Spartans, that they immediately ſent their king Cleombrotus againſt them, though it was then the depth of winter. The Athenians, in the mean time, who had hitherto aſſiſted the Thebans, declined any farther connection, leſt they ſhould draw upon themſelves the reſentment of the Spartans. However, they were ſoon after determined to act again on the ſame ſide, by an attempt which the Spartan general, Sphodnas, had raſhly made on the Pyræum or harbour of Athens. Thus, by means of the Athenians, a powerful diverſion was made in favour of the Thebans, who gradually recovered all the towns of Bœotia, and at length began to act offenſively againſt their enemies, and made a powerful invaſion in Phocis. They had now many ſharp encounters with them; which, though they did not amount to deciſive battles, yet did not fail to raiſe their courage, and diſtreſs that of the Spartans. In theſe encounters Pelopidas always ſignalized himſelf; and in the battle of Tanagra, where the Lacedæmonians were entirely defeated by the Athenians and their allies, Pelopidas had a principal ſhare in the victory, and killed the Spartan general with his own hand. Soon after this, with a body of only 300 Thebans, he entirely routed and diſperſed near 1000 Spartans: which was the greateſt diſgrace the latter had ever known; for till that time, whether in war with the Greeks or Barbarians, they had never been overcome by an equal, much leſs by ſuch an inferior number of troops.

9
Platæa and Theſpia raſed by the Thebans.

Theſe ſucceſſes of the Thebans greatly alarmed the Athenians, who continually ſought to oppoſe their growing power. In this oppoſition they were joined by the Platæans, who by that means became extremely obnoxious to the Thebans, ſo that they at laſt came to a reſolution to ſurpriſe their city. This they accompliſhed, and entirely deſtroyed it, together with

10 Account of Epaminondas.

11 His difference with Ageſilaus king of Sparta.

Theſpia, another city extremely well affected to Athens. Soon after this, the Thebans, encouraged by their ſucceſs, began to think of enlarging their territories, and making encroachments on their neighbours, as they ſaw other ſtates had done before them. This ſpirit of conqueſt is ſaid to have been raiſed by their general Pelopidas; in which he was ſeconded by Epaminondas, a perſon who, though like him endowed with all the neceſſary qualities to make a complete captain or patriot, had till then preferred a private life, and lived in a conſtant courſe of virtue and the ſtudy of philoſophy. He had as yet ſeldom appeared in public, except to get himſelf excuſed from thoſe ſtate-employments which were ſo eagerly courted by others. This, however, had not hindered him from contracting an intimate friendſhip with Pelopidas, which had been daily improved by the correſpondence of their tempers and principles, as well as by that zeal which both diſplayed for the good of their country; which laſt had made them, even before this time, appear together in action, and to ſuch advantage, that Epaminondas's merit could be no longer concealed, nor indeed ſuffer him to continue longer in his beloved retirement: ſo that he ſaw himſelf, at length, deſervedly placed at the head of the Theban troops; where he gave ſuch early proofs of his future proweſs and abilities, as juſtly gave him the next rank to Pelopidas. Both came now to be conſidered in the ſame light, as generals in the field, as governors at home, and as complete ſtateſmen in the council. When the general treaty for reſtoring peace to Greece came to be propoſed by the Athenians, and was upon the point of being executed by the reſt of the ſtates, the Thebans refuſed to agree to it, unleſs they were comprehended in it under the name of *Bœotians*. This demand was as ſtrenuouſly oppoſed by the other contracting powers as inſiſted on by Epaminondas, who was there as ambaſſador on the part of the Thebans. Ageſilaus, in particular, told him in plain terms, that the Thebans ought to evacuate Bœotia, and leave the cities of it free and independent. To which he was anſwered by him, that the Lacedæmonians would do well to ſet them the example, by reſtoring Meſſenia to its ancient proprietors, and Laconia to its ancient freedom; for that the pretenſions of the city of Thebes to Bœotia were as well founded, at leaſt, as thoſe of Sparta to thoſe two countries. After this he went on, and ſhowed how far Sparta had aggrandized herſelf at the expence of her neighbours: that peace might be indeed obtained, and upon a ſolid and laſting footing; but that this could not be otherwiſe done than by bringing all to an equality. This bold, though juſt remonſtrance, in which not only Thebes, but Greece in general, was concerned, failed not, however, to exaſperate the haughty Spartan monarch; and the Athenians, who had till now looked upon the Thebans as dependents either on them or on the Macedonians, were not a little offended to hear their ambaſſadors talk in ſuch high terms. The reſult of the conference was, that Ageſilaus ſtruck the name of *Thebes* out of the treaty and declared war againſt them, about the year 371 B. C.

12 The Spartans declare war againſt Thebes.

13 Are entirely defeated at Leuctra.

The Thebans were in no ſmall conſternation to ſee themſelves engaged in a war with the powerful Spartans, without any ally to aſſiſt them; and the reſt of the Grecian ſtates having made peace with the latter, began to look upon the ruin of the former as unavoidable. However, they reſolved to make the beſt defence they could; and put their army under the command of Epaminondas, aſſigning him, at his own requeſt, ſix others to act as counſellors or aſſiſtants. The Theban army conſiſted at moſt but of 6000 men, whereas that of the enemy was at leaſt thrice that number; but Epaminondas truſted moſt in his horſe, wherein he had much the advantage both in their quality and good management: the reſt he endeavoured to ſupply by the diſpoſition of his men, and the vigour of the attack. He even refuſed to ſuffer any to ſerve under him in the engagement, but ſuch as he knew to be fully reſolved to conquer or die. The two armies met at LEUCTRA, where the Spartans were defeated with great ſlaughter, as related under that article.

14 The Athenians jealous of the Thebans.

17 The Thebans invade Peloponneſus with a formidable army, but are repulſed.

The victorious general, deſirous to improve this great victory, ſent an herald, crowned with garlands, to communicate it in form to the Athenians, in hopes that this would be an effectual means to re-unite them to the Theban intereſt. But it proved quite otherwiſe. Athens, which now looked upon them with a jealous eye, and had then in view the ſovereignty of Greece, choſe rather, if they could not wholly obtain it, to ſhare it with Sparta, than to let the Thebans into the whole; and therefore declined even giving their herald audience. However, the Thebans took care to ſtrengthen themſelves by alliances; and, beſides the Arcadians and Eleans, had got the Phocians Locrians, Acarnanians, Eubœans, and other ſtates, under their dependence: ſo that they were now in a condition to act offenſively againſt the Spartans. Accordingly, under pretence of aſſiſting the Arcadians, they entered Peloponneſus with a gallant army, with Epaminondas and Pelopidas at their head. Here they were joined by the Arcadian and other confederate forces; ſo that the whole amounted to 40,000, ſome ſay 50,000, men, beſides great numbers of thoſe who followed the camp, rather for plunder than fighting, and were computed about 20,000 more. The army was divided into four columns, and moved ſtraight towards Sellaſia, the place of their rendezvous, from which they purſued their march with fire and ſword towards Sparta. But here they were repulſed by Ageſilaus, who was then returned to that metropolis.

18 The Meſſenians reſtored to their ancient dominions.

To repair, in ſome meaſure, this diſgrace, and at the ſame time to leave ſome laſting monument which ſhould redound as much to his glory as to the mortification of the Spartans, Epaminondas left not their territories till he had reſtored the poſterity of the old Meſſenians to their ancient dominions, out of which they had been baniſhed near 300 years; rebuilt their capital, and left a ſtrong garriſon for its defence. He was, however, like to have been ſtopped in his return by Iphicrates, whom the Athenians had ſent with 12,000 men to intercept him: but this laſt loitered ſo long at Corinth, that the Thebans had paſſed the defiles of Cenchreæ, the chief place where he could have obſtructed his retreat had he taken poſſeſſion of it time enough. Epaminondas continued his march till he came in full view of the city of Corinth. However, he found the roads choaked up with trees, rocks, ſtones, and every thing that could render them impaſſable; and the Corinthians well fortified, and reſolute on a ſtout

19 The Corinthians defeated.

defence. But he came ſo furiouſly upon them, notwithſtanding all theſe difficulties, that they abandoned all their entrenchments and outworks to the Thebans, and fled into the city. Thither theſe purſued them ſword in hand, and made an horrid ſlaughter of them; inſomuch that Corinth muſt have unavoidably fallen into their hands, had their generals thought fit to purſue theſe advantages; but whether they were afraid of the Athenians falling upon them, or apprehended ſome dangerous ambuſh in a country with which they were but indifferently acquainted, or whether the army was too much weakened through ſo many fatigues, or laſtly, whether the coldneſs of the ſeaſon, it being then in the depth of winter, would not permit them to proceed farther, they immediately marched towards Bœotia. This gave ſuch an handle to their enemies, that they met with a very mortifying reception at their return to Thebes, where they were both arreſted, and clapped up as ſtate-priſoners, for having preſumed to prolong their command four months longer than the time limited by law, which time took in almoſt the whole of their expedition from their firſt entrance into Peloponneſus. However, at laſt, the judges being aſhamed to proceed any farther, they were both honourably acquitted.

20 Epaminondas and Pelopidas diſgraced at Thebes.

This proſecution had been chiefly carried on and encouraged by Meneclides, a diſcontented Theban, and a bold and able ſpeaker, who, by his artful calumnies at the trial, had ſo far prevailed with the judges as to get Epaminondas deprived of the government of Bœotia for a whole year, though he could not gain the ſame advantage againſt Pelopidas, who was a greater favourite of the people, as being his ſenior in point of time.

21 War renewed with Sparta.

By this delay the Spartans, with much difficulty, had recovered themſelves from their great defeat at Leuctra, and ſettled their affairs in as good a poſture as they could: but though they had repulſed the Thebans in Peloponneſus, yet, from the exploits they had performed there, eſpecially in the diſmembering the whole kingdom of Meſſenia from them, they had ſtill cauſe to fear what their forces might do under two ſuch generals; and had accordingly taken due care to ſtrengthen themſelves againſt them, and to provide themſelves with a good number of auxiliaries from other ſtates, eſpecially from that of Athens, with whom they had renewed their old treaty, and had agreed that each ſhould have the command five days alternately. Soon after this treaty, the Arcadians renewed the war, and took Pallene in Laconia by ſtorm, put the garriſon to the ſword, and were preſently aſſiſted by the Argives and Eleans, and eſpecially by the Thebans, who ſent to them 7000 foot and 500 horſe under the command of Epaminondas. This ſo alarmed the Athenians likewiſe, that they immediately ſent Gobrias with ſome forces to oppoſe his paſſage in good earneſt; and he ſo behaved himſelf againſt the Thebans, that they were forced to abandon Peloponneſus a ſecond time. This ill ſucceſs gave freſh occaſion to the enemies of Epaminondas to blame his conduct in the higheſt terms, notwithſtanding the ſingular bravery with which he and his troops had forced the paſs. Even his friends could not but ſuſpect him of partiality for the Spartans, in not purſuing his advantage over them, and making a greater ſlaughter of them when he had it in his power; whilſt his enemies made it amount to no leſs than treachery to his country: ſo that their brave general was once more deprived of the government of Bœotia, and reduced to the condition of a private man. He did not continue long under this diſgrace, before an occaſion offered to make his ſervices again of ſuch neceſſity to the ſtate, as to give him an opportunity to retrieve his fame, and wipe off the ſtain which his enemies had thrown upon him

22 The Thebans repulſed.

23 Epaminondas degraded.

The Theſſalians, who had groaned ſome time under the tyranny of the uſurper Alexander ſurnamed the *Pheræan*, ſent an embaſſy to Thebes, to implore their aid and protection: upon which Pelopidas was immediately ſent as ambaſſador, to expoſtulate with him on their behalf. He was then in Macedon, from whence he took the young prince Philip, afterwards the celebrated monarch, in order to protect and educate him; and, upon his return, marched directly to Pharſalus in Theſſaly, in order to puniſh the treachery of ſome mercenaries, who had deſerted the Thebans in that expedition; but when he came thither, he was ſurpriſed to be met by the tyrant at the head of a numerous army before that city, whilſt his own was but as an handful of men in compariſon of it. However, whether he ſuppoſed, or would be thought to do ſo, that Alexander came thither to juſtify himſelf, and anſwer to the complaints alleged againſt him, he went, with Iſmenias his collegue, to him unarmed and unattended, not doubting but his character as ambaſſador from ſo powerful a republic, joined to his own character and authority, would protect them from inſult or violence: but he found himſelf miſtaken; for Alexander had no ſooner got them in his hands, than he cauſed them to be ſeized, and ſent priſoners to Pheræ.

24 Pelopidas ſeized by Alexander of Pheræ.

25 A Theban army ſent to reſcue him, defeated.

The Thebans, highly reſenting the indignity offered to their ambaſſadors, ſent immediately an army into Theſſaly: but the generals were repulſed with great loſs by the Pheræan uſurper; and it was owing to Epaminondas, who was among them only as a private centinel, that they were not totally cut off. For the Thebans, finding themſelves in ſuch imminent danger, which they attributed to the incapacity of their generals, had immediately recourſe to him, whoſe valour and experience had been ſo often tried; and, partly by perſuaſions and intreaties, and partly by threats, obliged him to take the command. This ſoon gave a different turn to their affairs, and converted their flight into a ſafe and regular retreat; for he took the horſe and light-armed foot, and placed himſelf at their head in the rear, and charged the enemy with ſuch vigour and bravery, that he obliged them to deſiſt from their purſuit.

26 Epaminondas reſtored.

However, as the army had ſuffered ſuch loſs before as not to be ſufficient to purſue them in their turn, he was obliged to return with them to Thebes, with their puſillanimous generals; where the latter were fined 12,000 drachms each, and the former was reinſtated in the command, and ſent with a new reinforcement to repair the late diſhonour, and proſecute their revenge. The news of his being in full march on this errand, greatly alarmed the tyrant: but Epaminondas, preferring the ſafety of his impriſoned colleague to all other conſiderations, forbore puſhing hoſtilities to extremes, for fear of provoking the enemy to wreak all his fury on him: to prevent which, he contented himſelf for a while hovering about with his army, and now-and-then with with ſuch ſlight ſkirmiſhes as ſhould intimidate the tyrant, and bring him the ſooner to make ſome ſatisfactory offers. Alexander being fully convinced of the ſuperiority of the Theban general, was glad to accept of a truce of 30 days, and to reſtore Pelopidas and Iſmenias to him; upon which he immediately withdrew his forces, and returned with them to Thebes.

27 Reſcues Pelopidas.

28 Succeſs of Pelopidas at the Perſian court.

By this time Thebes was raiſed to a ſufficient height of reputation and glory to begin to aim in earneſt at the ſovereignty of Greece in her turn. The main obſtacle to it was, that the other ſtates grew ſo jealous of of her preſent greatneſs, as to enter into the ſtrongeſt alliances and confederacies to prevent its farther growth; ſo that not being able now to procure many allies at home, they made no difficulty to ſeek for them abroad; and the Lacedæmonians, by leading the van, gave them a plauſible pretence to follow their ſteps, and to procure an alliance with Perſia, which at that time they found was ready to accept of the offers on any terms; the only queſtion was, which of the three ſtates ſhould be preferred, Sparta, Athens, or Thebes. At the ſame time the Thebans propoſed to their few confederates to ſend likewiſe proper deputies to the Perſian court, in order to ſupport their reſpective intereſts; which they readily agreed to. Theſe were the Arcadians, Eleans, and Argives; at the head of whoſe deputation Pelopidas was ſent on the behalf of the Thebans; which the Athenians being appriſed of, appointed two on their part. Theſe being all arrived at the Perſian court, began to purſue each their reſpective intereſts; but Pelopidas had by that time gained ſuch credit there, both for his ſingular addreſs and his extraordinary exploits, that he was diſtinguiſhed in a particular manner from all the other deputies, and was received by the king with the moſt manifeſt marks of honour and eſteem, who freely owned himſelf convinced that the Thebans were the people on whom he could moſt ſafely depend; and after having greatly applauded the equity of his demands, ratified and confirmed them with great readineſs, to the no ſmall mortification of the other ſtates. The ſubſtance of them was, that the liberties formerly granted to the other towns of Greece ſhould be confirmed; that Meſſenia, in particular, ſhould continue free and independent on the juriſdiction of Sparta; that the Athenians ſhould lay up their fleet; and that the Thebans ſhould be looked upon as the ancient and hereditary friends of Perſia.

29 The Thebans propoſe to build a fleet.

The Thebans took advantage of the diſſenſions which prevailed among the Greeks as a pretence for increaſing their forces; and Epaminondas thought it a proper opportunity for his countrymen to make a bold effort to obtain the dominion at ſea, as they had obtained it in a great meaſure at land. He propoſed it to them in a public aſſembly, and encouraged their hopes from the experience of the Lacedæmonians, who in Xerxes's time had, with ten ſhips only at ſea, gained the ſuperiority over the Athenians, who had no fewer than 200; and added, that it would be a diſgrace now to Thebes to ſuffer two ſuch republics to engroſs the empire of ſo extenſive an element, without putting in at leaſt for their ſhare of it. The people readily came into his propoſal, not without extraordinary applauſe, and immediately ordered 100 galleys to be equipped; and in the mean while ſent him to Rhodes, Chios, and Byzantium, to ſecure thoſe ſtates in their intereſt, and get what aſſiſtance he could from them. His negociations had all the ſucceſs that could be wiſhed for, notwithſtanding the ſtrenuous oppoſition of the Athenians, and of their admiral Laches, who was ſent with a powerful ſquadron againſt him. But what more effectually thwarted all his meaſures, was the work that they found for him at land, and the obliging the Thebans to take part in the quarrels that then reigned among their neighbours: ſo that whatever projects they had concerted, proved abortive for the preſent; and the death of Epaminondas, which happened not long after, put an effectual ſtop to them.

30 The city of Orchomenos razed.

31 Pelopidas marches againſt the Theſſalian tyrant.

During the abſence of that general, and of his colleague Pelopidas, the Orchomenians, being ſpirited up by ſome Theban fugitives, had formed a deſign to change the Theban government into an ariſtocracy; and 300 horſemen of the former had been actually ſent to put it in execution. Their project, however, was timely diſcovered by the vigilance of the magiſtrates, who cauſed them to be ſeized, and put immediately to death. They next ſent a ſufficient force againſt the city of Orchomenos, with orders to put all the men to death, and to ſell the women and children for ſlaves, which was punctually done; after which they raſed that noble city to the ground. Pelopidas was then on his way to Theſſaly, at the head of a powerful army, whither he had been ſent to aſſiſt the Theſſalians, who ſtill groaned under the tyranny of Alexander the Pheræan, and had made ſeveral brave efforts to recover their liberty, but had been ſtill overpowered by that uſurper. Being joined by the Theſſalians, he encamped in the face of the enemy, though far ſuperior in number, and conſiſting of above 20,000 men. A fierce engagement ſoon enſued, in which both ſides fought with uncommon bravery. The place where the battle was fought was called *Cynocephalea*, from ſeveral little hills on it, between which there ran a large plain. Both ſides endeavoured at firſt to poſt themſelves on theſe eminences with their foot, whilſt Pelopidas ordered his cavalry to charge that of the enemy below; which they did with ſuch ſucceſs, that they ſoon put them to the rout, and purſued them over the plain. This obliged the tyrant to gain the tops of the hills, where he greatly annoyed the Theſſalians that endeavoured to force thoſe aſcents; ſo that Pelopidas was obliged to give over his purſuit to come to their relief. This immediately inſpired the Theſſalians with freſh courage, who began again to charge the enemy at ſeveral onſets; and ſoon threw them into ſuch diſorder, that they were forced to give way. Pelopidas no ſooner perceived the advantage, than he began to look about for Alexander, with a deſign of engaging him. Having found him out as he was commanding his right wing and endeavouring to rally his men, he moved directly to him; and being got near enough to be heard by him, challenged him to decide the battle by ſingle combat with him. Alexander, inſtead of accepting the offer, turned about, and with all the ſpeed he could ran to ſcreen himſelf amongſt his guards. Upon this Pelopidas charged him with ſuch furious ſpeed, that he obliged him to retire farther, and ſhelter himſelf within the thickeſt

32 Is killed.

ranks; the ſight of which made him attack with freſh vigour, and fight more deſperately againſt him. He tried in vain ſeveral times to break through their ranks to reach him, cutting down great numbers of thoſe that came forward to oppoſe him: his eagerneſs at length expoſed him ſo far to the darts that were ſhot at him at a diſtance, that ſome of them went quite through his armour, and gave him a deſperate wound or two, while the reſt advanced and ſtabbed him in the breaſt with their ſpears.

33 Alexander defeated.

It is ſcarce poſſible for words to expreſs the grief and deſpair which not only his brave Thebans, but likewiſe the Theſſalians and other allies, ſhowed at the ſight of their ſlain general: ſome of the latter, who had perceived the danger he was expoſed to, came down the hill with all poſſible ſpeed to his relief; but when they perceived that they were come too late to ſave him, both they and the reſt of the little army thought on nothing but how to revenge his death. They rallied accordingly, both horſe and foot, as quick as poſſible, and began to charge the enemy afreſh, and with ſuch deſperate fury, that they at length gained a complete victory over them, and killed above 3000 of them in their purſuit, beſides a much greater number which they had ſlain on the field of battle, though they ſtill looked upon all theſe advantages as vaſtly too ſmall to compenſate the loſs of their brave general.

34 And at laſt murdered.

The news of his death had no ſooner reached Thebes than the whole city was ſeen in as deep a mourning as his army. However, they ſent a reinforcement to it of 7000 foot and 700 horſe, as well to revenge the death of that general, as to improve the victory he had gained over the enemy; by the help of which they fell ſo furiouſly on them, that they quickly broke and totally defeated the ſhattered remains of Alexander's army. Hereupon he was forced to ſue for peace, and to accept it on ſuch conditions as the conquerors thought fit to impoſe. He was at length diſpatched in his bed by his wife Thebe, aſſiſted by her brothers, about ſeven years after his defeat. His body was afterwards dragged along the ſtreets, trodden under foot, and left a prey to the dogs.

35 Ambition of the Thebans.

36 Epaminondas diſpleaſes the ſtates of Greece.

All this while the Thebans were watching to improve every commotion that happened, every ſucceſs they met with, to the forwarding of their then reigning and favourite project of increaſing their power above all the reſt, and in their turn to give laws to Greece. Their late ſucceſs in Theſſaly, and the rupture between the Arcadians and Mantineans at the ſame time about ſome conſecrated money which the former had taken out of the temple of Olympias to pay their troops employed againſt the Eleans, and which the latter called a downright ſacrilege, beſides other diſcords that reigned in the other ſtates of Greece, gave freſh encouragement to Thebes to ſet up for arbitreſs in thoſe diſputes; and ſo much the more, as thoſe who had embezzled the ſacred money, and wanted rather to embroil matters than to have them brought to light, ſent that republic word that the Arcadians were juſt upon the point of revolting to the Spartans, and adviſed them to come and put an immediate ſtop to it. At the ſame time they diſpatched ſome private directions to a Theban officer in Tegea to apprehend ſeveral of their own people as diſturbers of the peace: which was accordingly done, and ſeveral eminent perſons were confined as priſoners of ſtate; but were ſoon after diſcharged, and loud complaints were made againſt ſuch arbitrary and unjuſt proceedings. The officer was accuſed before the Theban ſenate for having intermeddled in their affairs, and endeavoured to interrupt the good correſpondence between the two ſtates. It was even inſiſted on by ſome of the Tegeans, that he ſhould be indicted and proceeded againſt by his principals; whilſt the more moderate ſort, who foreſaw the conſequences that were like to attend ſuch appeals, and that it would infallibly bring the Thebans upon them, loudly proteſted againſt their marching into their territories, and did all they could to prevent it. The Thebans, however, were become too powerful and ambitious to miſs ſo fair an opportunity of getting once more footing in Peloponneſus, as they had long ago premeditated; and Epaminondas was ſo far from making a ſecret of their deſign, that he told the Arcadian deputies in juſtification of it, that as it was on their account that the Thebans engaged in the war, they had acted treacherouſly with them in making peace with Athens without their conſent: however, that when he was got with his army on his march into Peloponneſus to aſſiſt his friends, he would ſoon ſee what proofs they, the Arcadians, would then give of their fidelity. This ſpeech did not fail to alarm them greatly; eſpecially as it was ſpoken in ſuch a magiſterial ſtyle and threatening tone. Even thoſe who were beſt affected to the Thebans could not forbear expreſſing their diſlike of it; and all that had the welfare of Peloponneſus at heart, readily agreed with the Mantineans, that there was no time to be loſt to uſe all proper means to prevent the impending ſtorm.

37 A combination againſt Thebes.

38 Epaminondas makes an unſucceſsful attempt on Sparta.

Athens and Sparta were accordingly applied to, and were eaſily prevailed upon to aſſiſt the Mantineans, and to come into a ſtrict confederacy againſt the Thebans; and to prevent all diſputes about the command of the army, it was agreed that each ſtate ſhould have it in its own territories; which plainly ſhows how terrified they all were at the apprehenſion of a freſh invaſion of the Thebans: for this was a point which neither the Spartans nor Athenians would have ſo readily given up to the Arcadians, though theſe had formerly as ſtrenuouſly inſiſted upon it, even when they were almoſt reduced to the laſt extremity, and had never been able to obtain it till now. But Epaminondas was then in full march at the head of his Bœotian troops, with ſome Eubœan auxiliaries and a body of ſtout Theſſalian horſe; and was moreover to be joined by the Meſſenians, Argives, and ſeveral other nations, as ſoon as he had entered Peloponneſus. The confederate army againſt him had ordered their rendezvous at Mantinea, the place which they naturally concluded would be firſt attacked, as being the chief ſeat of thoſe who had revolted from the Thebans. But whilſt they were ſecuring themſelves on that ſide, Epaminondas, who wiſely conſidered how far this confederacy and expedition muſt have drained the city of Sparta of its main ſtrength, broke up privately from Nemæa, where he had lain for ſome time encamped, and marched all that night with a deſign to have ſurpriſed that important capital: but his project being timely diſcovered, the vigilant king took care to diſconcert it; ſo that, though the Theban general made ſeveral vigorous aſſaults on that city, he was ſo ſtoutly repulſed, and the Spartans behaved with ſuch intrepid valour, that he was forced to retire and turn his thoughts againſt Mantinea, which

39 And on Mantinea.

which he judged by this time to have been quite defenceleſs. He judged rightly indeed; for the place was not only drained of its troops, but likewiſe of its inhabitants, who took that opportunity whilſt the ſcene of war was in Lacedæmon, to gather in their harveſt, and were ſcattered all over the country; ſo that he would not have met with any difficulty in gaining the town, had not the Athenian auxiliaries come unexpectedly to its relief and given him a freſh repulſe.

Theſe two laſt defeats greatly exaſperated the Theban general, who had never till now been uſed to them, and could not but foreſee that they would not only leſſen his reputation with his allies, but, if not timely retrieved, would ſully the glory of all his former exploits. What added to his preſent difficulties was, that the time allotted him for his expedition was almoſt expired; ſo that he had but a ſhort ſpace left to undertake ſome brave atchievement, which might recover his and his country's honour, and keep up the ſpirits of his auxiliaries and thoſe under his protection. He was moreover got very far into the enemy's country, and ſaw plainly enough how narrowly they watched all his motions, and how well prepared they were to oppoſe him whatever attempt he reſolved upon, whether to attack them or to retreat. Under all theſe difficulties, he rightly conſidered, that he muſt immediately reſolve upon a deciſive battle; in which, if his priſtine fortune followed him, he might at once retrieve his affairs, and make himſelf maſter of Peloponneſus; or, if that failed him, as it lately had done, fall honourably in the attempt. In this engagment Epaminondas made the wiſeſt diſpoſition of his troops, attacked and fought with the moſt intrepid courage and conduct, and had opened himſelf a way through the Spartan phalanxes, thrown them into the utmoſt confuſion, and made a terrible ſlaughter of them, inſomuch that the field of battle was covered with their wounded and ſlain, when, in the heat of the fight, having ventured himſelf too far in order to give them a total overthrow, the enemy rallied again, pouring their whole fury and three whole volleys of darts at him, ſome of which he drew out and returned to them, till at length, being covered with wounds, and weakened with the loſs of ſo much blood, he received a mortal wound from a javelin, and was with great difficulty reſcued from the enemy by his brave Thebans, and brought alive, though ſpeechleſs, into his tent. As ſoon as he had recovered himſelf, he aſked his friends that were about him what was become of his ſhield; and being told that it was ſafe, he beckoned to have it brought to him, and kiſſed it. He next inquired which ſide had gained the victory; and being anſwered, The Thebans; he replied, Then all is well: and upon obſerving ſome of his friends bewailing his untimely death, and leaving no children behind him, he is ſaid to have anſwered, Yes; I have left two fair daughters, the victory of Leuctra, and this of Mantinea, to perpetuate my memory. Soon after this, upon the drawing of the point of the javelin out of his body, he expired.

40 Battle of Mantinea.

41 Epaminondas killed.

The conſequence of this great general's fall, and of this bloody fight, in which neither ſide could boaſt any great advantage over the other, but a great loſs of men on both ſides, inſomuch that Xenophon makes it a drawn battle, was, that both parties agreed on a ceſſation of arms, and parted as it were by conſent, to take care of their wounded and ſlain. The Thebans indeed thus far gained the greater ſhare of glory, that they renewed the fight; and after a moſt deſperate conteſted, gained the victory over thoſe Spartans that oppoſed them, and reſcued the body of their dying general out of their hands. However, an effectual end was put to this bloody war, and a general peace agreed on by all but Sparta; who refuſed it only becauſe the Meſſenians were included in it. But as to the Thebans, they had no great reaſon to boaſt of this dear-bought victory, ſince their power and glory began to decline from that very time; ſo that it may be truly ſaid, that it roſe and ſet with their great general.

42 Peace concluded.

43 State of Thebes to the preſent time.

On the death of Epaminondas, the Thebans relapſed into their former ſtate of inactivity and indolence; and at laſt having ventured to oppoſe Alexander the Great, their city was taken, and the inhabitants ſlaughtered for ſeveral hours, after which the buildings were deſtroyed. It was rebuilt by Caſſander, but never afterwards made any conſiderable figure among the ſtates of Greece. About the year 146 B. C. it fell under the power of the Romans, under which it continued till the extinction of their empire by the Turks. It is now called *Thive*, and is nothing to what it was formerly; yet it is four miles in circumference, but ſo full of ruins, that there are not above 4000 Turks and Chriſtians in it. It is now famous for a fine ſort of white clay, of which they make bowls for pipes after the Turkiſh faſhion. They are never burnt, but dry naturally, and become as hard as a ſtone. There are two moſques in Thebes, and a great many Greek churches. It is ſeated between two ſmall rivers, in E. Long. 24. 5. N. Lat. 38. 22.

THEBES is alſo the ancient name of the capital of Upper Egypt, named likewiſe *Hecatompolis* and *Dioſpolis*. It was celebrated for its grandeur, and among other things, for its having 100 gates. It is now inconſiderable; but there are vaſt columns of marble and porphyry lying half buried in the ground, with ſtatues and obeliſks of a prodigious ſize, inſcribed with hieroglyphics. Not far from this place are to be ſeen the ſepulchres of the kings of Thebes, lying in grottos, cut out of the rock in a moſt beautiful manner, with long rooms or galleries under the mountains. The modern name of the place is *Sayd*.

THEFT, or *Simple* LARCENY, is "the felonious taking and carrying away, of the perſonal goods of another.". This offence certainly commenced then, whenever it was, that the bounds of property, or laws of *meum* and *tuum*, were eſtabliſhed. How far ſuch an offence can exiſt in a ſtate of nature, where all things are held to be common, is a queſtion that may be ſolved with very little difficulty. The diſturbance of any individual, in the occupation of what he has ſeiſed to his preſent uſe, ſeems to be the only offence of this kind incident to ſuch a ſtate. But, unqueſtionably, in ſocial communities, when property is eſtabliſhed, any violation of that property is ſubject to be puniſhed by the laws of ſociety; though how far that puniſhment ſhould extend, is matter of conſiderable doubt.

By the Jewiſh law, it was only puniſhed with a pecuniary fine, and ſatisfaction to the party injured. And in the civil law, till ſome very late conſtitutions, we never find the puniſhment capital. The laws of Draco at Athens puniſhed it with death: but his laws were ſaid to be written in blood; and Solon afterwards changed the penalty to a pecuniary mulct. And ſo the Attic laws in general continued; except that once, in a time of dearth, it was made capital to break into a garden and ſteal figs: but this law, and the informers againſt the offence, grew ſo odious, that from them all malicious informers were ſtyled *ſycophants*; a name which we have much perverted from its original meaning. From theſe examples, as well as the reaſon of the thing, many learned and ſcrupulous men have queſtioned the propriety, if not lawfulneſs, of inflicting capital puniſhment for ſimple theft. And certainly the natural puniſhment for injuries to property ſeems to be the loſs of the offender's own property: which ought to be univerſally the caſe, were all mens fortunes equal. But as thoſe who have no property themſelves are generally the moſt ready to attack the property of others, it has been found neceſſary, inſtead of a pecuniary to ſubſtitute a corporal puniſhment; yet how far this corporal puniſhment ought to extend, is what has occaſioned the doubt. Sir Thomas More and the marquis Beccaria, at the diſtance of more than two centuries, have very ſenſibly propoſed that kind of corporal puniſhment which approaches the neareſt to a pecuniary ſatiſfaction, viz. a temporary impriſonment, with an obligation to labour, firſt for the party robbed, and afterwards for the public, in works of the moſt ſlaviſh kind; in order to oblige the offender to repair, by his induſtry and diligence, the depredations he has committed upon private property and public order. But, notwithſtanding all the remonſtrances of ſpeculative politicians and moraliſts, the puniſhment of theft ſtill continues throughout the greateſt part of Europe to be capital: and Puffendorf, together with Sir Matthew Hale, are of opinion that this muſt always be referred to the prudence of the legiſlature; who are to judge, ſay they, when crimes are become ſo enormous as to require ſuch ſanguinary reſtrictions. Yet both theſe writers agree, that ſuch puniſhment ſhould be cautiouſly inflicted, and never without the utmoſt neceſſity.

The Anglo-Saxon laws nominally puniſhed theft with death, if above the value of twelvepence: but the criminal was permitted to redeem his life by a pecuniary ranſom; as, among their anceſtors the Germans, by a ſtated number of cattle. But in the ninth year of Hen. I. this power of redemption was taken away, and all perſons guilty of larceny above the value of twelvepence were directed to be hanged; which law continues in force to this day. For though the inferior ſpecies of theft, or petit larceny, is only puniſhed by whipping at common law, or, by ſtatute 4 Geo. I. c. 11. may be extended to tranſportation for ſeven years, as is alſo expreſsly directed in the caſe of the Plate-glaſs Company, yet the puniſhment of grand larceny, or the ſtealing above the value of twelvepence, (which ſum was the ſtandard in the time of king Athelſtan, 800 years ago) is at common law regularly death: which, conſidering the great intermediate alteration in the price or denomination of money, is undoubtedly a very rigorous conſtitution; and made Sir Henry Spelman (above a century ſince, when money was at twice its preſent rate) complain, that while every thing elſe was riſen in its nominal value, and become dearer, the life of man had continually grown cheaper. It is true, that the mercy of juries will often make them ſtrain a point, and bring in larceny to be under the value of value or twelvepence, when it is really of much greater value: but this, though evidently juſtifiable and proper when it only reduces the preſent nominal value of money to the ancient ſtandard, is otherwiſe a kind of pious perjury, and does not at all excuſe our common law in this reſpect from the imputation of ſeverity, but rather ſtrongly confeſſes the charge. It is likewiſe true, that by the merciful extenſions of the benefit of clergy by our modern ſtatute-law, a perſon who commits a ſimple larceny to the value of thirteen pence or thirteen hundred pounds, though guilty of a capital offence, ſhall be excuſed the pains of death: but this is only for the firſt offence. And in many caſes of ſimple larceny the benefit of clergy is taken away by ſtatute: as from horſe-ſtealing in the principals and acceſſories both *before* and *after* the fact; theft by great and notorious thieves in Northumberland and Cumberland; taking woollen cloth from off the tenters, or linens, fuſtians, calicoes, or cotton, goods, from the place of manufacture; (which extends, in the laſt caſe, to aiders, aſſiſters, procurers, buyers, and receivers); feloniouſly driving away, or otherwiſe ſtealing one or more ſheep or other cattle ſpecified in the acts, or killing them with intent to ſteal the whole or any part of the carcaſe, or aiding or aſſiſting therein; thefts on navigable rivers above the value of forty ſhillings, or being preſent, aiding, and aſſiſting thereat; plundering veſſels in diſtreſs, or that have ſuffered ſhipwreck; ſtealing letters ſent by the poſt; and alſo ſtealing deer, hares, and conies, under the peculiar circumſtances mentioned in the Waltham black act. Which additional ſeverity is owing to the great malice and miſchief of the theft in ſome of theſe inſtances; and, in others, to the difficulties men would otherwiſe lie under to preſerve thoſe goods, which are ſo eaſily carried off. Upon which laſt principle the Roman law puniſhed more ſeverely than other thieves the *Abigei*, or ſtealers of cattle; and the *Balnearii*, or ſuch as ſtole the cloaths of perſons who were waſhing in the public baths; both which conſtitutions ſeem to be borrowed from the laws of Athens. And, ſo too, the ancient Goths puniſhed with unrelenting ſeverity thefts of cattle, or of corn that was reaped and left in the field: ſuch kind of property (which no human induſtry can ſufficiently guard) being eſteemed under the peculiar cuſtody of heaven.

THEFT-*Bote*, (from the Saxon *theof*, i. e. *fur*, and *bote*, *compenſatis*) is the receiving of a man's goods again from a thief, after ſtolen, or other amends not to proſecute the felon, and to the intent the thief may eſcape; which is an offence puniſhable with fine and impriſonment, &c.

THEME, denotes the ſubject of an exerciſe for young ſtudents to write or compoſe on.

THEMISON, a phyſician of Laodicea, a diſciple of Aſclepiades. He founded the methodic ſect, with a view to the more eaſily teaching and practiſing the art of medicine. See MEDICINE, n° 78.—80. Themiſon gave the firſt account of diacodium, which was prepared of the juice and decoction of poppy-heads and honey. He invented a purging medicine called *heira*. See MEDICINE.

THEMISTIUS, an ancient Greek orator and philoſopher, a native of Paphlagonia, who flouriſhed in the fourth century. He had great intereſt and favour with the emperors in his time, and though a heathen, was of a very tolerating ſpirit. He taught for many years at Conſtantinople, of which city he was made præfect by Julian and Theodoſius; and lived to be exceeding old. More than 30 of his orations are ſtill extant, beſide commentaries on ſeveral parts of Ariſtotle's works.

THEMISTOCLES, the renowned Athenian admiral, general, and patriot, who gained the battle of Salamine againſt the Perſians. Being baniſhed his country by his ungrateful fellow-citizens, he fled to Artaxerxes king of Perſia; but, in order to avoid taking up arms againſt his country, he ſlew himſelf, 464 B. C. See ATTICA, n° 76, *et ſeq.*

THEOBALD (Lewis), the ſon of an attorney at Sittingbourn in Kent, was a well-known writer and critic in the early part of the preſent century. He engaged in a paper called the *Cenſor*, publiſhed in Miſt's Journal, wherein, by delivering his opinions with too little reſerve concerning ſome eminent wits, he expoſed himſelf to their reſentment. Upon the publication of Pope's Homer, he praiſed it in terms of extravagant admiration, yet afterwards thought proper to abuſe it as earneſtly; for which Pope at firſt made him the hero of his Dunciad, though he afterward laid him aſide for another. Mr Theobald not only expoſed himſelf to the laſhes of Pope, but waged war with Mr Dennis, who treated him more roughly, though with leſs ſatire. He nevertheleſs publiſhed an edition of Shakeſpeare, in which he corrected with great pains and ingenuity many faults that had crept into that poet's writings. This edition is ſtill in great eſteem; being in general preferred to thoſe publiſhed by Pope, Warburton, and Hanmer. He alſo wrote ſome plays, and tranſlated others from the ancients.

THEOCRACY, in matters of government, a ſtate governed by the immediate direction of God alone: ſuch was the ancient government of the Jews before the time of Saul.

THEOCRITUS, a celebrated Greek poet, was born at Syracuſe, but lived at the court of Egypt in the reign of Ptolemy Philadelphus, about the 285th year before the Chriſtian æra. It is ſaid that at his return to Syracuſe, venturing to ſpeak ill of Hiero king of that city, he was put to death by his order. There are ſtill extant Theocritus's Idylliums in the Doric dialect, which are maſterpieces in their kind, written with admirable ſimplicity, and filled with inexpreſſible beauties. The beſt edition of them is that of Oxford, in 1699, 8vo.

THEODICY. See METAPHYSICS, n° 6. 222—230.

THEODOLITE, a mathematical inſtrument much uſed in ſurveying. See GEOMETRY.

THEODORE, king of Corſica, baron Nieuhoff in the county of La Marc in Weſtphalia. He had his education in the French ſervice, and afterwards went to Spain, where he received ſome marks of regard from the duke of Riperda and cardinal Alberoni; but being of an unſettled diſpoſition, he quitted Spain, and travelled into Italy, England, and Holland, in ſearch of ſome new adventure. He at laſt fixed his attention on Corſica, and formed the ſcheme of rendering himſelf ſovereign of that iſland. He was a man of abilities and addreſs; and having fully informed himſelf of every thing relating to Corſica, went to Tunis, where he fell upon means to procure ſome money and arms; and then went to Leghorn, from whence he wrote a letter to the Corſican chiefs, Giafferi and Paoli, offering conſiderable aſſiſtance to the nation if they would elect him as their ſovereign. This letter was conſigned to count Domenico Rivarola, who acted as Corſican plenipotentiary in Tuſcany; and he gave for anſwer, that if Theodore brought the aſſiſtance he promiſed to the Corſicans, they would very willingly make him king.

Upon this he without loſs of time ſet ſail, and landed at Tavagna in the ſpring of the year 1736. He was a man of a very ſtately appearance, and the Turkiſh dreſs he wore added to the dignity of his mien. He had a few attendants with him; and his manners were ſo engaging, and his offers ſo plauſible, that he was proclaimed king of Corſica before count Rivarola's diſpatches arrived to inform the chiefs of the terms upon which he had agreed. He brought with him about 1000 zechins of Tunis, beſides ſome arms and ammunition, and made magnificent promiſes of foreign aſſiſtance; whence the Corſicans, who were glad of any ſupport, willingly gave into his ſchemes. Theodore inſtantly aſſumed every mark of royal dignity. He had his guards and his officers of ſtate. He conferred titles of honour, and ſtruck money both of ſilver and copper. The ſilver pieces were few in number, and can now hardly be met with; the copper coins have on one ſide T. R. that is, "Theodorus Rex," with a double branch croſſed, and round it this inſcription, PRO BONO PUBLICO RE. CO. that is, "For the public good of the kingdom of Corſica:" on the other ſide is the value of the piece; *Cinque ſolidi*, or five ſous.

The Genoeſe were not a little confounded with this unexpected adventurer. They publiſhed a violent manifeſto againſt Theodore, treating him with great contempt; but at the ſame time ſhowing they were alarmed at his appearance. Theodore replied, in a manifeſto, with all the calmneſs and dignity of a monarch; but after being about eight months in Corſica, perceiving that the people began to cool in their affections towards him, he aſſembled his chiefs, and declared he would keep them no longer in a ſtate of uncertainty, being determined to ſeek in perſon the ſupport he ſo long expected. He ſettled an adminiſtration during his abſence, recommended unity in the ſtrongeſt terms, and left the iſland with reciprocal aſſurances of fidelity and affection. He went to Holland, where he was ſo ſucceſsful as to obtain credit from ſeveral rich merchants, particularly Jews, who truſted him with cannon and other warlike ſtores to a great value, under the charge of a ſupercago. With theſe he returned to Corſica in 1739; but by this time the French, as auxiliaries to the Genoeſe, had become ſo powerful in the iſland, that though Theodore threw in his ſupply of warlike ſtores, he did not incline to venture his perſon, the Genoeſe having ſet a high price on his head. He therefore again departed; and after many unavailing attempts to recover his crown, at length choſe for retirement a country where he might enjoy the participation of that liberty which he had ſo vainly endeavoured to give his Corſicans; but his ſituation in England by degrees grew wretched, and he was reduced ſo low as to be ſeveral years before his death a priſoner for debt in the King's bench. At length, to the honour of ſome gentlemen of rank, a charitable contribution was ſet on foot for him in the year 1753. Mr Boſwell obſerves, that Mr Horace Walpole generouſly exerted himſelf for the unhappy Theodore, and wrote a paper in the World with great elegance and humour, ſoliciting a contribution for the unhappy monarch in diſtreſs, to be paid to Mr Robert Dodſley bookſeller, as lord high treaſurer. This brought him a very handſome ſum, and he was allowed to get out of priſon. That gentleman adds, that Mr Walpole has the original deed, by which Theodore made over the kingdom of Corſica in ſecurity to his creditors, and that he has alſo the great ſeal of the kingdom. Theodore died in 1756, and was buried in St Anne's church-yard, Weſtminſter; where, in 1757, a ſimple unadorned monument of marble was erected to his memory by a gentleman, with an inſcription, which, after mentioning ſome of the above particulars, concludes with the following lines:

The grave, great teacher, to a level brings
Heroes and beggars, galley-ſlaves and kings:
But Theodore this moral learn'd ere dead,
Fate pour'd its leſſon on his living head,
Beſtow'd a kingdom and deny'd him bread.

Theodore left a ſon, who is an accompliſhed young gentleman.

THEODORET, biſhop of St Cyricus in Syria, in the 5th century, and one of the moſt learned fathers of the church, was born in the year 386, and was the diſciple of Theodorus Mopſueſta and St John Chryſoſtom. Having received holy orders, he was with difficulty perſuaded to accept of the biſhopric of St Cyricus, about the year 420. He diſcovered great frugality in the expences of his table, dreſs, and furniture, but ſpent conſiderable ſums in improving and adorning the city of Cyricus. He erected two large bridges, public baths, fountains, and aqueducts, and laboured with great zeal and ſucceſs in his dioceſe. Yet his zeal was not confined to his own church: he went to preach at Antioch, and the neighbouring towns; where he became admired for his eloquence and learning, and had the happineſs to convert multitudes of people. He wrote in favour of John of Antioch and Neſtorius, againſt Cyril's Twelve Anathemas: he afterwards attacked the opinions of Neſtorius, and was depoſed in the ſynod held by the Eutychians at Epheſus; but was afterwards reſtored by the general council of Chalcedon, in which he was preſent, in 451. It is thought that he died ſoon after; though others ſay that he lived till the year 470. There are ſtill extant Theodoret's excellent Commentary on St Paul's Epiſtles, and on ſeveral other books of the holy Scriptures. 2. His Eccleſiaſtical Hiſtory from the time of Arius to Theodoſius the Younger. 3. The hiſtory of the famous Anchorites of his time. 4. Epiſtles. 5. Diſcourſes on Providence. And, 6. An excellent treatiſe againſt the Pagans, intitled, *De curandis Græcorum affectibus*; and other works. The beſt edition of all which is that of Father Sirmond in Greek and Latin, in 4 vols folio.

THEODOSIUS I. called the *Great*, was a native of Spain. The valour he had ſhown, and the great ſervices he had done to the empire, made Gratian, attacked by the Goths and Germans, to admit him as a partner in the government. He received the purple in 379, aged 43. See CONSTANTINOPLE, n° 81—92.

THEOGNIS, an ancient Greek poet of Megara in Achaia; flouriſhed about the 59th Olympiad, 144 B. C. We have a moral work of his extant, containing a uſual ſummary of precepts and reflections, to be found in the collections of the Greek minor poets.

THEOLOGY;

Or, The Study of RELIGION.

TO aſcend by a chain of reaſoning from things viſible to things inviſible, from palpable to impalpable, from terreſtrial to celeſtial, from the creature even up to the Creator, is the buſineſs of theology: it is not ſurpriſing, therefore, that the union of many doctrines is neceſſary completely to form ſuch a ſcience. To underſtand, and properly to interpret, the ſcriptures or revelation, demands not leſs ſagacity than aſſiduity. The gift of perſuaſion is alſo eſſential to the miniſters of the goſpel. And laſtly, the civil government has committed to their care certain functions of ſociety, which relate, or ſeem to relate, either to the doctrines or morality of the goſpel. They aſſemble, for example, in bodies to form conſiſtories; they judge in matrimonial caſes; they carry conſolation and hope to the ſouls of the ſick; they prepare for death thoſe criminals which juſtice ſacrifices to public ſafety; they take upon themſelves the charge of Ephori, with the inſpection of ſome pious foundations: they diſtribute alms; they adminiſter the ſacraments, &c.

To diſcharge fully ſo many duties, the theologian has need, 1. Of ſeveral preparatory ſtudies; 2. Of ſome theoretic ſciences; and, 3. Of many doctrines which have for their object his miniſterial office. The firſt are,

1. The languages; and among theſe,
   - (*a*) His native language, in which he is to preach and exerciſe his miniſtry, and with which he ought to be perfectly acquainted.
   - (*b*) The Latin language, which is the language of the learned world in general.
   - (*c*) The Greek language, in order to underſtand the new Teſtament.
   - (*d*) The Hebrew language, of which the Talmudian and Rabbinical idioms are a part.
   - (*e*) The Arabic language.
   - (*f*) The Syriac language.
   - (*g*) The French language. And,

(b) The Engliſh language. The two latter of which now appear neceſſary to every man of letters, and particularly to a theologian, on account of the excellent works which are wrote in thoſe languages.

2. The principal parts of philoſophy; as,
    (a) Logic.
    (b) Metaphyſics.
    (c) Moral philoſophy.
3. Rhetoric and eloquence, or the art of ſpeaking correctly, of writing with elegance, and of perſuaſion.

To which may be added,

4. The elements of chronology, and univerſal hiſtory.
5. The ſtudy of the Jewiſh antiquities.

He who would devote himſelf to the important employment of a theologian, and has the noble ambition to excel in it, ſhould early impreſs on his mind theſe truths: that the years which are paſſed at an univerſity are few; that they run rapidly away; that they are entirely engroſſed by the theoretic ſciences; and that he who does not carry with him to the univerſity a fund of knowledge in the preparatory parts of learning, commonly brings very little away, when his age or his parents oblige him to quit it.

The theoretic ſciences of a theologian are,

1. The dogmatic, or the theory of theology; which ſome Latin authors name alſo *thetica*, or *ſyſtmatica*.
2. The exegeſis, or the ſcience of attaining the true ſenſe of the holy ſcriptures.
3. The hermeneutic, or the art of interpreting and explaining the ſcriptures to others. This differs in general but little from the exegeſis, and in ſome reſpects is quite the ſame.
4. Polemic theology, or controverſy.
5. Natural theology.
6. Moral theology.
7. The hiſtory of the church under the Old and New Teſtaments.

The practical ſciences are,

1. Homiletic theology.
2. Cathechetic theology.
3. Caſuiſtic theology.

We do not here particularly name the *patriſtic theology*, (*theologia patrum ſeu patriſtica*), becauſe all Chriſtian communions are not agreed in their opinions concerning the degree of authenticity and infallibility that is to be attributed to theſe ancient fathers of the church. The Proteſtants believe, that theſe primitive theologians were liable to error in their ſentiments as well as thoſe of our days; and, in all probability, that they were leſs ſkilful, leſs learned, leſs clear, and leſs accumſtomed to cloſe reaſoning, than the latter, as philoſophy was then more imperfect. But as we find in the writings of theſe fathers, many elucidations of the doctrine of the primitive apoſtles, and many irrefragable teſtimonies of the authenticity of divers remarkable events, which ſerve to eſtabliſh the truth of Chriſtianity; and as we there ſee, moreover, the origin of errors, of arbitrary ceremonies, and of many doctrines that have been introduced into the Chriſtian church; the reading and the ſtudy of theſe fathers cannot but be of great utility to the theologian. To a virtuous citizen, who unites ſuch various ſciences, and employs them in pointing out to his fellow-citizens the path that leads to temporal and eternal felicity; in a word, to a wiſe theologian, what veneration is not due?

Sect. I. *Of the* Dogmatic.

Under the general term of dogmatic, we comprehend that part which the different writers on theology have called ſometimes *theoretic*, ſometimes *ſyſtematic*, and ſometimes *thetic theology*, &c. The term *dogmatic* appears to us the moſt general, and the moſt juſt, to expreſs the ſubject that we intend, as it comprehends an entire ſyſtem of all the dogmas or tenets that each religion profeſſes: whether it teach theſe dogmas by the way of theſis, as articles of faith; by public lecture; by catechiſing; or any other manner whatever.

Every poſitive religion muſt naturally have a ſyſtem of certain points of doctrine to propoſe to its followers; otherwiſe each one would form a particular ſyſtem according to his own fancy: there would be as many different religions as there are individuals on the earth, and each ſociety would conſiſt of a confuſed maſs of fantaſtic opinions; as the different modes of thinking, and the different degrees of diſcernment, are varied and compounded by mankind to infinity; but truth, on the contrary, is uniform and invariable.

The Chriſtian religion is as compound in its dogmas as it is ſimple in its moral principle. It includes, 1. The dogmas founded on the lights of reaſon. 2. Thoſe drawn from the Old Teſtament and the law of Moſes. 3. Thoſe taken from the New Teſtament and the doctrine of Jesus Christ. 4. Thoſe that the fathers of the church have drawn from the Holy Scriptures. 5. Thoſe that the church under the New Teſtament has preſcribed to Chriſtians by œcumenical and other councils aſſembled in different ages. 6. The dogmas that the popes, in quality of heads of the church, have eſtabliſhed by their bulls: and to theſe muſt be added, on the part of the Proteſtants, 7. The dogmas that the reformers, eſpecially Luther and Calvin, have taught. 8. The deciſions of ſynods; and laſtly, the tenets that are maintained by the different ſects, as Socinians, Anabaptiſts, Quakers, &c. Each of theſe particular religions or ſects pretend to ſupport their dogmas both by reaſon and revelation: we do not here offer a work of controverſy, and are very far from attempting to determine on which ſide truth and reaſon are to be found.

Our zeal, however, for the Chriſtian religion in general, which we regard as perfectly divine, and as the only religion adapted to promote the happineſs of mankind in this world, and to ſecure it in the next, and the deſire we have that it may endure to the end of time, compels us to make in this place one important reflection; which is, that ſimplicity is ever an eſſential attribute of perfection, as complexity is of imperfection. Now, it cannot be denied, without doing violence to truth, that among the different dogmas of which we have been ſpeaking, there are ſeveral that ſeem to be founded on ſpeculations very abſtruſe, on ſubtleties very intricate, and on interpretations very ambiguous. God certainly never intended that all mankind ſhould be theologians; he has not given them his divine word to be the cauſe of diſcord among men, nor that they ſhould paſs their whole lives in a painful ſearch after objects of belief and articles of faith; and that they ſhould forego, in that purſuit, the neceſſary offices of life, and their duties as citizens. The dogmas, then, eſſentially neceſſary to the welfare of mankind, ought to conſiſt of a ſmall number, and to bear the marks of ſimplicity and perſpicuity; without which they muſt be imperfect, and conſequently the work of man. Our intention, in making this remark, is, to extend our voice, if it be poſſible, even to poſterity, whom we would conjure not to injure our religion, ſo holy and ſo admirable, by a multiplicity of dogmas. It is neceſſary, however, that the divine, who makes it his ſtudy and his profeſſion, ſhould be thoroughly acquainted with the theory of this ſcience, in order that he may be able to inſtruct the ſincere Chriſtian, and to explain the nature of each particular dogma, as well as the ſolidity of its proofs; and to this it is that the ſtudy of the dogmatic leads; of which we ſhall now continue the analyſis.

The dogmatic is then nothing but *a ſuccinct expoſition of all the dogmas of the Chriſtian religion, in a natural and philoſophical order*. By the word philoſophic, we do not here preciſely mean the method of mathematicians, in the manner the late M. Wolff has applied it to philoſophy; every ſubject is not capable of a demonſtration ſo exact and rigid; but a regular order is required in the arrangement of the general ſyſtem, and a connection is to be preſerved in the ſeveral matters that form it: the definitions ſhould be juſt; the diviſions exact; the arguments ſolid; the proofs clear; the citations concluſive; the examples ſtriking; and, in a word, every thing ſhould be adduced that appertains to ſo important a diſcipline.

It is very eſſential, moreover, in the dogmatic, at the beginning of each theſis, to explain the ſeveral terms that are peculiar to it, and that uſe has eſtabliſhed in treating of theology; to draw from each definition certain axioms, and from thence to form propoſitions, and to illuſtrate them by ſolid reaſoning. Laſtly, we ſhould not neglect, in ſuch a ſyſtem, to make uſe of the expreſſions uſed in the ſymbolic books that have been received by the whole Chriſtian church, and which cannot be rejected or altered, without cauſing a confuſion in our ideas, and in the general ſyſtem of the Chriſtian religion. But before we make the leaſt advance in the ſtudy of Chriſtian theology, it is indiſpenſably neceſſary to examine the proofs by which the truth, the authenticity, and the divinity of the ſacred and canonical books are eſtabliſhed; for this is the foundation of all the dogmas, and the axis on which its whole doctrine turns.

The ſyſtematic part of the Chriſtian religion, among the great number of its dogmas or theſes, has *three principal*, from which all the reſt are derived, and which form the baſis of its whole doctrine:

1. The exiſtence of one God in three perſons.
2. The neceſſity of a Mediator or Redeemer.
3. The real appearance of the Mediator or Meſſiah on the earth.

Whoever writes, profeſſes, or teaches the dogmatic, ſhould be, above all things, careful well to eſtabliſh theſe important truths; to evince them by the ſtrongeſt and moſt evident proofs, drawn partly from the lights of reaſon, and partly from revelation: and he will then ſee with what facility all other theſes flow from, and how eaſy it will be to prove them by, theſe.

The infinite variety that is found among mankind in their manner of thinking, and in their method of treating ſubjects; the frequent changes that have happened in the exterior form of philoſophy, and in the method of treating it; the oppoſitions that have been raiſed at all times againſt divers doctrines of the Chriſtian religion; all theſe have produced among theologians, different ſyſtems of the dogmatic. Sometimes they have combined poſitive theology with morality, and have formed a ſyſtem that they call *theologia theoretico-practica*, or *theologia thetico-moralis*, &c.: ſometimes they have refuted the arguments that others oppoſe to certain theſes; and from thence has aroſe a ſyſtem that they call *theologia thetico*, or *dogmatico*, or *poſitivo-polemica*: ſometimes they have joined to natural theology that of revelation; and have formed a dogmatic, called *philoſophico-theologica*: and ſo of the reſt. But, beſides that theſe diſtinctions and denominations are in themſelves pedantic, it is at all times more eligible, in every ſcience, to avoid confounding with each other the ſeveral branches of which it conſiſts. The different dogmas, morality, philoſophy, and controverſy, are ſeparate articles; and when each of theſe parts of theology are ſeparately treated, they are diſpoſed with more order in the mind, and a greater light is diffuſed over their ſeveral ſubjects.

It appears, moreover, from the ſimple enumeration that we have made above, of the different principles on which the dogmas of the Chriſtian religion are founded, that, to be thoroughly acquainted with its whole theory, the theologian ſhould alſo apply himſelf to the ſtudy of the ſymbolic books of its communion, and eſpecially ſhould be well verſed in the Creed of the Apoſtles; that of Nice and St Athanaſius; the book called *Formula Concordiæ;* the Theſes of the council of Trent; the Catechiſms of Luther; the Confeſſion of Augſburg; the Articles of Smalcalden; the Catechiſm of Heidelberg, &c. That he ſhould be well acquainted with that part of theology that is called *patriſtica:* that is to ſay, that he ſhould be well read in the fathers of the church; that he ſhould not be ignorant even of ſcholaſtic theology; that he ſhould at leaſt know the frivolous ſubtleties and the complicated method of the ancient ſcholaſtic divines, which was derived from the philoſophy of Ariſtotle and the ſchools; that he ſhould make a ſerious ſtudy of the ſacred hiſtory of all ages, the councils and ſynods; that he ſhould, above all, never loſe ſight of natural theology; and laſtly, that it is indiſpenſably neceſſary that he ſhould procure a good bibliotheque, or treatiſe of eccleſiaſtical writers (A), which he may conſult occaſionally, and learn from thence to know the beſt guides. The more a theologian applies himſelf to all theſe ſubjects, the more ability he will acquire in this ſcience, and the more perfect he will be in the theory of that religion which it is his duty to teach to others.

Revealed religion being founded (at leaſt in great part) on natural religion, and philoſophy being the ſource from whence the principles and the knowledge of the latter are derived, it is evident that philoſophy is intimately connected with theology: nevertheleſs, the aid of the former is to be employed with precaution, and is not to be regarded as the foundation of the theological dogmas, but only as a mean by which they may be explained and enforced. The Holy Scriptures

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(A) Thoſe of Du Pin and William Cave are moſt celebrated.

Hermeneutic Theology.

tures conſtitute perpetually the true baſis of revealed theology: philoſophy effectually concurs, however, to prove the exiſtence and the attributes of the Supreme Being; the neceſſity of the creation of the univerſe by Almighty God, in oppoſition to every other poſſible manner of its being produced: it furniſhes, moreover, plauſible conjectures concerning the intention of the Almighty in creating this world; it proves the neceſſity of a perpetual power to preſerve it; it ſuppoſes, that as God could not produce any thing that was not perfect in its kind, he could not have created man as he now is; it vindicates the conduct of the Supreme Being, in appointing chaſtiſements for tranſgreſſions, by ſhowing that moral evil was not introduced into the world by abſolute neceſſity, but by the abuſe of liberty, the moſt noble prerogative of the human ſoul; it determines the neceſſity of a Mediator; it furniſhes arguments for the belief of the immortality of the ſoul, and of a future ſtate that has a relation to the moral actions of this life; and laſtly, it inſpires a love of God as a Being of ſovereign perfection, a gratitude towards him as our Creator and Preſerver, and a ſubmiſſion to his will as our Supreme Ruler and Director; motives of all others the moſt powerfully conducive to a virtuous conduct.

It is this uſe which theology makes of philoſophy, that has given occaſion to divide the theſes of the dogmatic into pure and mixed; that is, into theſes that are founded entirely upon revelation; and ſuch as ariſe from an union of reaſon with revelation. Of the firſt ſort are, 1. The article of the Holy Scripture itſelf; which treats of its divine origin, its authority, and its efficacy. 2. The dogma of the Trinity. 3. That of the origin of evil, or of original ſin. 4. The whole article of Jeſus Chriſt. 5. The dogma of the efficacy and operations of the Holy Ghoſt. 6. That of the ſacraments. 7. That of repentance. 8. That of the belief in Jeſus Chriſt. 9. That of good and bad angels. 10. That of the end of the world, and the laſt judgment. 11. That of the church, &c. The mixed dogmas or theſes are, 1. The doctrine of a Supreme Being in general; his being, his attributes, and his works. 2. That of the creation. 3. That of providence, or the conſervation of the world. 4. Of ſin, as a tranſgreſſion of the laws of God. 5. Of rewards and puniſhments after death, &c. He that attentively ſtudies, thoroughly comprehends, and well digeſts, all theſe theſes, will have reaſon to reſt content with his knowledge of the dogmatic.

SECT. II. *Of the* EXEGESIS *and the* HERMENEUTIC.

THE term *Exegeſis* is derived from the Greek verb EXE'GONSTAI, which ſignifies to *relate* or *explain;* and that of *Hermeneutic* from ERME'NEUEIN, which means to *ſearch into;* and, in a figurative ſenſe, *thoroughly to examine* and *interpret.* The learned, but eſpecially the theologians, make uſe of theſe words, ſometimes as ſynonima, to expreſs the ſame thing, and ſometimes (as there are ſcarce any terms that are perfectly ſynonymous) to denote a ſmall difference between two parts of learning of the ſame nature. By the word Exegeſis they mean, *that ſcience which teaches clearly to inveſtigate the true ſenſe of the original text of the Holy Scriptures;* and by the Hermeneutic, *the art of interpreting and explaining the Holy Scriptures to others* (B).

Moral Theology.

This diſtinction is ſo ſubtle, that it becomes almoſt frivolous. They are, in fact, the ſame ſcience; the one is only an explication of the other, and for that reaſon we think we are authoriſed to treat of them together in this place.

In order to the true underſtanding of the ſacred text of all the books contained in the Holy Bible, whether of the Old or New Teſtament, it is abſolutely neceſſary that the theologian be thoroughly acquainted, not only with the languages in which theſe books were originally wrote, but likewiſe with the hiſtory and antiquities of thoſe remote times in which their authors lived. With regard to reſearches into the hiſtory of the Jewiſh nation, their antiquities, their morals, and their cuſtoms, it will be found advantageous to purſue it as far as the nature of the ſubject will admit, without, however, engaging in critical ſubtleties that lead to a labyrinth to which there is no end, and have ſpread more clouds over theology than even the ſcholaſtic controverſies have formerly done.

He who would ſucceſsfully interpret any work whatever, ſhould firſt conſider the ſpirit in which it is wrote: he ſhould attentively reflect on the general deſign of that work, and the particular motives that induced the author to undertake it; his genius, his paſſions, his taſte; the time, the place, and the people for whom it was written. Theſe conſiderations are, above all, neceſſary, when we would undertake the explication of the Holy Scriptures. Independent of thoſe reflections which the theologian will of himſelf naturally make on the ſubject, the excellent commentaries which we have on the Bible, in which the greateſt men of every age have exerciſed their genius, may ſerve him as a guide in this courſe. The critical hiſtories will likewiſe afford great aid, and throw admirable lights on this matter. Clear ideas, an acute diſcernment, and a ſolid judgment, will complete the work.

Furniſhed with ideas from ſuch ſources, the theologian may venture to inveſtigate the true ſenſe of thoſe paſſages of Holy Scripture that may appear to him obſcure, contradictory, or difficult, and to interpret them to others: but he will be more wiſe and leſs vain than to attempt to impoſe his deciſions on mankind, at all times, as authentic and infallible. The human diſcernment is ever confined and imperfect; and God has not granted to any man, to any theologian, or aſſembly of divines, an excluſive power of interpreting his divine word: he has moreover denounced his anathema againſt all thoſe who ſhall add or take away a ſingle word thereof. But to explore the true ſenſe of any paſſage, and to explain it to others, cannot certainly be deemed either adding or retrenching.

SECT. III. *Of* MORAL THEOLOGY.

IF it were allowable to compare the Saviour of the world to a weak mortal, we would ſay, that the conduct of Jeſus Chriſt reſembled that of Socrates, who has left us no part of his doctrine in writing, but whoſe whole inſtructions (as well as the particulars of his life) have been collected, digeſted, and publiſhed, by his diſciples. The evangeliſts are the only hiſtorians of the Meſſiah: it is to their labours that we owe the knowledge of his actions upon earth, and his divine doctrine. The four Evangeliſts, and the Acts of the Apoſtles wrote by St Luke, contain therefore

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(A) The *Exegeſis* is a kind of rational grammar. The *Hermeneutic* is the art of interpreting entire paſſages.

alone the hiſtory of the life of Jeſus Chriſt, and the doctrine that he taught. His apoſtles and diſciples began by paraphraſing his doctrine, as well by their evangelic ſermons as in the epiſtles they addreſſed to the faithful of ſeveral Chriſtian churches: they have given explications, and have added paſtoral inſtructions, which are in effect admirable; but which, nevertheleſs, form not the original text of the diſcourſes of our Saviour. The biſhops of the apoſtolic century, the fathers of the church in all ſucceeding centuries, the other biſhops and eccleſiaſtics, the councils, the ſynods, the doctors of theology, the popes, the conſiſtories, the reformers likewiſe, and an infinity of theologians, have drawn from the Goſpel, and ſometimes alſo from the letters of the apoſtles, and from other commentaries on the goſpel, various tenets; which, united, form at this day the general ſyſtem of the Chriſtian religion. The theologians who devote themſelves to the ſervice of the altar, ſtudy this ſyſtem in the dogmatic: the laity learn it by means of catechiſms; and after they have made confeſſion of their faith, ſolemnly adopt it when they are received into the boſom of the church.

It is not the ſame with regard to the morality of Jeſus Chriſt, which every one may read in the Goſpel; and to know which, it is not neceſſary to become learned, nor to ſtudy a complicated ſyſtem. If the dogmatic were not armed with a thouſand arguments to eſtabliſh the divinity of Jeſus Chriſt, yet would the morality of his goſpel ſufficiently prove it; ſeeing that it is perfectly holy, entirely ſimple, ſtrictly juſt, and moſt completely adapted to promote the felicity of the human race in this world, and in that which is to come. The Saviour of the world has not enjoined any part of mankind to engage in diſputes or abſtract refinements: the ſole command that he has given them is, *to believe in his goſpel*; and that is compriſed in one word only, LOVE: the grand and only principle on which the whole of his ſacred doctrine is founded.

To produce the greateſt effects poſſible by the leaſt efforts, is the higheſt perfection in nature, and at the ſame time the true characteriſtic of divinity. God has given to all the beings that compoſe the univerſe, one ſimple principle alone, by which the whole, and every part, is connected and perpetually ſupported; and that is LOVE. The attraction of the celeſtial bodies, as well as of thoſe of which our globe is formed, is a ſpecies of *love;* a mutual tendency toward each other. The uniform generation, by which all beings are perpetuated, is founded in *love*. This is the true *minimum*, the true ſyſtem of *the leaſt action*, which includes ſomething ſo divine. It appears to be the will of God to eſtabliſh by the mouth of the Meſſiah, the ſame ſimple principle in morality, that is, in the rule of human actions, by ſaying *Love:* in a word, it was his will, that in the conduct of mankind, as in every other part of nature, there ſhould be no other principle than that of Love.

That in the different ſyſtems of ethics of the ancient heathen philoſophers many maxims and precepts of admirable morality are to be found, cannot be denied; but, beſide that theſe philoſophers are almoſt continually contradicting each other in their maxims, no one of their ſyſtems is founded on the true principle. In ſearching after it, they have diſcovered ſome excellent truths; but it has been by chance, and they are at beſt imperfect. Jeſus Chriſt has alone taught mankind perfect morals, by deducing them from this true principle. Every principle ſhould be ſimple: the idea of a compound principle implies at once an imperfection. Every principle ſhould be comprehenſive, even univerſal, in its effects. Every principle, whoſe effects are limited, is imperfect. God himſelf is uniform in his principle, and infinite in his effects. His doctrine, or his law, ſhould be the ſame. Jeſus Chriſt has made known to mankind this principle, ſimple and univerſal. He has therefore been, in this ſenſe alſo, the true Saviour of the world. He has preached to mankind; and his only doctrine has been that of love.

By the word *Love*, with regard to bodies in general, is meant a tendency, a mutual inclination, that urges them to join and to coaleſce; and with regard to men in particular, a lively affecting pleaſure that poſſeſſes the mind on contemplating the perfections of any object. This pleaſure is always accompanied with a deſire either to poſſeſs that object, or to render it propitious. By adopting therefore this principle, and this laſt definition of *Love*, it follows, that all the duties of man conſiſt, 1. In the love of God in preference to all other objects. 2. In the love of himſelf. 3. In the love of his own ſpecies. 4. In the love of every other creature to a certain degree.

The doctrines of Jeſus Chriſt are, in theſe reſpects, the moſt explicit.

From this principle flows our duty towards God, towards ourſelves, our neighbour, and to thoſe beings that are ſubject to our power. The firſt rule is, to communicate to all thoſe, whom it is our duty to love, all the good, and to preſerve them from all the evil in our power. The ſecond, to do to no one what we would not have done to ourſelves in ſimilar circumſtances. The third, which is the ſimple effect of love, is to endeavour to pleaſe the object that we ought to love. The fourth, to endeavour to render the pleaſures that we communicate to others, as lively as poſſible, and thoſe inevitable evils, which we are ſometimes conſtrained to do to them, as ſupportable as we can; and ſo of the reſt. The whole evangelic doctrine of our Saviour is replete, from beginning to end, with admirable precepts for theſe purpoſes; and theſe precepts, with their applications, general and particular, we learn from that ſcience which we call *moral theology*.

This doctrine we diſtinguiſh from moral philoſophy, or the ſimple doctrine of Ethics; becauſe Jeſus Chriſt has made known, in his divine morality, a far greater degree of perfection than is diſcoverable by the mere light of human reaſon. For the renouncing of ſelf-intereſt, and private pleaſure; the forgiveneſs of offences; the love of his enemies; the triumph over deſtructive paſſions; and many other like virtues, the Chriſtian is alone indebted to the doctrine of Jeſus Chriſt.

A ſecond difference between Chriſtianity and philoſophy conſiſts in this, That the firſt adds to the ſecond ſtill new motives to the practice of virtue. That of redemption and pardon, obtained by Jeſus Chriſt, is not one of the leaſt. Its argument is this: If God has ſo loved mankind, as to afford them the means by which the evil, cauſed by their own fault, may be aboliſhed, it would be the greateſt of all ingratitude and malice towards himſelf, if man ſhould not endeavour to acknowledge this love, to merit it, and to embrace the means of pleaſing God. A third motive, taken alſo from the merit of Jeſus Chriſt, here offers itſelf as an auxiliary to the two former. According to the Chriſtian doctrine, man has not by nature the power to practiſe all thoſe virtues which are agreeable to God: but the ſame doctrine teaches, on the other hand, the conditions by which it is poſſible to pleaſe that moſt holy and perfect Being; and gives the Chriſtian hope alſo that he ſhall never labour in vain.

Laſtly, the Chriſtian morality is of far greater efficacy in adverſity than philoſophy: it carries with it a wonderful conſolation in misfortune, and even in the hour of death; for the Chriſtian may ſay, with the Apoſtle, *that godlineſs* (or the practice of evangelic morals) *is in all things profitable, having the promiſe of the preſent life, and that which is to come.*

SECT. IV. *Of* POLEMIC THEOLOGY, *or* CONTROVERSY.

WE cannot ſufficiently lament, that the church of the God of peace ſhould be a church-militant; and that a doctrine ſo ſimple and clear as that of the Goſpel ſhould be the cauſe of diſcord even among Chriſtians themſelves. Nevertheleſs, as the truth is ſo difficult to diſcover in all things, and eſpecially in matters of religion; as it is ſo frequently covered with the clouds of intereſt and ambition; as the ſame object appears ſo different to different men; and as error in the face of the world conſtantly aſſumes the maſk of truth; it is but juſt that the true religion be furniſhed with arms to combat error, and to pluck off that deceitful maſk by which ſo many poor mortals are ſeduced.

The theologian, who has made the proper preparatory ſtudies, who is thoroughly inſtructed in natural religion, in the dogmatic and the hermeneutic, and who joins to theſe ſound logic, is already well prepared for this ſpiritual combat: he is armed, but he is ſtill to learn how to uſe theſe arms: he muſt alſo be made acquainted with the enemies he is to encounter, to know their force, and the arts they will uſe againſt him. It is plain enough, we ſuppoſe, that we here ſpeak of ſpiritual arms; of thoſe with which we are furniſhed by reaſon and the Holy Scripture: evil be to him that employs any other: force is ever an infallible proof of the want of argument. The propagation of a religion by the ſword, after the manner of Mahomet; perſecutions, either ſecret or open; conſtraint, violence, every ſort of religious war, is ſo atrocious, ſo contrary to the ſpirit of the Goſpel, in a word, ſo deteſtable, that every true Chriſtian muſt avert his ſight from ſuch infamous horrors.

Controverſy is conducted either from the pulpit or chair, by way of harangue, by converſation, or by writing. The firſt quality that is neceſſary to a diſputant is reaſon, and the next moderation; in what manner ſoever the conteſt is conducted, theſe two qualities ſhould conſtantly be manifeſt, during the whole courſe of altercation.

There are ſome errors that attack the ſyſtem of religion, and there are others that attack even its morality. In order properly to oppoſe an error, we muſt begin by finding out its real meaning: we muſt therefore ſtudy the different ſyſtems of other religions, and the principal hereſies, if we would ſucceſsfully refute them. We do not mean by this, that the theologian ſhould know all the errors that ſpring up in the brain of each individual; we ſpeak only of thoſe that are profeſſed by whole ſects.

They who attack our religion, found their opinions either on the interpretation of the ſacred text, or on philoſophy or hiſtory; and we ſhould always oppoſe them with the ſame arms with which they pretend to defeat us. It is neceſſary to begin by diveſting ourſelves of all prejudice, in order the better to ſhow others thoſe prejudices by which they are deluded. We ſhould never make uſe, but eſpecially when we oppoſe weak minds, of opprobrious terms in the courſe of the debate, nor contend about words or expreſſions, nor attack incidental circumſtances that may attend erroneous principles; but bend our whole force againſt the root of the tree, the principal error; to uncover it, to dig it up, to deſtroy it.

Polemic theology is taught in univerſities by two methods, according to the views of the ſtudent. If he learn it merely in order hereafter to defend his pariſhioners againſt the moſt prevalent errors, he is only to examine the principal controverſies according to the ſyſtematic order of theology; and may content himſelf with knowing their true meaning, together with the arguments of thoſe that oppoſe them. But if it be his intention to teach this ſcience to others, or to engage in controverſy, either by converſation or writing; in ſhort, if he aſpire to renown in it, he ſhould ſtudy the origin and hiſtory of each controverſy, he ſhould make himſelf a complete maſter of the arguments for and againſt it, the exceptions that it makes, its intereſts, its different revolutions and actual ſtate, &c. Theſe follow, in this ſtudy, either the order eſtabliſhed in the dogmatic, or that which is uſed in ſymbolic books, that is, ſuch as treat on articles of faith.

In order the better to elucidate the method to be obſerved in this ſort of ſtudy, we ſhall ſay, that to acquire a complete knowledge of theological diſputes, the ſtudent ſhould, 1. Make the examen of each religion, and even of each controverſy. 2. He ſhould thoroughly examine his ſyſtem in the ſymbolic books, and likewiſe the ſources of his religion. 3. He ſhould preciſely determine the principal and capital error of each religion, ſect, or individual; that which is the ſource from whence all the other errors flow. 4. Search into the political cauſes of each error, and each controverſy, from hiſtory. 5. Examine the natural order according to which all the errors have taken their riſe, the one from the other: and laſtly, 6. Confront the reſpective arguments, the anſwers, and exceptions, that each party has made to defend its cauſe. To all this is to be added, 7. What they call *collegium diſputatorium;* an exerciſe by which all that is learned in the cloſet and in the ſchools is called forth and animated, under the inſpection of a profeſſor; and the mind is accuſtomed to think, and the tongue to ſpeak, with facility and efficacy.

Polemic Theology.

The principal conteſts in which the theologian may be engaged, are, 1. Againſt thoſe who admit of no revealed religion; as the atheiſt and deiſt. 2. Againſt thoſe who admit of a revealed religion, but adopt not the true Revelation; as the Heathens, the Mahometans, &c. 3. Againſt thoſe who believe only a part of the true Revelation; as the Jews. 4. Againſt thoſe who add to the true Revelation matter foreign to it; as traditions, &c. 5. Againſt thoſe who make a falſe interpretation of the ſacred text, and draw from it erroneous ſyſtems; as the heretics and the ſchiſmatics, &c. And laſtly, 6. Againſt thoſe who make a wrong uſe of certain expreſſions of Revelation, and build on whimſical notions, ridiculous ſyſtems; the Fanatics, &c.

According to this diviſion, the theologian will have to combat principally with,

1. The Atheiſts, with Spinoſa at their head. 2. The Deiſts. 3. The Heathens and Idolaters. 4. The Mahometans. 5. The modern Jews. 6. The Arians and the Manicheans, or rather thoſe who in theſe days follow their ancient errors. 7. The Socinians. 8. The Catholics, oppoſed to the Proteſtants. 9. The Proteſtants, oppoſed to the Catholics. 10. The Moliniſts, oppoſed to the Janſeniſts. 11. The Janſeniſts, oppoſed to the Moliniſts. 12. The Reformed, oppoſed to the Lutherans. 13. The Lutherans, oppoſed to the Reformed. 14. The Arminians. 15. The Anabaptiſts. 16. The Quakers. 17. The Fanatics, at the head of whom is Jacob Bohm. 18. The Pietiſts. 19. The Moravian Brethren, or the Herenhuters, &c.

Now, as each of the religions, communions, or hereſies above-mentioned, have not ſcrupled to publiſh to the world their dogmas and creeds, the theologian ought carefully to inſtruct himſelf in thoſe ſymbolic books, in which each of them have compriſed its ſyſtem; to ſtudy and to make a good analyſis of them; and to prepare ſuch arguments as are the moſt juſt, the moſt weighty, and proper to confute them.

Before we quit this ſubject, there is one remark to be made, or rather one caution that is very eſſential, which we would offer to the young theologian; which is, that the polemic is uſeful, and even neceſſary, in the ſtudy of theology in general; but that it is a diſcipline which ought to be treated with great prudence and moderation. Diſputation in general is a dangerous art; and religious diſputation is a deceitful art, and of infinite peril. The ſtudent will do right well to remember, that there is no ſect, no communion on earth, that is perfectly true in all its dogmas without exception; that there are ſome ſmall errors in all religions; that infallibility never was, nor ever will be, the portion of humanity. He ſhould likewiſe remember, that the maſters who teach him, or the books that he reads, are conſtantly partial to the religion they profeſs: and that when he has ſupported a theſis, and confuted his adverſaries in a collegial diſpute, (where his adverſaries, as well as his preceptors, are of the ſame ſide of the queſtion, and will not fail to adjudge him the victory), he ſhould be perſuaded, that the victory would not have been ſo eaſily obtained had he contended with able adverſaries of the oppoſite religion: he ſhould remember, that we triumph without glory when we combat without danger; and let him not be vain of his laurels, nor imagine himſelf ſome wonderful ſcholar; ſeeing that it is very poſſible that he may go off victorious from ſuch a diſpute, that he may receive vaſt applauſe from his profeſſors and his colleagues, and at the ſame time have reaſoned like a dolt.

On the other hand, the moſt able theologians, and the moſt conſummate profeſſors in this ſcience, ought to be conſtantly on their guard againſt the abuſe of polemic theology; which frequently ſerves leſs to clear and confirm the truth of the dogmas of a communion, than to eſtabliſh perpetual diſcord and hatred among Chriſtians. Every theologian ſhould alſo remember, that, by the nature of the ſubject, it is not poſſible to produce demonſtration in ſupport of his theſes and opinions; but that his arguments will be only valid, and preponderate in proportion to their degree of evidence; and laſtly, that it is a ridiculous and inſufferable vanity to imagine, that every man, who does not think preciſely as we do, is guilty of palpable error.

Paſtoral Theology.

SECT. V. PASTORAL THEOLOGY.

HAVING deſcribed the theoretic ſciences of theology, we now come to thoſe which regard the practice. It would be to bury the talents that God has given him, and the ſtudies that he has made, if the theologian did not employ them to the edification of his neighbour and the proſperity of the church. His office in ſociety is attended with conſtant and anxious labours. He is charged with the cure of ſouls, with the inſtruction of youth, with preaching of the Goſpel, the conduct of his flock, and the adminiſtration of the ſacraments, with viſitations to the ſick and the dying, with calming the terrors of weak minds, with adminiſtering comforts to afflicted ſouls, and many other functions equally difficult and important.

As the homily makes a part of eloquence, it is unneceſſary to ſay any thing of it in this place, but treat the others in their order.

It is in vain that a ſon of the church poſſeſſes all the ſciences that belong to his profeſſion, that he is an agreeable and even a renowned preacher, if he do not give a life, an efficacious ſpirit, to his miniſtry, by a good example; for that is the firſt precept in paſtoral theology. He is at the head of a flock, and ought to be their guide: but how abſurd, if his words and his actions be at continual variance with each other! How ſcandalous, if he be not the firſt to practiſe theſe leſſons of wiſdom that he preaches! How indecent, if, while he edifies by his diſcourſes, he diſguſts by his morals! What baſeneſs, if he ſhould even glory in his irregularities! It is leſs ſhameful for a ſoldier to relate that he has tamely ſuffered an affront, than for an eccleſiaſtic to boaſt of his debaucheries! Both the one and the other is a diſgrace to his profeſſion.

But this exemplary conduct ſhould be free from all affectation in the external behaviour. A ſingularity of dreſs, and an air of auſterity; the head declined, the eyes turned up to heaven, the hands conſtantly claſped, a plaintive tone of voice, and a ſolemn gait; a ſcrupuloſity in things indifferent, and a dogmatic and clerical manner of deciding in the common affairs of life; a ridiculous inclination to diſcover iniquity in innocent actions; to confound pleaſure with vice, and to be an enemy to joy, the greateſt boon that God has beſtowed on man; and a hundred other like fopperies there are, with which the religious make a parade, that is ſhocking both to good ſenſe and the evangelic morality, and which render their miniſtry, in the eyes of ſenſible people, more contemptible than reſpectable. Theſe are rocks on which the young theologian is much too liable to run, and of which he cannot be ſufficiently cautioned.

After this candid caution and brief introduction, we paſs to the examen of the different parts, the union of which compoſes the ſyſtem of the paſtoral, the moſt important article perhaps in all theology. The deſign of Revelation was, without doubt, to conduct man by faith to a virtuous life. It is not the opinions or the learning of weak mortals that can determine their intrinſic merit; it is their wiſdom, their regularity of conduct, that muſt ſtamp their value. Experience ſhows, that a man of great genius and learning may be alſo a great villain; one who is unable to pleaſe God or his neighbour: the virtuous Chriſtian, on the contrary, muſt be agreeable to both: it follows therefore, that the practical part of theology, which leads mankind to a virtuous conduct, is of all its parts the moſt important.

SECT. VI. CATECHETIC THEOLOGY.

BY Catechetic Theology is meant, *The art of teaching youth, and ignorant perſons, the principal points of the Evangelical Doctrine, as well with regard to belief as practice.* This application of the theoretic ſciences of theology ought to be conducted in the moſt ſimple manner poſſible. It is not every one who is poſſeſſed of the talent of properly compoſing and delivering catechetic inſtructions: and it is an art that is very neceſſary in the Chriſtian church.

The greateſt difficulty conſiſts in ſeparating the articles of faith that are abſolutely eſſential and indiſpenſable to the ſalvation of mankind, from thoſe that are ſubtle and ſpeculative, more liable to contradiction, and leſs neceſſary to ſuch as do not make theology their profeſſion. However, as children do not always remain children, and as the church is compoſed of perſons of both ſexes and of all ages, it is neceſſary that, in the explanations of the catechiſm, there ſhould be employed different degrees of ſimplicity, proportioned to the age and capacity of thoſe that are to be inſtructed. It is expedient for young people to retain in their minds the firſt principles of religion, ſuch as are contained in good catechiſms; and that they be explained to them in particular lectures; which is the moſt uſual and moſt natural method of enabling youth to give an account of their faith. The ſermons that are given in the Catholic churches on controverſy, and in Proteſtant churches on the catechiſm, ſerve to inſtruct thoſe who are of riper years and have their judgment more formed. Theſe ſermons compoſe, at the ſame time, a ſort of courſe of the dogmatic and the polemic theology.

Both in private catechiſing, and in ſermons that are purpoſely intended to explain the catechiſm, the theologian ſhould avoid, as much as poſſible, the uſe of technical terms; or (which is ſtill better) he ought to begin by explaining thoſe terms, of which he ſhould give ſuch clear and determinate definitions, that no perſon of a moderate capacity can poſſibly miſtake them. In a word, he ſhould endeavour more to prove than to perſuade; and as eloquence ſometimes perſuades at the expence of truth, he ſhould cautiouſly avoid that ſort of deluſive perſuaſion, and in its room ſubſtitute clear and ſolid argument.

SECT. VII. *Of* CASUISTIC THEOLOGY.

BY caſuiſtic theology is meant, the ſcience that decides in doubtful caſes of moral theology, and that calms the ſcruples of conſcience which ariſe in the Chriſtian's ſoul during his ſojourn in this world.

The ſtudies relative to theſe objects, which the theologian is ſuppoſed to have made, and the confidence that the common rank of Chriſtians place in their paſtors, afford them the means and the opportunities of rendering ſignal ſervice to thoſe of their fellow-citizens who have need of their counſel and conſolation: for where there is one man of a philoſophic ſpirit, one Chriſtian of a well-grounded knowledge in theology, there are in a ſociety a thouſand that are not, and who are yet deſirous of being inſtructed, guided, comforted, eſtabliſhed. It is therefore both juſt and important that he who devotes himſelf to the ſervice of the altar, ſhould early ſtudy all thoſe ſciences that will enable him worthily to perform this important part of his miniſtry.

God forbid, however, that we ſhould countenance the abuſe that is made, in ſome Chriſtian countries, of the duties that we have here explained. To reduce theſe matters into a political ſyſtem; to make the direction of conſciences a profeſſion, a regular trade; to provide each houſe with a ſpiritual director, as with a butcher or baker, a ſteward or porter, who by that means may inſinuate himſelf into the confidence of families, and become the depoſitory of all their ſecrets; may ſometimes ſow diſcord between huſband and wife, or the neareſt relations; who may avail himſelf of the confidence of his devotees, to direct them conſtantly in matters of a worldly, and ſometimes even of a criminal, nature; to efface the legitimate and ſacred authority of the father of a family, and in its place to ſubſtitute a foreign power; to undermine the confidence, the union and concord of families, in order to confirm and render neceſſary this ſecondary authority; to captivate the ſpirit, and oft-times the heart, of a wife or daughter, and in general of weak minds; to enjoin them ridiculous mummeries that lead to fanaticiſm, and a thouſand dangerous ſuperſtitions, or to religious exerciſes that divert them from their domeſtic duties; in a word, to aſſume an abſolute authority over the conſciences of mankind, is a pernicious invention, contrary to the evangelic moral, to the welfare of ſociety, to the intereſt of the ſtate, and to the ſovereign authority; and well deſerves an exemplary puniſhment.

But the cure of ſouls, faithfully intended, and properly limited, differs totally from this deſpotic power. He who is charged with it by a lawful vocation, ſhould remember that there are four claſſes of men with whom he will be engaged: 1. With thoſe of weak minds; of little knowledge and little ability. 2. With thoſe whoſe ſpirits are afflicted by ſome great reverſe of fortune. 3. With thoſe of nice and timorous conſciences, who ſuffer by their ſcruples, whether they be vain or rational. 4. And laſtly, the wicked, the hardened and incorrigible ſinner. The grand art here conſiſts in repreſenting to each of theſe claſſes of men, the truth, in a manner ſo clear, ſo ſtrong and full, that

Caſuiſtic Theology.

they can no longer retain any doubts that conviction muſt take place, and conſolation or converſion be the conſequence.

Truth is in its nature highly problematic: each one, however, is perſuaded that he knows it, that he poſſeſſes it, and is guided by it; every man thinks himſelf in the right. We ſhould therefore begin by diſcovering the truth in the ſubject before us, and in placing it upon a ſolid foundation. This buſineſs of demonſtrating the truth to others, is attended in the mean time with infinite difficulty. Every mind is not capable of diſcovering it at the firſt glance; nor can all diſcern it from the ſame point of view. Sometimes men require conviction by abſtract or philoſophical arguments, and ſometimes by the expreſs deciſions of the Holy Scripture. Sometimes by authority, ſometimes by gentle remonſtrance, and ſometimes by dreadful menaces. Sometimes they are to be reclaimed by properly expoſing the neceſſary and fatal conſequences that reſult from their conduct; and at others, by the alluring promiſes of the goſpel. Now vice is to be boldly confronted; and now the tranſgreſſor is to be conducted into the right path by artful turnings: now the ſinner's crimes are to be painted in the ſtrongeſt colours; and now a veil is to be lightly caſt over them; and ſometimes we ſhould even indulge a favourite inclination, in order to induce them to abandon a more pernicious paſſion: and ſo of the reſt.

As it is impoſſible that the books which have been wrote on this ſubject, though of an immenſe quantity, can contain every caſe that daily occurs in the miniſtry of the goſpel; and as theſe caſes are not always juſtly decided by theſe authors; and, if they were, the conſulting of ſuch enormous works would take up too much of a theologian's time, and divert him from his other ſtudies; and as theſe caſuiſtic writers contain, moreover, a number of puerile ſubtleties and wretched chimeras; it is highly proper that the miniſter of the altar, whom we ſuppoſe to have a maſterly knowledge of the principles, the dogmas, and moral of the Chriſtian religion, ſhould endeavour to draw from the true ſource the means that he is to employ on each occurrence, and not have recourſe to books for their deciſions. For which purpoſe it is neceſſary, 1. That he accuſtom himſelf to reaſon according to the rules of ſound logic. 2. That he learn to know the human heart, under its different diſguiſes; the characters of men, their arts, and ruling paſſions. 3. That he do not attempt to gain or convince by little pious frauds, or by lucky ſophiſms artfully repreſented. 4. That he do not inflict what are called *penances*, which are the height of abſurdity. 5. That he do not enjoin mummeries, pilgrimages, auſterities, and a thouſand like matters, which can never carry with them a real conviction, and only ſerve to divert men from their labours and the duties of ſociety. But, 6. That he conſtantly preſent, as we have before ſaid, and cannot too often repeat, the truth, in all its native force and purity.

This truth, however, is no enemy to ſacred eloquence; on the contrary, the latter ſerves to introduce the former into the mind of the auditor, and there to give it ſuch ſtrong impreſſions, as neither time, the diſſipations of the world, nor the diſtractions of fortune, are able eaſily to efface. The whole miniſterial function conſiſts in teaching, preaching, adminiſtering the ſacraments of the church, viſiting the ſick and the dying, comforting the afflicted, and affording the ſpiritual aids to all thoſe who have need of them. Eloquence is of the greateſt efficacy in all theſe functions; and, without affecting it, the miniſter of the goſpel ſhould never neglect it. There are ſome profeſſors in univerſities who give their auditors a complete ſyſtematic courſe on paſtoral theology, which may be attended with many advantages.

Theophilus Theophraſtus.

THEOPHILUS, the ſixth biſhop of Antioch; was raiſed to that ſee in 169, and inſtructed his church till about the year 182. There are ſtill extant his three books, written in Greek, againſt the calumniators of the Chriſtian religion, addreſſed to Autolycus. They were printed at Oxford in 1684, in duodecimo, under the inſpection of Dr Fell. There are alſo other works attributed to him; but theſe are written by later authors.

THEOPHRASTUS, a celebrated Greek philoſopher, was the ſon of Melanthus, and was born at Ereſus in Bœotia. He was at firſt the diſciple of Lucippus, then of Plato, and at laſt of Ariſtotle. He ſucceeded the latter in the 322d year before the Chriſtian æra, and taught philoſophy at Athens with extraordinary applauſe. He ſaid of an orator without judgment, "that he was a horſe without a bridle." He was accuſtomed to ſay, "There is nothing ſo valuable as time, and thoſe who loſe it are the moſt inexcuſable of all prodigals." He died at above 100 years of age. Theophraſtus wrote many works; of which the following are the principal of thoſe that are ſtill extant, 1. An excellent moral treatiſe intitled *Characters*, which he ſays in his preface he compoſed at 99 years of age. Iſaac Caſaubon has written learned Commentaries on this ſmall treatiſe: it has been tranſlated from the Greek into French, by M. de la Bruyere; it has alſo been tranſlated into Engliſh. 2. A curious treatiſe on Plants. 3. A hiſtory of Stones; of which Dr Hill has given a good edition, with an Engliſh tranſlation, and learned notes, in 8vo.

Theophylact || Theoretic.

THEOPHYLACT, archbiſhop of Achrida, the metropolis of Bulgaria, and one of the moſt learned men of the 11th century, was born at Conſtantinople, where he was inſtructed in eccleſiaſtical learning. He laboured with great zeal to eſtabliſh the Chriſtian religion in Achrida, where there were ſtill many pagans, and died after the year 1071. He wrote Commentaries upon the Goſpels, the Acts of the Apoſtles, St Paul's Epiſtles, and upon Habakkuk, Jonah, Nahum, and Hoſea, and alſo ſeveral Epiſtles, and other works in Greek.

THEOPOMPUS, a celebrated Greek orator and hiſtorian, was born in the iſland of Chios, and flouriſhed in the reign of Alexander the Great. He was one of the moſt famous of all the diſciples of Iſocrates, and won the prize from all the panegyriſts whom Artemiſa invited to praiſe Mauſolus. He wrote ſeveral works, which are loſt.

THEOREM, a ſpeculative propoſition, demonſtrating the properties of any ſubject.

THEORETIC, ſomething relating to theory, or that terminates in ſpeculation. See THEORY.

oy-

tic.

THEORY, in general, denotes any doctrine which terminates in ſpeculation alone, without conſidering the practical uſes or application thereof.

THERAPEUTÆ, a term applied to thoſe that are wholly in the ſervice of religion. This general term has been applied to particular ſects of men, concerning whom there have been great diſputes among the learned.

THERAPEUTICS, that part of medicine which acquaints us with the rules that are to be obſerved, and the medicines to be employed in the cure of diſeaſes.

THERAPHIM, certain images or ſuperſtitious figures mentioned in Scripture. Some Jewiſh writers tell us, that the theraphim were effigies of human heads, placed in niches, and conſulted as oracles. Others ſay, they were taliſmans, or figures of metal caſt and engraved under certain aſpects of the planets; to which they aſcribe extraordinary effects.

THERIACA ANDROMACHI, a compound medicine made in the form of an electuary. See PHARMACY, n° 903, b.

THERMÆ, hot baths or bagnios. Luxury and extravagance were in nothing carried to ſuch heights as in the thermæ of the Roman emperors. Ammian complains, that they were built to ſuch an extent as to equal whole provinces; from which Valeſius would abate, by reading *piſcinæ* inſtead of *provinciæ*. And yet after all, the remains of ſome ſtill ſtanding are ſufficient teſtimonies for Ammian's cenſure; and the accounts tranſmitted of their ornaments and furniture, ſuch as being laid with precious ſtones, (Seneca); ſet round with ſeats of ſolid ſilver, (Pliny); with pipes and ciſterns of the ſame metal, (Statius); add to, rather than take from, the cenſure. The moſt remarkable bagnios were thoſe of Diocleſian and Caracalla at Rome, great part of which remains at this day; the lofty arches, ſtately pillars, variety of foreign marble, curious vaulting of the roofs, great number of ſpacious apartments, all attract the curioſity of the traveller. They had alſo their ſummer and winter baths.

THERMOMETER, an inſtrument for meaſuring the increaſe and decreaſe of the heat and cold of the air, by means of the elaſtic and expanſive power of fluids.

The thermometer is an inſtrument of modern invention, but authors are not agreed on the perſon who was the firſt inventor. Sanctorius affirms, that he himſelf had this honour; and his aſſertion is corroborated by the teſtimonies of Borelli and Malphigi. Boerhaave, however, aſcribes it to Cornelius Drebbel; Muſchenbroek to the Venetian Paul Sarpi; and Viviani to Galileo. It is not well known what was the form of the firſt inſtruments of this kind, only it is certain that they were far from being as perfect as they are at preſent. They were very clumſy; and air being the fluid employed, they acted alſo as a kind of *barometers*, and thus were entirely unfit for comparing the degrees of heat at the diſtance of any conſiderable time. The firſt improvement in their conſtruction was made by Ferdinand II. great duke of Tuſcany, or the members of the academy del Cimento under his protection. Spirit of wine incloſed in glaſs tubes hermetically ſealed, was now employed; by which means evaporation was prevented, and likewiſe the preſſure of the external air kept off. Inſtruments of this kind were introduced into England by Mr Boyle, and very ſoon came to be univerſally uſed among the virtuoſi in different parts of the world. However, they ſtill laboured under great diſadvantages; for as they were not adjuſted to any common ſcale, tho' they would each of them ſhow the comparative degrees of heat and cold in the bodies to which they were applied; yet they could never be compared with one another, nor could the obſervations made in different parts of the world be collected in ſuch a manner as to anſwer any good purpoſe.

Mr Boyle was the firſt who propoſed one certain and determinate degree of cold as a ſtandard to be univerſally choſen from whence to begin the ſcale of thermometers, and which being at all times invariable, would keep the obſervations made by different thermometers ſufficiently exact. The point he propoſed was that in which the oil of aniſeeds congeals; and he alſo mentioned that in which diſtilled water begins to freeze, as another which might be employed. At laſt, however, Mr Boyle laid aſide both theſe ſtandards; as thinking that the oil of aniſeeds, water, and other liquors, might freeze in different degrees of heat. In this opinion he was followed by Dr Halley, who propoſed for a ſtandard the temperature of deep caves below ground. Theſe indeed do always preſerve the ſame temperature, but the uſe of them would be found not a little inconvenient for the purpoſe of adjuſting thermometers; nor, after all, could there be any certainty even in this method; for we are by no means ſure that the temperature of the ground is the ſame in all places at the ſame depth from the ſurface. Dr Halley therefore propoſed another point, namely, that in which ſpirit of wine boils; and he alſo mentioned the heat of boiling water as a point very fixed and determined, and in which he has been followed by all that came after him.

From this one point of the heat of boiling water, it has been propoſed to conſtruct thermometers in ſuch a manner that they ſhall all correſpond with each other. This method is by marking the degree of expanſion or contraction of the fluid in thermometers, as the heat applied is either greater or leſs than that of boiling water. Suppoſing, for example, the whole volume of this fluid to conſiſt of 10,000 parts, we muſt mark on the tube, where that volume is expanded by heat or contracted by cold, 1, 2, 3, 4, &c. of theſe parts; all which may be done by different perſons and in different places, ſo that they ſhall anſwer preciſely to one another.—Yet this method, ſo plauſible in appearance, is found not to be very practicable; it being difficult to determine exactly all the diviſions from the alteration of the bulk of the fluid. The beſt method, therefore, is to have two fixed points of heat at a conſiderable diſtance the one from the other; ſuch as that of boiling and freezing water; after which we are to divide the ſcale or tube between them into any convenient number of equal parts or degrees.

The method juſt now propoſed is that which has for a long time been univerſally followed; and the only difficulties which remained in the conſtruction of thermometers were the choice of a proper fluid, the adjuſting of the two fixed points, and the diviſion of the ſpace between them in ſuch a manner as to make proper allowance for any inequalities that might happen to be in the diameter of the tube through which the fluid moves.

With regard to the fluid, quickſilver has univerſally obtained the preference, as being ſooner heated and cooled than any other with which we are acquainted, and requiring ſo great a degree of cold to congeal it, that till very lately it was thought impoſſible to do ſo; though the contrary is now ſhown by undeniable experiments*. The heat alſo which quickſilver requires to make it boil, is very conſiderable, ſo that the ſcale on a quickſilver thermometer may be enlarged greatly beyond that made with any other fluid. In extreme degrees of cold, indeed, where quickſilver freezes, the thermometer ſhould be filled with highly rectified ſpirit of wine, or the fluid petroleum, called *naphtha;* both of which are found unalterable in the greateſt degrees of cold, either natural or artificial, hitherto obſerved in any part of the world.

The adjuſtment of the two fixed points of heat, viz. that of boiling and that of freezing water, has been found a matter of conſiderable difficulty, as they vary conſiderably according to the height of the mercury in the barometer at the time. Hence the greateſt philoſophers have not thought it below them to beſtow their labour in attempting to bring this matter to its utmoſt exactneſs; and for this purpoſe a committee of the Royal Society was lately appointed.

This inaccuracy in the heat of boiling water at different times, was obſerved by Mr Fahreinheit, a celebrated artiſt at Amſterdam, from whom the kind of thermometers now moſtly uſed took their name. He ſuppoſed the variation to be much greater than it really is; but Mr de Luc, by a great number of experiments made at different heights above the level of the ſea, found a rule by which the difference in the boiling point, anſwering to different heights in the barometer, is determined with great exactneſs. According to this rule, the alteration of the boiling point by the variation of the barometer from $29\frac{1}{2}$ to $30\frac{1}{2}$ inches is 1°.59 of Fahreinheit. The committee of the Society (of whom M. de Luc was one), after a number of experiments which our limits will not allow us to inſert, lay down the following practical rules for adjuſting the boiling and freezing points.

"*Rules to be obſerved in adjuſting the boiling point.*—The moſt accurate way of adjuſting the boiling point is, not to dip the thermometer into the water, but to expoſe it only to the ſteam, in a veſſel cloſed up in the manner repreſented in fig. 4. where AB*ba* is the veſſel containing the boiling water, D*d* the cover, E a chimney made in the cover intended to carry off the ſteam, and M*m* the thermometer paſſed thro' a hole in the cover. Thoſe who would make uſe of this method, muſt take care to attend to the following particulars.

"1ſt, The boiling point muſt be adjuſted when the barometer is at 29.8 inches; unleſs the operator is willing to correct the obſerved point in the manner directed below.

"2dly, The ball of the thermometer muſt be placed at ſuch a depth within the pot, that the boiling point ſhall riſe very little above the cover; for otherwiſe part of the quickſilver in the tube will not be heated, and therefore the thermometer will not riſe to its proper height. The ſurface of the water in the pot alſo ſhould be at leaſt one or two inches below the bottom of the ball; as otherwiſe the water, when boiling faſt, might be apt to touch the ball: but it does not ſignify how much lower than that the ſurface of the water may be.

"3dly, Care muſt be taken to ſtop up the hole in the cover through which the tube is inſerted, and to make the cover fit pretty cloſe, ſo that no air ſhall enter into the pot that way, and that not much ſteam may eſcape. A piece of thin flat tin plate muſt alſo be laid on the mouth of the chimney, ſo as to leave no more paſſage than what is ſufficient to carry off the ſteam. The ſize of this plate ſhould be not much more than ſufficient to cover the chimney, that its weight may not be too great; and the mouth of the chimney ſhould be made flat, that the plate may cover it more completely. It muſt be obſerved, that when the tin-plate is laid on the mouth of the chimney, it will commonly be lifted up by the force of the ſteam, and will rattle till it has ſlipped aſide ſufficiently to let the ſteam eſcape without lifting it up. In this caſe it is not neceſſary to put the plate back again, unleſs by accident it has ſlipped aſide more than uſual. If the artiſt pleaſes, he may tie each corner of this plate by a ſtring to prongs fixed to the chimney, and ſtanding on a level with the plate, as thereby it will neceſſarily be kept always in its place (A); but we would by no means recommend having it made with a hinge, as that might be apt to make it ſtick, in which caſe the included vapour might be ſo much compreſſed as to cauſe an error. We would alſo by no means adviſe lining the tin-plate with leather, or any other ſoft ſubſtance for the ſake of making it ſhut cloſer, as that alſo might be apt to make it ſtick. The chimney alſo ought not to be made leſs than half a ſquare inch in area: for though a ſmaller chimney would be ſufficient to carry off the ſteam, unleſs the veſſel is much larger than what we uſed; yet the adheſion which is apt to take place between it and the tin-plate when wet, might perhaps bear too great a proportion to the power which the included ſteam has to lift it off, if it was made much leſs. It is convenient that the chimney be not leſs than two or three inches long, as thereby the obſerver will be leſs incommoded by the ſteam; but it would be improper to make it much longer, for the longer the chimney is, the greater diſpoſition has the air to enter into the pot between it and the cover.

"It is moſt convenient not to make the cover fit on tight, but to take on and off eaſily; and to wrap ſome ſpun cotton round that part of the cover which enters into the pot, in order to make it ſhut cloſer; or, what ſeems to anſwer rather better, a ring of woollen cloth may be placed under the cover, ſo as to lie between the top of the pot and it. Theſe methods of making the cover ſhut cloſe can be uſed more conveniently when the cover is made to enter within the pot, as in the figure, than when it goes on on the outſide.

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* See *Cold, Congelation,* and *Quickſilver.*

Plate CCLXXVIII.

(A) Fig. 2. n° 3. is a perſpective view of the chimney and tin plate; ABCD is the plate; E the chimney; F*f*, G*g*, M*m*, and N*n*, the prongs faſtened to the chimney, to which the four corners of the plate are to be tied by the ſtrings AF, BG, CM, and DN; the ends F, G, M, and N, of the prongs muſt be on a level with the plate, and the ſtrings ſhould not be ſtretched tight.

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Plate CCLXXXIII.

Fig. 1.

The Order of the Thiſtle.

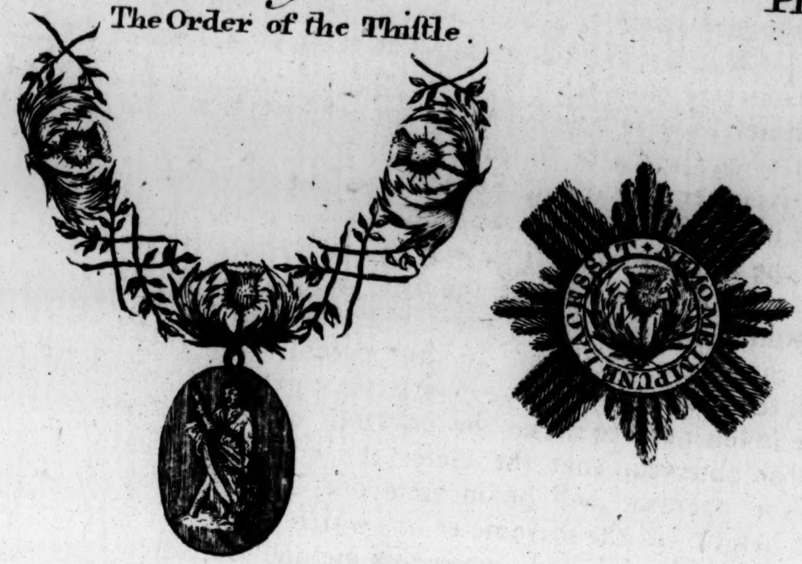


Fig. 2.

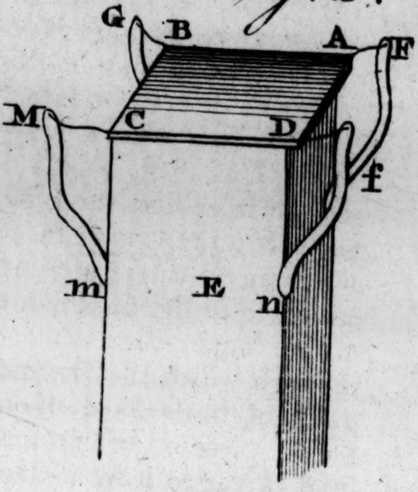

G
B
A
F
M
C
D
f
m
E
n

Fig. 5.

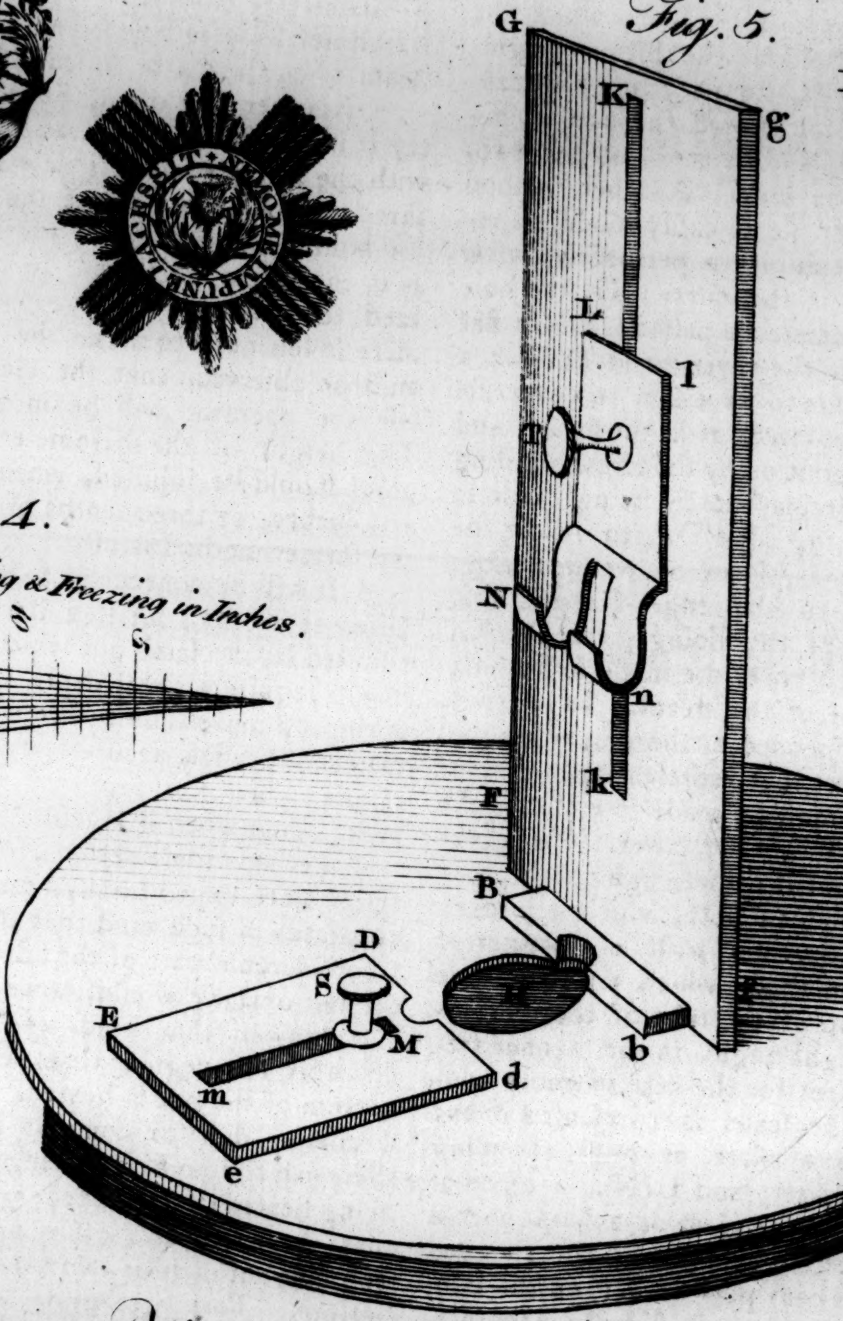

G
K
g
L
l
N
n
k
F
B
b
D
S
E
M
m
d
e
A

Fig. 4.

Interval between Boiling & Freezing in Inches.

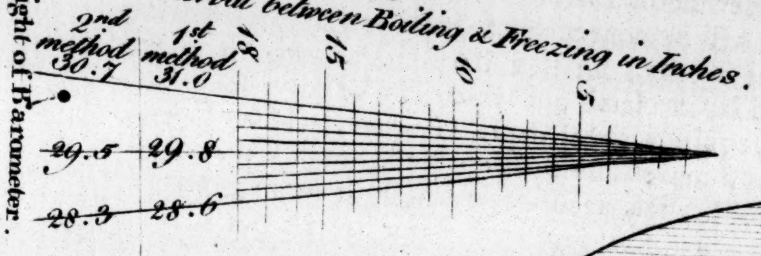


Fig. 6.

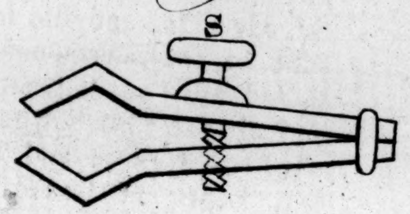


Fig. 3.

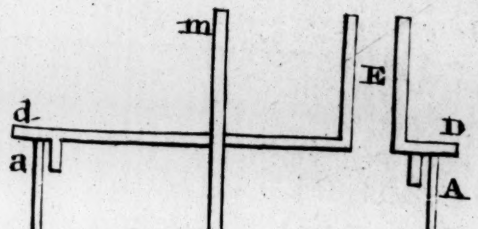


Fig. 9

VULTURE.

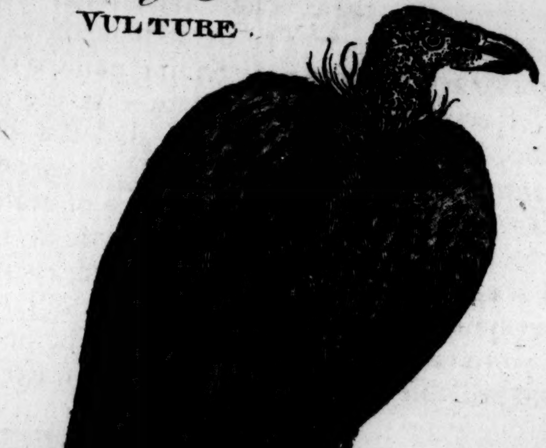


Fig. 7.

VESPERTILIO, or Shrew-Bat.

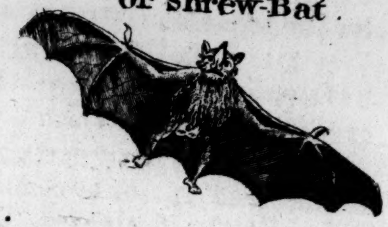
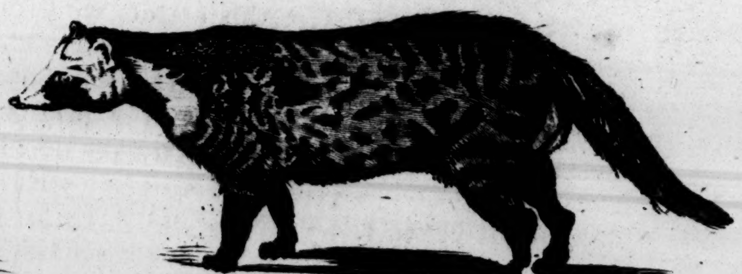


Fig. 8.

VIVERRA ZIBETHA, or Civat Cat.



A Bell Sculpt.

“ There are various eaſy ways by which the hole in the cover, through which the tube of the thermometer is paſſed, may be ſtopped up, and by which the thermometer may be ſuſpended at the proper height. The hole in the cover may be ſtopped up by a cork, which muſt firſt have a hole bored through it big enough to receive the tube, and be then cut into two, parallel to the length of the hole. Another method more convenient in uſe, but not ſo eaſily made, is repreſented in fig. 6. which exhibits a perſpective view of the apparatus; A*a*, is the cover; H, the hole through which the thermometer is paſſed; B*b*, a flat piece of braſs fixed upon the cover; and D*d*E*e*, a ſliding piece of braſs, made ſo as either to cover the hole H, or to leave it uncovered, as in the figure, and to be tightened in either poſition by the ſcrew S ſliding in the ſlit M*m*; a ſemi-circular notch being made in the edge B*b*, and alſo in the edge D*d*, to incloſe the tube of the thermometer: pieces of woollen cloth ſhould alſo be faſtened to the edges B*b* and D*d*, and alſo to the bottom of the ſliding-piece D*d*E*e*, unleſs that piece and the cover are made ſufficiently flat, to prevent the eſcape of the ſteam. In order to keep the thermometer ſuſpended at the proper height, a clip may be uſed like that repreſented in fig. 6. which, by the ſcrew S, muſt be made to embrace the tube tightly, and may reſt on the cover. That part of the clip which is intended to bear againſt the tube had beſt be lined with woollen cloth, which will make it ſtick tighter to the tube, and with leſs danger of breaking it. Another method, which is rather more convenient, when the top of the tube of the thermometer is bent into a right angle, in the manner frequently practiſed at preſent for the ſake of more conveniently fixing it to the ſcale, is repreſented in the ſame figure; G*g*F*ſ*, is a plate of braſs, ſtanding perpendicularly on the cover; and L*l*N*n*, a piece of braſs, bent at bottom into the form of a loop, with a notch in it, ſo as to receive the tube of the thermometer, and to ſuffer the bent part to reſt on the bottom of the loop; this piece muſt ſlide in a ſlit K*k*, cut in the plate L*l*N*n*, and be tightened at any height by the ſcrew T.

Plate CCLXXXIII.

[*N. B.* In the preceding page, col. i. l. 13. from bottom, for *fig.* 4. read *Plate* 283, *fig.* 3.; and in the foot-note, for *Plate* 278. *fig.* 2. n° 3. read *Ibid.* *fig.* 2.]

“ 4thly, It is beſt making the water boil pretty briſkly, as otherwiſe the thermometer is apt to be a great while before it acquires its full heat, eſpecially if the veſſel is very deep. The obſerver, too, ſhould wait at leaſt one or two minutes after the thermometer appears to be ſtationary, before he concludes that it has acquired its full height.

“ 5thly, Though, as was ſaid before, this appears to be the moſt accurate way of adjuſting the boiling-point; yet, if the operator was to ſuffer the air to have any acceſs to the inſide of the veſſel, he would be liable to a very great error: for this reaſon, we ſtrongly recommend it to all thoſe who uſe this method, not to deviate at all from the rules laid down, without aſſuring themſelves, by repeated trials with a pretty ſenſible thermometer, that ſuch alteration may be uſed with ſafety. But the covering the chimney with the tin-plate ought by no means to be omitted; for though, if the cover of the pot fits cloſe, it ſeldom ſignifies whether the plate is laid on or not, yet, if by accident the cover was not to fit cloſe, the omitting the tin-plate would make a very great error. Making the chimney very narrow would not anſwer the end properly; for if it was made ſo ſmall as to make the veſſel ſufficiently cloſe when the water boiled gently, it would not leave ſufficient paſſage for the eſcape of the ſteam when the water boiled faſt.

“ Another way of adjuſting the boiling point is, to try it in a veſſel of the ſame kind as the former, only with the water riſing a little way, namely from one to three or four inches above the ball, taking care that the boiling point ſhall riſe very little above the cover, as in the former method. In this method there is no need to cover the chimney with the tin-plate; and there is leſs need to make the cover fit cloſe, only it muſt be obſerved, that the cloſer the cover fits, the leſs the operator will be incommoded by the ſteam. The height of the barometer at which the boiling point ſhould be adjuſted, when this method is uſed, is 29½ inches, or three-tenths of an inch leſs than when the former method is uſed.

“ It will be convenient to have two or three pots of different depths; for if a ſhort thermometer is to be adjuſted in the ſame pot which is uſed for a long one, it will require a great depth of water, which, beſides taking up more time before it boils, makes the obſervation rather leſs accurate, as the heat ſeems to be leſs regular when the depth of water in the pot is very great, than when it is leſs.

“ Perhaps ſome perſons, for the ſake of heating the water more expeditiouſly, may be inclined to uſe an apparatus of ſuch kind that the fire ſhall be applied to a conſiderable part of the ſides of the pot as well as to the bottom; we would, however, caution them againſt any thing of that kind, as the obſervations are conſiderably leſs regular than when little more than the bottom of the pot is heated. If the pot is heated over a chafing-diſh or common fire, we apprehend that there can ſeldom be any danger of too much of the ſides being heated; but if the operator ſhould be apprehenſive that there is, it is eaſily prevented by faſtening an iron ring an inch or two broad round the pot near the bottom. This precaution is equally neceſſary when the thermometer is adjuſted in ſteam, eſpecially when there is not much water in the pot.

“ The greateſt inconvenience of this method of adjuſting the boiling point is the trouble of keeping a proper depth of water in the pot; as to do this it is neceſſary firſt to find the height of the boiling point coarſely by trying it in an open veſſel, and then to put ſuch a quantity of water into the pot that it ſhall riſe from one to three or four inches above the ball, when the thermometer is placed at ſuch a depth within the pot that the boiling point ſhall riſe very little above the cover. The operator muſt be very careful that the quantity of water in the pot be not ſo ſmall as not entirely to cover the ball.

“ A third way of adjuſting the boiling point is to wrap ſeveral folds of linen rags or flannel round the tube of the thermometer, and to try it in an open veſſel, taking care to pour boiling water on the rags, in order to keep the quickſilver in the tube as nearly of the heat of boiling water as poſſible. The beſt way is to pour boiling water on the rags three or four times, waiting a few ſeconds between each time, and to wait ſome ſeconds after the laſt time of pouring on water before the boiling point is marked, in order that the

the water may recover its full ſtrength of boiling, which is in good meaſure checked by pouring on the boiling water.

“ In this method the boiling point ſhould be adjuſted when the barometer is at 29.8 inches, that is, the ſame as when the firſt method is uſed; the water ſhould boil faſt, and the thermometer ſhould be held upright, with its ball two or three inches under water, and in that part of the veſſel where the current of water aſcends (B).

“ Whichever of theſe methods of adjuſting the boiling point is uſed, it is not neceſſary to wait till the barometer is at the proper height, provided the operator will take care to correct the obſerved height according to the following table.

Height of the barometer when the boiling point is adjuſted according to,		Correction in 1000ths of the interval between 32° and 212°.		Height of the barometer when the boiling point is adjuſted according to,		Correction in 1000ths of the interval between 32° and 212°.	
1ſt or 3d method.	2d method.			1ſt or 3d method.	2d method.		
	30.64	10	lower.	29.69	29.39	1	higher.
	53	9		58	28	2	
30.71	41	8		47	17	3	
59	29	7		36	06	4	
48	18	6		25	28.95	5	
37	07	5		14	84	6	
25	29.95	4		03	73	7	
14	84	3		28.92	62	8	
03	73	2		81	51	9	
29.91	61	1		70	—	10	
80	50	0		59	—	11	

“ To make uſe of this table, ſeek the height which the barometer is found to ſtand at in the left-hand column, if the boiling point is adjuſted either in the firſt or third method, and in the ſecond column if it is adjuſted in the ſecond method; the correſponding number in the third column ſhows how much the point of 212° muſt be placed above or below the obſerved point, expreſſed in thouſandth parts of the interval between the boiling and freezing point: for example, ſuppoſe the boiling point is adjuſted in ſteam when the barometer is at 29 inches, and that the interval between the boiling and freezing points is 11 inches; the neareſt number to 29 in the left-hand column is 29.03, and the correſponding number in the table is 7 higher, and therefore the mark of 212° muſt be placed higher than the obſerved point by $\frac{7}{1000}$ of the interval between boiling and freezing, that is, by $\frac{11\times7}{1000}$, or .077 of an inch.

“ This method of correcting the boiling point is not ſtrictly juſt, unleſs the tube is of an equal bore in all its parts; but the tube is very ſeldom ſo much unequal as to cauſe any ſenſible error, where the whole correction is ſo ſmall. The trouble of making the correction will be abridged by making a diagonal ſcale, ſuch as is repreſented in fig. 4.

“ It is not very material what kind of water is uſed for adjuſting the boiling point, ſo that it is not at all ſalt; only, if any kind of hard water is uſed, it is better that it ſhould be kept boiling for at leaſt ten minutes before it is uſed. But we would adviſe all thoſe deſirous of adjuſting thermometers in the moſt accurate manner for nice experiments, to employ rain or diſtilled water, and to perform the operation in the firſt-mentioned manner, that is, in ſteam.

“ *On the freezing point.*—In adjuſting the freezing as well as the boiling point, the quickſilver in the tube ought to be kept of the ſame heat as that in the ball. In the generality of thermometers, indeed, the diſtance of the freezing point from the ball is ſo ſmall, that the greateſt error which can ariſe from neglecting this precaution is not very conſiderable, unleſs the weather is warmer than uſual; but as the freezing point is frequently placed at a conſiderable diſtance from the ball, the operator ſhould always be careful either to pile the pounded ice to ſuch a height above the ball, that the error which can ariſe from the quickſilver in the remaining part of the tube not being heated equally with that in the ball, ſhall be very ſmall; or he muſt correct the obſerved point, upon that account, according to the following table;

Heat of the air.	Correction.
42°	.00087
52	.00174
62	.00261
72	.00348
82	.00435

“ The firſt column of this table is the heat of the air, and the ſecond is the correction expreſſed in 1000th parts of the diſtance between the freezing point and the ſurface of the ice: for example, if the freezing point ſtands ſeven inches above the ſurface of the ice, and the heat of the room is 62, the point of 32° ſhould be placed 7×.00261, or .018 of an inch lower than the obſerved point. This correction alſo would be made more eaſy by the help of a diagonal ſcale, ſimilar to that propoſed for the boiling point.

“ *On the precautions neceſſary to be obſerved in making obſervations with thermometers.*—In trying the heat of liquors care ſhould be taken that the quickſilver in the tube of the thermometer be heated to the ſame degree as that in the ball; or, if this cannot be done conveniently, the obſerved heat ſhould be corrected on that account.”

After having adjuſted the fixed points of thermometers in this manner, the diviſion of the ſcale is eaſy; for by making a certain quantity of mercury, ſuppoſe as much as fills the tube the length of half an inch, paſs through the whole length of it when open at both ends, we can perceive what length of ſpace it occupies in different parts of the tube, and divide accordingly. However, even after thermometers are conſtructed in this manner with the utmoſt accuracy, a very conſiderable inconveniency attends the uſing them, namely, that the obſerver's eye muſt be on the inſtrument the very inſtant that the mercury ſtands at the higheſt or loweſt degree; for ſince the time when that may happen is utterly uncertain, if it be not immediately noticed, it can never afterwards be known. The ſultry heat of the ſummer's day, and the freezing cold of the winter's night, render it very un-

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“ (B) In a veſſel of boiling water one may almoſt always perceive the current of water to aſcend on one ſide of the veſſel, and to deſcend on the other.

3 MA 53

THERMOMETER.

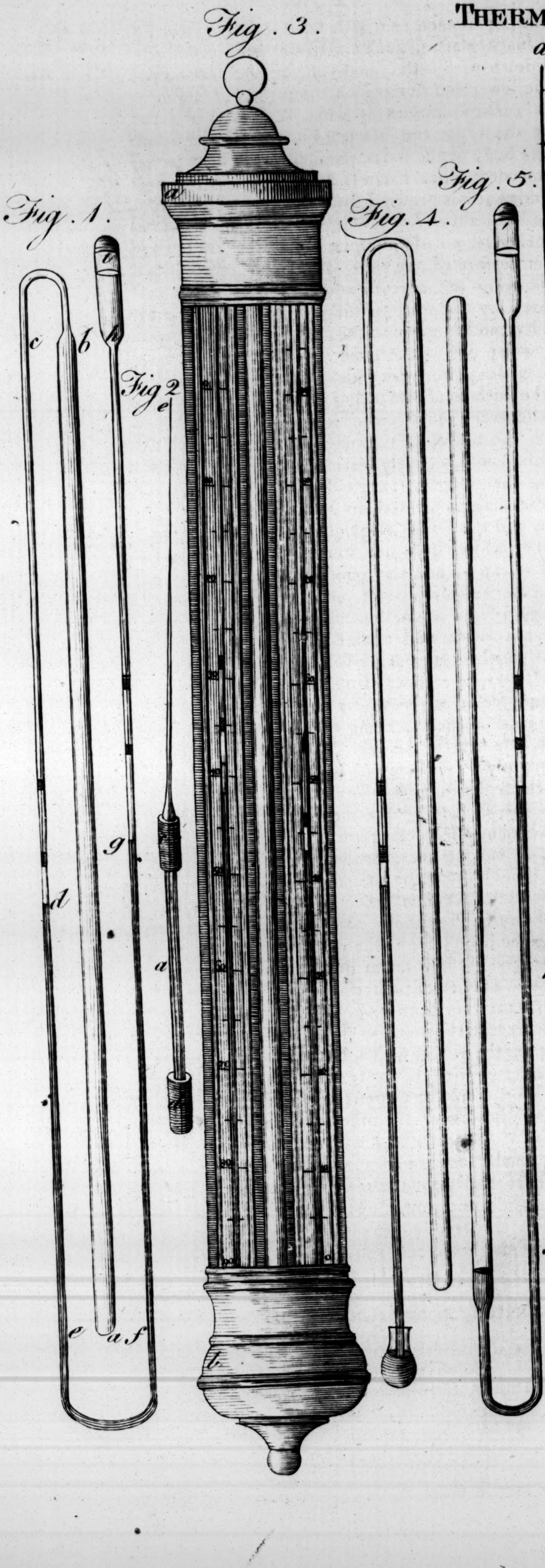
Fig. 1.
c
b
h
i
g
d
e
a
f
Fig 2
e
a
Fig. 3.
a
b
Fig. 4.
Fig. 5.

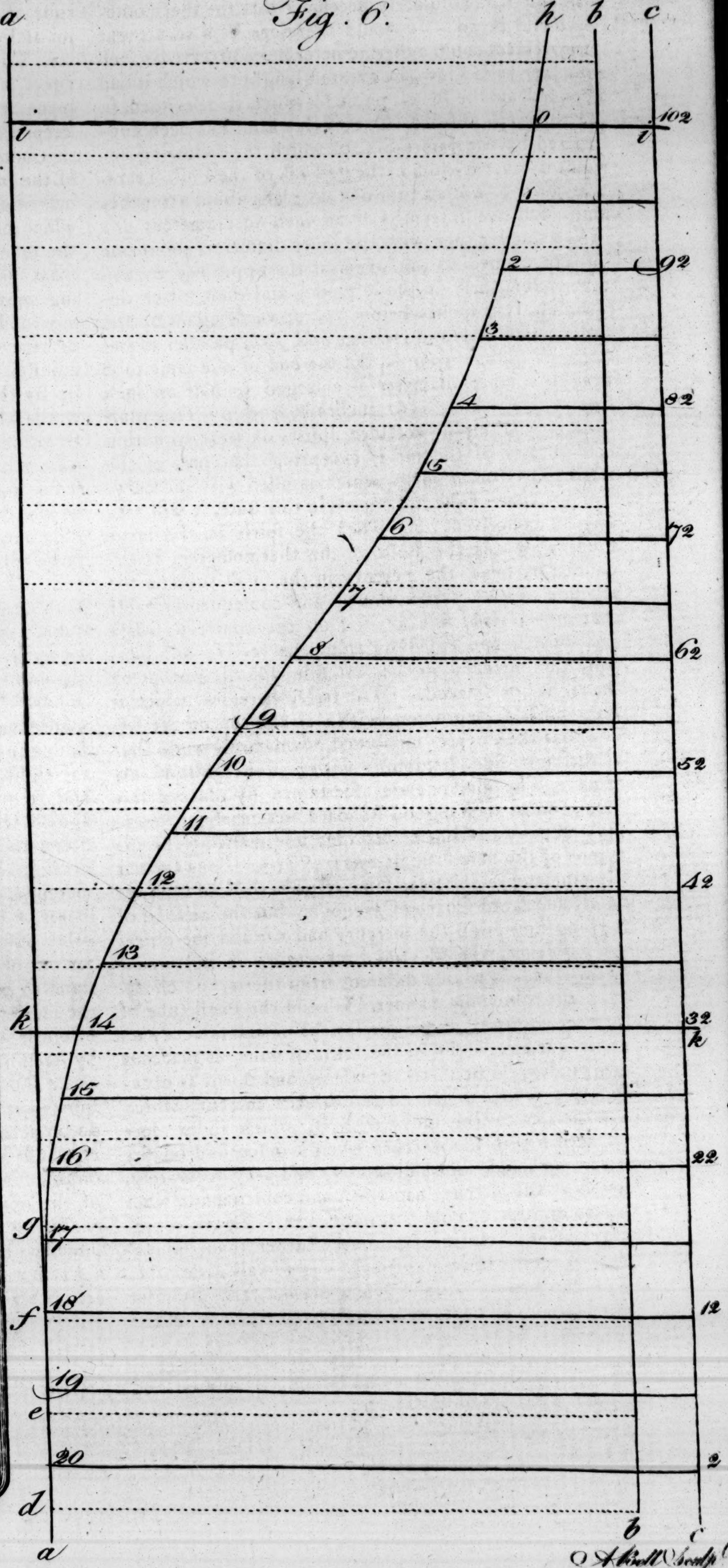
Fig. 6.
a
h
b
c
i
0
102
i
1
2
92
3
4
82
5
6
72
7
8
62
9
10
52
11
12
42
13
k
14
32
k
15
16
22
g
17
f
18
12
19
e
20
2
d
a
b
c

A Bell Sculpt.

Thermometer.

unpleaſant to be abroad at ſuch times in the open air, although it is abſolutely neceſſary that the thermometer ſhould be ſo. It would therefore be a very great improvement could a thermometer be conſtructed in ſuch a manner as to ſhow the greateſt height to which it had aſcended, or the loweſt point to which it deſcended, in the obſerver's abſence. One of this kind has been conſtructed by Mr James Six, of which the following account is given by him in the 72d vol. of the Phil. Tranſ.

Plate CCLXXXIV.

“ Fig. 1. *ab* is a tube of thin glaſs, about 16 inches long, and five ſixteenths of an inch in diameter; *cdefgh*, a ſmaller tube with the inner diameter, about one fortieth, joined to the larger at the upper end *b*, and bent down, firſt on the left ſide, and then, after deſcending two inches below *ab*, upwards again on the right, in the ſeveral directions *cde*, *fgh*, parallel to and one inch diſtant from it. On the end of the ſame tube at *h*, the inner diameter is enlarged to half an inch from *h* to *i*, which is two inches in length. This glaſs is filled with highly rectified ſpirits of wine to within half an inch of the end *i*, excepting that part of the ſmall tube from *d* to *g*, which is filled with mercury. From a view of the inſtrument in this ſtate, it will readily be conceived, that when the ſpirit in the large tube, which is the bulb of the thermometer, is expanded by heat, the mercury in the ſmall tube on the left ſide will be preſſed down, and conſequently cauſe that on the right ſide to riſe; on the contrary, when the ſpirit is condenſed by cold, the reverſe will happen, the mercury on the left ſide will riſe as that on the right ſide deſcends. The ſcale, therefore, which is Fahrenheit's, beginning with *o* at the top of the left ſide, has the degrees numbered downwards, while that at the right ſide, beginning with *o* at the bottom, aſcends. The diviſions are aſcertained by placing this thermometer with a good ſtandard mercurial one in water gradually heating or cooling, and marking the diviſions of the new ſcale at every 5° (C). Thus far our thermometer reſembles in ſome reſpects thoſe of Mr Bernoulli and Lord Charles Cavendiſh: but the method of ſhowing how high the mercury had riſen in the obſerver's abſence, the eſſential property of an inſtrument of this kind, is wholly different from theirs, and effected in the following manner. Within the ſmall tube of the thermometer, above the ſurface of the mercury on either ſide, immerſed in the ſpirit of wine, is placed a ſmall index, ſo fitted as to paſs up and down as occaſion may require: that ſurface of the mercury which riſes carries up the index with it, which index does not return with the mercury when it deſcends; but by remaining fixed, ſhows diſtinctly, and very accurately, how high the mercury had riſen, and conſequently what degree of heat or cold had happened. Fig. 2. repreſents one of theſe indexes drawn larger than the real ones, to render it more diſtinct. *a* is a ſmall glaſs tube, three quarters of an inch long, hermetically ſealed at each end, incloſing a piece of ſteel wire nearly of the ſame length; at each end *cd* is fixed a ſhort piece of a tube of black glaſs, of ſuch a diameter as to paſs freely up and down within the ſmall tube of the thermometer. The lower end floating on the ſurface of the mercury, is carried up with it when it riſes, while the piece at the upper end being of the ſame diameter, keeps the body of the index parallel to the ſides of the thermometrical tube. From the upper end of the body of the index at *c* is drawn a ſpring of glaſs to the fineneſs of a hair, about five-ſevenths of an inch in length, which being ſet a little oblique, preſſes lightly againſt the inner ſurface of the tube, and prevents the index from following the mercury when it deſcends, or being moved by the ſpirit paſſing up or down, or by any ſudden motion given to the inſtrument by the hand or otherwiſe; but at the ſame time the preſſure is ſo adjuſted as to permit this index to be readily carried up by the ſurface of the riſing mercury, and downwards whenever the inſtrument is to be rectified for obſervation. To prevent the ſpirit from evaporating, the tube at the end *i* is cloſely ſealed (D). Fig. 3. repreſents the thermometer on its frame; the plates on which the ſcale is graved on either ſide are made to ſlide out, and the frame is open to the back behind the large tube, which does not touch it, except at each end. The cap *a*, and the baſe *b*, are made to fix on with ſcrews, and only cover the turning of the ſmall tube. By a ſcrew at the bottom of the frame, it may be made faſt to the wall againſt which it is to hang without doors, to prevent its being ſhaken by violent winds. Towards evening I uſually viſit my thermometer, and ſee at one view, by the index on the left ſide, the cold of the preceding night; and by that on the right, the heat of the day. Theſe I minute down, and then apply a ſmall magnet to that part of the tube againſt which the indexes reſt, and move each of them down to the ſurface of the mercury: thus, without heating, cooling, ſeparating, or at all diſturbing the mercury, or moving the inſtrument, may this thermometer, without a touch, be immediately rectified for another obſervation. When I wiſh to put the thermometer out of my hand without hanging it up, I have a ſtand to place it on; for if the mercury preſſes againſt the index while the inſtrument lies in an horizontal poſition, it is in danger of paſſing by it, which is avoided by keeping the thermometer in a poſition nearly vertical. To prevent the mercury ſhifting its place in the ſpirits within the tube (which I apprehend it might do on account of the ſuperiority of its ſpecific gravity, eſpecially when kept for a conſiderable time, very high on one ſide, and low on the other), I made that part of the ſmall tube from *e* to *f* with the inner diameter exceeding ſmall; and found upon trial, that after the ſummer's heat had kept the mercury for a long time high on one ſide, the winter's cold brought it again as accurately to the freezing point on the other as at firſt (E). This thermometer may be made a mercu-

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“ (C) The diviſions below the freezing point are taken by means of a mixture of ſea-ſalt and ice, as deſcribed by Nollet, De Luc, and others.

“ (D) When this tube is cloſed (not hermetically, but only ſo as to prevent the ſpirits evaporating) the thermometer muſt be brought to the greateſt heat it is likely at any time after to ſuſtain; and though no more air is incloſed than what remains at that time above the ſpirits, yet that will, by its elaſticity preſſing on the fluid, anſwer every purpoſe as well as if the external air was freely admitted.

“ (E) With a thermometer of this ſort I obſerved the greateſt heat and cold that happened every day and night throughout the year 1781.

rial one by inverting the glaſs, and filling with mercury that part which in the firſt is filled with ſpirits, and with ſpirits that part of the ſmall tube from *d* to *g* which in the former is filled with mercury; the indexes in either caſe may be the ſame, and will be carried up in the ſame manner upon the ſurface of the mercury; but the end of the tube at *i*, inſtead of being ſealed, muſt then be left open, and ſtand inverted in a bulb, or ſmall ciſtern of mercury, into which the external air has free acceſs. The diameter of the tube *ab* ſhould be conſiderably increaſed if the degrees on the ſcale are required to be as wide as thoſe in the ſpirit-thermometers. It is indeed better in this caſe to have a double rather than a larger ſingle tube; but finding the weight of ſo great a quantity of mercury in a thin glaſs tube attended with many diſadvantages, and the motion of the fluids in the ſpirit-ones perfectly agreeing with, and being as readily excited by change of heat and cold as in the mercurial thermometers, I preferred the former as much more commodious. A perſon cannot approach near to the thermometer firſt deſcribed when the air is very cold (eſpecially with a light, which by night is neceſſary) without cauſing the ſpirits preſently to expand, and conſequently the mercury on the left ſide immediately to deſcend. This ſenſibility is here attended with every advantage, without the inconvenience to which common thermometers in this caſe are liable (F); for the index will accurately ſhow the greateſt height to which the mercury had riſen, although, before the exact degree can well be diſtinguiſhed, it will appear ſeparated from the index, and deſcending apace. As the ſcale is 16 inches long, and divided into 100° only, which are more than ſufficient for the temperature of the air, they are large enough to be ſubdivided at pleaſure. The indexes, though of a tender and delicate nature, when once placed in the tube, are not liable to ſuffer any alteration by time or accident; and the thermometer may be expoſed to rain at all times, without ſuffering the leaſt injury in any reſpect.

"In conſtructing the thermometer before-mentioned, I at firſt hit on a plan by which the ſame end was obtained by a different method; and though in ſome reſpects, and for ſome purpoſes, it may not be ſo proper as that already deſcribed, yet for ſome others it may be found uſeful; and therefore I ſhall briefly deſcribe it. The glaſs of this inſtrument is in all reſpects the ſame as in the former, excepting that the diameters of the tubes are ſomething larger. It is likewiſe filled with ſpirits of wine and mercury, in the ſame manner; but the indexes are different, being only a ſmall tube of black glaſs, about five-ſevenths of an inch in length, hermetically ſealed at each end, containing a piece of ſteel wire. An index of this ſort is placed in the thermometer on either ſide, which having no ſpring to ſupport them, ſink down in the ſpirits, and reſt upon the mercury. Whenever the mercury deſcends, the index will follow it; but when it riſes, the index will not riſe with it, and by remaining at the place to which the mercury had deſcended, will ſhow the greateſt degree of heat or cold which had happened. In this manner do theſe indexes anſwer the ſame purpoſe, though they move directly contrary to the others in the other thermometer; but this inſtrument is not ſo eaſily rectified as the former, for the moſt powerful magnet will not bring the index up again while the mercury above preſſes againſt them; and although it is poſſible to remove the mercury, and by that means ſet the index at liberty, yet inconveniences will be incurred from which the other is entirely free.

"In ſome caſes it may be found expedient, inſtead of the double thermometer firſt deſcribed, to make two ſingle ones; one to ſhow the greateſt degree of heat only, and the other the cold, each having its proper index (ſee fig. 4. and 5.) The firſt has the ſmall tube as this thermometer was principally to be uſed immerſed in a bulb or ſmall ciſtern of mercury, to which the external air has free acceſs; the other has the ſmall tube turned up on the right ſide, with ſome mercury let down to the bottom, and the upper end cloſely ſealed, as in the double inſtrument. Making a ſtandard mercurial thermometer, by which the ſcale of the ſpirit-one was to be divided, I endeavoured to obtain as wide degrees as poſſible, that the motion of the mercury might thereby be rendered more conſpicuous, and the height of it aſcertained with greater preciſion. It is true, the larger the degrees, the larger in ſome meaſure muſt be the bulb, and therefore the fluid contained in it not likely to be ſo ſoon affected by any change bent down on the left ſide, and the lower end immer- of heat or cold in the atmoſphere as in a ſmaller. But ſed in a large quantity of water, gradually heating or cooling, little or no diſadvantage could ariſe from making the bulb ſomewhat larger than thoſe commonly made uſe of in the air. Not being able, however, to procure glaſs tubes ſo long as I had occaſion for, whoſe inner diameters were perfectly equal, I took the following method to adjuſt the diviſions on the ſcale to the inequality of the tubes. Chooſing a tube of a length ſuitable to my purpoſe, with a proper bulb at the end, I put into it a ſmall quantity of mercury (G) ſufficient to form a column about one inch in length. Drawing then on a board the three lines *aa*, *bb*, *cc*, fig. 6. I placed the glaſs tube on the line *aa*, and while the mercury remained at reſt at the end of the tube, near the bulb, I made two pencil-marks on the line *aa*, one at *d*, and the other at *e*, perfectly coinciding with the two ends of the column of mercury: then cauſing the mercury to move ſlowly on farther from the bulb, till that end of the column which was firſt at *d* coincided

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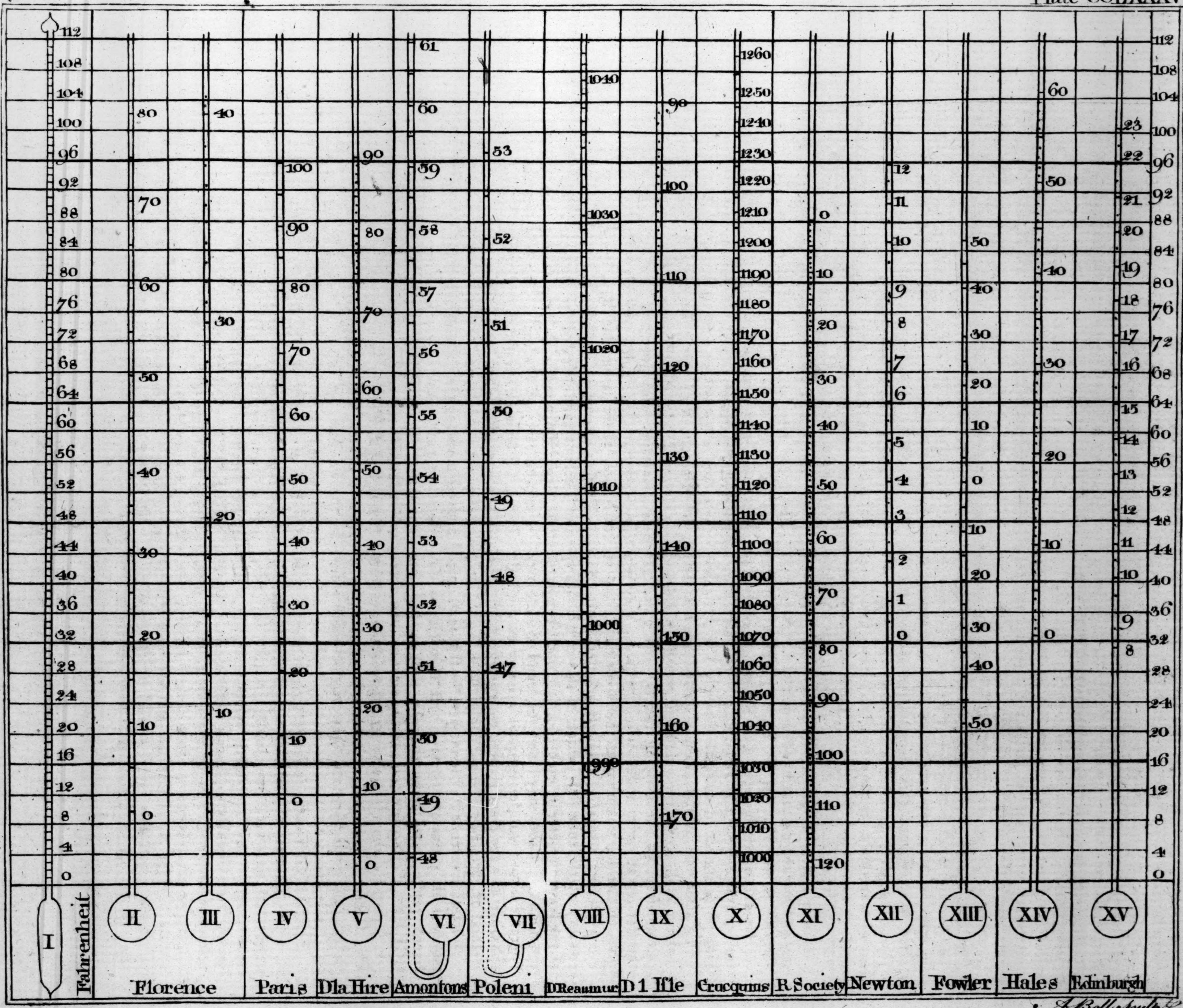
"(F) The moſt ſenſible mercurial thermometers commonly have the column of mercury, as well as the degrees, very ſmall; and a perſon aſſiſted with a light can hardly view them near enough, when the weather is very cold, without cauſing the mercury to riſe before the degrees where it ſtood can be well aſcertained.

"Freezing fogs alſo, which with us uſually attend the greateſt degrees of cold, by covering the glaſs with froſt, render the mercury inviſible, and cannot well be removed without cauſing the mercury to riſe, or at leaſt render the obſervation doubtful, which at ſuch a time is very diſagreeable; for in proportion to the extraordinary degree of cold, ſo is our curioſity likely to be excited.

"(G) To put in a ſmall quantity of mercury, and meaſure its length at different parts of the tube, as deſcribed by Abbe Nollet, vol. iv. p. 370. *Lecons Phyſique*, is a very excellent method to diſcover the error; but in what manner readily to adjuſt the ſcale ſo as to avoid any inaccuracy from ſuch inequality (which in tubes of the length I had occaſion for ſeemed to me unavoidable), was a matter concerning which I could meet with no information.

THERMOMETER.

Plate CCLXXXV.


I Fahrenheit
II Florence
III
IV Paris
V D la Hire
VI Amontons
VII Poleni
VIII D Reaumur
IX D l Isle
X Cruquius
XI R Society
XII Newton
XIII Fowler
XIV Hales
XV Edinburgh

A Bell Sculp.

ded with the mark at *e*, and letting it reſt again, I made another mark at *f*; after which, cauſing the mercury to move on as before, and continuing to mark its length at every part of the tube till it reached the end fartheſt from the bulb; by theſe means I obtained the ſeveral intermediate points on the line *aa*. Through theſe ſeveral points I drew dotted lines parallel to each other, and at right angles with the line *aa* to the line *bb*. Taking now, with a pair of compaſſes, the wideſt intervals between any of the dotted parallels, which in this caſe is from *d* to *e*, I inſerted that diſtance ſucceſſively between the ſeveral parallels, beginning at the loweſt pair, as from *d* to *e*, from *e* to *f*, from *f* to *g*, and ſo on to *h*, as exhibited in the figure; and the aggregate of theſe lines may be conſidered as one continued line, without any error of conſequence in this matter. Having now the thermometer completely filled with mercury, the air expelled, the point of the ſcale at 102°, and the freezing point properly taken (H) and marked upon the tube, which was now hermetically ſealed, I again applied the tube to the line *aa*, and marked on that line the point of 102° and the freezing point. Through thoſe points I drew the lines *ii*, *kk*, and divided that part of the compound line *dh* included between *ii* and *kk* into 14 equal parts, beginning at *o*, the point where *ii* cuts the line *dh*, continuing afterward ſix diviſions now on that line below *kk*, making in all 20 equal diviſions. If now lines be drawn through each of the dividing points, from *o* to 20 to the line *cc*, at right angles with the ſame, they will give on the line *cc* the true thermometrical ſcale to every 5° from 2 to 102, properly adjuſted to the inequality of the tube (I), which in this caſe is nearly of the ſame diameter at each end, but ſmaller towards the middle. Tubes may indeed be found of ſome conſiderable length with leſs inequality than what this ſcale exhibits; but the error is here enlarged to render the method of correcting it more conſpicuous."

Though Fahrenheit's thermometer is that moſt commonly uſed, yet as others have been invented by different perſons, we have thought proper, in Plate CCLXXXV. to give a comparative view of their different ſcales; by which if the reader happens to meet with any of thoſe inſtruments, or to peruſe the accounts of obſervations made by them, they may be eaſily reduced to one ſtandard.

THERMOPYLÆ, (anc. geog.); a narrow paſs or defile, between the waſh of the Sinus Maliacus; on the eaſt and ſteep mountains, reaching to Oeta, made dreadful by unpaſſable woods; on the weſt, leading from Theſſaly to Locris and Bœotia. Theſe mountains divide Greece in the middle, in the ſame manner as the Apennine does Italy; forming one continued ridge from Leucate on the weſt to the ſea on the eaſt, with thickets and rocks interſperſed; that perſons even prepared for travelling, much leſs an army encumbered with baggage, cannot eaſily find a commodious paſſage. In the valley verging towards the Sinus Maliacus, the road is only ſixty paces broad; the only military way for an army to paſs, if not obſtructed by an enemy; and therefore the place is called *Paylæ*, and by others, on account of its hot water, *Thermopylæ*. Ennobled by the brave ſtand made by Leonidas and three hundred Spartans, againſt the whole army of Perſia; and by the bold reſolution of blind Euthycus, chooſing rather to fall there in fight, than return to Sparta, and eſcape the common danger. Famous alſo for the Amphyctiones, the common council, or ſtates general of Greece, aſſembling there twice a-year, ſpring and autumn.

THESEA, in antiquity, feaſts celebrated by the Athenians in honour of Theſeus, conſiſting of ſports and games, with mirth and banquets; ſuch as were poor and unable to contribute to them were entertained at the public expence.

THESEUS, a famous hero of antiquity ranked among the demi-gods, whoſe hiſtory is fabulous. He was the reputed ſon of Ægeus king of Athens. He threw Sciron, a cruel robber, down a precipice; faſtened Procruſtes tyrant of Attica to a bending pine, which being let looſe, tore him aſunder; killed the Minotaur kept in the labyrinth by king Minos, in Crete; and by the aſſiſtance of that prince's daughter, Ariadne, who gave him a clue, eſcaped out of that labyrinth, and ſailed with his deliverer to the iſle of Naxos, where he had the ingratitude to leave her.

Theſeus afterwards overcame the Centaurs, ſubdued the Thebans, and defeated the Amazons. He aſſiſted his friend Pirithous in his expedition to the infernal regions to carry off Proſerpine; but was impriſoned by Pluto, till he was releaſed by Hercules. He is alſo ſaid to have eſtabliſhed the Iſthmean games, in honour of Neptune; to have united the twelve cities of Attica; and to have founded a republic there, 1236 B. C. Some time after, taking a voyage into Epirus, he was ſeized by Aidonius king of the Moloſſians; meanwhile Meneſtheus rendered himſelf maſter of Athens. But at length Theſeus being releaſed from priſon, retired to Scyros, where king Lycomedes cauſed him to be thrown from the top of a rock. Theſeus had ſeveral wives; the firſt of whom was Helena the daughter of Tyndarus; the ſecond, Hypolita queen of the Amazons; and the laſt, Phedra ſiſter to Ariadne, who puniſhed him for his infidelity to her ſiſter, by her inceſtuous paſſion for his ſon Hippolitus.

THESIS, a general poſition which a perſon advances, and offers to maintain. In colleges it is frequent to have placards containing a number of them in theology, in medicine, in philoſophy, in law, &c.

THESPIS, a famous Greek tragic poet, and the firſt repreſenter of tragedy at Athens. He carried his

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" (H) The freezing point marked on the tube of this thermometer is immediately taken by means of grated ice but the point of 100° by a ſtandard mercurial thermometer, the upper point of the ſcale of which was properly taken by boiling water, and the lower one by grated ice; but it is more commodious in the firſt to have the tube no longer than the air-ſcale, eſpecially as the degrees are pretty wide. The method of adjuſting the ſcale to the inequality of the tube remains the ſame, let the given points be at any diſtance, or the diviſions increaſed to any number.

" (I) Experimentally to prove this method, I have made mercurial thermometers, whoſe ſcales from the freezing point to that of boiling heat were nearly three feet; and though the inequalities of the tubes were very conſiderable, varying in contrary directions to each other, yet when they were on the ſame frame, they perfectly agreed in a motion of the mercury in every part of their ſcales."

his troop from village to village in a waggon, from which they performed their pieces. Alceſtis was the firſt tragedy they performed at Athens, 536 B. C.

THESSALY, a country of ancient Greece, ſuppoſed to have received its name from Theſſalus the father, or, according to others, the ſon of Græcus, an ancient king of an obſcure village, from whom the Greeks are ſaid to have been deſcended. It was alſo called *Æmonia*, the origin of which name is uncertain; *Pelaſgia*, from Pelaſgus one of the firſt Grecian princes; and *Pyrrhæa*, from Pyrrha the wife of Deucalion.

It was anciently divided into four diſtricts, or perhaps kingdoms. Theſſaliotes, Iſtœotis, Pelaſgiotis, and Phthiotis. Deucalion was king of this laſt when the deluge that goes by his name happened, which deſtroyed all the inhabitants of this and the neighbouring countries, except only ſuch as happily eſcaped into the high mountains of Theſſaliotis, and Deucalion and his wife, who were carried in an ark upon the waters nine days and nights, and reſted at length upon Parnaſſus, from which they were feigned to have repeopled the country by throwing of ſtones behind them. However, the name of Theſſaly and Theſſalians in time prevailed, and came to ſignify all the four parts. Sometimes it included Magneſia and Phthiotis, and ſometimes not; ſometimes it was joined with Macedonia, and ſometimes ſevered from it, and again rejoined to it.

Theſſaly, properly ſo called, had on the eaſt the provinces of Magneſia and Phthia abovementioned, and theſe two were bounded by the Ægean ſea. On the weſt it had Illyricum and Epirus, now Albania; on the north Macedonia and Mygdonia, and on the ſouth Grecia Propria. It extended from 24 deg. 10 min. to 25 and a half eaſt longitude, and from north to ſouth, from 39 deg. 50 min. to about 41 deg. north latitude.

Theſſaly was famous, among other things, for ſuch an extraordinary breed of oxen, that Neleus king of Pylus refuſed to give his daughter in marriage to Melampus king of Tyrius, except he procured him ſome of them; which he ſoon after did by the help of his brother Bias. What fine horſes they bred, and how expert they were in the uſe and management of that noble creature, is evident, ſince the fiction of the Centaurs is allowed to have taken its origin from them. This fable, however, reflects no leſs diſgrace upon them for their brutiſh incontinency, than it commends them for their ſkill in horſemanſhip. The attempt which they made upon the women at the nuptials of their neighbour Pirithous king of the Lapithæ, if not forged on purpoſe to caſt an ignominious brand upon them, is a pregnant proof of the one; and the hiſtory of their wars with other nations afford us a conſtant proof of the latter: ſo that in ſpite of their debauchery, they have ſhowed themſelves a warlike nation; and as ſuch, their alliance as well as aſſiſtance, eſpecially that of their cavalry, was ever highly courted by contending powers. And indeed, if we conſider how liable the pleaſantneſs and fertility of their country made them to foreign invaſions, it will be no wonder they ſhould be ſo well inured to the trade of war. Nor can it be ſuppoſed that any thing but their extraordinary valour could have ſaved them from being ſwallowed up by ſome of their neighbours, conſidering that their ſcanty territories conſiſted only of four ſmall kingdoms or diſtricts, as often disjointed from each other under different princes as united together under one.

At the head of the Theſſalian hiſtory muſt be placed the celebrated Argonautic expedition, which happened in the reign of Pelias king of Theſſaly, about the year of the world 2720, or 100 years before the taking of Troy. The occaſion of this expedition was as follows:

Æſon the third in deſcent from Æolus, being either worn out with age or weary of government, whilſt his ſon Jaſon was yet very young, appointed Pelias, his brother by the mother's ſide, guardian of the kingdom till his ſon came of age. Pelias on the other hand, who had reſolved to ſecure the government to himſelf, ſent to conſult the oracle about it, and was bid to beware of the man that had but one ſhoe. It happened ſome time after, that as he was ſacrificing to Neptune, he called his nephew to him, who was on the other ſide of a rivulet, and Jaſon having dropped one of his ſhoes in croſſing the brook, gave him occaſion to think that he was the perſon pointed out by the oracle. He then aſked him what courſe he would take with the perſon of whom the oracle had bid him beware; and Jaſon readily anſwered, That he would ſend him to Colchis in ſearch of the golden fleece. His uncle took him at his word, and ſent him immediately upon that enterpriſe. Jaſon made no difficulty to obey; and having engaged a conſiderable number of young noblemen, the flower of all Greece, to this expedition, he procured a ſhip to be built for this purpoſe at Pegaſa, by one Argus, from whom he called it *Argos*; and hence he and his gallant company were called *Argonautæ*.

Theſe adventurers, after many ſtrange difficulties and exploits, arrived at length at the land of Colchis, where the golden fleece was kept. They went immediately to the metropolis, where Jaſon acquainted Æetes king of the country with Pelias's command, and demaded the fleece of him. Æetes promiſed to deliver it to him, provided he could yoke together by his own ſingle ſtrength two fierce and terrible bulls (which had brazen hoofs, and breathed out fire and flame, and had been preſented to him by Vulcan), and plough the ground with them, ſowing it with the dragon's teeth which Minerva had given him, and were the remainder of thoſe which Cadmus had ſown at Thebes.

Jaſon, perplexed how to perform theſe conditions, was happily relieved by Medea the king's daughter, who was fallen in love with him. She promiſed him that if he would marry her, ſhe would aſſiſt him in it; and he had no ſooner agreed to it, than ſhe gave him a medicine, with which having anointed his body and armour, he became proof againſt the violence of the bulls; or, according to others, ſhe taught him how to tame thoſe fierce creatures, ſo as to be able to yoke and make uſe of them. She told him, moreover, that the teeth which he was to ſow would preſently ſpring up into armed men, which would infallibly deſtroy him unleſs he raiſed an immediate diſſention among them, by throwing ſtones at them, during which he might eaſily cut them off. Jaſon having ſucceſsfully performed the taſk, went and demanded the fleece according to Æetes's promiſe,

whilſt

Theſſaly.

whilſt he, inſtead of delivering it, was contriving how to deſtroy him and his company, and burn their ſhip. To prevent this, Medea went, and by her inchantments caſt the dragon into a deep ſleep, ſtole the fleece, and brought it to her lover, who took her, and, at her deſire, alſo her brother Abſyrtus, into his ſhip, and ſailed away immediately with his companions. Æetes, who was ſoon informed of his daughter's treachery, purſued immediately after them; which when ſhe perceived, ſhe cut her brother in pieces, and ſcattered his mangled limbs about in hopes to ſtop his farther purſuit, as it actually did: for the diſconſolate king, ſurpriſed at her unnatural barbarity, ſtaid to gather up the fragments of his ſon's body, and buried them in a place called from thence *Tomi;* and in the mean time ſhe and the Argonauts eſcaped into Theſſaly, not without having firſt felt the effects of Jupiter's anger for the murder of Abſyrtus, and after having ſpent four whole months in this expedition.

During the abſence of Jaſon, Pelias, who never expected his return from Colchis, had taken ſome means to cut off his father, in order to fix the kingdom upon himſelf and his ſon Acaſtus; and the old king being appriſed of his plots, had poiſoned himſelf by drinking a draught of bull's blood. His queen likewiſe, oppreſſed with grief for his death, and the ſuppoſed loſs of her ſon and kingdom, had hanged herſelf; ſo that Pelias now thought himſelf ſecure on his throne, when, contrary to his expectation, Jaſon returned ſucceſsful and victorious, and brought the fleece to him. However, he had ſo well ſtrengthened himſelf in it, that Jaſon did not dare to undertake any thing againſt him openly. Medea was forced to have recourſe to her magic to be revenged on the tyrant, and, as ſome ſay, reſtored Jaſon's father to life. After this ſhe perſuaded Pelias's daughters to boil their old father, on pretence ſhe would reſtore him to life and youthful vigour; but upon her non-performance Acaſtus mounted the throne, and having performed his father's funeral obſequies, baniſhed Jaſon and his wife from Theſſaly, who went and dwelt at Corinth.

Acaſtus is famed for having been a great hunter, and for the incontinency of his wife Hippolyta, or, as ſhe is called by others, *Cretheis;* which proved fatal to him. She was in love with Peleus the ſon of Cacus, and had ſolicited him in vain for ſome time, till, enraged at length at his conſtant refuſal, ſhe accuſed him to her huſband for making ſome attempts upon her honour. Acaſtus believing her, and endeavouring to kill Peleus, was himſelf and his unchaſte wife ſlain by him.

The next Theſſalian prince, both in time and fame, was the celebrated Achilles, the ſon of Peleus and Thetis, the goddeſs of the ſea. This hero was king of Phthia, one of the four provinces of Theſſaly, and is feigned to have been dipped by his mother in the river Styx when he was a child, and to have been made invulnerable by it in every part except the heel, by which ſhe held him. After this ſhe ſent him to be brought up by the Centaur Chiron, where he learned muſic, arms, and the riding of the great horſe. Being afterwards warned by the oracle, that if he went to the Trojan war he ſhould meet with his death there, ſhe diſpatched him privately in womens apparel to Lycomedes king of Scyrus, an iſland in the Ægean ſea, and one of the Cyclades.

Theſſaly,
Thetis.

In the mean time the Grecian chiefs, being likewiſe forewarned by an old prophecy, that their enterpriſe againſt Troy would prove unſucceſsful unleſs they had Achilles with them, Ulyſſes undertook to find him out, and to bring him to that war; which he accordingly did. Thetis finding that her ſon was determined to prefer a glorious death before the walls of Troy to an inglorious immortality, prevailed upon Vulcan to make him an impenetrable armour, with which he went at the head of his bold myrmidons to the fatal ſiege. Here he forbore acting for ſome time, upon a pique he had taken againſt Agamemnon on account of a beautiful female captive; but his reſentment giving way to his grief for the death of his dear friend Patroclus, who had been killed by Hector, Achilles thenceforth ſought nothing but to revenge it; which he ſoon after did. Hector was not only ſlain, but moſt barbarouſly uſed by him after his death, he having cauſed his body to be tied to his chariot and dragged thrice round the walls of Troy. This inhumanity did not go long unpuniſhed; and Priam having redeemed his ſon's ſhattered remains at an exceſſive price, Paris, another of his ſons, ſoon after ſhot Achilles in the heel, the only place in which he was not invulnerable.

The two moſt memorable things which the Theſſalians are ſince recorded for, are their driving the Bœotians from the country of Arne, a ſmall territory in Theſſaly; ſo called from its metropolis built by Bœotus the ſon of Neptune, by Arne the daughter of Æolus, the ſecond of that name, who was the ſon of Hyppotes, and grandſon of Mimas king of Æolis; and their conſtant wars againſt the Phocians. The former of theſe happened, according to Thucidydes, 60 years after the taking of Troy, and about 100 after their firſt ſettlement in that territory; when the Bœotians being driven thence, went and poſſeſſed themſelves of a country then named *Cadmeis,* and called it by their name *Bœotia.* We have elſewhere ſpoken of that country, and given another etymology of it, to which we refer the reader.

As for their wars with the Phocians, it is not eaſy to gueſs at the true ground of them; only we find, that there was an irreconcileable hatred entailed between thoſe two nations, which proved a conſtant ſource of freſh and bloody encounters, in which the Theſſalians, though ſuperior in ſtrength, eſpecially on account of their cavalry, were very often worſted by the policy of their enemies; witneſs thoſe ſtatues of Apollo, Minerva, Diana, and other trophies, which Pauſanias tells us they ſet up both on their borders and at the temple of Delphos, in memory of their ſignal victories over them. The truth is, the kingdom of Phocis was very mountainous, and the avenues to it very rugged; ſo that the Theſſalians, who ſeem ſtill to have been the aggreſſors, could receive but little benefit from their horſe.—Theſſaly is now called *Janna,* a province of European Turkey, bounded by Macedonia on the north, by the Archipelago on the eaſt, by Achaia or Livadia on the ſouth, and by Epirus on the weſt.

THETIS, in Pagan mythology, the wife of Oceanus, and the mother of Nereus and Doris, who were

Thevenot, Thibet.

married to each other; and from this marriage ſprung the nymphs of the earth and ſea. Among the ſea-nymphs there was one named *Thetis the Younger*, who excelled all the reſt in beauty, and for whom Jupiter conceived ſuch a paſſion, that he reſolved to eſpouſe her: but being informed by the Deſtinies that ſhe would bring forth a ſon who would riſe above his father, he married her to Peleus. To their nuptials all the gods and goddeſſes were invited, except Diſcord, who, to be revenged for this contempt, threw a golden apple into the aſſembly, on which was engraven, *This for the faireſt.* Juno, Pallas, and Venus, diſputed for this apple; but Paris being choſen to decide the difference, adjuged it to Venus. From the marriage of Thetis and Peleus ſprung Achilles.

THEVENOT (Melchiſedeck), a celebrated writer of travels, and keeper of the French king's library, was born at Paris. At a very early period he diſcovered an extreme deſire to ſee foreign countries; and notwithſtanding the intreaties of his mother, who ſtrove to detain him, he ſet out from Paris on his travels. However, he viſited only a part of Europe; but the ſtudy of the languages of different countries, and the great pains he took to obtain a knowledge of their manners and cuſtoms, rendered him, perhaps, as well ſkilled in them as if he had himſelf travelled in thoſe countries. He collected a great number of curious manuſcripts in Engliſh, French, Spaniſh, Italian, Latin, Greek, Hebrew, Syriac, Arabic, Turkiſh, and Perſic. He applied himſelf to ſtudy during his whole lifetime; and his Travels into the Levant are eſteemed. They were publiſhed in folio, in French, in 1663, and in Engliſh in 1687.

THIBET, a country of Aſia, very little known to the Europeans, till of late that it has been in ſome meaſure explored by Mr Bogle, one of the ſervants of the Engliſh Eaſt India Company. In Bengal this country is known by the name of *Boutan*, and lies to the northward of Hindoſtan, ſeparated from it by a range of high and ſteep mountains, properly a continuation of the celebrated mount Caucaſus. This chain of mountains ſtretches from the ancient Media and the ſhores of the Caſpian Sea, round the north-eaſt frontiers of Perſia to Candahar and Caſſamire; from thence directing its courſe more eaſterly, it forms the great northern barrier to the various provinces of the Mogul empire, and probably ends in Aſſam or China. In the valleys lying between the lower mountains are many tribes of Indian people; and a diſpute happening between the heirs of one of the rajahs or petty princes, one party called to their aſſiſtance the Boutaners, and the other the Britiſh. The latter prevailed; and the fame of Britiſh valour being carried to the court of Thibet, the *Tayſhoo-Lama*, who ruled the ſtate under the Delai-Lama, at that time in his minority, ſent a deputation to Bengal, deſiring peace for the prince who had been engaged in war with the Britiſh. This was readily granted by the governor; and Mr Bogle was ſent ambaſſador to the court of Thibet, where he reſided ſeveral months; and after an abſence of a year and a quarter, returned to Calcutta. The account of this gentleman's expedition hath not been publiſhed by himſelf; but from Mr Stewart's letter to Sir John Pringle, publiſhed in the Philoſophical Tranſactions, vol. 67. we learn the following particulars, collected from his papers.

Thibet.

"Mr Bogle divides the territories of the Delai Lama into two different parts. That which lies immediately contiguous to Bengal, and which is called by the inhabitants *Docpo*, he diſtinguiſhes by the name of *Boutan*; and the other, which extends to the northward as far as the frontiers of Tartary, called by the natives *Pu*, he ſtyles *Thibet*. Boutan is ruled by the Dah Terriah, or Deb Rajah, as I have already remarked. It is a country of ſteep and inacceſſible mountains, whoſe ſummits are crowned with eternal ſnow; they are interſected with deep valleys, through which pour numberleſs torrents that increaſe in their courſe, and at laſt, gaining the plains, loſe themſelves in the great rivers of Bengal. Theſe mountains are covered down their ſides with foreſts of ſtately trees of various ſorts; ſome (ſuch as pines, &c.) which are known in Europe; others, ſuch as are peculiar to the country and climate. The valleys and ſides of the hills which admit of cultivation are not unfruitful, but produce crops of wheat, barley, and rice. The inhabitants are a ſtout and warlike people, of a copper complexion, in ſize rather above the middle European ſtature, haſty and quarrelſome in their temper, and addicted to the uſe of ſpirituous liquors; but honeſt in their dealings, robbery by violence being almoſt unknown among them. The chief city is Taſſey Seddein ſituated on the Patchoo. Thibet begins properly from the top of the great ridge of the Caucaſus, and extends from thence in breadth to the confines of Great Tartary, and perhaps to ſome of the dominions of the Ruſſian empire. Mr Bogle ſays, that having once attained the ſummit of the Boutan mountains, you do not deſcend in an equal proportion on the ſide of Thibet; but continuing ſtill on a very elevated baſe, you traverſe valleys which are wider and not ſo deep as the former, and mountains that are neither ſo ſteep, nor apparently ſo high. On the other hand, he repreſents it as the moſt bare and deſolate country he ever ſaw. The woods, which every where cover the mountains in Boutan, are here totally unknown; and, except a few ſtraggling trees near the villages, nothing of the ſort to be ſeen. The climate is extremely ſevere and rude. At Chamnanning, where he wintered, although it be in latitude 31° 39′, only 8° to the northward of Calcutta, he often found the thermometer in his room at 29° under the freezing point by Fahrenheit's ſcale; and in the middle of April the ſtanding waters were all frozen, and heavy ſhowers of ſnow perpetually fell. This, no doubt, muſt be owing to the great elevation of the country, and to the vaſt frozen ſpace over which the north wind blows uninterruptedly from the pole, through the vaſt deſerts of Siberia and Tartary, till it is ſtopped by this formidable wall.

"The Thibetians are of a ſmaller ſize than their ſouthern neighbours, and of a leſs robuſt make. Their complexions are alſo fairer, and many of them have even a ruddineſs in their countenances unknown in the other climates of the eaſt. Thoſe whom I ſaw at Calcutta appeared to have quite the Tartar face. They are of a mild and cheerful temper; and Mr Bogle ſays, that the higher ranks are polite and entertaining in converſation, in which they never mix either ſtrained compliments or flattery. The common people, both in Boutan and Thibet, are cloathed in coarſe woollen ſtuffs of their own manufacture, lined with ſuch ſkins as they can procure; but the better orders of men are dreſſed in European cloth, or China ſilk, lined with the fineſt Siberian furs. The ambaſſador from the Deb Rajah, in his ſummer-dreſs at Calcutta, appeared exactly like the figures we ſee in the Chineſe paintings, with the conical hat, the tunick of brocaded ſilk, and light boots. The Thibetian who brought the firſt letter from the Lama was wrapped up from head to foot in furs. The uſe of linen is totally unknown among them. The chief food of the inhabitants is the milk of their cattle, prepared into cheeſe, butter, or mixed with the flour of a coarſe barley or of peaſe, the only grain which their ſoil produces; and even theſe articles are in a ſcanty proportion: but they are furniſhed with rice and wheat from Bengal and other countries in their neighbourhood. They alſo are ſupplied with fiſh from the rivers in their own and the neighbouring provinces, ſalted and ſent into the interior parts. They have no want of animal-food from the cattle, ſheep, and hogs, which are raiſed on their hills; and are not deſtitute of game, though I believe it is not abundant. They have a ſingular method of preparing their mutton, by expoſing the carcaſe entire, after the bowels are taken out, to the ſun and bleak northern winds which blow in the months of Auguſt and September, without froſt, and ſo dry up the juices and parch the ſkin, that the meat will keep uncorrupted for the year round. This they generally eat raw, without any other preparation. Mr Bogle was often regaled with this diſh, which, however unpalatable at firſt, he ſays, he afterwards preferred to their dreſſed mutton juſt killed, which was generally lean, tough, and rank. It was alſo very common for the head men in the villages through which he paſſed, to make him preſents of ſheep ſo prepared, ſet before him on their legs as if they had been alive, which at firſt had a very odd appearance.

“ The religion and political conſtitution of this country, which are intimately blended together, would make a conſiderable chapter in its hiſtory. It ſuffices for me to ſay, that at preſent, and ever ſince the expulſion of the Eluth Tartars, the kingdom of Thibet is regarded as depending on the empire of China, which they call *Cathay;* and there actually reſide two mandarines, with a garriſon of a thouſand Chineſe, at Lahaſſa the capital, to ſupport the government; but their power does not extend far: and in fact the lama, whoſe empire is founded on the ſureſt grounds, perſonal affection and religious reverence, governs every thing internally with unbounded authority. Every body knows that the Delai Lama is the great object of adoration for the various tribes of heathen Tartars, who roam through the vaſt tract of continent which ſtretches from the banks of the Volga to Correa on the ſea of Japan, the moſt extenſive religious dominion, perhaps, on the face of the globe. He is not only the ſovereign pontiff, the vicegerent of the Deity on earth; but, as ſuperſtition is ever the ſtrongeſt where it is moſt removed from its object, the more remote Tartars abſolutely regard him as the Deity himſelf. They believe him immortal, and endowed with all knowledge and virtue. Every year they come up from different parts, to worſhip and make rich offerings at his ſhrine: even the emperor of China, who is a Mantchou Tartar, does not fail in acknowledgments to him in his religious capacity; and actually entertains at a great expence, in the palace of Pekin, an inferior lama, deputed as his nuncio from Thibet. It is even reported that many of the Tartar chiefs receive certain preſents, conſiſting of ſmall portions of that, from him, which is ever regarded in all other perſons as the moſt humiliating proof of human nature and of being ſubject to its laws, and treaſure it up with great reverence in gold boxes, to be mixed occaſionally in their ragouts. It is, however, but juſtice to declare, that Mr Bogle ſtrenuouſly inſiſts, that the lama never makes ſuch preſents; but that he often diſtributes little balls of conſecrated flour, like the *pain benit* of the Roman-Catholics, which the ſuperſtition and blind credulity of his Tartar votaries may afterwards convert into what they pleaſe. The orthodox opinion is, that when the grand lama ſeems to die, either of old age or of infirmity, his ſoul in fact only quits an actual crazy habitation to look for another younger or better, and it is diſcovered again in the body of ſome child, by certain tokens known only to the lamas or prieſts, in which order he always appears. The preſent Delai Lama is an infant; and was diſcovered only a few years ago by the Tayſhoo Lama, who in authority and ſanctity of character is next to him, and conſequently, during the other's minority, acts as chief. The lamas, who form the moſt numerous as well as the moſt powerful body in the ſtate, have the prieſthood entirely in their hands; and, beſides, fill up many monaſtic orders, which are held in great veneration among them. Celibacy, I believe, is not poſitively enjoined to the lamas; but it is held indiſpenſable for both men and women who embrace a religious life: and indeed their celibacy, their living in communities, their cloiſters, their ſervice in the choirs, their ſtrings of beads, their faſts, and their penances, give them ſo much the air of Chriſtian monks, that it is not ſurpriſing an illiterate capuchin ſhould be ready to hail them brothers, and think he can trace the features of St Francis in every thing about them. It is an old notion, that the religion of Thibet is a corrupted Chriſtianity; and even Father Diſederii, a Jeſuit (but not of the Chineſe miſſion) who viſited the country about the beginning of this century, thinks he can reſolve all their myſteries into ours; and aſſerts, with a truly myſtical penetration, that they have certainly a good notion of the Trinity, ſince, in their addreſs to the Deity, they ſay as often *konciok-oik* in the plural as *konciok* in the ſingular, and with their roſaries pronounce theſe words, *om, ha, hum*. The truth is, that the religion of Thibet, from whence-ever it ſprung, is pure and ſimple in its ſource, conveying very exalted notions of the Deity, with no contemptible ſyſtem of morality: but in its progreſs it has been greatly altered and corrupted by the inventions of worldly men; a fate we can hardly regret in a ſyſtem of error, ſince we know that that of truth has been ſubject to the ſame. Polygamy, at leaſt in the ſenſe we commonly receive the word, is not in practice among them: but it exiſts in a manmanner ſtill more repugnant to European ideas; I mean in the plurality of huſbands, which is firmly eſtabliſhed and highly reſpected there. In a country where the means of ſubſiſting a family are not eaſily found, it ſeems not impolitic to allow a ſet of brothers to agree in raiſing one, which is to be maintained by their joint efforts. In ſhort, it is uſual in Thibet for the brothers in the family to have a wife in common, and they generally live in great harmony and comfort with her; not but ſometimes little diſſenſions will ariſe (as may happen in families conſtituted upon different principles) an inſtance of which Mr Bogle mentions in the caſe of a modeſt and virtuous lady, the wife of half a dozen of the Tayſhoo Lama's nephews, who complained to the uncle that the two youngeſt of her huſbands did not furniſh that ſhare of love and benevolence to the common ſtock which duty and religion required of them. In ſhort, however ſtrange this cuſtom may appear to us, it is an undoubted fact that it prevails in Thibet in the manner I have deſcribed.

"The manner of beſtowing their dead is alſo ſingular: they neither put them in the ground like the Europeans, nor burn them like the Hindoos; but expoſe them on the bleak pinnacle of ſome neighbouring mountain, to be devoured by wild beaſts and birds of prey, or waſted away by time and the viciſſitudes of weather in which they lie. The mangled carcaſes and bleached bones lie ſcattered about; and, amidſt this ſcene of horror, ſome miſerable old wretch, man or woman, loſt to all feelings but thoſe of ſuperſtition, generally ſets up an abode, to perform the diſmal office of receiving the bodies, aſſigning each a place, and gathering up the remains when too widely diſperſed."

THIGH, in anatomy. See Anatomy, n° 57.

THINKING, a general name for any act or operation of the mind. See Metaphysics, n° 70.

THIRLAGE. See Law, N° clxx. 12—18.

THIRST, an uneaſy ſenſation ariſing from a deficiency of the ſaliva to moiſten the inward parts of the mouth. Hence ariſes a ſtrong deſire for drink; and thirſt is a ſymptom generally attending fevers of all kinds.—Thirſt is beſt allayed by acids; water kept a while in the mouth, then ſpit out, and repeated as required; a bit of bread chewed with a little water, which latter may be gradually ſwallowed; if the perſon is very hot, brandy is the beſt for holding in the mouth, but ſhould be ſpit out again: except in fevers, large draughts of cold water are hurtful.

Preſervation againſt Hunger and Thirst. See Hunger.

THISTLE, in botany. See Carduus.—The dried flowers of the carduus lanceolatus or ſpear-thiſtle, and carduus nutans or muſk-thiſtle, are uſed in ſome countries as a runnet for curdling their milk. Many kinds of phalenæ are fond of the flowers, and hover over them at night; the tender ſtalks of the paluſtris or marſh-thiſtle, and indeed of moſt thiſtles, are eſculent, being firſt peeled and boiled. In this manner the inhabitants of Smaaland in Sweden, as Linnæus informs us, often eat them.

Order of the Thistle, or *of St Andrew*, a military order of knighthood in Scotland, the riſe and inſtitution whereof is variouſly related by different authors. Leſley biſhop of Roſs reports, that the night before the battle between Athelſtan king of Northumberland, and Hungus king of the Picts, a bright croſs, in form of that whereon St Andrew (the tutelar ſaint of Scotland) ſuffered martyrdom, appeared to Hungus; who having gained the victory, ever after bore the figure of that croſs on his banners. Others aſſert, that Achaius king of Scotland firſt inſtituted this order, after having made the famous league offenſive and defenſive with Charlemagne king of France. But although the thiſtle had been acknowledged as the ſymbol of the kingdom of Scotland from the reign of Achaius, yet ſome refer the beginning of this order to Charles VII. of France. Others place the foundation of it as low as the year 1500.

The chief and principal enſign is a gold collar compoſed of thiſtles and ſprigs of rue interlinked with amulets of gold, having pendent thereunto the image of St Andrew with his croſs, and the motto, Nemo me impune lacesset.

See Plate CCLXXXIII. fig. 1.

The ordinary or common enſign worn by the knights, is a ſtar of four ſilver points, and over them a green circle, bordered and lettered with gold, containing the ſaid motto, and in the centre is a thiſtle proper; all which is embroidered on their left breaſt, and worn with the collar, with a green ribband over the left ſhoulder, and brought under the right arm; pendent thereto is the image of St Andrew, with his croſs, in a purple robe, within an oval of gold enamelled vert, with the former motto: but ſometimes they wear, encircled in the ſame manner, a thiſtle crowned.

About the time of the Reformation, this order was dropped, till James II. of England reſumed it, by creating eight knights: however, the Revolution unſettled it again; and it lay neglected, till queen Anne, in 1703, reſtored it to the primitive deſign, of twelve knights of St Andrew.

THLASPI, mithridate, or *Treacle-muſtard*; a genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants. There are 10 ſpecies; of which the moſt remarkable are, 1. The arvenſe, or penny-creſs, is a native of ſeveral places of England and Scotland, growing in corn-fields, but not very common. The ſtalk is a foot high, angular and branched; the leaves ſeſſile, embracing the ſtalk at their baſe; the flowers very ſmall and white. The plant ſmells of garlic; and in countries where it abounds, is found often to communicate its diſagreeable odour to the milk of cows that feed on it. The ſeeds abound with an oil formerly uſed for the rheumatiſm and ſciatica, but now taken no notice of. 2. The burſa paſtoris, or ſhepherd's purſe, is common in corn-fields, gardens, waſte places, and by way-ſides. This plant affords us a ſtrong inſtance of the influence of ſoil and ſituation; for in ſome places it is not more than two inches high when it flowers and perfects its ſeeds, in others it riſes to the height of two or three feet. It is inſipid; but was nevertheleſs formerly much recommended in hæmorrhagies of all kinds, though deſervedly rejected in the preſent practice.

THOMÆANS, Thomists, or *Chriſtians of St Thomas*, a people of the Eaſt Indies, who, according to the tradition, received the Goſpel from St Thomas. Upon the arrival of the Portugueſe at Calicut, in their firſt voyage to the Indies, they met with ancient Chriſtians, who pretended to be deſcended from thoſe converted by St Thomas. The Thomæans being informed of a new people arrived among them, who bore a particular veneration for the croſs, ſent ambaſſadors to them to make an alliance with them, and to ſolicit their aſſiſtance againſt the Gentile princes, by whom they were greatly oppreſſed. A mixture of opinions, with a total interruption of paſtors, ſometimes for ſeveral years together, occaſioned that horrible chaos their religion was in at the arrival of the Portugueſe; for a ſpecimen whereof we ſhall add their manner of celebrating the euchariſt: Over their altar was a kind of gallery; and while the prieſt was ſaying the beginning of the office below, a cake of flour of rice was frying in oil, or butter, above; when enough, the cake was let down in a baſket upon the altar, where the prieſt conſecrated it: as to the other ſpecies, for wine they uſed a kind of brandy or arrack, variouſly prepared in that country. Nor was their ordination much more regular; the archdeacon, who was ſometimes more reſpected than the biſhop himſelf, frequently ordained prieſts: their other abuſes were infinite. The Portugueſe, for theſe two laſt centuries, have laboured the reformation of this church, and have employed both the eccleſiaſtic and ſecular power therein: for this end they have called the Thomæan biſhops to the council at Goa, have inſtructed, charged them, &c. and even ſent them for inſtruction to Portugal and Rome; but finding that they were ſtill apt to relapſe at their return, and that no good was like to be done with them, they reſolved to exclude them once for all, and to appoint an European biſhop in their room. Theſe proceedings have rendered the Portugueſe infinitely odious to the Thomæans.

St **THOMAS** *the Apoſtle*, ſurnamed *Didymus*. He was not with the diſciples when Chriſt appeared to them after his reſurrection, and therefore would not believe that he was really riſen from the dead; but eight days after, Chriſt making him feel the place where the wounds had been made in his ſide and in his hands, he was thoroughly convinced of that important truth. His infidelity, indeed, furniſhed ſuch an inconteſtible proof of our Saviour's reſurrection, that it made ſome of the fathers ſay, that "St Thomas's incredulity was of greater ſervice than the faith of the other apoſtles." St Thomas preached the goſpel to the Ethiopians, Parthians, Medes, &c. It is even ſaid that he preached to the Indians; and was run through with a lance, near the town of Meliapore, called the *town of St Thomas*: but this is now generally allowed to be a miſtake, and the converſion of the people called the *Chriſtians of St Thomas*, is, with great certainty, attributed to another Thomas, who lived ſome centuries after the apoſtle of that name.

St **THOMAS**, a city of the Hither India, on the coaſt of Coromandel, three miles ſouth of Fort St George; ſubject to the Portugueſe.

St **THOMAS**, is alſo an iſland in the Atlantic ocean, ſituated under the equator, in 8° E. Long.

St **THOMAS** is alſo a town of Guiana, in South America, ſituated on the river Oroonoko; ſubject to Spain.

St **THOMAS**'s *Day*, a feſtival of the Chriſtian church, obſerved on Dec. 21. in commemoration of St Thomas the apoſtle.

St **THOMAS** *of Canterbury's Day*, a feſtival of the Romiſh church, obſerved on Dec. 29. in memory of Thomas Becket archbiſhop of Canterbury, who was murdered, or, as the Romaniſts ſay, martyred, in the reign of king Henry II.

THOMISM, the doctrine of St Thomas Aquinas, and his followers the Thomiſts, chiefly with regard to predeſtination and grace. There is ſome doubt what the true genuine Thomiſm is; but there are authors who diſtinguiſh the Thomiſm of St Thomas from that of the Dominicans. Others again make Thomiſm no other than a kind of Janſeniſm diſguiſed: but Janſeniſm, it is known, has been condemned by the popes, which pure Thomiſm never was: in effect, the writings of Alvarez and Lemos, who were appointed by their order to lay down and defend, before the holy ſee, the dogmata of their ſchool, have ſince been reputed the rule of pure Thomiſm.

THOMSON (James), an excellent Britiſh poet, the ſon of a Scots divine, was born in the ſhire of Roxburgh in 1700, and was educated in the univerſity of Edinburgh with a view to the miniſtry. But his genius inclining him to the ſtudy of poetry, which he ſoon found would be incompatible with that of theology, or at leaſt might prevent his being provided for in that way in his own country, he relinquiſhed his views of engaging in the ſacred function; and repaired to London in conſequence of ſome encouragement he had received from a lady of quality there, a friend of his mother's.

The reception he met with wherever he was introduced, emboldened him to riſk the publication of his excellent poem on Winter.—This piece was publiſhed in 1726; and from the univerſal applauſe it met with, Mr Thomſon's acquaintance was courted by people of the firſt taſte and faſhion. But the chief advantage which it procured him, was the acquaintance of Dr Rundle, afterward biſhop of Derry, who introduced him to the late lord chancellor Talbot; and ſome years after, when the eldeſt ſon of that nobleman was to make his tour of travelling, Mr Thomſon was choſen as a proper companion for him. The expectations which his Winter had raiſed, were fully ſatisfied by the ſucceſſive publications of the other ſeaſons: of Summer, in the year 1727; of Spring, in the following year; and of Autumn, in a quarto edition of his works, in 1730. Beſide the Seaſons, and his tragedy of Sophoniſba, written and acted with applauſe in the year 1729, he had, in 1727, publiſhed his poem to the memory of Sir Iſaac Newton, with an account of his chief diſcoveries; in which he was aſſiſted by his friend Mr Gray, a gentleman well verſed in the Newtonian philoſophy. That ſame year the reſentment of our merchants, for the interruption of their trade by the Spaniards in America, running very high, Mr Thomſon zealouſly took part in it, and wrote his ſpirited and public-ſpirited Britannia, to rouſe the nation to revenge.

With the Hon. Mr Charles Talbot, our author viſited moſt of the courts in Europe, and returned with his views greatly enlarged; not of exterior nature only, and the works of art; but of human life and manners, and of the conſtitution and policy of the ſeveral ſtates, their connections, and their religious inſtitutions.—How particular and judicious his obſervations were, we ſee in his poem on Liberty, begun ſoon after his return to England. We ſee at the ſame time, to what a high pitch his care of his country was raiſed, by the compariſons he had all along been making of our happy government with thoſe of other nations. To inſpire his fellow-ſubjects with the like ſentiments, and ſhow them by what means the precious freedom we enjoy may be preſerved, and how it may be abuſed or loſt, he employed two years in compoſing that noble work; upon which he valued himſelf more than upon all his other writings. On his return to England with Mr Talbot (who ſoon after died), the chancellor made him his ſecretary of briefs; a place of little attendance, ſuiting his retired indolent way of life, and equal to all his wants. This place fell when death, not long after, deprived him of his noble patron, and he then found himſelf reduced to a ſtate of precarious dependance, in which he paſſed the remainder of his life; excepting only the two laſt years of it, during which he enjoyed the place of ſurveyor-general of the Leeward-iſlands, procured for him by Lord Lyttelton. His genius, however, could not be ſuppreſſed by any reverſe of fortune. He reſumed his uſual cheerfulneſs, and never abated one article in his way of living; which, though ſimple, was genial and elegant. The profits ariſing from his works were not inconſiderable; his tragedy of Agamemnon, acted in 1738, yielded a good ſum. But his chief dependence was upon the late prince of Wales, who ſettled on him a handſome allowance, and honoured him with many marks of particular favour. Notwithſtanding this, however, he was refuſed a licence for his tragedy of Edward and Eleanora, which he had prepared for the ſtage in the year 1739.

Mr Thomſon's next performance was the Maſque of Alfred, written jointly with Mr Mallet, by the command of the prince of Wales, for the entertainment of his royal highneſs's court, at Cliſden, his ſummer-reſidence, in the year 1740. Mr Thomſon's poem, entitled the *Caſtle of Indolence*, was his laſt work publiſhed by himſelf; his tragedy of Coriolanus being only prepared for the theatre, when a fatal accident robbed the world of one of the beſt of men and beſt of poets. He would commonly walk the diſtance between London and Richmond (where he lived), with any acquaintance that offered, with whom he might chat and reſt himſelf, or perhaps dine by the way. One ſummer evening being alone in his walk from town to Hammerſmith, he had over-heated himſelf, and in that condition imprudently took a boat to carry him to Kew; apprehending no bad conſequence from the chill air on the river, which his walk to his houſe, towards the upper end of Kew-lane, had always hitherto prevented. But now the cold had ſo ſeized him, that the next day he found himſelf in a high fever. This, however, by the uſe of proper medicines, was removed, ſo that he was thought to be out of danger; till the fine weather having tempted him to expoſe himſelf once more to the evening dews, his fever returned with violence, and with ſuch ſymptoms as left no hopes of a cure. His lamented death happened on the 27th of Auguſt 1748.

Mr Thomſon had improved his taſte upon the fineſt originals, ancient and modern. The autumn was his favourite ſeaſon for poetical compoſition, and the deep ſilence of the night he commonly choſe for his ſtudies. The amuſement of his leiſure-hours were civil and natural hiſtory, voyages, and the beſt relations of travellers. Though he performed on no inſtrument, he was paſſionately fond of muſic, and would ſometimes liſten a full hour at his window to the nightingales in Richmond gardens; nor was his taſte leſs exquiſite in the arts of painting, ſculpture, and architecture. As for the more diſtinguiſhing qualities of his mind and heart, they beſt appear in his writings. There his devotion to the Supreme Being, his love of mankind, his country, and friends, ſhine out in every page; his tenderneſs of heart was ſo unbounded, that it took in even the brute creation. It is not known, that through his whole life he ever gave any perſon a moment's pain, either by his writings or otherwiſe. He took no part in the political ſquabbles of his time, and was therefore reſpected and left undiſturbed by both ſides. Theſe amiable virtues did not fail of their due reward; the applauſe of the public attended all his productions, and his friends loved him with an enthuſiaſtic ardour.

His teſtamentary executors were the Lord Lyttelton, whoſe care of our poet's fortune and fame ceaſed not with his life; and Mr Mitchell, a gentleman equally noted for the truth and conſtancy of his private friendſhip, and for his addreſs and ſpirit as a public miniſter. By their united intereſts, the orphan play of Coriolanus was brought on the ſtage to the beſt advantage; from the profits of which, and the ſale of manuſcripts and other effects, a handſome ſum was remitted to his ſiſters. His remains were depoſited in the church of Richmond, under a plain ſtone, without any inſcription. A handſome monument was erected to him in Weſtminſter abbey, in the year 1762, the charge of which was defrayed by the profits ariſing from a ſplendid edition of all his works in quarto; Mr Millar the bookſeller, who had purchaſed all Mr Thomſon's copies, giving up his property on this grateful occaſion.

THORN, a town of Poland, in Regal Pruſſia, and in the palatinate of Culm. It was formerly an Hanſeatic town, and ſtill enjoys great privileges; is large and well fortified; but part of the fortifications, and a great number of houſes, were ruined by the Swedes in 1703. It is ſeated on the Viſtula, in E. Long. 19. 22. N. Lat. 52. 56.

THORNBACK, in ichthyology. See RAIA.

THORNHILL (Sir James), an eminent Engliſh painter, was born in Dorſetſhire in 1676, of an ancient family; but was conſtrained to apply to ſome profeſſion by the diſtreſſes of his father, who had been reduced to part with his family-eſtate. His genius directed him to the art of painting, which his uncle Dr Sydenham enabled him to ſtudy by placing him with a middling painter: however, his own talents ſupplied the deficiences of his inſtructor; and by a happy exertion of them, he gradually roſe to the higheſt reputation. The dome of St Paul's church at London, with his works at Hampton-court and Greenwich hoſpital, are public proofs of his merit that will convey his name to poſterity with the greateſt honour. He enriched himſelf ſo far by his works that he purchaſed back his paternal eſtate; was appointed ſtate-painter to queen Anne, received the honour of knighthood, and was ſeveral years a member of parliament. He died in 1732.

THOROUGH-WAX, in botany. See BUPLEURUM.

THOUGHT, a general name for all the ideas conſequent on the operations of the mind, and even on the operations themſelves. See METAPHYSICS.

THOUGHT, in compoſition, See ORATORY, n° 101, 104, 111.

When ſpeaking with a particular reference to the belles letters and polite arts, we mean, by thoughts, the ideas which the artiſt attempts, to raiſe by his performance, in contradiſtinction to the manner in which they are raiſed or expreſſed.

In works of art, thoughts are what remains of a performance, when ſtripped of its embelliſhments. Thus, a poet's thoughts are what remains of his poems, independently of the verſification, and of ſome ideas merely ſerving for its decoration and improvement.

Thoughts, therefore, are the materials propoſed and applied by art to its purpoſes: The dreſs in which they appear, or the form into which they are moulded by the artiſt, is merely accidental. Conſequently, they are the firſt object of attention in every work of art; the ſpirit, the ſoul of a performance, which, if its thoughts are indifferent, is but of little value, and may be compared to a palace of ice, raiſed in the moſt regular form of an habitable ſtructure, but, from the nature of its materials, totally uſeleſs.

While, therefore, you are contemplating an hiſtorical picture, try to forget that it is a picture: forget the painter, whoſe magic art has, by lights and ſhades, created bodies where there are none. Fancy to yourſelf that you are actually looking at men, and then attend to their actions. Obſerve whether they are intereſting; whether the perſons expreſs thoughts and ſentiments in their faces, attitudes, and motions; whether you may underſtand the language of their airs and geſtures, and whether they tell you ſomething remarkable. If you find it not worth your while to attend to the perſons thus realiſed by your fancy, the painter has thought to little purpoſe.

Whilſt liſtening to a muſical performance, try to forget that your are hearing ſounds of an inanimate inſtrument, produced only by great and habitual dexterity of lips or fingers. Fancy to yourſelf, that you hear a man ſpeaking ſome unknown language, and obſerve whether his ſounds expreſs ſome ſentiments; whether they denote tranquillity or diſturbance of mind, ſoft or violent, joyful or grievous affections; whether they expreſs any character of the ſpeaker; and whether the dialect be noble or mean. If you cannot diſcover any of theſe requiſites, then pity the virtuoſo for having left ſo much ingenuity deſtitute of thought.

In the ſame manner we muſt alſo judge of poems, eſpecially of the lyric kind. That ode is valuable which, when deprived of its poetical dreſs, ſtill affords pleaſing thoughts or images to the mind. Its real merit may beſt be diſcovered by tranſpoſing it into ſimple proſe, and depriving it of its poetical colouring. If nothing remains that a man of ſenſe and reflection would approve, the ode, with the moſt charming harmony and the moſt ſplendid colouring, is but a fine dreſs hung round a man of ſtraw. How greatly then are thoſe miſtaken, who conſider an exuberant fancy and a delicate ear as ſufficient qualifications for a lyric poet!

It is only after having examined the thoughts of a performance in their unadorned ſtate, that we can pronounce whether the attire, in which they have been dreſſed by art, fits and becomes them well or ill. A thought, whoſe value and merit cannot be eſtimated but from its dreſs, is, in effect, as futile and inſignificant as a man who affects to diſplay his merit by external pomp.

THRACE, a country very frequently mentioned by the Greek and Latin writers, deriving its name, according to Joſephus, from Tiras one of the ſons of Japhet. It was bounded on the north by mount Hæmus; on the ſouth, by the Ægean Sea; on the weſt by Macedon, and the river Strymon; and on the eaſt by the Euxine Sea, the Helleſpont, and the Propontis.—The Thracian Cherſoneſus is a peninſula incloſed on the ſouth by the Ægean Sea, on the weſt by the gulf of Melas, and on the eaſt by the Helleſpont; being joined on the north to the continent by a neck of land about 37 furlongs broad. The inland parts of Thrace are very cold and barren, the ſnow lying on the mountains the greateſt part of the year; but the maritime provinces are productive of all ſorts of grain and neceſſaries for life; and withal ſo pleaſant, that Mela compares them to the moſt fruitful and agreeable countries of Aſia.

The ancient Thracians were deemed a brave and warlike nation, but of a cruel and ſavage temper; being, according to the Greek writers, quite ſtrangers to all humanity and good-nature. It was to the Thracians, however, that the Greeks were chiefly indebted for the polite arts that flouriſhed among them; for Orpheus, Linus, Muſæus, Thamyris, and Eumolpus, all Thracians, were the firſt, as Euſtathius informs us, who charmed the inhabitants of Greece with their eloquence and melody, and perſuaded them to exchange their fierceneſs for a ſociable life and peaceful manners; nay, great part of Greece was anciently peopled by Thracians. Tereus, a Thracian, governed at Daulis in Phocis, where the tragical ſtory of Philomela and Progne was acted. From thence a body of Thracians paſſed over to Eubœa, and poſſeſſed themſelves of that iſland. Of the ſame nation were the Aones, Tembices, and Hyanthians, who made themſelves maſters of Bœotia; and great part of Attica itſelf was inhabited by Thracians, under the command of the celebrated Eumolpus. It is not therefore without the utmoſt ingratitude and injuſtice that the Greeks ſtyle them *Barbarians*, ſince to them chiefly they were indebted both for the peopling and poliſhing of their country.

Thrace was anciently divided into a number of petty ſtates; which were firſt ſubdued by Philip of Macedon. On the decline of the Macedonian empire, the country fell under the power of the Romans. It continued under ſubjection to them till the irruption of the Turks, in whoſe hands it ſtill remains.

THRAVE, *of* CORN, an expreſſion denoting 24 ſheaves, or four ſhocks of ſix ſheaves to the ſhock; though in ſome countries they only reckon 12 ſheaves to the thrave.

THRASYBULUS, a renowned Athenian general and patriot, the deliverer of his country from the yoke of the 30 tyrants, lived about 294 B. C *.

THRASYMENUS LACUS, (anc. geog.) a lake of Etruria, near Peruſia, and not far from the Tiber, fatal to the Romans in the Punic war. Now *il lago de Perugia* on the eccleſiaſtical ſtate.

THREAD, a ſmall line made up of a number of fine hairs of any vegetable or animal ſubſtance, ſuch as flax, cotton, or ſilk; from which thread takes its name of linen, cotton, or ſilk.

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* See *Attica*, nº 169—174.

Nettle THREAD. See NETTLE and URTICA.

Dyeing THREAD *black*. Linen and cotton thread may be dyed of a durable and deep black by ſolution of iron in ſour beer, in which the linen is to be ſteeped for ſome time, and afterwards boiled in madder. See the article DYEING, Part III.

THREATENING letters. Knowingly to ſend any letter without a name, or with a fictitious name, demanding money, or any other valuable thing, or threatening (without any demand) to kill or fire the houſe of any perſon, is made felony without benefit of clergy. And ſending letters, threatening to accuſe any perſon of a crime puniſhable with death, tranſportation, pillory, or other infamous puniſhment, with a view to extort from him any money or other valuable chattels, is puniſhable by ſtatute 30 Geo. 2. c. 24. at the diſcretion of the court, with fine, impriſonment, pillory, whipping, or tranſportation for ſeven years.

THRIPS, a genus of inſects, belonging to the order of hemiptera. The roſtrum is obſcure, or ſo ſmall as to be ſcarce perceptible. The antennæ are filiform, and as long as the thorax. The body is ſlender, and of equal thickneſs in its whole length. The abdomen is reflexible, or bent upwards. The four wings are extended, incumbent upon the back of the inſect, narrow in proportion to their length, and croſs one another at ſome diſtance from their baſe. The tarſi of the feet are compoſed of only two articulations. There are five ſpecies. The largeſt is the juniperina, of a gloſſy black colour with yellowiſh antennæ; the wings and elytra are whitiſh, narrow, and furniſhed at the point with a few ſmall hairs. The inſects live under the bark of old trees, in flowers, and under the juniper-tree. In the ſame places are to be found their larvæ, which only differ from them by the want of wings and elytra; but it is difficult to obſerve theſe differences in ſuch diminutive creatures, which look rather like moving atoms than any thing elſe.

THROAT, the anterior part of an animal, between the head and the ſhoulders, wherein is the gullet.

THRONE, a royal ſeat or chair of ſtate, enriched with ornaments of architecture and ſculpture, raiſed on one or more ſteps, and covered with a kind of canopy. Such are the thrones in the rooms of audience of kings and other ſovereigns.

THRUSH, in ornithology. See TURDUS.

THRUSH, or *Aphthæ*. See MEDICINE, n° 214.

THUANUS (Jacobus Auguſtus), youngeſt ſon of the preſident de Thou, was famous for the depth and erudition of his works. He was born in 1553; and having finiſhed his ſtudies and travels, was made preſident a-Mortier, and took poſſeſſion thereof in 1595. He was employed in ſeveral important offices of ſtate, and in reforming of the univerſity of Paris; which he diſcharged with ſo much prudence, that he was eſteemed the Cato of his age, and the ornament of France. He wrote the hiſtory of his own time in Latin, from the year 1543 to 1608, in 138 books; a work, both for ſubject and ſtyle, worthy of the ancients. He alſo left memoirs of his own life, beſides poems; and died at Paris, 1617.

THUCYDIDES, a celebrated Greek hiſtorian, was born at Athens 475 B.C. He was the ſon of Olorus, and grandſon of Miltiades, who is thought to have been deſcended from Miltiades the famous Athenian general, and to have married the king of Thrace's daughter. He was educated in a manner ſuitable to his quality, that is, in the ſtudy of philoſophy and eloquence. His maſter in the former was Anaxagoras, in the latter Antiphon; one, by his deſcription in the eighth book of his Hiſtory, for power of ſpeech almoſt a miracle, and feared by the people on that account. Suidas and Photius relate, that when Herodotus recited his hiſtory in public, a faſhion in uſe then and many ages after, Thucydides felt ſo great a ſting of emulation, that it drew tears from him; inſomuch that Herodotus himſelf took notice of it, and congratulated his father on having a ſon who ſhowed ſo wonderful an affection to the muſes. Herodotus was then 29 years of age, Thucydides about 16.

When the Peloponneſian war began to break out, Thucydides conjectured truly, that it would prove an argument worthy of his labour; and it no ſooner commenced than he began his hiſtory, purſuing the ſame, not in that perfect manner in which we ſee it now, but by way of commentary, and in writing down plain actions or paſſages thereof, as from time to time they fell out and came to his knowledge. We know nothing with certainty of Thucydides, but what he himſelf has delivered in his hiſtory. He was a lover of contemplation and retirement; yet did not decline the ſervice of the ſtate, and accepted accordingly of a command in the army. This, however, proved unfortunate to him; for while he reſided in the iſle Thaſus, it happened that Braſidas the Lacedæmonian beſieged Amphipolis, a city belonging to the Athenians, about half a day's ſail from Thaſus. Thucydides being one of the ſtrategi, or of thoſe who had authority to raiſe forces in thoſe parts for the ſervice of the commonwealth, the Athenian captain ſent to him to levy a power and haſten to his relief. Thucydides did ſo; but not arriving till too late, and when the city was already yielded up, he was afterwards baniſhed, as if he had done this either through negligence or fear of the enemy; which, however, there was no juſt reaſon to ſuſpect; for he put himſelf into the city Eion, and preſerved it to the Athenians, with the repulſe of Braſidas, who came down the next morning from Amphipolis and beſieged it.

After his baniſhment, which happened in his 48th year, he lived in Scapte-Hyle, a city of Thrace, from whence he married a very wealthy wife; and he had large poſſeſſions and rich mines of gold, as he himſelf tells us in his fourth book. He was not however ſo affected with his diſgrace, as to ſhut himſelf up from the world, and drag on, as many have done, a life embittered with ſpleen and diſappointment; on the contrary, he went abroad, and was preſent at the actions of the reſt of the war. This appears from his own words, in the fifth book of his Hiſtory; where he ſays, that he was preſent at the actions of both parties, and by reaſon of his exile no leſs at thoſe of the Peloponneſians than thoſe of the Athenians. During this time he perfected his Hiſtory, ſo far as is now to be ſeen. He was very nice and curious concerning a perfect inſight into affairs; in order to obtain which he employed great ſums of money in procuring authentic memorials, not only from the Athenians but the Lacedæmonians alſo, that out of his collec-

Thule ‖ Thunder.

collections from both the great tranſactions of that time might be better and more impartially ſet forth.

At the end of 20 years, his ſentence of baniſhment was revoked. Some authors affirm that he returned to Athens, and was treacherouſly killed in that city. But others aſſert that he died in Thrace, at the advanced age of 80 years, leaving his hiſtory unfiniſhed. It is contained in eight books, and ends with the 21ſt year of the war of Peloponneſus. The moſt eſteemed edition is that of Oxford in 1696, folio. Demoſthenes ſet ſuch a value on Thucydides's hiſtory, that he tranſcribed the whole ſeveral times with his own hand.

THULE, or Thylæ, (anc. geog.) an iſland about the ſituation of which authors diſagree. Strabo frankly owns that it lies in obſcurity, and that what Pytheas of Marſeilles ſays about it is not to be depended on. Pliny ſeems to have known a little more ; namely, that it is the outmoſt or laſt of all the known iſlands, in which there are no nights at the ſummer-ſolſtice : Ptolemy makes the longeſt day there 24 hours, and aſſigns it 63 degrees of north latitude. Stephanus allows but 20 for the longeſt day. From all which it appears evident to ſome, that the ancients could not mean Iceland, as is commonly thought, but either Shetland or Ferro, as agreeing tolerably well with the days and hours above-mentioned ; though others are of opinion that Iceland is the Thule of the ancients. Agricola, in ſailing round Britain, ſays, he had then a view of Thule, lying in ſnow and involved in winter ; whereas Iceland lies at too great a diſtance to be ſeen in ſailing round Britain. Nor is it certain whether they took it for ſome ordinary iſland, or for the great peninſula of Scandinavia ; that is, Sweden and Norway, which very many authors formerly took for an iſland. Pliny, however, ſeems to have diſtinguiſhed Norway from Thule ; who places beyond it, at the diſtance of a day's ſail, the Frozen Sea, called *Cronium* by ſome, and *Pigrum* by Tacitus. All the knowledge either Greeks or Romans had of this iſland, Bochart ſuppoſes to have been derived from the Phœnicians. Antonius Diogenes, a very ancient author, who lived in the time of Alexander the Great, and who wrote concerning the iſland of Thule, profeſſes he drew his tale or his ſtory from the *Tabulæ Cypariſſimæ* dug up at Tyre, when taken by Alexander, from the tomb of the Tyrian adventurers who ſailed thither.

Southern THULE. See AMERICA, n° 21.

THUMB, in anatomy, one of the extremities of the hand.

THUMB *Cap*, an iſland in the South-Sea, lies about ſeven leagues north-weſt of Lagoon-iſland ; it is a low, woody iſland, of a circular form, and not much above a mile in compaſs. There was no appearance of inhabitants ; the land was covered with verdure of many hues.

THUMMIM. See URIM.

THUNDER, the noiſe occaſioned by the exploſion of a flaſh of lightning echoed back from the inequalities on the ſurface of the earth, in like manner as the noiſe of a cannon is echoed, and in particular circumſtances forms a rolling lengthened ſound.

Thunder.

Although *thunder*, properly ſpeaking, is only a mere ſound capable of producing very little effect, yet the word is generally ſuppoſed to include the phenomena of lightning alſo ; and electrified clouds are by univerſal conſent called *thunder-clouds*, and the exploſions of many flaſhes of lightning proceeding from them are generally called *thunder-ſtorms*. Though the phenomena of lightning, therefore, have been at great length explained and accounted for under the articles ELECTRICITY and LIGHTNING, and though the immediate cauſe of electrical exploſions from clouds is explained under the article RAIN ; yet the ultimate cauſe remains ſtill to be ſhown, and properly belongs to the preſent article.

It is univerſally allowed, that the variation of the electricity in different parts of the atmoſphere is the cauſe of thunder. Under the article ELECTRICITY, it has been ſhown why lightning explodes after the thunder-clouds are charged. Under the article LIGHTNING it is ſhown why that meteor puts on the various forms in which we ſee it, why it ſometimes ſtrikes houſes or animals, and ſometimes not, &c. ; and under the article RAIN, why the atmoſphere in ſome caſes parts with the vapours which at other times it ſo obſtinately retains. It remains, therefore, only to ſhow why rains are ſometimes attended with thunder, and ſometimes not ; which, to thoſe who attentively peruſe the articles above-mentioned, may be done in few words.

In this part of Great Britain, and for a conſiderable way along the eaſtern coaſt, although thunder may happen at any time of the year, yet the month of July is that in which it may almoſt certainly be expected. Its duration is of very uncertain continuance ; ſometimes only a few cracks will be heard at any particular place during the whole ſeaſon ; at others the ſtorm will return at the interval of three or four days for a month, ſix weeks, or even longer ; not that we have violent thunder in this country directly vertical in any one place ſo frequently in any year, but in many ſeaſons it will be perceptible that thunder-clouds are formed in the neighbourhood even at theſe ſhort intervals. Hence it appears, that during this particular period there muſt be ſome natural cauſe operating for the production of this phenomenon, which does not take place at other times. This cannot be the mere heat of the weather, for a great tract of hot weather is very often obſerved without any thunder being heard ; and beſides, though not common, it is ſometimes heard in the winter alſo. As therefore the heat of the weather is common to the whole ſummer, whether there be thunder or not, we muſt look for the cauſes of it in thoſe phenomena, whatever they are, which are peculiar to the months of July, Auguſt, and the beginning of September. Now it is generally obſerved, in the tract of country of which we now ſpeak, that from the month of April an eaſt or ſouth-eaſt wind generally takes place, and continues with little interruption till towards the end of June. At that time, ſometimes ſooner, and ſometimes later, a weſterly wind takes place ; but as the cauſes producing the eaſt wind are not removed, the latter oppoſes the weſt wind with its whole force. At the place of meeting, there is naturally a moſt vehement preſſure of the atmoſphere, and friction of its parts againſt one another ; a calm enſues, and the vapours brought by both winds begin to collect and form dark clouds, which can have little motion either way, becauſe they are preſſed almoſt equally on all ſides. For the moſt part, however, the weſt wind prevails, and what little motion the clouds have is towards the eaſt; whence the common remark in this country, that "thunder-clouds move againſt the wind." But this is by no means univerſally true: for if the weſt wind happens to be excited by any temporary cauſe before its natural period when it ſhould take place, the eaſt wind will very frequently get the better of it; and the clouds, even although thunder is produced, will move weſtward. Yet in either caſe the motion is ſo ſlow, that the moſt ſuperficial obſervers cannot help taking notice of a conſiderable reſiſtance in the atmoſphere.

That when two ſtreams of air are thus driven againſt each other, the ſpace where they meet muſt become highly electrified, is as plain as that an electric globe muſt be excited when friction is applied. It is true, as the ſubſtances here to be excited are both electrics *per ſe*, it may be objected, that no electricity could be produced; for we cannot excite one electric by rubbing it with another. Yet it is obſerved, that glaſs may be electrified by blowing ſtrongly upon it, or by the exploſion of cannon; and even when glaſs is ſtrongly preſſed upon glaſs, both pieces become electrified as ſoon as they are ſeparated. When glaſs is rubbed upon glaſs, no attraction or repulſion can be perceived, nor is any ſign of electricity obſerved on bodies brought near to it; yet a very bright electric light always appears on the glaſſes, and a phoſphoreal ſmell is ſmelt †; which ſhows, that though the electricity does not fly out through the air in the uſual way, yet the fluid within the glaſs is agitated, and there is little reaſon to doubt that any conducting body incloſed within the ſubſtance of the glaſs would be electrified alſo. The vapours therefore, which are the conducting ſubſtances in the atmoſphere, become immediately electrified in conſequence of the preſſure above-mentioned, and all the phenomena deſcribed under the various articles already referred to take place.

In like manner, by the ſtruggle of two other winds as well as thoſe of the eaſt and weſt, may a thunder-ſtorm be produced; but it is always neceſſary that the reſiſtance of the air to the motion of the clouds ſhould be very great, and nearly equal all round. For if the vapour ſhould get off to a ſide, no thunder would take place; the electricity would then be carried off as faſt as it was collected, and rain would only be the conſequence, by reaſon of the electrified vapours parting with their latent heat, as is explained under the article RAIN. In fact, we very often obſerve that in the time of rain the clouds evidently move acroſs the wind, and the nearer their motion is to a direct oppoſition, the heavier will the rain be; while on the other hand, if they move briſkly before the wind, let the direction be what it will, the atmoſphere ſoon clears up. But for a farther illuſtration of theſe matters, ſee the articles WEATHER, and WIND.

THURINGIA, a diviſion of the circle of Upper Saxony in Germany. It is a fruitful track, abounding in corn, eſpecially wheat; in black cattle, ſheep, and horſes; and in ſome places with vines and woad, and other valuable plants. It contains 47 towns, 14 boroughs, betwixt 700 and 800 villages, 300 noble eſtates, 7 ſuperintendencies, and 5 under-conſiſtories. Thuringia, the country of the ancient Thuringi, or Catti, a branch of the Vandals, mentioned by Tacitus, was formerly a kingdom, afterwards a county, then a landgravate, and was governed by its own princes for many ages, till 1124, when it devolved to the marquis of Miſnia, and, with that country, afterwards to the duke of Saxony. But the modern Thuringia is only a part of the ancient, nay, but a part of the ancient South Thuringia, which comprehends beſides, a large ſhare of the modern Franconia, Heſſe, &c. On the extinction of the male line of the ancient landgraves in 1247, it came to the margraves of Meiſſen, anceſtors to the preſent electoral family. The elector has no voice in the diet, on account of his ſhare in the landgravate or circle of Thuringia.

THURLOE (John), an Engliſh ſtateſman under Oliver Cromwel; was born at Abbots Roding in Eſſex in 1616, of which pariſh his father was rector; and was educated to the ſtudy of the law. In 1648 he was made receiver or clerk of the curſitor fines; and though his attachments were entirely on the ſide of the parliament, he declares himſelf totally unconcerned in all counſels relative to the death of the king: however, on that event, and on the eſtabliſhment of the commonwealth, he was diverted from proſecuting his employments in the law, by engaging in public buſineſs. When Cromwel aſſumed the protectorſhip, he became ſecretary of ſtate; in 1655, he had the care and charge both of foreign and inland poſtage committed to him by the protector; and was afterward ſworn one of his privy-council, according to "The humble petition and advice." He was continued in the ſame capacities under Richard Cromwel, and until meaſures were taking for the reſtoration; when he made an offer of his ſervices to that end, which however were not accepted. May 15th 1660, he was committed to the cuſtody of the ſerjeant at arms on a charge of high-treaſon; but being ſoon releaſed, he retired to Great Milton in Oxfordſhire: and though he was afterward often ſolicited by Cha. II. to engage in the adminiſtration of public buſineſs, he thought proper to decline the offers. He died in 1668; and was a man of an amiable private character, who in the higheſt of his power exerciſed all poſſible moderation toward perſons of every party. The moſt authentic teſtimony of his abilities is that vaſt collection of ſtate-papers, 7 vols folio, now in the hands of the public; which place the affairs of Great Britain, and of Europe in general, during that remarkable period, in the cleareſt light.

THURSDAY, the fifth day of the Chriſtian week, but the ſixth of that of the Jews.

THUYA, the ARBOR VITÆ, a genus of the monodelphia order, belonging to the monoecia claſs of plants. The ſpecies are,

1. The occidentalis, or common arbor vitæ, grows naturally in Canada, Siberia, and other northern countries. In ſome of the Engliſh gardens a few of theſe trees are to be met with of a large ſize: it has a ſtrong woody trunk, which riſes to the height of 40 feet or more. The bark, while young, is ſmooth, and of a dark brown colour; but as the trees advance, the bark becomes cracked, and leſs ſmooth. The branches are produced irregularly on every ſide, ſtanding almoſt horizontal, and the young ſlender ſhoots frequently hang downward, thinly garniſhed with leaves; ſo that when

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† See *Electricity*, nº 17, 28, 96.

the trees are grown large, they make but an indifferent appearance. The young branches are flat, and their ſmall leaves lie imbricatim over each other like the ſcales of a fiſh; the flowers are produced from the ſide of the young branches pretty near to the foot-ſtalk; the male flowers grow in oblong katkins, and between theſe the female flowers are collected in form of cones. When the former have ſhed their farina, they ſoon after drop off; but the female flowers are ſucceeded by oblong cones, having obtuſe ſmooth ſcales, containing one or two oblong ſeeds. The leaves of this tree have a rank oily ſcent when bruiſed.

2. The orientalis, or China arbor vitæ, grows naturally in the northern parts of China, where it riſes to a conſiderable height; but this has not been long enough in Europe to have any trees of large ſize. The ſeeds of this ſort were firſt ſent to Paris by ſome of the miſſionaries; and there are ſome of the trees growing in the gardens of the curious there, which are more than 20 feet high. The branches of this ſort grow cloſer together, and are much better adorned with leaves, which are of a brighter green colour, ſo make a much better appearance than the other, and being very hardy, it is eſteemed preferable to moſt of the evergreen trees with ſmall leaves, for ornament in gardens. The branches of this tree croſs each other at right angles: the leaves are flat; but the ſingle diviſions of the leaves are ſlender, and the ſcales are ſmaller and lie cloſer over each other than thoſe of the firſt ſort. The cones are alſo much larger, and of a beautiful grey colour; their ſcales end in acute reflexed points.

Theſe trees are propagated by ſeeds, layers, or cuttings.

THYMUS, THYME, a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants. There are ſeveral ſpecies, all celebrated for their agreeable flavour, but ſo well known that no deſcription is neceſſary. The whole plant is fragrant, and yields an eſſential oil that is very heating. An infuſion of the leaves removes the headach occaſioned by the debauch of the preceding evening. A general opinion prevails that the fleſh of ſheep that feed upon aromatic plants, particularly upon thyme, is much ſuperior in flavour to common mutton: but the ingenious author of the account of the Sheep-walks in Spain (Gent. Mag. 1764.) conſiders this as a vulgar error. He ſays ſheep are not fond of aromatic plants; that they will carefully puſh aſide the thyme to get at the graſs growing beneath it; and that they never touch it unleſs when walking apace, and then they will catch at any thing.—The attachment of bees to this and other aromatic plants is well known. In the experiments made at Upſal, ſheep and goats were obſerved to eat it, and ſwine to refuſe it.

Thymus, in anatomy. See Anatomy, n° 379.

THYRSUS, in antiquity, the ſceptre which the poets put into the hand of Bacchus, and wherewith they furniſhed the menades in their Bacchanalia.

Thyrsus, in botany, a mode of flowering reſembling the cone of a pine. It is, ſays Linnæus, a panicle contracted into an oval or egg-ſhaped form. The lower foot-ſtalks, which are longer, extend horizontally, whilſt the upper ones are ſhorter and mount vertically. Lilac and butter-burr furniſh examples.

TIARA, an ornament or habit wherewith the ancient Perſians covered their head; and with which the Armenians and kings of Pontus are repreſented on medals; theſe laſt, becauſe they were deſcended from the Perſians. Latin authors call it indifferently *tiara* and *cidaris*. Strabo ſays, the tiara was in form of a tower; and the ſcholiaſt on Ariſtophanes's comedy, Αχορνης, act. 1. ſcene 2. affirms, that it was adorned with peacock's feathers.

The kings of Perſia alone had the right of wearing the tiara ſtraight and erect; the prieſts and great lords wore it depreſſed, or turned down on the fore-ſide. Xenophon in his Cyropædia ſays, that the tiara was ſometimes encompaſſed with the diadem, at leaſt in ceremonies; and had frequently the figure of a half-moon embroidered on it: others are of opinion, that the diadem was in figure of a moon, and that it was hence the tiara was called *lunata*: laſtly, others think that the tiara itſelf was ſometimes in form of a half-moon. In fact, it appears that there were different forms of tiaras; and Paſchalius *De coronis*, diſtinguiſhes no leſs than five different kinds.

Tiara is alſo the name of the pope's triple crown. The tiara and keys are the badges of the papal dignity; the tiara of his civil rank, and the keys of his juriſdiction: for as ſoon as the pope is dead, his arms are repreſented with the tiara alone, without the keys. The ancient tiara was a round high cap. John XXIII. firſt encompaſſed it with a crown. Boniface VIII. added a ſecond crown; and Benedict XII. a third.

TIBER, a great river of Italy, which runs through the pope's territories, paſſing by Perugia and Orvietto; and having viſited Rome, falls into Tuſcan ſea at Oſtia, fifteen miles below that city.

TIBERIAS, (anc. geog.) the laſt town of Galilee, ſituated on the ſouth ſide of the lake Tiberias; built by Herod the tetrarch, and called *Tiberias* in honour of the emperor Tiberius; diſtant 30 ſtadia from Hippus, 60 from Gadara, and 120 from Scythopolis: whence it appears to have been at no great diſtance from where the Jordan runs out of the lake. It is a number of times mentioned by John the Evangeliſt. Pliny places it on the weſt extremity of the lake, commending the ſalubrity of its hot waters. Jerome ſays, the ancient name was *Chennereth*; which, if true, will account for the name of the lake.

TIBULLUS (Aulus Albius), a Roman knight, and a celebrated Latin poet, was born at Rome 43 B. C. He was the friend of Horace, Ovid, Macer, and other great men in the reign of Auguſtus. He accompanied Meſſala Corvinus in his expedition againſt the iſland of Corcyra: but falling ſick, and being unable to ſuppor tthe fatigues of war on account of the weakneſs of his conſtitution, he quitted the profeſſion of arms, and returned to Rome, where he died before the year 17; when Ovid ſhowed his grief for his death by writing a fine elegy upon him. Tibullus wrote four books of elegies, which are ſtill extant: they are written in a tender and agreeable ſtyle, and in a very elegant Latin. Muret and Joſeph Scaliger have written learned and curious commentaries on the works of this poet. The beſt edition of Tibullus is that of Janus Bronckhuſius, publiſhed at

Amſterdam in 1708, in one volume quarto. We have an Engliſh poetical verſion of them by Mr Grainger.

TIBUR, (anc. geog.) a town of Latium, pleaſantly ſituated on the Anio. Here Horace had his villa and houſe; and here he wiſhed to end his days. Here Adrian built an extraordinary villa called *Tiburtina*, inſcribed with the names of the provinces and of the moſt conſiderable places, (Spartian); near which Zenobia had a houſe called *Zenobia*, (Trebellius, Pollio). Hither Auguſtus often retreated on account of its ſalubrity, (Suetonius): for which it is greatly commended, (Martial). Anciently, when the Romans had far extended their territory, it was the utmoſt place of baniſhment, (Ovid). It had a temple of Hercules; and therefore called *Herculeum*. In the temple was a library, (A. Gellius). Now *Tivoli* in the Campagna di Roma on the Teverone.

TICINUM, (anc. geog.) a town of Inſubria, built by the Gauls; ſituated on the river Ticinus near its confluence with the river Po: a municipium, famous under the Cæſars. Now *Pavia* in the Milan, from its name *Pabia* or *Papia* in the middle age.

TICINUS, (anc. geog.) a river in Inſubria, riſing in mount Adula, traverſing the Lacus Verbanus ſouthwards, and falling into the Po near Ticinum. Between this river and the Po Hanibal gained his firſt victory over the Romans under P. Scipio. The general himſelf eſcaped with the utmoſt difficulty, and that by the bravery of his ſon the firſt Scipio Africanus. Now the *Teſino*, riſing in mount Godard, running ſouth through the Lago Maggiore and Milan, by Pavia, into the Po.

TICKELL (Thomas), an excellent Engliſh poet, was the ſon of a clergyman who enjoyed a conſiderable preferment in the north of England; but we have no account where or when he was born. He was educated at Queen's college, Oxford, of which he was made fellow; and while he continued at that univerſity, he addreſſed to Mr Addiſon a complmentary copy of verſes on his Opera of Roſamond, which introduced him to an acquaintance with that gentleman, who diſcovering his merit, became his ſincere friend. On Mr Addiſon's being made ſecretary of ſtate, he appointed Mr Tickell his under-ſecretary; and on his being obliged to reſign that office on account of his ill health, he recommended him ſo effectually to Mr Craggs his ſucceſſor, that he was continued in his poſt till that gentleman's death. In 1724 Mr Tickell was appointed ſecretary to the lords juſtices in Ireland, and enjoyed that place as long as he lived. He wrote ſome poems, which, when ſeparately publiſhed, met with a favourable reception, and paſſed through ſeveral editions: they are now printed in the ſecond volume of The Minor Poets. After Mr Addiſon's death Mr Tickell had the care of the edition of his works printed in 4 vols 4to; to which he prefixed an account of Mr Addiſon's life, and a poem on his death. Mr Tickell died in the year 1740.

TIDES. See ASTRONOMY, n° 161. *et ſeq.*

TIDE-WAITERS, or *Tideſmen*, are inferior officers belonging to the cuſtom-houſe, whoſe employment is to watch or attend upon ſhips until the cuſtoms be paid: they get this name from their going on board ſhips on their arrival in the mouth of the Thames or other ports, and ſo come up with the tide.

TIEND, in Scots law. See LAW, n° clxxi.

TIERCE, or TEIRCE, a meaſure of liquid things, as wine, oil, &c. containing the third part of a pipe, or 42 gallons.

TIERCED, in heraldry, denotes the ſhield to be divided by any part of the partition-lines, as party, coupy, tranchy, or tailly, into three equal parts of different colours or metals.

TIGER, in zoology. See FELIS.

TIGRIS, a river of Aſia, which has its ſource near that of the Euphrates in the mountain Tchildir in Turkomania: afterwards it ſeparates Diarbeck from Erzerum, and Khuſiſtan from Irac-Arabi; and uniting with the Euphrates at Gorno, it falls into the gulph of Buzarah, under the name of *Schat el-Arab*. This river paſſes by Diarbekar, Gezirah, Mouſul, Bagdad, Gorno, and Buzarah.

TILBURY, a fortreſs in the county of Eſſex, ſeated on the river Thames, oppoſite to Graveſend in Kent.

TILIA, the LIME OR LINDEN TREE; a genus of the monogynia order, belonging to the polyandria claſs of plants. The moſt remarkable ſpecies is the Europœa, or common lime-tree, a native of Britain and other northern countries of Europe. The leaves are heart-ſhaped, with the apex produced, and ſerrated on the edges; the flowers grow in a thin umbel, from three to nine together, of a whitiſh colour and a fragrant ſmell; very grateful to bees. The wood is light, ſmooth, and of a ſpongy texture, uſed for making laſts and tables for ſhoemakers, &c. Ropes and bandages are made of the bark, and mats and ruſtic garments of the inner rind, in Carniola and ſome other countries.—The lime-tree contains a gummy juice, which being repeatedly boiled and clarified, produces a ſubſtance like ſugar.

TILLANDSIA, the large barren WILD PINE of the Weſt Indies; a genus of the monogynia order, belonging to the hexandria claſs of plants. It is called *Caragatua* by Father Plumier, and is a paraſitic plant, and ought perhaps, in ſtrict propriety, to be denominated an *aquatic*: for although it is ſuſpended in the air among the branches of lofty trees, to whoſe boughs it is faſtened by its numerous roots; yet it is not indebted to thoſe boughs, like the miſletoe and other paraſitic plants, for nouriſhment, but merely for ſupport; provident nature having, in a very extraordinary manner, ſupplied this with other means to preſerve its exiſtence: for the leaves, which much reſemble thoſe of the pine-apple, but are larger, ſurround this plant in a circular manner; each leaf being terminated near the ſtalk with a hollow bucket, which contains about half a pint of water. It is by theſe numerous ſmall reſervoirs of water, that the roots, as well as every other part of this plant, are ſupplied with nouriſhment, without the help of any earth. The flouriſhing condition of this plant, as well as the great growth of fig-trees, upon barren rocks, ſhows that water is of greater uſe to vegetation than earth.

One contrivance of nature in this vegetable, ſays Dr Sloane, is truly admirable. The ſeed is crowned with many long, downy threads, not only that it may be carried everywhere by the wind; but that by thoſe threads, when driven through the boughs, it may be held faſt, and ſtick to the arms and prominent parts of the barks of trees. So ſoon as it ſprouts or germinates, although it be on the under-part of a bough, its leaves and ſtalks riſe perpendicular or erect; if they aſſumed any other direction, the ciſtern or reſervoir juſt mentioned, made of the hollow leaves, could not hold water, which is neceſſary to the life and nouriſhment of the plant. In ſcarcity of water this reſervoir is uſeful, not to the plant only, but to men, and even to birds and all ſorts of inſects, which come thither in troops, and ſeldom go away without refreſhment.

To the ſame purpoſe, Dampier, in his voyage to Campeachy, relates, "that the wild pine has leaves that will hold a pint and a half or quart of rain-water, which refreſhes the leaves and nouriſhes the roots. When we find theſe pines we ſtick our knives into the leaves, juſt above the root; and the water guſhing out, we catch it in our hats, as I myſelf have frequently done, to my great relief."

TILLEMONT. See Nain.

TILLER *of a* Ship, a ſtrong piece of wood faſtened in the head of the rudder, and in ſmall ſhips and boats called the *helm*.

TILLOTSON (John), a celebrated archbiſhop of Canterbury, was the ſon of Robert Tillotſon of Sowerby, in the pariſh of Hallifax in Yorkſhire, clothier; and was born there in the year 1630. He ſtudied in Clare-hall, Cambridge; and in 1656 left this college, in order to become tutor to the ſon of Edmund Prideaux, Eſq; of Ford-abbey in Devonſhire. He was afterwards curate to Dr Hacket vicar of Cheſhunt, in Hertfordſhire. In 1663, he was preſented by Sir Thomas Barnardiſton to the rectory of Ketton or Keddington in the county of Suffolk; but was the next year choſen preacher to Lincoln's Inn, when he procured Ketton to be beſtowed on his curate. He was greatly admired in London for his ſermons; and the ſame year was appointed Tueſday-lecturer at St Lawrence's church, London, where his lectures were frequented by all the divines of the city and many perſons of quality and diſtinction. In 1666, he took the degree of doctor of divinity at Cambridge; in 1669, was made prebendary of Canterbury; in 1672, was admitted dean of that cathedral; and three years after, was made a prebendary of St Paul's cathedral, London. In 1679, he became acquainted with Charles earl of Shrewſbury, whom he converted from Popery; and the next year refuſed to ſign the clergy of London's addreſs of thanks to king Charles II. for not agreeing to the bill of excluſion of the duke of York. In 1683, he viſited the unhappy lord Ruſſel when under condemnation; and attended him in his laſt moments on the ſcaffold. In 1689, he was inſtalled dean of St Paul's; made clerk of the cloſet to king William and queen Mary; and appointed one of the commiſſioners to prepare matters to be laid before the convocation, in order to a comprehenſion of all Proteſtants, as well diſſenters as churchmen; but this attempt was fruſtrated by the zeal of thoſe members of that body, that refuſed to admit of any alteration in things confeſſedly indifferent. In 1691, Dr Tillotſon was, notwithſtanding the warmeſt remonſtrances and intreaties on his part, conſecrated archbiſhop of Canterbury, and four days after was ſworn one of the privy-council; their majeſties always repoſing an entire confidence in his prudence, moderation, and integrity. In 1694, he was ſeized with a dead palſy, of which he died in the 65th year of his age. He was interred in the church of St Lawrence Jury, London, where a neat monument is erected to his memory. This learned and pious divine, while living, was greatly inveighed againſt by the enemies of the revolution. After his death there was found a bundle of bitter libels which had been publiſhed againſt him, on which he had written with his own hand, "I forgive the authors of theſe books, and pray God that he may alſo forgive them." It is remarkable, that while this truly great man was in a private ſtation, he always laid aſide two-tenths of his income for charitable uſes. One volume in folio of Dr Tillotſon's ſermons was publiſhed in his life-time, and corrected by his own hand: theſe Barbeyrac tranſlated into French. Thoſe which came abroad after his death, from his chaplain Dr Barker, made two vols in folio, the copy of which was ſold for 2500 l. and this was the only legacy he left to his family, his extenſive charity having conſumed his yearly revenues as conſtantly as they came to his hands. However, king William gave two grants to his widow; the firſt of which was an annuity of 400 l. during the term of her natural life, and the ſecond of 200 l. as an addition to the former annuity. Dr Tillotſon wrote ſome other works beſides his Sermons; and alſo publiſhed Dr Barrow's works, and Dr Wilkins's Treatiſe of the Principles and Duties of Natural Religion, and a volume of that divine's Sermons.

TIMÆUS, a Greek hiſtorian, the ſon of Andronicus, who was eminent for his riches and excellent qualities, was born at Tauromenium in Sicily, and flouriſhed in the time of Agathocles. He wrote ſeveral books, and among the reſt an hiſtory of his own country; but they are all loſt.

Timæus, a famous Pythagorean philoſopher, was born at Locres in Italy, and lived before Plato. There is ſtill extant a ſmall treatiſe of his on the Nature and Soul of the World, written in the Doric dialect. This treatiſe, which is to be found in the works of Plato, furniſhed that great philoſopher with the ſubject of his treatiſe intitled *Timæus*.

TIMBER, a name for all kinds of felled and ſeaſoned woods. See Trees and Wood.

TIMBERS, the ribs of a ſhip, or the incurvated pieces of wood, branching outward from the keel in a vertical direction, ſo as to give ſtrength, figure, and ſolidity to the whole fabric. It has been obſerved in the article *Naval* Architecture, that one timber is compoſed of ſeveral pieces united into one frame, which is accordingly called a *frame of timbers* by the artificers. Theſe different pieces are exhibited in Plate CCLXVI. fig. 3. by U, V, and W; the head of the lower piece, called the *floor-timber*, being cut ſquare, to join the heel of the next above it. To ſupport the connection of the timber in that place, another aſſemblage of pieces are formed, and joined in the ſame manner; ſo that when both the ſets are faſtened together, the joinings in one ſet will be nearly oppoſite to the middle of the pieces in the other. Hence it is evident, that the mould which ſerves for the loweſt piece will conform to the under part of the correſponding piece above it: and thus the mould appropriated to every diviſion of a timber will determine or anſwer to the figure of the next adjoining thereto.

—The timbers, whoſe areas or planes are perpendicular to the keel, are called *ſquare-timbers*; and thoſe which are placed obliquely on the keel, as at the extremities of a ſhip, are called *cant-timbers*. The foremoſt of thoſe pieces on the ſhip's bow are called the *knuckle-timbers*; and the hindmoſt on the quarter are called the *faſhion-pieces*.—The outlines, or bends of the principal timbers of the ſhip, are geometrically delineated in the plane of projection, ibid. fig. 4. as alſo in Plate CLIX. fig. 2. and Plate CCLXXVII. fig. 2.; and their particular ſtations in the ſhip's length are repreſented in the horizontal plane, and that of the elevation, Plate CCLXVI. fig. 1, 2. In order to give a more comprehenſive idea of their figures and dimenſions, we have exhibited a perſpective view of the carcaſe of a ſmall veſſel Plate CCLXXXVI. fig. 1. conſiſting only of the keel A, the ſtern-poſt B, the ſtem C, the tranſoms KLM, and the ribbands FF.

TIME, a ſucceſſion of phenomena in the univerſe, or a mode of duration marked by certain periods or meaſures, chiefly by the motion and revolution of the ſun. See ASTRONOMY.

The general idea which time gives in every thing to which it is applied, is that of limited duration. Thus we cannot ſay of the Deity, that he exiſts in time; becauſe eternity, which he inhabits, is abſolutely uniform, neither admitting limitation nor ſucceſſion.

TIME, in muſic, is that which meaſures the duration of ſounds; and is marked by emphatic or accented notes, which are heard at equal diſtances, or by the regular returns of cadences.

A ſucceſſion of ſounds, ſays Rouſſeau, however happily it may be conducted in its procedure, in its tranſitions from low to high, or from high to low, will produce nothing, if we may ſpeak ſo, but indeterminate effects. It is the relative and proportionate duration of theſe very ſounds that fixes the genuine character of any muſic, and gives it its full energy. Time is the ſoul of melody: airs, whoſe movements are ſlow, naturally deject our ſpirits, and inſpire ſadneſs; but thoſe which proceed with cheerfulneſs and vivacity, whoſe cadences are regular and properly marked, excite us to joy, and ſcarce can the feet reſtrain themſelves from dancing. Remove meaſure, deſtroy the proportions of duration between ſounds, and the ſame airs which thoſe proportions rendered agreeable to you, will remain without charms and without force, will, in ſhort, become incapable of pleaſing or intereſting. Time, on the contrary, has its own intrinſic power; it depends on itſelf alone, and can ſubſiſt without diverſity of ſounds. Of this the drum preſents us with an example; rude indeed, and extremely inadequate, becauſe in it the ſounds cannot be ſupported.

Time in muſic is conſidered, either with reſpect to the general movement of an air, and in this ſenſe it is ſaid to be ſwift or ſlow: or it is conſidered with reſpect to the aliquot parts of every bar; theſe parts are marked by motions of the hand or foot, and in a particular ſenſe are called *times*: or, in ſhort, it is conſidered with reſpect to the proper value of each particular note in duration.

In his Muſical Dictionary, at the word *Rhythme*, Rouſſeau has ſufficiently treated concerning the time of muſic among the Greeks. Such readers as wiſh to examine the rhythmus of the ancients more curiouſly, may derive conſiderable advantage from reading Cicero's treatiſe *De Oratore*, and Burney's diſſertation prefixed to his hiſtory. We are more particularly concerned in the *time* of modern muſic.

Thoſe muſicians who may be called *ancient moderns*, only recognize two different ſpecies of meaſures or times; one containing three equal diviſions of time, which they called *perfect meaſure*; the other comprehending two, which they termed *imperfect meaſure*; and they denominated the ſigns which they added to the cleff, *times*, *modes*, or *prolations*, to fix the character of the bars, whether of the one or the other kind. Theſe ſigns did not, as at preſent, ſerve for that uſe alone, but they likewiſe fixed the relative value of notes; as may be ſeen at the words *Mode* and *Prolation* in Rouſſeau's Muſical Dictionary, with reſpect to the maximum or large, the long, the ſemibreve. With reſpect to the breve, the manner of dividing it was what they more preciſely called *time*; and that time was perfect or imperfect.

When the time was *perfect*, the breve or ſquare was equivalent to three ſemibreves; and this they ſignified by a full circle, ſometimes with lines drawn through it and ſometimes not, ſometimes likewiſe it was marked thus $\frac{3}{1}$.

When the time was *imperfect*, the breve was only equivalent to two ſemibreves; and this was marked by a ſemicircle or C. Sometimes this C was inverted; and this ſignified that the value or duration of each particular note was diminiſhed by one half. We at preſent expreſs the ſame thing by interſecting C with a line. Sometimes the quantity of a bar, ſignified by the interſected C, where the notes only are protracted to half their value, divided into what they called *minor times*; and that which was marked by the C without a line, where the notes occupied their full duration, into *major times*, in which the bar was generally divided into four equal parts or times.

We have exactly retained the triple time of the ancients, as well as the double, which we call *common time*; but, by an unaccountable caprice, we have hardly retained any thing in their manner of dividing notes except by duplicates, though their diviſion into three equal parts is often no leſs neceſſary to us than to them; ſo that to divide a bar into three equal parts, or a time in the ſame manner, we are at a loſs for characters of expreſſion, and ſcarcely can we tell how to ſupply them. We muſt have recourſe to the figure 3, or to other expedients of the ſame kind; which demonſtrate how inadequate our muſical characters are to anſwer their proper purpoſes. See TRIPLE in the *Muſical Dictionary*.

To ancient muſic we had added a combination of time, by which the bar, inſtead of two, is divided by four, equal parts or times; but as they may always be reduced to bars containing only two, it may be ſaid, that in reality we have only two or three times as the aliquot parts of all our different bars.

The value of times is as numerous and different as the diverſities in the quantity of bars and the modifications of movement. But when the bar and the movement are once fixed, all the bars ſhould be perfectly equal, and all the times contained in each bar perfectly equivalent one to another. Now, to render this equality ſenſible, every bar is ſtruck, and every time diſtinguiſhed, by a motion of the hand or foot; and by theſe motions

Plate CCLXXXVI.

Fig. 1.
TIMBERS
of a Ship.

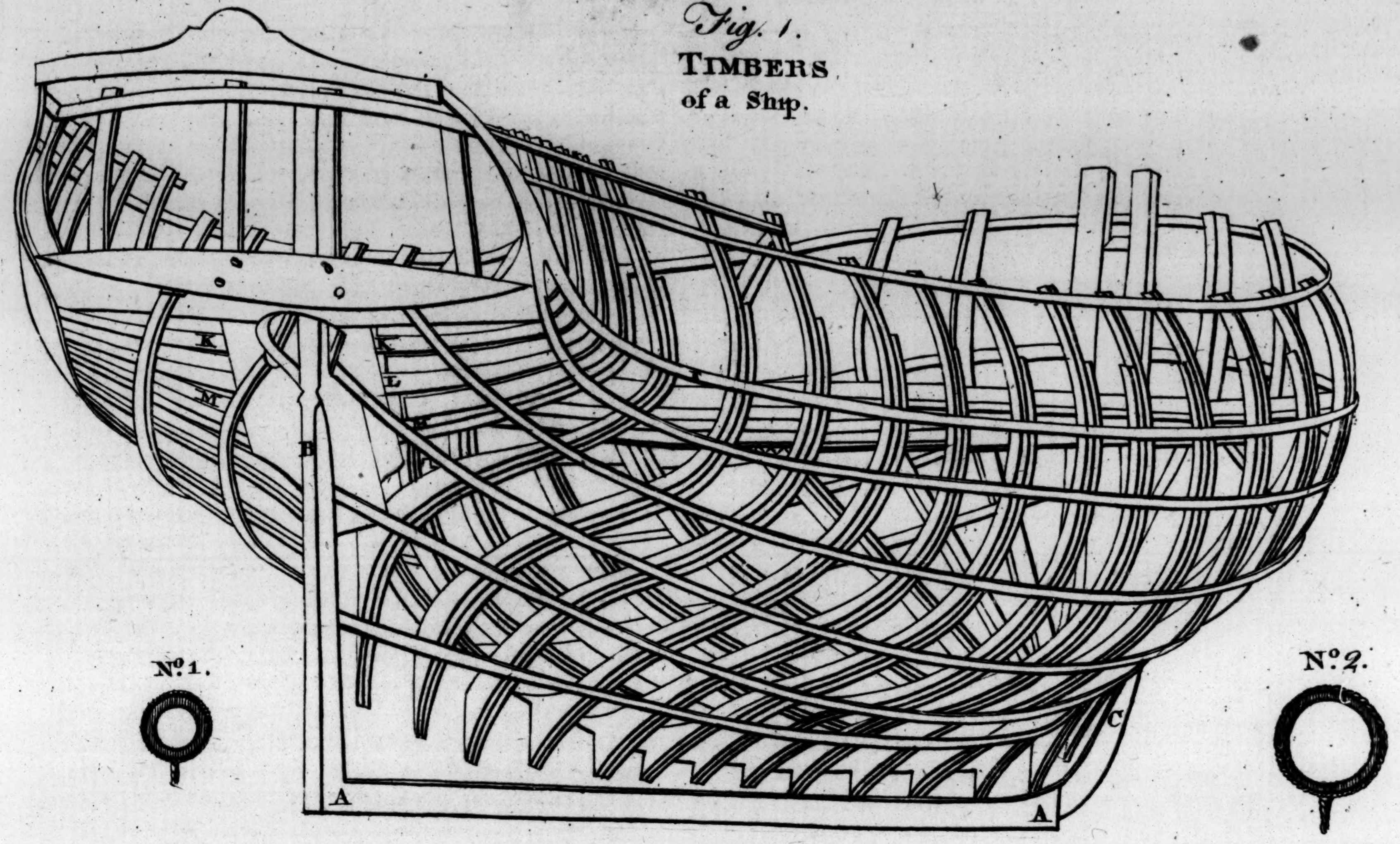
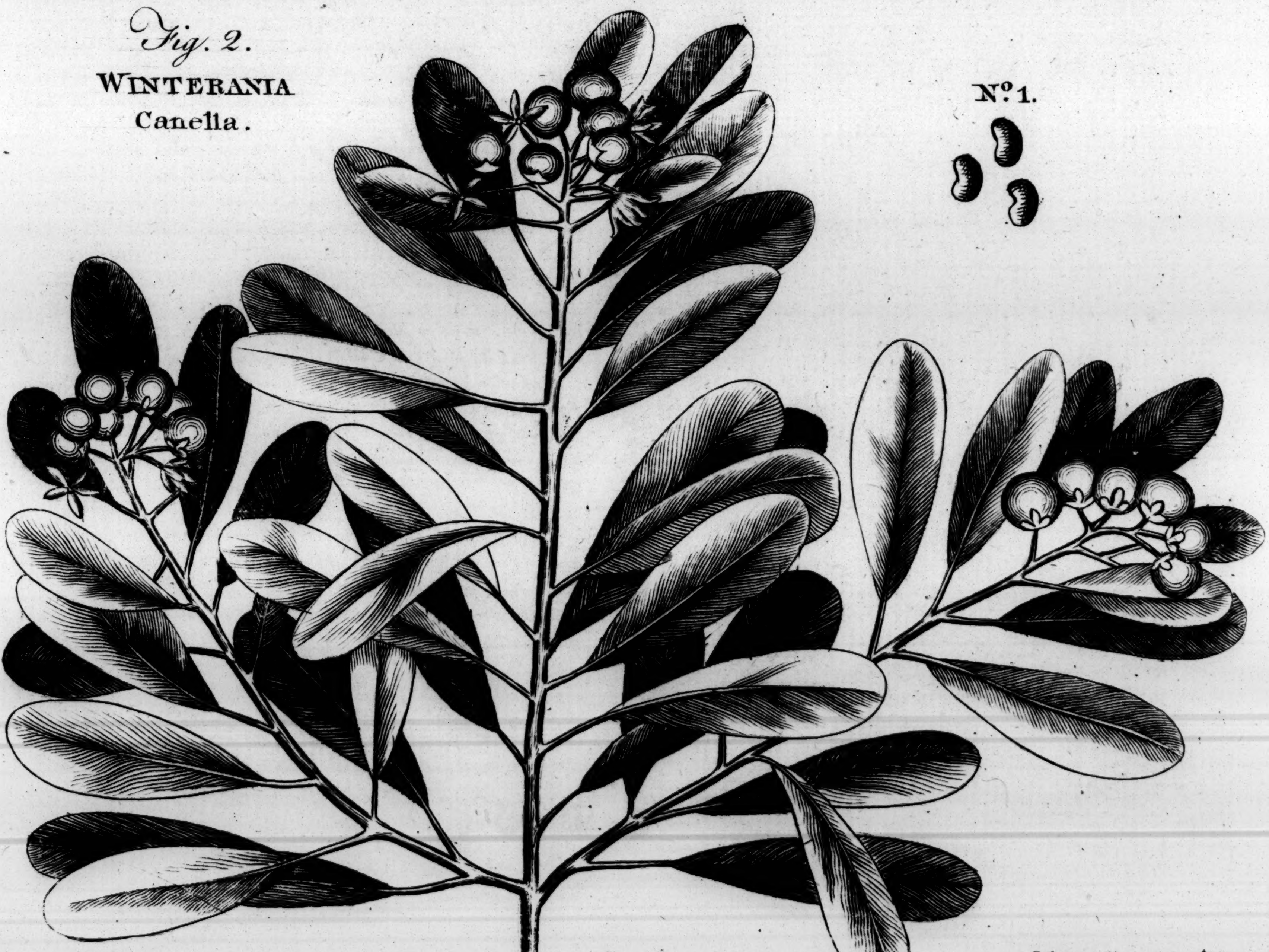

K
L
M
I
B
A
A
C
N°1.
N°2.

Fig. 2.
WINTERANIA
Canella.



A. Bell Sculp^t

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motions the different values of notes are exactly regulated, according to the genius and character of the bar. It is a ſurpriſing phenomenon to obſerve with how much preciſion, by the aſſiſtance of a little habit and practice, initiates may be brought to follow and diſtinguiſh the times, with an equality ſo perfect, that no pendulum can vibrate more juſtly than the hand or foot of a good muſician, and that even the internal perception of this equality is ſufficient to conduct them and to anſwer with accuracy every purpoſe of ſenſible motion; ſo that, in a concert, every performer plays or ſings the bar with the utmoſt exactitude, without hearing the time diſtinguiſhed by any other, or diſtinguiſhing it himſelf any other ways than by the ſucceſſion of his own ideas.

Of the different times included in a bar, though all are equal, yet there are ſome more ſtrongly and ſenſibly marked than others. This diſtinction is expreſſed in execution by emphatic or accented notes, and by ſuch as are unaccented or common. The time which is thus more ſenſibly diſtinguiſhed is called the *perfect time;* that which is more feebly diſtinguiſhed, or which is occupied by unaccented notes, is called the *imperfect time.* (See Music, art. 174.) The perfect is the firſt of every bar, conſiſting of two times; it is the firſt and third of ſuch bars as include three or four times. The ſecond time is always imperfect in every bar, and it is the ſame caſe with the fourth in bars containing four times.

If every time be ſubdivided into two other equal parts, which may likewiſe be called *iſochronic* or *hemichronic times*, for the firſt part of this ſubdiviſion you will likewiſe have a perfect time, and for the ſecond an imperfect; and there is no part of any time which may not, according to Rouſſeau, be ſubdivided in the ſame manner.

Here, however, we muſt diſſent; and for this plain reaſon, that notes may be ſo minutely ſubdivided, as by the ſhortneſs of their duration to be rendered incapable of emphaſis; and we ſhould be glad to know how this author, either with his hand, his foot, or this thought, could diſtinguiſh the perfect and imperfect times of a demi-ſemiquaver.

Every note which begins in the imperfect and ends in the perfect time, is an antichronic note; and as it violates and ſhocks in ſome meaſure the order of the bar, its commencement in the middle of one time, and its continuation to another, is called *ſyncopation*.

Theſe obſervations are neceſſary to ſuch as would learn how they may employ diſſonances with ſucceſs. For every diſſonance properly introduced, ought to be prepared in the imperfect, and ſtruck in the perfect time: except, however, in ſucceſſions of cadences avoided, where this rule, though applicable to the firſt diſſonance, is not equally ſo to thoſe which ſucceed it. See Discord and Preparation.

Time-*Keepers*, or *Inſtruments for meaſuring Time.* See Clock, Dial, &c.

Time-*Keepers for finding the Longitude.* Gemma Friſius ſeems to have been the firſt who ſuggeſted the method of finding the longitude at ſea by means of watches or time-keepers; which machines were then, as he ſays, but lately invented. After him Metius, and ſome others, attempted it; but the ſtate of watch-making was then too imperfect for this purpoſe. The diſpute between Hooke and Huygens, concerning the invention and application of the pendulum-ſpring to watches, was long and violent: each of them claiming this curious and moſt uſeful invention, and repreſenting the other as a pirate. It is probable that their claims were each of them juſt; nor is this the only inſtance in which different perſons have made the ſame diſcovery, nearly about the ſame time. Hooke and Huygens, each of them, on making this diſcovery, applied it to the purpoſe of diſcovering the longitude at ſea. Some diſputes, however, between the former of thoſe gentlemen and the Engliſh miniſtry at that time, prevented the making any experiments with watches conſtructed by him; but many experiments were made with watches conſtructed by Mr Huygens, from which it appeared that thoſe watches were of no real uſe at ſea for this purpoſe. Dr Hooke never, as far as we know, made a full diſcovery of his inventions of this kind; but many hints are dropped in different parts of the Philoſophical Tranſactions, his Philoſophical Collections, and Cutlerian Lectures; of which later mechanics have undoubted availed themſelves.

In 1714, an act paſſed for giving 20,000l. to that perſon who ſhould firſt diſcover a method by which a ſhip might ſail from England to any port in the Weſt Indies, without having committed an error of 30′ in her longitude, on arriving at the ſaid port. The firſt who turned his thoughts this way, in conſequence of this public encouragement, was Henry Sully, an Engliſhman, but who had left England before the paſſing of this act: for in 1714 he printed, at Vienna, a ſmall tract on the ſubject of watch-making; and ſoon after he removed from thence and ſettled at Paris, where he ſpent the remainder of his life in improving time-keepers for the diſcovery of the longitude. In 1716 he preſented a watch of his own making to the Royal Academy of Sciences, which was much approved. It is particularly ſaid, that he had greatly diminiſhed the friction; and that what he had not taken entirely away, he had by a very ſingular addreſs rendered uniform. He went to Bourdeaux in 1726, for the convenience of trying his watches, and died there in 1728. The greater part of what is yet known of watch-making in France is principally to be attributed to him; for the famous Julien le Roy was his pupil, and owed moſt of his inventions to him, which he afterwards perfected and executed; and this gentleman, his ſon, and M. Berthoud, are the only perſons in France who have turned their thoughts this way ſince the time of Sully. Several watches made by the two latter artiſts have been tried at ſea at the expence of the king of France, and very voluminous accounts of theſe trials have been publiſhed with great pomp; but the facts which are there related are ſo very few, and thoſe few enveloped in ſuch a volume of words, vague and indeterminate in their meaning, that it is ſcarcely poſſible to diſcover from thence what theſe watches are capable of performing.

M. Berthoud, in a pretty bulky pamphlet in 4to, has with great labour collected together a few of the principal facts which reſulted from the three laſt trials that were made of two time-keepers conſtructed by M. Le Roy, marked *A* and *S;* and of two of his own conſtruction, denominated N° 6. and N° 8. which are as follow:

June 8th, 1768, being then at Havre de Grace, M. Le Roy's time-keeper *A* loſt $1''\frac{1}{2}$ a-day on mean time; and *S* gained 4″ a-day. At the iſland of Miquelon, on the coaſts of Newfoundland, *A* was loſing at the rate of $0''\frac{2}{3}$ a-day, and *S* gaining about 10″ a-day on mean time. At Cadiz *S* gained on different days between the 16th and 30th of September $1''\frac{1}{2}$, $1''\frac{3}{4}$, 3″, $2''\frac{1}{4}$, $3''\frac{7}{8}$, $2''\frac{3}{4}$ and $6''\frac{1}{2}$ a-day on mean time: and *A* gained on the ſame day, reſpectively, 2″, $2''\frac{3}{4}$, $3''\frac{3}{4}$, $2''\frac{1}{2}$, $5''\frac{3}{8}$, $4''\frac{3}{4}$, and $14''\frac{5}{6}$ a-day. *A* gained on mean time, at Breſt, from the 4th of November to the 7th, at the rate of $7''\frac{1}{3}$ in 24 hours, and *S* at the rate of $5''\frac{1}{6}$.

In November 1768, the time-keepers, N° 6. and N° 8. made by M. Berthoud, were put to the trial in a voyage conducted by M. Fleurieu.

	N° 8 loſt per day.	N° 6 loſt per day.
Nov. 14th to Dec. 7th, at Rochford,	4″12	6″33
Dec. 22d to Jan. 18th, 1769, Iſle d'Aix,	5 09	4 80
March 1ſt to the 4th, at Cadiz,	8 54	5 61
April 13th to 18th, at St Jago,	11 61	7 81
May 11th to 14th, Martinico,	13 47	4 17
June 7th to the 11th, at St Domingo,	14 42	7 94
July 25th to the 31ſt, at Tercera,	16 75	12 78
Aug. 18th to the 21ſt, at Teneriffe,	19 27	14 05
Oct. 4th to the 10th, at Cadiz,	15 92	25 03
Nov. 1ſt to the 13th, at the Iſle of Aix,	18 60	25 10

In the month of October 1771, two watches made by M. Le Roy, marked *A* and *S*, and M. Berthoud's, N° 8. were again ſent out on trial under Meſſ. Verdun, Borda, and Pingre. *A* was the ſame watch which had been tried before by the Marquis de Courtanvaux and M. Caſſini; but that marked *S* was a new one. They had alſo with them a ſmall watch made by M. Le Roy, which, on account of its ſize and form, they called *La petite ronde:* but this did not anſwer at all. The performances of the other three were as follow:

	N° 8.	*Watch* A.	*Watch* S.
At Breſt, Oct. 10th to 26th, 1771,	Gain. 1″39	Loſt 2″14	Gain. 1″48
Cadiz, Nov. 21ſt to Decem. 1ſt,	Do. 0 50	Do. 1 00	Do. 1 38
St Crutz, Dec. 24th to Jan. 3d, 1772,	Do. 0 19	Gain. 0 44	Do. 2 63
Goree, 16th to 25th January,	Do. 1 46	Do. 1 44	Do. 1 67
Fort Royal, 17th to 26th Feb.	Do. 1 11	Do. 2 66	Do. 0 66
Fort Royal, 12th to 16th March,	———	Do. 4 19	Do. 1 12
Fort Royal, 28th Mar. to 7th Apr.	Do. 0 50	———	Do. 1 09
Cape François, 18th Mar. to 30th Apr.	Loſt 0 63	———	Do. 2 24
Miquelon, 30th May to 4th June,	Do. 3 00	———	Do. 9 00
Patrixfiord, 10th to 18th July,	Do. 4 72	———	Do. 8 22
Copenhagen, 20th Aug. to 4th Sept.	Gain. 0 51	———	Do. 7 01
Breſt, 10th to 17th October,	Do. 0 04	———	Do. 8 07

On the 17th of March the ſhip ſtruck on the Wilmington Rock, which lies off the iſland of Antigua; and the thermometer of compenſation for heat and cold of the watch A was broken by the ſhock, and the watch put entirely out of order. This accident was the cauſe of their putting back to Port Royal.

From this account it would appear, that M. Berthoud's time-keepers greatly exceed thoſe of M. Le Roy: but it ought perhaps to be obſerved, that this (N° 8.) is the only one of his making which has performed ſo well; and even this, on the former trial, did not go with any very great degree of regularity.

About the year 1726, Mr John Harriſon, whoſe name is now ſo well known on account of his time-keepers, began to apply himſelf to the conſtruction of them: and in the year 1736, one of them was tried on board his Majeſty's ſhips, in a voyage to and from Liſbon; in which trial it gave ſo much ſatisfaction, that he received public encouragement to proceed, and began to entertain hopes of obtaining the reward offered by the act of the 12th of Queen Anne; in order to which, he made three other time-keepers, every one of which was more accurate, and better adapted to the purpoſe of meaſuring time truly at ſea, than the former. The ſecond of theſe was finiſhed in 1739; and during the next ten years, its going was ſo much admired by the ingenious men of thoſe times, that the annual prize-medal, diſtributed by the Royal Society, for improvements in experimental philoſophy, was given to Mr Harriſon on St Andrew's day, 1749. Mr Harriſon did not finiſh his third machine until the year 1758; having then a fourth in conſiderable forwardneſs, and which he finiſhed in October 1761: this proved ſo much to his ſatisfaction, that he wrote immediately to the commiſſioners of the board of longitude, informing them that he was then ready to make the ultimate trial preſcribed by the above-mentioned act. Accordingly Mr William Harriſon, ſon of the inventor, embarked on board his Majeſty's ſhip Deptford, in November 1761, with this fourth time-keeper, on a voyage for Jamaica; and the longitude of the iſland, as ſhown by the time-keeper on his arrival there, differed but one minute and a quarter of the equator from the true longitude deduced from aſtronomical obſervations. The time-keeper alſo pointed out the longitudes of the ſeveral places which they ſaw in the courſe of the voyage, in a very exact manner. Mr Harriſon junior returned to England with the time-keeper, in the latter end of March 1762, and found that it had erred in the whole, from its ſetting out to its return to England, no more than $1'\,54''\frac{1}{2}$ in time, or $28\frac{5}{8}$ minutes of longitude.

Mr Harriſon now claimed the whole reward of 20,000l. offered by the act of the 12th of Queen Anne (1714); but ſome doubts ariſing in the minds of the commiſſioners concerning the true ſituation of the iſland of Jamaica, the manner in which the time at that place had been found, as well as at Portſmouth; and it being further ſuggeſted by ſome, that although the time-keeper happened to be right at theſe two times, namely when at Jamaica and on its return to England, it was by no means a proof that it had been always ſo in the intermediate times, another trial was propoſed in a voyage to the iſland of Barbadoes, in which precautions were taken to obviate as many of thoſe objections as poſſible. Accordingly, the commiſſioners having previouſly ſent out proper perſons to make aſtronomical obſervations at that iſland, which, when compared with other correſponding ones made in England, would determine beyond a doubt its true ſituation; Mr William Harriſon again ſet out with his father's time-keeper, in the latter end of the month of March 1764, the watch having been compared with equal altitudes before he ſet out at Portſmouth; and arrived at Barbadoes about the middle of May: where, on comparing it again with equal altitudes of the ſun, it was found to ſhow the difference of longitude between Portſmouth and Barbadoes 3^h 55′ 3″. The true difference of longitude between theſe places, reſulting from aſtronomical obſervations, is 3^h 54′ 20″: conſequently the error of the watch was 43″, or 10′ 45″ of longitude. The watch gained at the rate of 2″, 58 a-day on mean time, from February 29th to March 21ſt, at Portſmouth; and loſt at the rate of 2″, 8 a-day, from May 14th to May 17th, at Barbadoes.

In conſequence of this and the former trials, Mr Harriſon received a moiety of the reward offered by the act of the 12th of Queen Anne, on his explaining the principles by which his time-keeper was conſtructed, and delivering it, as well as the former three, up to the commiſſioners of the longitude for the uſe of the public. He was alſo promiſed the other moiety of the reward, when other time-keepers were made on the ſame principles, either by himſelf or others, which performed equally well with that which he had laſt made. This laſt time-keeper was alſo ſent down to the royal obſervatory at Greenwich, to be tried there under the direction of the Rev. Mr Maſkelyne, his Majeſty's aſtronomer royal. It did not appear, however, that during the time of this trial the watch went with the regularity that was expected; nor indeed with any thing near the regularity that it muſt actually have gone with during the courſe of the two voyages that had been made with it; which ſurpriſed many, and conveyed no favourable impreſſion of the general utility of this method of diſcovering the longitude at ſea; as it gave reaſons for apprehending that the performance, even of the ſame watch, was not at all times equal; and conſequently that little certainty could be expected in the performance of different ones. Moreover, the watch was now found to go faſter than it did during its voyage to and from Barbadoes, by about 18 or 19 ſeconds in 24 hours: but this circumſtance was accounted for by Mr Harrriſon, in a publication intitled, *Remarks on a Pamphlet lately publiſhed by the Rev. Mr Maſkelyne;* where he tells us, that not expecting the watch would be required of him ſo ſoon as it was, he had altered the rate of its going, by trying ſome experiments which he had not time to finiſh before he was ordered to deliver the watch up to the board. It is poſſible that the watch might be diſordered by theſe experiments, and that diſorder be the cauſe of its ſubſequent irregularity.

Soon after this trial, the commiſſioners of longitude agreed with Mr Kendall, one of the watchmakers appointed by them to receive Mr Harriſon's diſcoveries, to make another watch on the very ſame conſtruction with this, in order to determine whether other watchmakers could make them from the account which Mr Harriſon had given, as well as himſelf. The event proved the affirmative: for the watch produced by Mr Kendall, in conſequence of this agreement, went conſiderably better than that which had been made by Mr Harriſon himſelf: and indeed better than any which have been made ſince on other principles, this only excepted which is the ſubject of the account before us.

This watch, made by Mr Kendall on Mr Harriſon's conſtruction, was ſent out in the ſecond voyage which Captain Cook made towards the South Pole, and round the world, in the years 1772, 1773, 1774, and 1775, to be tried under the care of Mr Wales, who was employed by the board of longitude for that purpoſe: and it appears from his account, that this watch was loſing at the rate of $\frac{5}{8}$ of a ſecond a-day, from March the 24th to April 25th 1772, at the royal obſervatory at Greenwich. Auguſt 1ſt 1772, at the iſland of Madeira, latitude 32°$\frac{1}{2}$ N. longitude 17° W. it loſt at the rate of 1″, 77 a-day on mean time. At the Cape of Good Hope, latitude 33°$\frac{3}{4}$ S. longitude 18$\frac{1}{3}$ E. it gained at the rate of 1″, 2 a-day on mean time, from November 2d to the 14th, 1772; and the greateſt variation between the rates of its going on any two days was 5″, 4. At Duſky Bay, in New Zealand, latitude 45°$\frac{3}{4}$ S. longitude 166° E. the watch gained at the rate of 6″, 7 a-day, from the 6th of April to the 25th, 1773, and its greateſt variation was 3″, 6 from any one day to any other in that time. The watch gave the longitude of the iſland of Madeira 17° 6′$\frac{1}{3}$ W. which, for aught that is yet known to the contrary, is the exact longitude of that place. It made the longitude of the Cape of Good Hope 18° 12′$\frac{1}{4}$ E. which is about 11′ ſhort of the truth; and the longitude of Duſky Bay, in New Zealand, 163° 47′$\frac{1}{4}$ E. or too little by about 2° 15′$\frac{1}{4}$. But we ought, perhaps, with the perſon who had this watch then under his care, to obſerve, that in the compaſs of theſe 13 months the watch had paſſed through all climates, from the latitude of 51$\frac{1}{2}$ N. to 67° S. and over a ſpace nearly equal to the whole equatorial circumference of the earth. The only defect which appears to have been in this watch is, that its rate of going was continually accelerated; but in the three years and a half that it was under this trial, it never amounted to 14″$\frac{1}{2}$ a-day; for on its return to Greenwich, in the month of Auguſt 1775, it gained only 13″ a-day; and its greateſt rate during the voyage was at Fayal, one of the weſtern iſlands, where it gained at the rate of 13″, 5 a-day on mean time.

In conſequence of the going of this watch, the Houſe of Commons were pleaſed, in 1774, to order the other moiety of the reward offered by the act of the 12th of Queen Anne, to be given to Mr Harriſon: and to enact, that any other perſon who, by means of a time-keeper, the principles of which had not then been made public, ſhould enable a ſhip to keep her longitude during a voyage of ſix months, within 60 geographical miles, or a degree of a great circle, ſhould be entitled to a reward of 5000l.; that in caſe he could enable her to keep her longitude for the ſame time within 40 geographical miles, or two-thirds of a degree of a great circle, he ſhould be entitled to a reward of 7500l.; or to a reward of 10,000l. if he enabled her to keep it for that time, within 30 geographical miles, or half a degree of a great circle. This determination, however, ought clearly to have been in minutes of the equator; as it now is, it may be ſubject to numberleſs diſputes.

This reward was in 1780 claimed by Mr Arnold, who invented a new balance ſpring, with a compenſation for the effects of heat and cold in the balance.

It appears from this report of the going of Mr Arnold's watch, that the mean rate which it went at during the month of February 1779, was loſing 0″, 31 a-day on mean ſolar time: during the month of March, its mean daily loſs was 1″, 37: during the month of April, 1″, 38; during the month of May, 1″, 34; the month of June, 1″, 47; July 0″, 31; Auguſt 0″, 55. In the month of September it gained, on mean ſolar time, at the rate of 0″, 44 a-day; in October, at the rate of 0″, 38; at the rate of 0″, 04 in the month of November; and it loſt at the rates 0″, 50, 0″, 68, and 0″, 60, reſpectively, in the months of December 1779, January and February 1780. From hence it appears, that the parts of this machine which are to counteract the effects of heat and cold, are moſt exactly adjuſted; and perform their office with all the regularity that can ever be expected.

It further appears, that Mr Arnold has very happily adjuſted his balance, to go alike in the different poſitions that the watch may be put into: for we find, that when the watch was in an horizontal poſition, with the face upwards, it gained at the rate of 1″, 72 a day, on mean ſolar time; with the face downwards, it gained 2″, 83: in a vertical poſition, with the hour XII. upwards, it gained at the rate of 0″, 35 a-day; with the hour VI. higheſt, at the rate of 3″, 85 a-day; with the hour IX. higheſt, at the rate of 0″, 29 a-day; and with the hour III. higheſt, it loſt at the rate of 0″, 35 *per* day.—The greateſt difference between the rates at which the watch went on any two days in theſe 13 months, is 6″, 69; namely, between its rates on October 8th and December 26th. The greateſt difference between its rates of going on any day, and the next to it, is 4″, 11; namely, between the 26th and 27th of December. So that the greateſt error that it would have committed in the difference of longitude on any one day, would have been very little more than one minute; which, as Mr Arnold juſtly obſerves, is determining the longitude daily, to as great preciſion as the latitude can in general be determined.

If we take the mean rate which it went at during the month of February 1779, as a ſtandard rate with which we may compare its going for the following 12 months, we ſhall find that the greateſt error which it would have committed in the longitude ſhown by it, would have been 2′, 33″, 2, or 38′ 18″ in longitude: and this error happened about the end of ſix months, or in the beginning of September; for during theſe ſix months, the watch had all along gone ſlower than it did in the month of February, with which rate of going it is compared; but about the beginning of September it began rather to go faſter than it did in the month of February, and by that means began to leſſen its total error. And it continued to do ſo until the latter end of November, when it began again to go ſlower than it had done in the month of February, and of courſe to increaſe the quantity of its total error. And this it continued to do until the latter end of February 1780, when the error appeared again to be at a *maximum*, and equal to 2′ 6″, 6 in time, or 31′ 39″ of longitude. After this time it rather decreaſed to the end of the month.

Harriſon's TIME-*Keeper*. See LONGITUDE, and the preceding article.

TIMOLEON, a celebrated Corinthian general, who reſtored the Syracuſans to their liberty, and drove the Carthaginians out of Sicily. See SYRACUSE, nº 50—54.

TIMON, ſurnamed *Miſanthropos*, or the *Man-hater*, a famous Athenian, who lived about 420 B. C. He was one day aſked, why he loved the young Alcibiades while he deteſted all the reſt of the human race? on which he replied, "It is becauſe I foreſee that he will be the ruin of the Athenians." He carefully avoided all ſorts of company; yet went one day to an aſſembly of the people, and cried with a loud voice, "That he had a fig-tree on which ſeveral perſons had hanged themſelves; but as he intended to cut it down, in order to build a houſe on the place where it ſtood, he gave them notice of it, that if any of them had a mind to hang themſelves, they muſt make haſte and do it ſpeedily." He had an epitaph engraved on his tomb, filled with imprecations againſt thoſe who read it. Shakeſpeare has formed an excellent tragedy on his ſtory.

TIMOR, an iſland of Aſia, in the Eaſt-Indian ſea, to the ſouth of the Moluccas, and to the eaſt of the iſland of Java, being 150 miles in length, and 37 in breadth. It abounds in ſandal-wood, wax, and honey; and the Dutch have a fort here. The inhabitants are Pagans, and are little better than ſavages; and ſome pretend they had not the uſe of fire many years ago.

TIMOTHEUS, one of the moſt celebrated poet-muſicians of antiquity, was born at Miletus, an Ionian city of Caria, 446 years B. C. He was cotemporary with Philip of Macedon and Euripides; and not only excelled in lyric and dithyrambic poetry, but in his performance upon the cithara. According to Pauſanias, he perfected that inſtrument, by the addition of four new ſtrings to the ſeven which it had before; though Suidas ſays it had nine before, and that Timotheus only added two, the tenth and eleventh, to that number. See LYRE.

With reſpect to the number of ſtrings upon the lyre of Timotheus: The account of Pauſanias and Suidas is confirmed in the famous ſenatus-conſultum againſt him, ſtill extant, preſerved at full length in Boethius. Mr Stillingfleet has lately given an extract from it, in proof of the ſimplicity of the ancient Spartan muſic. The fact is mentioned in Athenæus; and Caſaubon, in his notes upon that author, has inſerted the whole original text from Boethius, with corrections. The following is a faithful tranſlation of this extraordinary Spartan act of parliament. "Whereas Timotheus the Mileſian, coming to our city, has diſhonoured our ancient muſic, and, deſpiſing the lyre of ſeven ſtrings, has, by the introduction of a greater variety of notes, corrupted the ears of our youth; and by the number of his ſtrings, and the novelty of his melody, has given to our muſic an effeminate and artificial dreſs, inſtead of the plain and orderly one in which it has hitherto appeared; rendering melody infamous, by compoſing in the chromatic inſtead of the enharmonic: ———————— The kings and the ephori have therefore reſolved to paſs cenſure upon Timotheus for theſe things: and, farther, to oblige him to cut all the ſuperfluous ſtrings of his eleven, leaving only the ſeven tones; and to baniſh him from our city; that men may be warned for the future not to introduce into Sparta any unbecoming cuſtom."————]

The ſame ſtory, as related in Athenæus, has this additional circumſtance, That when the public executioner was on the point of fulfilling the ſentence, by cutting off the new ſtrings, Timotheus, perceiving a little ſtatue in the ſame place, with a lyre in his hand of as many ſtrings as that which had given the offence, and ſhowing it to the judges, was acquitted.

It appears from Suidas, that the poetical and muſical compoſitions of Timotheus were very numerous, and of various kinds. He attributes to him nineteen nomes, or canticles, in hexameters; thirty-ſix proems, or preludes; eighteen dithyrambics; twenty-one hymns; the poem in praiſe of Diana; one panegyric; three tragedies, the Perſians, Phinidas, and Laertes; to which muſt be added a fourth, mentioned by ſeveral ancient authors, called *niobe*, without forgetting the poem on the birth of Bacchus. Stephen of Byzantium makes him author of eighteen books of nomes, or airs, for the cithara, to eight thouſand verſes; and of a thouſand Προοιμια, or preludes, for the nomes of the flutes.

Timotheus died in Macedonia, according to Suidas, at the age of ninety-ſeven; though the Marbles, much better authority, ſay at ninety; and Stephen of Byzantium fixes his death in the fourth year of the 105th Olympiad, two years before the birth of Alexander the Great; whence it appears, that this Timotheus was not the famous player on the flute ſo much eſteemed by that prince, who was animated to ſuch a degree by his performance, as to ſeize his arms; and who employed him, as Athenæus informs us, together with the other great muſicians of his time, at his nuptials. However, by an inattention to dates, and by forgetting that of theſe two muſicians of the ſame name the one was a Mileſian and the other a Theban, they have been hitherto almoſt confounded.

TIMOTHY (St), the diſciple of St Paul, was the ſon of a Gentile: but his mother was a Jewiſh convert. St Paul wrote two epiſtles to him, which are acknowledged to be canonical. St Timothy was ſtoned at Epheſus for oppoſing the worſhip of Diana and the ſuperſtition of the Gentiles, at one of that goddeſs's feſtivals, about the year 109.

TIN, one of the ſeven perfect metals. See Chemistry, n° 150, 203, 246, 285, 406. See alſo Metallurgy.

This metal is found very plentifully in the ſouthern parts of Britain, particularly Cornwall, to which and Devonſhire the mines are now principally confined. Though in itſelf the lighteſt, it is in its ore the heavieſt of all the metals. It is very ſeldom, if ever, found pure, and the appearances of its ore are very different. The fineſt and richeſt are ſtyled *tin grains*, or *corns of tin*, being cryſtals of a black colour of different ſizes. It is alſo found in an heavy black ſtone, ſometimes in a more porous yellow-coloured one, and is commonly intermixed with ſpar, arſenic, &c. Tin-mines are generally found on the ſides of the hills, though veins ſometimes paſs through valleys or brooks between two hills, and may be traced to the oppoſite hill. The miners work with the utmoſt difficulty through hard rocks from three to 70 fathoms depth; and it is no leſs troubleſome, as well as dangerous, where the earth is looſe and apt to crumble. The veins are of an uncertain thickneſs; from three inches to three feet. Tin grains or corns of tin yield five parts in eight of metal; whereas tin ſtones yield only from one in 30 to one in 60, and to one in 120; for theſe laſt are alſo wrought with ſome ſmall profit. After melting it is called *black tin*; but before it can be expoſed to ſale it is carried to one of the five coinage-towns, where, after examination of a piece that is broke from the corner of a block, the arms of the duchy of Cornwall are impreſſed with an hammer, and then it is called *white tin*. The duty on coinage, which is four ſhillings on the hundred-weight, belongs to the prince of Wales as duke of Cornwall, and produces a revenue of upwards of 10,000 l. *per annum*.

TINDAL (Dr Matthew), a famous Engliſh writer, was the ſon of the reverend Mr John Tindal of Beer-Ferres in Devonſhire, and was born about the year 1657. He ſtudied at Lincoln college in Oxford, whence he removed to Exeter, and was afterwards elected fellow of All Souls. In 1685 he took the degree of doctor of law, and in the reign of James II. declared himſelf a Roman Catholic; but ſoon renounced that religion. After the Revolution he publiſhed ſeveral pamphlets in favour of government, the liberty of the preſs, &c. His "Rights of the Chriſtian Church aſſerted," occaſioned his having a violent conteſt with the high-church clergy, and his treatiſe "Chriſtianity as old as the Creation," publiſhed in 1730, made much noiſe, and was anſwered by ſeveral writers, particularly by Dr Conybeare, Mr Forſter, and Mr Leland. Dr Tindal died at London in Auguſt 1733. He left in manuſcript a ſecond volume of his "Chriſtianity as old as the Creation;" the preface to which has been publiſhed. Mr Pope has ſatyrized Dr Tindal in his Dunciad.

TINDALE, or Tyndale. See Tyndale.

TINE. There are two rivers of this name; the one called *North Tine*, which riſes on the borders of Scotland; and the other called *South Tine*, which riſes on the confines of Cumberland; the one running ſouth-eaſt, and the other north-eaſt. They unite their waters at Hexham; and continuing to run eaſt, divide the counties of Durham and Northumberland, paſſing by Newcaſtle, and falling into the German ſea at Tinmouth.

TINNING, the covering or lining any thing with melted tin, or tin reduced to a very fine leaf. Looking-glaſſes are foliated or tinned with thin plates of beaten tin, the whole bigneſs of the glaſs, applied or faſtened thereto by means of quickſilver. See Foliating.

TINNITUS aurium, a noiſe in the ears like the continued ſound of bells, very common in many diſorders, particularly in nervous fevers.

TINTORETTO, ſo called from being the ſon of a dyer, but whoſe proper name was *Giacomo Robuſti*; was an excellent painter, born at Venice in 1512. He was a diſciple of Titian; who having obſerved ſomething extraordinary in his genius, diſmiſſed him from his family, for fear he ſhould become his rival: yet he adhered to Titian's manner of colouring as the moſt natural, while he ſtudied Michael Angelo's guſto of deſigning as the moſt correct. He was called the *Furious Tintoret*, from his bold manner of painting, with ſtrong lights and deep ſhadows; from the rapidity of his genius; and from his grand vivacity of ſpirit, ſo much admired by Paul Veroneſe. Venice was the place of his conſtant abode, where he was made a citizen, and was wonderfully beloved: he died in 1594. Tintoret had a ſon and a daughter, both of whom excelled in the art of painting; his daughter Maria eſpecially, who was eminent for an admirable ſtyle in portraits, and for her muſical talents. She married a German, and died in 1530. Dominico his ſon gave great hopes in his youth of being a conſiderable portrait-painter; but fell ſhort by neglecting his talents: he died in 1637.

TIPPERARY, a county of the province of Munſter in Ireland, bounded on the weſt by that of Limerick and the river Shannon, on the eaſt by the county of Kilkenny, on the ſouth by the counties of Cork and Waterford, and on the north and north-eaſt by King's-county and the territory of the ancient O'Carrols. It extends about 60 miles in length, 36 in breadth, containing 599,500 acres, divided into 14 baronies, in which are ſeveral market-towns and boroughs. It ſends eight members to parliament, viz. two for the county, two for the city of Caſhel, and two for each of the boroughs of Clonmell, Fethard, and Thurles. The north part of it is mountainous and cold; but in the ſouth the air is milder, and the ſoil much more fertile, producing plenty of corn, and good paſture for the numerous herds of cattle and flocks of ſheep with which it abounds. The north part is called *Ormond*, and for a long time gave the title of *earl*, and afterwards of *marquis* and *duke*, to the noble family of Butler, deſcended from a ſiſter of Thomas a Becket archbiſhop of Canterbury, till, at the acceſſion of George I. the laſt duke was attainted of high-treaſon, and died abroad. In that part of the county, the family had great prerogatives and privileges granted them by Edward III. Another diſtrict in this county was anciently called the *county of the Holy Croſs of Tipperary*, from a famous abbey in it ſtyled *Holy Croſs*, on account of a piece of Chriſt's croſs that was ſaid to be preſerved there. This abbey and diſtrict enjoyed alſo ſpecial privileges in former times. The remains of the abbey, or rather the ſpot where it ſtood, are ſtill held in great veneration, and much reſorted to by the Roman Catholics.

TIPSTAFF, an officer who attends the judges with a kind of ſtaff tipped with ſilver, and takes into his charge all priſoners who are committed or turned over at a judge's chambers.

TIPULA, the CRANE-FLY; a genus of inſects belonging to the order of diptera. The mouth is a prolongation of the head; the upper-jaw is arched. They have two palpi, which are curved, and longer than the head. The proboſcis is ſhort, and bends inwards. They are divided into two families. 1. Thoſe with wings diſplayed. 2. Thoſe with wings incumbent, and which in form reſemble a gnat.

This two-winged inſect is often taken for the gnat, which it reſembles, but has not its miſchievous inſtinct, nor its murderous proboſcis. The larger tipulæ go by the name of *ſempſtreſſes*, the ſmall ones by that of *culiciform*; which latter, in fine ſummer-evenings, flutter about the water-ſide in legions, through which a perſon may paſs on his way unhurt. The ſhrill noiſe they make with their wings is not very diſcernible. Tipulæ, before they become inhabitants of the air, creep under the form of grubs. Thoſe which turn to larger tipulæ dwell in holes of decayed willows, in the dampeſt places, where they change into chryſalids, and in that ſtate have the faculty of breathing through two ſmall curve horns; beſides which they are endowed with progreſſive motion, but not retrogreſſive, being impeded by little ſpines placed on every ring of the abdomen. When the ſhroud is torn, the inſect, prettily apparelled, eſcapes from his gloomy habitation by means of his wings, which often are variegated, and takes his paſtime in the fields. Its long legs, and its wings, mutually aſſiſt each other when it either walks or flies. The larvæ and chryſalids of the little tipulæ are found in water. They are various in colour, form, and carriage; ſome being grey, others brown, and others red; ſome, like the polypus, furniſhed with a pair of arms; ſeveral with cylindrical tubes that perform the office of vent-holes. Theſe ſwim with nimbleneſs; thoſe never leave the holes they have dug themſelves in the banks of rivulets. Laſtly, others make a ſilken cod that receives part of their body; but all of them, after a period, renounce their reptile and aquatic life, and receive wings from the hands of nature. Their frame is then ſo weak, that a touch is enough to cruſh them. They are ſometimes of a beautiful green, ſometimes coal-black; and the moſt remarkable are thoſe whoſe fore-legs, extraordinarily long, do not touch the ground, and are moveable like antennæ. In this ſtate of perfection, the tipulæ being provided with proper organs, apply themſelves to the propagation of the ſpecies. Thoſe ſame poor inſects, who in the ſtate of larvæ have eſcaped the voraciouſneſs of fiſhes, often become, in their progreſs through the air, a prey to equally mercileſs birds.

TIRE, in the ſea-language, is a row of cannon placed along a ſhip's ſide, either above upon deck, or below, diſtinguiſhed by the epithets of *upper* and *lower tires*.

TIRESIAS, a famous ſoothſayer of antiquity, was the ſon of Everes and the nymph Chariclo. Pherecydes ſays, that Minerva being accidentally ſeen by Tireſias, as ſhe was bathing with Chariclo in the fountain of Hippocrene, the goddeſs was enraged, and declared that he ſhould ſee nothing more, on which he inſtantly loſt his ſight: but afterwards received from the goddeſs ſuperior endowments. Others ſay, that Juno ſtruck him ſtone-blind for deciding a caſe between Jupiter and her, to her diſſatisfaction; for which Jupiter gave him the faculty of divination: He was the moſt celebrated prophet in the Grecian annals. Ulyſſes is ordered by Circe to conſult him in the ſhades.

> There ſeek the Theban bard depriv'd of ſight,
> Within irradiate with prophetic light.

But, beſides the honour done to him by Homer, Sophocles makes him act a venerable and capital part in his tragedy of Oedipus. Callimachus aſcribes to Minerva the gift of his ſuperior endowments; the pre-eminence of his knowledge is likewiſe mentioned by Tully in his firſt book of Divination. And not only Tireſias is celebrated by Diodorus Siculus, but his daughter Daphne, who, like her father, was gifted with

Tirol.

a prophetic ſpirit, and was appointed prieſteſs at Delphos. She wrote many oracles in verſe, from whence Homer was reported to have taken ſeveral lines, which he interwove in his poems. As ſhe was often ſeized with a divine fury, ſhe acquired the title of *ſibyl*, which ſignifies "enthuſiaſt." She is the firſt on whom it was beſtowed: in after-times this denomination was given to ſeveral other females that were ſuppoſed to be inſpired, and who uttered and wrote their predictions in verſe; which verſe being ſung, their function may be juſtly ſaid to unite the prieſthood with prophecy, poetry, and muſic.

TIROL, or Tyrol, a county of Auſtria, under which may be included the territories belonging to the biſhops of Brixen, Trent, and Chur, Teutonic Order, and the prince of Deitrichſtein, the Auſtrian ſeigniories before the Arlberg, and the Auſtrian diſtricts in Swabia.

This county, with regard to the face of it, is very mountainous. Of theſe mountains, ſome have their tops always buried in ſnow; others are covered with woods, abounding with a variety of game; and others are rich in metals, and marble of all colours. Of the lower, ſome yield plenty of corn, others wine, and woods of cheſnut trees. The valleys are exceeding fertile alſo, and pleaſant. In ſome places conſiderable quantities of flax are raiſed, in others there is a good breed of horſes and horned cattle; and, among the mountains, abundance of chamois and wild goats. In this country are alſo found precious ſtones of ſeveral ſorts, as granates, rubies, amethyſts, emeralds, and a ſpecies of diamonds, agates, cornelians, chalcedonies, malachites, &c. nor is it without hot-baths, acid waters, ſalt-pits, mines of ſilver, copper, and lead, mineral colours, alum, and vitriol. The principal river of Tyrol is the Inn, which after traverſing the country, and receiving a number of leſſer ſtreams into it, enters Bavaria, in which, at Paſſau, it falls into the Danube. The men here are very tall, robuſt, and vigorous; the women alſo are ſtout, and generally fair: and both ſexes have a mixture of the Italian and German in their tempers and characters. As there is little trade or manufacture in the country, except what is occaſioned by the mines and ſalt-works, many of the common people are obliged to ſeek a ſubſiſtence elſewhere. A particular kind of ſalutation is uſed all over Tyrol. When a perſon comes into a houſe, he ſays, "Hail! Jeſus Chriſt:" the anſwer is, "May Chriſt be praiſed, and the Holy Virgin his mother." Then the maſter of the houſe takes the viſitor by the hand. This ſalutation is fixed up in print at all the doors, with an advertiſement tacked to it, importing, that pope Clement XI. granted an hundred days indulgence, and a plenary abſolution, to thoſe who ſhould pronounce the ſalutation and anſwer, as often as they did it. The emperor has forts and citadels ſo advantageouſly ſituated on rocks and mountains all over the country, that they command all the valleys, avenues, and paſſes that lead into it. The inhabitants, however, to keep them in good humour, are more gently treated, and not ſo highly taxed as thoſe of the other hereditary countries. As to the ſtates they are much the ſame in this country as in the other Auſtrian territories, except that the peaſants here ſend deputies to the diets. Tyrol came to the houſe of Auſtria in the year 1363, when Margaret, counteſs thereof, bequeathed it to her uncles the dukes of Auſtria. The arms of Tyrol are an eagle gules, in a field argent. The counts of Trap are hereditary ſtewards; the lords of Gloſz, chamberlains; the princes of Trautſon, marſhals; the counts of Wolkenſtein, maſters of the horſe and carvers; the houſe of Spaur, cup-bearers; the counts of Kunigl, ſewers and rangers; the counts of Brandis, keepers of the jewels; the houſe of Welſperg, purveyors and ſtaff-bearers; and the counts of Coalto, falconers. Beſides the governor, here are three ſovereign colleges, ſubordinate to the court at Vienna, which ſit at Inſpruck, and have their different departments. Towards the expences of the military eſtabliſhment of this county, the proportion is 100,000 florins yearly; but no more than one regiment of foot is generally quartered in it.

Titan, Tithes.

Tyrol is divided into ſix quarters, as they are called, namely, thoſe of the Lower and Upper Innthal, Vintſgow, Etch, Eiſack, and Puſterthal.

TITAN, in fabulous hiſtory, the ſon of Cœlus and Terra, and the eldeſt brother of Saturn, ſuffered the latter to enjoy the crown, on condition that he ſhould bring up none of his male iſſue, by which means the crown would at length revert to him; but Jupiter being ſpared by the addreſs of Rhea, Saturn's wife, Titan and his children were ſo enraged at ſeeing their hopes fruſtrated, that they took up arms to revenge the injury; and not only defeated Saturn, but kept him and his wife priſoners, till he was delivered by Jupiter, who defeated the Titans; when from the blood of theſe Titans ſlain in the battle, proceeded ſerpents, ſcorpions, and all venomous reptiles. See Saturn.

TITHES, in eccleſiaſtical law, are defined to be the tenth-part of the increaſe, yearly ariſing and renewing from the profits of lands, the ſtock upon lands, and the perſonal induſtry of the inhabitants: the firſt ſpecies being uſually called *predial*, as of corn, graſs, hops, and wood; the ſecond *mixed*, as of wool, milk, pigs, &c. conſiſting of natural products, but nurtured and preſerved in part by the care of man; and of theſe the tenth muſt be paid in groſs: the third *perſonal*, as of manual occupations, trades, fiſheries, and the like; and of theſe only the tenth-part of the clear gains and profits is due.

We ſhall, in this article, conſider, 1. The original of the right of tithes. 2. In whom that right at preſent ſubſiſts. 3. Who may be diſcharged, either totally or in part, from paying them.

1. As to their original, we will not put the title of the clergy to tithes upon any divine right; though ſuch a right certainly commenced, and we believe as certainly ceaſed, with the Jewiſh theocracy. Yet an honourable and competent maintenance for the miniſters of the goſpel, is undoubtedly *jure divino*, whatever the particular mode of that maintenance may be. For, beſides the poſitive precepts of the New Teſtament, natural reaſon will tell us, that an order of men who are ſeparated from the world, and excluded from other lucrative profeſſions for the ſake of the reſt of mankind, have a right to be furniſhed with the neceſſaries, conveniences, and moderate enjoyments of life, at their expence; for whoſe benefit they forego the uſual means of providing them. Accordingly all municipal laws have provided a liberal and decent maintenance for their national prieſts or clergy: ours, in

particular, have eſtabliſhed this of tithes, probably in imitation of the Jewiſh law: and perhaps, conſidering the degenerate ſtate of the world in general, it may be more beneficial to the Engliſh clergy to found their title on the law of the land, than upon any divine right whatſoever, unacknowledged and unſupported by temporal ſanctions.

We cannot preciſely aſcertain the time when tithes were firſt introduced into this country. Poſſibly they were cotemporary with the planting of Chriſtianity among the Saxons by Auguſtin the monk, about the end of the ſixth century. But the firſt mention of them which we have met with in any written Engliſh law, is a conſtitutional decree, made in a ſynod held A. D. 786, wherein the payment of tithes in general is ſtrongly enjoined. This canon or decree, which at firſt bound not the laity, was effectually confirmed by two kingdoms of the heptarchy, in their parliamentary conventions of eſtates, reſpectively conſiſting of the kings of Mercia and Northumberland, the biſhops, dukes, ſenators, and people. Which was a few years later than the time that Charlemagne eſtabliſhed the payment of them in France, and made that famous diviſion of them into four parts; one to maintain the edifice of the church, the ſecond to ſupport the poor, the third the biſhop, and the fourth the parochial clergy.

The next authentic mention of them is in the *fœdus Edwardi et Guthruni*; or the laws agreed upon between king Guthrun the Dane, and Alfred and his ſon Edward the Elder, ſucceſſive kings of England, about the year 900. This was a kind of treaty between thoſe monarchs, which may be found at large in the Anglo-Saxon laws: wherein it was neceſſary, as Guthrun was a Pagan, to provide for the ſubſiſtence of the Chriſtian clergy under his dominion; and accordingly, we find the payment of tithes not only enjoined, but a penalty added upon non-obſervance: which law is ſeconded by the laws of Athelſtan, about the year 930. And this is as much as can certainly be traced out with regard to their legal original.

2. Upon the firſt introduction, though every man was obliged to pay tithes in general, yet he might give them to what prieſts he pleaſed; which were called *arbitrary conſecrations of tithes*; or he might pay them into the hands of the biſhop, who diſtributed among his dioceſian clergy the revenues of the church, which were then in common. But when dioceſes were divided into pariſhes, the tithes of each pariſh were allotted to its own particular miniſter; firſt by common conſent or the appointments of lords of manors, and afterwards by the written law of the land.

However, arbitrary conſecrations of tithes took place again afterwards, and became in general uſe till the time of king John. Which was probably owing to the intrigues of the regular clergy, or monks of the Benedictine and other rules, under archbiſhop Dunſtan and his ſucceſſors; who endeavoured to wean the people from paying their dues to the ſecular or parochial clergy, (a much more valuable ſet of men than themſelves), and were then in hopes to have drawn, by ſanctimonious pretences to extraordinary purity of life, all eccleſiaſtical profits to the coffers of their own ſocieties. And this will naturally enough account for the number and riches of the monaſteries and religious houſes which were founded in thoſe days, and which were frequently endowed with tithes. For a layman, who was obliged to pay his tithes ſomewhere, might think it good policy to erect an abbey, and there pay them to his own monks, or grant them to ſome abbey already erected: ſince for this donation, which really coſt the patron little or nothing, he might, according to the ſuperſtition of the times, have maſſes for ever ſung for his ſoul. But in proceſs of years, the income of the poor laborious pariſh-prieſts being ſcandalouſly reduced by theſe arbitrary conſecrations of tithes, it was remedied by pope Innocent III. about the year 1200, in a decretal epiſtle ſent to the archbiſhop of Canterbury, and dated from the palace of Lateran; which has occaſioned Sir Henry Hobart and others to miſtake it for a decree of the council of Lateran, held A. D. 1179, which only prohibited what was called the *infeodation of tithes*, or their being granted to mere laymen; whereas this letter of pope Innocent to the archbiſhop enjoined the payment of tithes to the parſons of the reſpective pariſhes where every man inhabited, agreeable to what was afterwards directed by the ſame pope in other countries. This epiſtle, ſays Sir Edward Coke, bound not the lay ſubjects of this realm; but being reaſonable and juſt, it was allowed of, and ſo became *lex terræ*. This put an effectual ſtop to all the arbitrary conſecrations of tithes; except ſome footſteps which ſtill continue in thoſe portions of tithes which the parſon of one pariſh hath, though rarely, a right to claim in another: for it is now univerſally held, that tithes are due, of common right, to the parſon of the pariſh, unleſs there be a ſpecial exemption. This parſon of the pariſh may be either the actual incumbent, or elſe the appropriator of the benefice: appropriations being a method of endowing monaſteries, which ſeems to have been deviſed by the regular clergy, by way of ſubſtitution to arbitrary conſecrations of tithes.

Lands and their occupiers may be exempted or diſcharged from the payment of tithes, either in part or totally, firſt, by a real compoſition; or, ſecondly, by cuſtom or preſcription.

Firſt, a real compoſition is when an agreement is made between the owner of the lands and the parſon or vicar, with the conſent of the ordinary and the patron, that ſuch lands ſhall for the future be diſcharged from payment of tithes, by reaſon of ſome land or other real recompenſe given to the parſon in lieu and ſatiſfaction thereof. This was permitted by law, becauſe it was ſuppoſed that the clergy would be no loſers by ſuch compoſition; ſince the conſent of the ordinary, whoſe duty it is to take care of the church in general, and of the patron, whoſe intereſt it is to protect that particular church, were both made neceſſary to render the compoſition effectual: and hence have ariſen all ſuch compoſitions as exiſt at this day by force of the common law. But experience ſhowing that even this caution was ineffectual, and the poſſeſſions of the church being by this and other means every day diminiſhed, the diſabling ſtatute 13 Eliz. c. 10. was made; which prevents, among other ſpiritual perſons, all parſons and vicars from making any conveyances of the eſtates of their churches, other than for three lives or 21 years. So that now, by virtue of this ſtatute, no real compoſition made ſince the 13 Eliz. is good for any longer term than three lives or 21 years, though made by conſent of the patron and ordinary: which has indeed effectually demoliſhed this kind of traffic; ſuch compoſitions being now rarely heard of, unleſs by authority of parliament.

Secondly, a diſcharge by cuſtom or preſcription, is where time out of mind ſuch perſons or ſuch lands have been, either partially or totally, diſcharged from the payment of tithes. And this immemorial uſage is binding upon all parties; as it is in its nature an evidence of univerſal conſent and acquieſcence, and with reaſon ſuppoſes a real compoſition to have been formerly made. This cuſtom or preſcription is either *de modo decimandi*, or *de non decimando*.

A *modus decimandi*, commonly called by the ſimple name of a *modus* only, is where there is by cuſtom a particular manner of tithing allowed, different from the general law of taking tithes in kind, which are the actual tenth-part of the annual increaſe. This is ſometimes a pecuniary compenſation, as twopence an acre for the tithe of land: ſometimes it is a compenſation in work and labour, as that the parſon ſhall have only the twelfth cock of hay, and not the tenth, in conſideration of the owner's making it for him: ſometimes, in lieu of a large quantity of crude or imperfect tithe, the parſon ſhall have a leſs quantity when arrived to greater maturity, as a couple of fowls in lieu of tithe-eggs, and the like. Any means, in ſhort, whereby the general law of tithing is altered, and a new method of taking them is introduced, is called a *modus decimandi*, or ſpecial manner of tithing.

A preſcription *de non decimando* is a claim to be entirely diſcharged of tithes, and to pay no compenſation in lieu of them. Thus the king by his prerogative is diſcharged from all tithes. So a vicar ſhall pay no tithes to the rector, nor the rector to the vicar, for *eccleſia decimas non ſolvit eccleſiæ*. But theſe perſonal privileges (not ariſing from or being annexed to the land) are perſonally confined to both the king and the clergy; for their tenant or leſſee ſhall pay tithes, tho' in their own occupation their lands are not generally tithable. And, generally ſpeaking, it is an eſtabliſhed rule, that in lay hands, *modus de non decimando non valet*. But ſpiritual perſons or corporations, as monaſteries, abbots, biſhops, and the like, were always capable of having their lands totally diſcharged of tithes by various ways: as, 1. By real compoſition. 2. By the pope's bull of exemption. 3. By unity of poſſeſſion; as when the rectory of a pariſh, and lands in the ſame pariſh, both belonged to a religious houſe, thoſe lands were diſcharged of tithes by this unity of poſſeſſion. 4. By preſcription; having never been liable to tithes, by being always in ſpiritual hands. 5. By virtue of their order; as the Knights Templars, Ciſtercians, and others, whoſe lands were privileged by the pope with a diſcharge of tithes. Though, upon the diſſolution of abbeys by Henry VIII. moſt of theſe exemptions from tithes would have fallen with them, and the lands become tithable again, had they not been ſupported and upheld by the ſtatute 31 Henry VIII. c. 13. which enacts, that all perſons who ſhould come to the poſſeſſion of the lands of any abbey then diſſolved, ſhould hold them free and diſcharged of tithes, in as large and ample a manner as the abbeys themſelves formerly held them. And from this original have ſprung all the lands which, being in lay hands, do at preſent claim to be tithe-free: for if a man can ſhow his lands to have been ſuch abbey-lands, and alſo immemorially diſcharged of tithes by any of the means before-mentioned, this is now a good preſcription *de non decimando*. But he muſt ſhow both theſe requiſites: for abbey-lands, without a ſpecial ground of diſcharge, are not diſcharged of courſe; neither will any preſcription *de non decimando* avail in total diſcharge of tithes, unleſs it relates to ſuch abbey-lands.

TITHING, (*Tithinga*, from the Sax. *Theothunge*, i. e. *Decuriam*), is in its firſt appointment the number or company of ten men with their families, held together in a ſociety, all being bound for the peaceable behaviour of each other; and of theſe companies there was one chief perſon, who was called *teothung-man*, at this day *tithing-man*: but the old diſcipline of tithings is long ſince left off. In the Saxon times, for the better conſervation of the peace, and more eaſy adminiſtration of juſtice, every hundred was divided into ten diſtricts or tithings; and within every tithing, the tithing-men were to examine and determine all leſſer cauſes between villages and neighbours; but to refer greater matters to the then ſuperior courts, which had a juriſdiction over the whole hundred.

TITHING-*Men*, are now a kind of petty conſtables, elected by pariſhes, and ſworn in their offices in the court-leet, and ſometimes by juſtices of the peace, &c. There is frequently a tithing-man in the ſame town with a conſtable, who is as it were a deputy to execute the office in the conſtable's abſence; but there are ſome things which a conſtable has power to do, that tithing-men and head-boroughs cannot intermeddle with. When there is no conſtable of a pariſh, the office and authority of a tithing-man ſeems to be all one under another name.

TITHONUS, in fabulous hiſtory, the ſon of Laomedon king of Troy, and the brother of Priamus; was beloved by Aurora, who carried him to Delos, thence to Ethiopia, and at laſt to heaven, where ſhe prevailed on the Deſtinies to beſtow upon him the gift of immortality; but forgot to add that of youth, which could only render the preſent valuable. At length Tithonus grew ſo old that he was obliged to be rocked to ſleep like an infant, when Aurora, not being able to put an end to his miſery by death, transformed him into a graſshopper; which renews its youth by caſting his ſkin, and in its chirping retains the loquacity of old age.

TITIANO, or TITIAN, the moſt univerſal genius for painting of all the Lombard ſchool, the beſt colouriſt of all the moderns, and the moſt eminent for hiſtories, portraits, and landſcapes, was born at Cadore, in the province of Friuli, in the ſtate of Venice, in 1477. His parents ſent him at ten years of age to one of his uncles at Venice, who finding that he had an inclination to painting, put him to the ſchool of Giovanni Bellino, where he greatly improved himſelf, by his endeavouring to excel Giorgone his fellow diſciple, and became the greateſt coloureſt ever known. He deſigned with much greater eaſe than Giorgone. Some of his women and children, ſays du Freſnoy, are admirable both for the deſign and colouring; they are in a delicate and noble guſto, with a certain pleaſing negligence of the head-dreſſes, draperies, and ornaments of the habits peculiar to him. However, the figures of his men are deſigned but moderately well, and ſome of their draperies are mean. His painting is wonderfully glowing, ſweet, and delicate. He made portraits that were extremely noble; the attitudes being very graceful, grave, and adorned after a becoming manner. Nobody ever painted landſcapes with ſo great a manner, ſo good a colouring, and with ſuch a reſemblance of nature. For eight or ten years he took the pains to copy with great exactneſs whatever he performed, in order to obtain an eaſy method, and to eſtabliſh ſome general maxims for his future conduct. Beſides his excellent guſto in colours, in which he excelled all mankind, he perfectly underſtood how to give every thing the touches moſt proper and ſuitable to it, ſuch as diſtinguiſh them from each other, and which give the greateſt ſpirit and the moſt of truth. He was, however, cenſured by Michael Angelo Buonaruoti for want of correctneſs in deſign, a fault common to all the Lombard painters who had not been acquainted with the antiques, yet that defect was abundantly ſupplied by his being maſter of all the other parts of an accompliſhed artiſt.

Titian made three portraits of the emperor Char. V. who honoured him with knighthood, created him count palatine, made all his deſcendants gentlemen, and aſſigned him a conſiderable penſion out of the chamber of Naples. It is ſaid this emperor one day took up a pencil that Titian dropped when drawing his picture; and that upon the compliment made him by the artiſt on this occaſion, he replied, "Titian deſerves to be ſerved by Cæſar." In ſhort, ſome of that emperor's courtiers being unable to conceal their jealouſy on the viſible preference he ſhowed to Titian's perſon and converſation, the emperor told them, That he could never want courtiers, though he might a Titian. He accordingly loaded him with wealth; and whenever he ſent him money, he did it with this obliging obſervation, That it was not to pay him the value of his pictures, becauſe that was above all price. Titian alſo painted that emperor's ſon Philip II. Solyman emperor of the Turks, three kings, two empreſſes, ſeveral queens, two popes, and almoſt all the princes of Italy; and ſo great was his reputation, that there was hardly a perſon of any eminence in Europe from whom he did not receive ſome marks of eſteem; for being of an obliging and generous temper, his houſe at Venice was the conſtant rendezvous of all the virtuoſi and people of quality. He was of ſo happy a conſtitution, that he was never ill till the year 1576, when he died of the plague, at 99 years of age. His diſciples were Paulo Veroneſe, Giacomo Tintoret, Giacomo de Ponte Baſſano, and his ſons.

Horatio, Titian's youngeſt ſon, painted ſeveral portraits that might ſtand in competition with thoſe of his father. He was alſo famous for many hiſtory-pieces, which he executed at Venice in concurrence with Paul Veroneſe and Tintoret: but, bewitched at laſt with alchemy, he laid aſide his pencil, and, in ſearch of the philoſophers's ſtone, converted all his paternal inheritance into ſmoke.

TITLE, an appellation of dignity or quality, given to princes and other perſons of diſtinction. Thus the title of his Britannic majeſty is, *King of Great Britain, France, and Ireland;* that of the French king is, *King of France and Navarre:* and ſo of others. The pope aſſumes the title of *Holineſs*, and the cardinals that of *Eminence*, &c.

Title, in law, denotes any right which a perſon has to the poſſeſſion of a thing; or an authentic inſtrument whereby he can prove his right. See the articles, Right, Property, &c.

Title *to the Crown in the Britiſh Conſtitution.* See Succession.

TITMOUSE, in ornithology. See Parus.

TITULAR, denotes a perſon inveſted with a title, in virtue of which he holds an office or benefice, whether he perform the functions thereof or not.

TITUS Vespasianus, the Roman emperor, the ſon of Veſpaſian; of whom it is related, that not being able to recollect any remarkable good action he had done on a certain day, he exclaimed, "I have loſt a day!" He might truly be called the *father of his people;* and though Rome laboured under various public calamities during his reign, ſuch was his equitable and mild adminiſtration, that he conſtantly preſerved his popularity. He was a great lover of learning, and compoſed ſeveral poems. He reigned but two years; and it is thought Domitian his brother poiſoned him, A. D. 81, aged 41. See (*Hiſtory of*) Rome.

TIVIOT, or Cheviot, hills, are high hills in the county of Northumberland in England.

TOAD, in zoology. See Rana.

Toad-*Fiſh*. See Lophius.

Toad-*Flax*, in botany. See Antirrhinum.

TOBACCO, in botany. See Nicotiana.

Tobacco-*Pipe-Fiſh*. See Fistularia.

TOBAGO, one of the Caribbee iſlands, ceded to Great Britain by the treaty of Paris in 1763, but taken by the French in the courſe of laſt war. It lies in the latitude of 11 degrees 10 minutes north, and 59 degrees 40 minutes longitude weſt from London, about 40 leagues ſouth-by-weſt from Barbadoes, 35 ſouth-eaſt from St Vincents, 20 ſouth-eaſt from Grenada, 12 north-eaſt from the Spaniſh iſland of Trinidada, and between 30 and 40 north-eaſt from the Spaniſh main. According to the lateſt accounts, it is ſomewhat more than 30 miles in length from north-eaſt to ſouth-weſt, between 8 and 9 in breadth, and from 23 to 25 leagues in circumference. The Engliſh viſited this iſland very early, Sir Robert Dudley being there in the reign of queen Elizabeth. In that of Charles I. William Earl of Pembroke procured a grant of this, with two other ſmall iſlands; but died before he was able to carry into execution his deſign of ſettling them. In A. D. 1632 ſome merchants of Zealand ſent over a ſmall colony thither, and gave it the name of *New Walcheren;* but before they were able thoroughly to eſtabliſh themſelves, they were deſtroyed by the Indians aſſiſted by the Spaniards. Ten years after, James Duke of Courland ſent a colony thither, who ſettled themſelves upon Great Courland bay, and made a conſiderable progreſs in planting. A. D. 1654, Meſſieurs Adrian and Cornelius Lampſins, two opulent merchants of Fluſhing, ſent a conſiderable number of people thither, who ſettled on the other ſide of the iſland, and lived in amity with the Courlanders until they learned that the king of Sweden had ſeized the perſon of their duke and diſpoſſeſſed him of his dominions, when they attacked and forced his ſubjects to ſubmit. The duke being afterwards reſtored, he obtained from Charles II. a grant, dated the 17th of November 1664, of this iſland. In the ſecond Dutch war the count d'Eſtrees, by order of his maſter, totally ruined it at the cloſe of the year 1677, and from that time it continued waſte till we took poſſeſſion of it after the treaty of Paris. The climate, notwithſtanding its vicinity to the line, is ſo tempered by the breezes from the ſea, as to be very ſupportable even to Europeans; and hath the ſame advantages with that of Grenada, in having regular ſeaſons, and alſo in being exempt from the hurricanes. There are throughout the iſland many riſing grounds, though, except at the north-eaſt extremity, there is no part of it that can be ſtyled mountainous, and even there the country is far from being rugged or impaſſable. The ſoil, if we may credit either Dutch or French writers, is as fertile and luxuriant as any of the iſlands, and very finely diverſified. Ground proviſions of all ſorts have been raiſed in great plenty, a vaſt variety of vegetables, excellent in their kind, ſome for food, ſome for phyſic. Almoſt every ſpecies of uſeful timber is to be found here, and ſome of an enormous ſize; amongſt others, the true cinnamon and nut-meg tree, as the Dutch confeſs, and of which none could be better judges; whole groves of ſaſſafras, and of trees that bear the true gum copal, with other odoriferous plants that render the air wholeſome and pleaſant. It is as well watered as can be wiſhed, with rivers that fall into the ſea on both ſides, many ſmaller ſtreams, and fine freſh ſprings in almoſt every part of the iſland. The ſea-coaſt is indented by 10 or 12 fair and ſpacious bays, and there are amongſt theſe one or two ports capable of receiving as large ſhips as ever viſited thoſe ſeas. There are wild hogs in great plenty, abundance of fowls of different kinds, and a vaſt variety of ſea and river fiſh. At the north-eaſt extremity lies Little Tobago, which is two miles long, and about half a mile broad, very capable of improvement.

TOBOLSKI, the capital of Siberia, is ſituated at the confluence of the rivers Tobol and Irtiſh, in N. Lat. 58. E. Long. 63. The city ſtands upon the aſcent of a high hill, the lower part of which is inhabited by Mahometan Tartars, who carry on a conſiderable traffic upon the river Irtiſh, and convey their merchandiſe quite acroſs Great Tartary, as far as China. The river Irtiſh is reckoned as rapid as the Danube; runs from the ſouth, and empties itſelf into the Oby: the Tobol waſhes the other ſide of the town, and a little below it falls into the Irtiſh. By means of theſe two rivers, there is a conſtant flow of merchandiſe into the city during the ſummer-ſeaſon. Tobolſki is therefore a great mart for the commodities of Muſcovy, Tartary, and other countries: and here is a great concourſe of merchants. All ſorts of proviſions are plentiful and cheap. An hundred weight of rice is ſold for ſixteen copecs, equal to about eightpence ſterling; a ſturgeon, weighing forty pounds, for half that money; an ox for two rix-dollars, and every other article in proportion: the adjacent country abounds with game in great variety. The ſupreme court of judicature for all Siberia is held in this city, which is alſo the ſeat of a metropolitan, ſent hither from Moſcow to exerciſe ſpiritual juriſdiction over the whole kingdom. Tobolſki is well fortified, and defended by a ſtrong garriſon, under the command of the waiwode, who reſides in the place, and takes charge of the fur tribute, which is here depoſited in proper magazines. This governor enjoys a very extenſive command, and can occaſionally bring into the field nine thouſand men, beſides a ſtrong body of Tartars on horſeback, to make head againſt the Khalmucks and Coſſacks, in their repeated incurſions. A ſufficient number of Ruſſians, called *Jemſkoiks*, are kept in continual pay by the government, on the banks of the Irtiſh, to ſupply travellers on the czar's account with men, boats, or carriages, to convey them as far as Surgut on the Oby, a voyage of two hundred leagues by water. This is the common method of travelling in the ſummer; but in winter the journey by land is not half ſo long, being performed in ſleds over the ice and ſnow, with which the country is covered. Theſe ſleds are moved by a pair of dogs, which will draw a load of three hundred pounds with ſurpriſing expedition. They are hired at eaſy rates, and during one half of the year may be ſeen flying over the ſnow in great numbers.

TOCKAY, a very ſtrong town of Upper Hungary, in the county of Zimplin, with a caſtle. It is noted for its excellent wine, which is produced but in one vineyard, inſomuch that it is ſcarce at Vienna itſelf; ſo that it is no wonder to find other wines often ſold for it. Some diſtance from the town are large ſalt-works. It is ſeated at the confluence of the rivers Bodrag and Teiſſe. E. Long. 21. 5. N. Lat. 48. 0.

TODDY. See Arack.

TOGA, in Roman antiquity, a wide woollen gown or mantle; which ſeems to have been of a ſemicircular form, without ſleeves; differing both in richneſs and largneſs, according to the circumſtances of the wearer, and uſed only upon occaſion of appearing in public.

Every body knows that the toga was the diſtinguiſhed mark of a Roman: hence, the *jus togæ*, or privilege of a Roman citizen; *i. e.* the right of wearing a Roman habit, and of taking, as they explain it, fire and water through the Roman empire.

TOISE, a French meaſure containing ſix of their feet, or a fathom.

TOLAND (John), a very famous writer, was born near Londonderry in Ireland, 1670, and educated in the Popiſh religion; but at ſixteen years of age embraced the principles of the Proteſtants. He ſtudied three years at the univerſity of Glaſgow; was created maſter of arts in the univerſity of Edinburgh; and afterwards completed his ſtudies at Leyden, where he reſided two years. He then went to Oxford, where, having the advantage of the public library, he collected materials upon various ſubjects, and compoſed ſome pieces, among which was, A Diſſertation to prove the received hiſtory of the tragical death of Atilius Regulus, the Roman conſul, to be a fable. He began likewiſe a work of greater conſequence, in which he undertook to ſhow that there are no myſteries in the Chriſtian religion. He publiſhed it in 1696 at London, under the title of *Chriſtianity not myſterious*. This book gave great offence, and was attacked by ſeveral writers. He afterward wrote in favour of the Hanoverian ſucceſſion, and many other pieces. In 1717 he went into Germany, where he viſited

Toledo, Toleration.

ſited ſeveral courts; and in 1710 he was introduced to prince Eugene, who gave him ſeveral marks of his generoſity. Upon his return to England he was for ſome time ſupported by the liberality of the earl of Oxford lord-treaſurer, and kept a country-houſe at Epſom; but ſoon loſing his lordſhip's favour, he publiſhed ſeveral pamphlets againſt that miniſter's meaſures. In the four laſt years of his life he lived at Putney, but uſed to ſpend moſt part of the winter in London. Mr Toland died at London in 1722. He was a man of uncommon abilities, publiſhed a number of curious tracts, and was perhaps the moſt learned of all the infidel writers: but his private character was far from being an amiable one; for he was extremely vain, and wanted thoſe ſocial virtues which are the chief ornaments as well as duties of life. His poſthumous works, 2 vols 8vo, were publiſhed in 1726, with an account of his life and writings, by Mr Deſmaizeaux.

TOLEDO, an ancient and trading city of Spain in New Caſtile, of which it was formerly the capital. It is advantageouſly ſeated on the river Tajo, which ſurrounds it on two ſides; and on the land-ſide it has an ancient wall built by a Gothic king, and flanked with 100 towers. It is ſeated on a mountain, which renders the ſtreets uneven, and which are narrow; but the houſes are fine, and there are a great number of ſuperb ſtructures, beſides 17 public ſquares, where the markets are kept. The fineſt buildings are the royal caſtle and the cathedral church; which laſt is the richeſt and moſt conſiderable in Spain. It is ſeated in the middle of the city, joining to a handſome ſtreet, with a fine ſquare before it. Several of the gates are very large, and of bronze. There is alſo a ſuperb ſteeple extremely high, from whence there is a very diſtant proſpect. The Sagrariro, or principal chapel, is a real treaſury, in which are 15 large cabinets let into the wall, full of prodigious quantities of gold and ſilver veſſels, and other works. There are two mitres of ſilver gilt, ſet all over with pearls and precious ſtones, with three collars of maſſy gold, enriched in like manner. There are two bracelets and an imperial crown of the Virgin Mary, conſiſting of large diamonds and other jewels. The weight of the gold in the crown is 15 pounds. The veſſel which contains the conſecrated wafer is of ſilver gilt, as high as a man, and ſo heavy, that it requires 30 men to carry it; within it is another of pure gold enriched with jewels. Here are 38 religious houſes, moſt of which are worthy a traveller's notice, with many other ſacred buildings, a great number of churches belonging to 27 pariſhes, and ſome hoſpitals. Without the town are the remains of an amphitheatre, and other antiquities. It is an archbiſhop's ſee, has a famous univerſity, and ſeveral manufactories of ſilk and wool. It is very pleaſantly ſeated in E. Long. 3. 15. N. Lat. 43. 6.

TOLERATION, in matters of religion, is either civil or eccleſiaſtical. Civil toleration is an impunity and ſafety granted by the ſtate to every ſect that does not maintain doctrines inconſiſtent with the public peace: and eccleſiaſtical toleration is the allowance which the church grants to its members to differ in certain opinions, not reputed fundaments. See NONCONFORMISTS.

Toleration.

On the ſubject of religious toleration, we have the following obſervations in Dr Robertſon's hiſtory of Charles V. “Among the ancient heathens, all whoſe deities were local and tutelary, diverſity of ſentiments concerning the objects or rites of religious worſhip ſeems to have been no ſource of animoſity; becauſe the acknowledging veneration to be due to one God, did not imply a denial of the exiſtence or the power of any other god; nor were the modes and rites of worſhip eſtabliſhed in one country incompatible with thoſe which other nations approved and obſerved. Thus the errors in their ſyſtem of theology were of ſuch a nature as to be productive of concord; and notwithſtanding the amazing number of their deities, as well as the infinite variety of their ceremonies, a ſociable and tolerating ſpirit ſubſiſted almoſt univerſally in the Pagan world.

“But when the Chriſtian revelation declared one Supreme Being to be the ſole object of religious veneration, and preſcribed the form of worſhip moſt acceptable to him, whoever admitted its truth, held every other mode of religion to be abſurd and impious. Hence the zeal of the firſt converts to the Chriſtian faith in propagating its doctrines, and the ardour with which they laboured to overturn every other form of worſhip. They employed, however, for this purpoſe, no methods but ſuch as ſuited the nature of religion. By the force of powerful arguments, they convinced the underſtandings of men; by the charms of ſuperior virtue, they allured and captivated their hearts. At length the civil power declared in favour of Chriſtianity, and though numbers, imitating the example of their ſuperiors, crowded into the church, many ſtill adhered to their ancient ſuperſtitions. Enraged at their obſtinacy, the miniſters of religion, whoſe zeal was ſtill unabated, though their ſanctity and virtue were much diminiſhed, forgot ſo far the nature of their own miſſion, and of the arguments which they ought to have employed, that they armed the imperial power againſt theſe unhappy men; and as they could not perſuade, they tried to compel them to believe.

“At the ſame time, controverſies concerning articles of faith multiplied, from various cauſes, among Chriſtians themſelves; and the ſame unhallowed weapons which had firſt been uſed againſt the enemies of their religion were turned againſt each other. Every zealous diſputant endeavoured to intereſt the civil magiſtrate in his cauſe, and each in his turn employed the ſecular arm to cruſh or to exterminate his opponents. Not long after, the biſhops of Rome put in their claim to infallibility in explaining articles of faith, and deciding points in controverſy; and, bold as the pretenſion was, they, by their artifices and perſeverance, impoſed on the credulity of mankind, and brought them to recognize it. To doubt or to deny any doctrine to which theſe unerring inſtructors had given the ſanction of their approbation, was held to be not only a reſiſting of truth, but an act of rebellion againſt their ſacred authority; and the ſecular power, of which, by various arts, they had acquired the abſolute direction, was inſtantly employed to avenge both.

“Thus Europe had been accuſtomed, during many centuries, to ſee ſpeculative opinions propagated or defended by force, the charity and mutual forbearance which Chriſtianity recommends with ſo much warmth, were forgotten, the ſacred rights of conſcience and of private judgment were unheard of; and not only the idea of toleration, but even the word itſelf, in the ſenſe now affixed to it, was unknown. A right to extirpate error by force, was univerſally allowed to be the prerogative of thoſe who poſſeſſed the knowledge of truth; and as each party of Chriſtians believed they had got poſſeſſion of this invaluable attainment, they all claimed, and exerciſed, as far as they were able, the rights which it was ſuppoſed to convey. The Roman Catholics, as their ſyſtem reſted on the deciſions of an infallible judge, never doubted that truth was on their ſide, and openly called on the civil power to repel the impious and heretical innovators who had riſen up againſt it. The Proteſtants, no leſs confident that their doctrine was well-founded, required with equal ardour the princes of their party to check ſuch as preſumed to impugn or oppoſe it. Luther, Calvin, Cranmer, Knox, the founders of the reformed church in their reſpective countries, inflicted, as far as they had power and opportunity, the ſame puniſhments which were denounced againſt their own diſciples by the church of Rome, on ſuch as called in queſtion any article in their creeds. To their followers, and perhaps to their opponents, it would have appeared a ſymptom of diffidence in the goodneſs of their cauſe, or an acknowledgment that it was not well-founded, if they had not employed in its defence all thoſe means which it was ſuppoſed truth had a right to employ.

"It was towards the cloſe of the 17th century, before toleration, under its preſent form, was admitted firſt into the republic of the United Provinces, and from thence introduced into England. Long experience of the calamities of mutual perſecution, the influence of free government, the light and humanity acquired by the progreſs of ſcience, together with the prudence and authority of the civil magiſtrate, were all requiſite in order to eſtabliſh a regulation ſo repugnant to the ideas which all the different ſects had adopted from miſtaken conceptions concerning the nature of religion and the rights of truth."

TOLOSA, a town of Spain, in the province of Biſcay, and capital of Guipuſcoa. It is not large, but it is the capital of the province. It is ſeated in a pleaſant valley, between two rivers, Araxes and Oria; over which there are two handſome bridges, and near them are ſeveral natural caſcades. W. Long. 2. 3. N. Lat. 43. 12.

TOLU, a town of South America, in Terra Firma, and in the government of Carthagena; famous for the fine balſam of Tolu, brought into Europe from thence, and produced from a tree like a pine. It is ſeated on a bay of the north ſea, 60 miles ſouth of Carthagena. W. Long. 72. 55. N. Lat. 9. 40.

TOLUIFERA, the BALSAM OF TOLU TREE; a genus of the monogynia order, belonging to the decandria claſs of plants. There is but one ſpecies, growing naturally near Carthagena in America, from whence the late Dr Houſtoun ſent the ſeeds to England: in its native place this grows to a tree of a large ſize. The bark is very thick, rough, and of a brown colour; the branches ſpread out wide on every ſide, and are garniſhed with winged leaves, compoſed of ſeveral oblong lobes, placed alternately along the footſtalk, terminated by an odd one, rounded at both ends, but run out to an acute point at the top; they are ſmooth, of a light-green colour, and ſit cloſe to the foot-ſtalk. The flowers are produced in ſmall bunches at the wings of the branches, each ſtanding upon a ſlender foot-ſtalk almoſt an inch long; their empalements are of the round bell-ſhape, being of one leaf, which is ſlightly ſcolloped at the brim into five obtuſe parts. The flower has four narrow petals of a yellow colour, which are a little longer than the empalement, and one more whoſe tail is of the ſame length with the other petals; the top is of an oval heart-ſhape, ſtretched out beyond the other parts; it has ten ſhort ſtamina within the tube of the flower, which are terminated by oblong erect ſummits, of a ſulphur colour; and at the bottom of the tube is ſituated a roundiſh germen, having a very ſhort ſtyle, crowned by an acute-pointed ſtigma. After the flower is paſt, the germen turns to a roundiſh fruit the ſize of a large pea, divided into four cells, each containing one oblong oval ſeed.—This tree may be propagated by ſeeds, which muſt be procured from the country where it grows naturally, and ſhould be freſh, otherwiſe they will not grow. When they are gathered from the tree, they ſhould be put up in ſand to preſerve them; for when they are ſent over in papers, the inſects generally devour them. Theſe ſeeds muſt be ſown in pots filled with light earth as ſoon as they arrive, and plunged into the tan. If it ſhould happen in autumn or winter, they ſhould be plunged into the ſtove; but in ſpring or ſummer, they may be plunged into the tan-bed under a frame; they ſhould be taken out of their covers, otherwiſe they will be long in the ground before they vegetate. When the plants come up, and are fit to remove, they ſhould be carefully tranſplanted, each into a ſeparate pot, and plunged into a good hot-bed of tanners bark, ſhading them from the ſun till they have taken new root; after which they ſhould be treated in the ſame way as the coffee-tree, with which management the plants will ſucceed.

TOMPION, a ſort of bung or cork uſed to ſtop the mouth of a cannon. At ſea this is carefully encircled with tallow or putty, to prevent the penetration of the water into the bore, whereby the powder contained in the chamber might be damaged or rendered incapable of ſervice.

TON, a meaſure or weight. See TUN.

TONE, or TUNE, in muſic, has ſeveral ſenſes.

1. It is moſt immediately taken for that interval which characterizes the diatonic ſyſtem or ſpecies, or what, in our language, we call a note played or ſung. In this acceptation there are two kinds of tones; viz. the *major tone*, whoſe proportion is as 8 to 9, and which reſults from the difference between the fourth and the fifth; and the *minor tone*, whoſe proportion is as 9 to 10, and which reſults from the difference between the third minor and the fourth.—The production of the major and that of the minor tone, are equally found beginning with *ut* at the ſecond *re*, which forms a fifth above *ſol*: for the quantity by which this *re* is ſuperior to the octave of the firſt *ut*, is exactly in the proportion of 8 to 9; and that by which the ſame *re* is inferior to *mi*, the third major of that octave, is in the proportion of 9 to 10.

2. That degree of elevation which is taken by voices or inſtruments for performing a piece of muſic, is likewiſe called the *tone* or *pitch*. It is in this ſenſe that

we ſay, in a concert, the *tone* is too high or too low.

3. Tone is taken for a rule of modulation with relation to a fundamental note or principal ſound, which is called the *tonic* or *key note*. See Tonic.

With reſpect to the tones of the ancients, may be conſulted Rouſſeau's Dictionary, at the word Mode.

As our modern ſyſtem contains in each octave 12 different notes or ſounds, which, relatively to that octave, are called *ſemi-tones;* each of theſe ſounds may ſerve for the fundamental of a tone, that is to ſay, may be its tonic. Theſe tones are already 12; but as the major and minor modes are applicable to each of them, upon theſe 12 there are 24 different modulations of which our muſic is ſuſceptible. See Modulation.

Theſe tones differ one from another by various degrees of elevation between the loweſt and higheſt, according as the tonic takes its ſtation. They differ alſo by the different alteration of ſounds and intervals produced in each tone by the temperament; ſo that, upon a harpſichord properly in tune, a practiſed ear recognizes any tone whatever whoſe modulation it hears; and theſe tones are equally recognized upon harpſichords, though tuned higher or lower ſome than others: which ſhows, that this diſcernment proceeds at leaſt as much upon the modification which every note receives from the whole chord, as upon the degree of elevation which the tonic occupies in the harpſichord.

From hence ariſes a ſucceſſion of varieties and beauties in modulation. From hence ariſes a wonderful diverſity and energy in the expreſſion. From hence ariſes, in ſhort, the power of exciting different feelings by ſimilar chords, when ſtruck in different tones. Would you produce the majeſtic, the grave? The F *ut fa*, and the major tones effectuated by a flat, will expreſs it nobly. Would you produce the gay and the cheerful? Take A *mi la*, D *la re*, the major tones effectuated by a ſharp. Would you produce ſuch ſtrains as are moving and tender? Take the minor tones effectuated by a flat. C *ſol ut* minor, inſpire the ſoul with tenderneſs; F *ut fa* minor, carry it even to melancholy and grief. In a word, every tone, every mode, has its peculiar expreſſion, which ought to be known and perceived with delicacy; and this is one of the means which render a compoſer of art and genius in ſome degree maſter of the affections of thoſe who hear him. It is, however, a kind of ſuccedaneum to the ancient modes, though far from reaching their expreſſion or energy.

Yet it is this rich and agreeable diverſity of which (ſays Rouſſeau) M. Rameau would deprive muſic, in wholly reducing every mode to one inſipidely equal and monotonous harmony, by his rule for temperament, though it had been ſo often propoſed and neglected before him. According to this author, the whole harmony would be more perfect by its obſervation. It is nevertheleſs abſolutely certain, that nothing can be gained by this on one hand, without loſing its equivalent on the other; and though we ſhould grant (what is by no means true) that by this temperament the harmony in general would be rendered more pure, would this compenſate what we loſe in point of expreſſion? See Temperament.

To what has been already ſaid by M. Rouſſeau, we muſt beg leave to add two obſervations. 1. The eſſence of the tone conſiſts in this, that by it the ſeries of diatonic intervals immediately riſing or deſcending, whether major or minor, is regulated and known from any fundamental note which we aſſume. Tone, therefore, is the conſtitution of the octave, as determined by that fundamental note. The fundamental note itſelf is the key. Hence the *tone* differs from the *mode*, as the former regulates the nature and ſucceſſion of intervals contained in the octave; the latter modifies all the chords whether natural or artificial, particularly the third and fifth. 2. M. D'Alembert, in the ſecond edition of his Elements, (ſee the article Music, n° 72. note u) has conſidered at ſome length, and with ſome degree of accuracy, the advantages and inconveniences reſulting from temperament. He ſeems fairly to have ſtated the objections of muſicians againſt it. He affirms, that without it, in paſſing from one mode to another, the ear is ſhocked; and agrees with M. Rameau, that the character of different harmonies does not ariſe from any differences in the intervals of the diatonic ſcale, but from the ingenious and agreeable intertexture of the modes, and from other circumſtances enumerated in the note. He adds, that from all which has been ſaid in his work concerning the formation of the diatonic ſcale, and that ſpecies of muſic which it characterizes, it muſt appear to be the obvious intention of nature, that the intervals in that ſyſtem, whether major or minor, whether conſiſting of a ſemitone or a full note, ſhould each of them be exactly ſimilar one to another, which cannot be effectuated without having recourſe to temperament.

TONGUE, in anatomy. See there n° 366, *d*. and 403.

TONIC, in muſic, ſignifies a certain degree of tenſion, or the ſound produced by a vocal ſtring in a given degree of tenſion, or by any ſonorous body when put in vibration. It has already been obſerved in other articles, that the word *tone* ſignifies the natural ſeries or ſucceſſion of the diatonic ſcale, whether major or minor, or conſiſting in intervals of both kinds, commencing from any particular note. The tonic therefore, or key, is the ſound from whence that ſeries commences; and it is ſo called, becauſe it eſtabliſhes the nature of the ſeries, and, as it were, opens a paſſage to it. With this every piece of muſic, whether in harmony or melody, for the moſt part begins, at leaſt when the excluded notes are finiſhed. By excluded notes we mean thoſe notes which are ſeparated from the air by a bar, yet which do not conſtitute a bar; becauſe they are parts of a time, the reſt of which is ſuppoſed to have paſſed before the commencement of the air; and for which, at the end of the ſtrain, there is, or ought to be, always an interval in duration left unoccupied.

Here then we have ſaid, that the air commences for the moſt part with its tonic or key; that it ſhould end with the ſame note, is a rule more generally obſerved, and more neceſſary to be obſerved; but that its baſs ſhould end upon the tonic, is indiſpenſable. Whatever kind of third the key or tonic has above it, determines the mode. If the third be major, ſuch likewiſe is the mode; if minor, the mode is alſo minor. Thus, upon every tonic or key, we may compoſe in either mode. In ſhort, muſicians recognize this peculiarity in the tonic, that the perfect chord does not rigorouſly belong to any other note except itſelf. When that chord is ſtruck upon another note, either ſome diſſonance is underſtood, or ſome other note becomes the key for that inſtant.

By this method of tranſpoſition, the tonic or key bears the name of C or *ut* in the major mode, and of A or *la* in the minor. See Music, Chap. XII.

Tonic, ſays Rouſſeau, is likewiſe the name given by Ariſtoxenus to one of the three kinds of chromatic muſic whoſe diviſions he explains, and which was the ordinary chromatic of the Greeks, proceeding by two ſemi-tones in ſucceſſion, and afterwards a third minor.

Tonic *Dominant*. See Dominant.

TONNAGE *and* Poundage, an ancient duty on wine and other goods. The origin of tonnage and poundage ſeems to have been this. About the 21ſt of Edward III. complaint was made, that merchants were robbed and murdered on the ſeas. The king thereupon, with the conſent of the peers, levied a duty of 2s. on every ton of wine, and 6d. in the pound on all goods imported; which was treated as illegal by the commons. About 25 years after, the king, when the knights of ſhires were returned home, obtained a like grant from the citizens and burgeſſes, and the year after it was regularly granted in parliament. Theſe duties were diminiſhed ſometimes, and ſometimes increaſed; at length they ſeem to have been fixed at 3s. tonnage and 1s. poundage. In old times theſe were diſtinguiſhed from cuſtoms, which were conſidered as duties on ſtaple commodities, though they have been long ſince blended together. The fixing of ſtaple towns had its advantages and diſadvantages; and even the great ſtaple at Calais, which rendered the loſs of that place ſo much regretted, cramped our navigation. By ſucceſſive acts of the legiſlature, the liberty and property of the ſubjects of all ranks being better ſecured, promoted domeſtic induſtry, and thereby the welfare and happineſs of the people.

TONQUIN, a kingdom of Aſia, in the Eaſt Indies, beyond the Ganges; bounded on the north by the province of Yunnan in China, on the eaſt by the province of Canton and the bay of Tonquin, on the ſouth by Cochin China, and on the weſt by the kingdom of Laos. It is about 1200 miles in length, and 500 in breadth; and is one of the fineſt and moſt conſiderable kingdoms of the Eaſt, as well on account of the number of inhabitants, as the riches it contains and the trade it carries on. The country is thick ſet with villages; and the natives in general are of a middle ſtature and clean-limbed, with a tawny complexion. Their faces are oval and flattiſh, and their noſes and lips well proportioned. Their hair is black, long, lank, and coarſe; and they let it hang down their ſhoulders. They are generally dexterous, nimble, active, and ingenious in mechanic arts. The weave a multitude of fine ſilks, and make curious lacker-works, which are tranſported to other countries. There is ſuch a number of people, that many want employment; for they ſeldom go to work but when foreign ſhips arrive. The money and goods brought hither by the Engliſh and Dutch put them in action, for they have not money of their own ſufficient to employ themſelves; and therefore one-third at leaſt, muſt be advanced before-hand by the merchants: and the ſhips muſt ſtay here till the goods are finiſhed, which is generally five or ſix months. They are ſo addicted to gaming, that when every thing elſe is loſt, they will ſtake their wives and children. The garments of the Tonquineſe are made either of ſilk or cotton; but the poor people and ſoldiers wear only cotton of a dark tawny colour. Their houſes are ſmall and low; and the walls either of mud, or hurdles daubed over with clay. They have only a ground-floor, with two or three partitions; and each room has a ſquare hole to let in the light. The villages conſiſt of 30 or 40 houſes, ſurrounded with trees; and in ſome places there are banks to keep the water from overflowing their gardens, where they have oranges, betels, melons, and ſalad-herbs. In the rainy ſeaſon they cannot paſs from one houſe to another without wading through the water: they ſometimes have boats. In the capital city called *Cacho*, there are about 20,000 houſes, with mud-walls, and covered with thatch; a few are built with brick, and roofed with pan-tiles. In each yard is a ſmall arched building like an oven, about ſix feet high, made of brick, which ſerves to ſecure their goods in caſe of fire. The principal ſtreets are very wide, and paved with ſmall ſtones. The king of Tonquin has three palaces in it, ſuch as they are; and near them are ſtables for his horſes and elephants. The houſe of the Engliſh factory is ſeated at the north end of the city, fronting the river; and is the beſt in the city. The people in general are courteous, and civil to ſtrangers: but the great men are proud, haughty, and ambitious; the ſoldiers inſolent, and the poor thieviſh. They buy all their wives, of which the great men have ſeveral; but the poor are ſtinted for want of money. In hard times the men will ſell both their wives and children, to buy rice to maintain themſelves. The women offer themſelves to ſtrangers as wives, while they ſtay, and agree with them for a certain price. Even the great men will offer their daughters to the merchants and officers who are likely to ſtay ſix months in the country. They are not afraid of being with child; for if they are girls, they can ſell them well when they are young, becauſe they are fairer than the other inhabitants. Theſe women are ſaid to be very faithful; and are truſted with money and goods by the Europeans during their abſence, and will make great advantage with them. The firſt new moon in the year that happens after the middle of January, is a great feſtival; when they rejoice for 10 or 12 days together, and ſpend their time in all manner of ſports. Their common drink is tea, but they make themſelves merry with arrack. The language is ſpoken very much in the throat; and ſome of the words are pronounced through the teeth, and has a great reſemblance to the Chineſe. They have ſeveral mechanic arts or trades; ſuch as ſmiths, carpenters, joiners, turners, weavers, taylors, potters, painters, money-changers, paper-makers, workers in lacker, and bell-founders. Their commodities are gold, muſk, ſilks, callicoes, drugs of many ſorts, woods for dyeing, lacquered wares, earthen wares, ſalt, aniſeeds, and worm-ſeeds. The lacquered ware is not inferior to that of Japan, which is accounted the beſt in the world. With all theſe merchandiſes, one would expect the people to be very rich, but they are in general very poor; the chief trade being carried on by the Chineſe, Engliſh, and Dutch. The goods imported, beſides ſilver, are ſalt-petre, ſulphur, Engliſh broad cloth, pepper, ſpices, and great guns.

TONSILS, in anatomy. See there n° 366, g.

TONSURE, in eccleſiaſtical hiſtory, a particular manner of ſhaving or clipping the hair of eccleſiaſtics or monks. The ancient tonſure of the clergy was nothing more than polling the head, and cutting the hair to a moderate degree, for the ſake of decency and gravity: and the ſame obſervation is true with reſpect to the tonſure of the ancient monks. But the Romans have carried the affair of tonſure much farther; the candidate for it kneeling before the biſhop, who cuts the hair in five different parts of the head, *viz.* before, behind, on each ſide, and on the crown.

TOOL, among mechanics, denotes in general any ſmall inſtrument uſed as well for making other complex inſtruments and machines, as in moſt other operations in the mechanic arts.

TOOTH, in anatomy. See there, n° 26.

TOOTHACH. See MEDICINE, n° 621, 622, and ELECTRICITY, parag. *ult.*

TOOTHACH *Tree.* See XANTHOXYLUM.

TOP, a ſort of platform, ſurrounding the lower maſt-head, from which it projects on all ſides like a ſcaffold.

The principal intention of the top is to extend the top-maſt ſhrouds, ſo as to form a greater angle with the maſt, and thereby give additional ſupport to the latter. It is ſuſtained by certain timbers fixed acroſs the hounds or ſhoulders of the maſt, and called the *treſtle-trees* and *croſs-trees.*

Beſides the uſe above-mentioned, the top is otherwiſe extremely convenient to contain the materials neceſſary for extending the ſmall ſails, and for fixing or repairing the rigging and machinery with more facility and expedition. In ſhips of war it is uſed as a kind of redoubt, and is accordingly fortified for attack or defence; being furniſhed with ſwivels, muſketry, and other fire-arms, and guarded by a thick fence of corded hammocs. Finally, it is employed as a place for looking out, either in the day or night.

The frame of the top is either cloſe-planked like a platform, or open like a grating. The former kind is generally ſtronger and more convenient; but the latter is much better in tempeſtuous weather, as preſenting a ſmaller ſurface to the wind when the ſhip leans over to one ſide, and by conſequence being leſs expoſed to its efforts.

In all ſhips of war, and in the largeſt merchantmen, the top is fenced on the aft-ſide by a rail of about three feet high, ſtretching acroſs, and ſupported by ſtanchions, between which a netting is uſually conſtructed. The outſide of this netting is generally covered with red baize or red painted canvas, which is extended from the rail down to the edge of the top, and called the *top-armour*. By this name it ſeems to have been conſidered as a ſort of blind, behind which the men may conceal themſelves from the aims of the enemy's fire-arms in time of action, whilſt they are charging their own muſkets, carabines, or ſwivels.

TOP-*Maſt*, the ſecond diviſion of a maſt; or that part which ſtands between the upper and lower pieces. See the article MAST.

TOP-*Sails*, certain large ſails extended acroſs the top-maſts by the topſail-yard above, and by the yard attached to the lower maſt beneath; being faſtened to the former by robands, and to the latter by means of two great blocks fixed on its extremities, thro' which the topſail-ſheets are inſerted, paſſing from thence to two other blocks fixed on the inner part of the yard cloſe by the maſt: and from theſe latter the ſheets lead downwards to the deck, where they may be ſlackened or extended at pleaſure. See the article SAIL.

TOPAZ, in natural hiſtory, a gem called by the ancients *chryſolite*, as being of a gold colour.

The topaz, when perfect and free from blemiſhes, is a very beautiful and valuable gem; it is, however, very rare in this ſtate. It is of the number of thoſe gems which are found only in the round or pebble form, there never having been yet ſeen a true and genuine topaz of a columnar figure, though the far greater part of what our jewellers call ſuch are in that form. The greateſt part of the true topazes are no larger than grains of a coarſe ſeed; among theſe there are, however, ſome met with of the ſize of a pea, and ſome much larger, though theſe are very rare. It is of a roundiſh or oblong figure in its native or rough ſtate, and uſually is flatted on one ſide; and is generally of a bright and naturally poliſhed ſurface, tolerably tranſparent. They are ever of a fine yellow colour; but they have this, like the other gems, in ſeveral different degrees: the fineſt of all are of a true and perfect gold colour; but there are ſome much deeper, and others extremely pale, ſo as to appear ſcarce tinged. The oriental topaz is equal to the ruby in hardneſs, and is ſecond only to the diamond in luſtre. The topazes of the other parts of the world fall off greatly from this hardneſs; but the pureſt of the genuine ones are conſiderably harder than cryſtal. The topaz on being thrown into a charcoal fire entirely loſes its colour; and when taken out, is a very fine colourleſs ſtone, undiſtinguiſhable from that known by the name of the *white ſapphire*. Upon the whole it appears, that the oriental-coloured gems are much alike in their matter, differing ſcarce at all, except in colour; and that when they are found either naturally colourleſs, or rendered ſo by art, it is not eaſy to diſtinguiſh one of them from the other.

The fineſt topazes in the world are found in the Eaſt Indies; but they are very rare there of any great ſize: the Great Mogul, however, at this time, poſſeſſes one which is ſaid to weigh 157 carats, and to be worth more than 20,000 pounds. The topazes of Peru come next after theſe, in beauty and in value. The European are principally found in Sileſia and Bohemia, and are generally full of cracks and flaws, and of a browniſh yellow.

Beſides all theſe degrees of value in the genuine topazes, our jewellers keep what they call a kind of them, inferior greatly to the true ones; all theſe are common hexangular cryſtals, coloured to a paler or deeper yellow in mines: theſe they cut into ſtones for rings, and ſell under the name of topazes; and moſt of the ſtones we ſee under that name are ſuch.

TOPHUS, in medicine, denotes a chalky or ſtony concretion in any part of the body; as the bladder, kidney, &c. but eſpecially in the joints.

TOPIC, a general head, or ſubject of diſcourſe.

TOPICS, in oratory. See ORATORY, n° 2—23.

TOPICS, or *Topical Medicines*, are the ſame with external ones, or thoſe applied outwardly to ſome diſeaſed and painful part: ſuch are plaſters, cataplaſms, unguents, &c.

TOPOGRAPHY, a deſcription or draught of ſome particular place, or ſmall track of land, as that of a city or town, manor or tenement, field, garden, houſe, caſtle, or the like; ſuch as ſurveyors ſet out in their plots, or make draughts of, for the information and ſatisfaction of the proprietors.

TOPSHAM, a town of Devonſhire, in England, ſeated on the river Exmouth, five miles ſouth-eaſt of Exeter, to which place the river was formerly navigable; but in time of war was choaked up deſignedly, ſo that ſhips are now obliged to load and unload at Topſham. W. Long. 3. 40. N. Lat. 50. 37.

TOR, a town of Aſia, in Arabia Petræa, ſeated on the Red Sea, with a good harbour defended by a caſtle. There is a handſome Greek convent, in whoſe garden are fountains of bitter water, which they pretend are thoſe rendered ſweet by Moſes by throwing a piece of wood into them. Some think that this town is the ancient Elana. E. Long. 31. 25. N. Lat. 28. 0.

TORBAY, a fine bay of the Engliſh channel, on the coaſt of Devonſhire, a little to the eaſt of Dartmouth, formed by two capes, called *Bury Points*, and *Bob's Noſe*.

TORIES, in the hiſtory of England, a faction or party oppoſed to the whigs. See WHIGS.—The tories are great ſticklers for the prerogatives of the crown, as the whigs are for the liberties and privileges of the people: though, in truth, the principles of the moderate people of both parties do not greatly differ.

TORMENTILLA, TORMENTIL; a genus of the polygynia order, belonging to the icoſandria claſs of plants. There are two ſpecies, the moſt remarkable of which is the erecta, growing very frequently in barren paſtures, moors, and heaths, in Scotland, England, and the neighbouring iſlands. The roots conſiſt of thick tubercles, an inch or more in diameter, replete with a red juice, of an aſtringent quality. They are uſed in moſt of the Weſtern Iſles, and in the Orkneys, for tanning of leather; in which intention they are proved by ſome late experiments to be ſuperior even to the oak-bark. They are firſt of all boiled in water, and the leather is afterwards ſteeped in the liquor. In the iſlands of Tirey and Col the inhabitants have deſtroyed ſo much ground by digging them up, that they have lately been prohibited the uſe of them. A decoction of theſe roots in milk is alſo frequently adminiſtered by the inhabitants of the ſame iſlands in diarrhœas and dyſenteries, with good ſucceſs; but perhaps it would be moſt proper not to give it in dyſenteries till the morbid matter be firſt evacuated. A ſpirituous extract of the plant ſtands recommended in the ſea-ſcurvy, to ſtrengthen the gums and faſten the teeth. Linnæus informs us, that the Laplanders paint their leather of a red colour with the juice of the roots.

TORNADO, a ſudden and vehement guſt of wind from all points of the compaſs, frequent on the coaſt of Guinea.

TORNE, the capital of Torne Lapmark, a province of Sweden, ſituated at the mouth of the river Torne, at the bottom of the Bothnic Gulph, upon a little iſland made by the river, 400 miles north of Stockholm. E. Long. 22. 45. N. Lat. 65. 45.

TORPEDO, the CRAMP-FISH. See RAJA.

The ſurpriſing property of this fiſh in giving a violent ſhock to the perſon who takes it in his hands, or who treads upon it, was long an object of wonder. For ſome time it was in general reckoned to be entirely fabulous; but at laſt the matter of fact being aſcertained beyond a doubt, philoſophers endeavoured to find out the cauſe. M. Reaumur reſolved it into the action of a vaſt number of minute muſcles, which by their accumulated force gave a ſudden and violent ſtroke to the perſon who touched it. But ſolutions of this kind were quite unſatisfactory, becauſe the ſtroke was found to be communicated through water, iron, wood, &c. When the phenomena of electricity began to be better known, it was then ſuſpected that the ſhock of the torpedo was occaſioned by a certain action of the electric fluid; but as not the leaſt ſpark of fire, or noiſe, could ever be perceived, this too ſeemed inſufficient. Of late, however, Mr Walſh has with indefatigable pains, not only explained this ſurpriſing phenomenon on the known principles of electricity, but given a demonſtration of his being in the right, by conſtructing an artificial torpedo, by which a ſhock reſembling that of the natural one can be given.

The electric organs of the torpedo conſiſt of two ſets of very ſmall cylinders lying under the ſkin, one of which is electrified poſitively and the other negatively, ſeemingly at the pleaſure of the fiſh. When a communication is made between the ſet of cylinders poſitively electrified, and thoſe which are negatively ſo, a diſcharge and ſhock enſue, like what happens in the caſe of the Leyden vial. The only difficulty now is to account for the total abſence of a ſpark, (which in the caſe of the torpedo never exiſts even in the ſmalleſt degree,) and the impoſſibility of conducting the ſhock through the ſmalleſt interval of air. But this alſo is explained in a ſatisfactory manner by Mr Walſh, and ſhown to be nothing elſe than what every day takes place in our electrical experiments. It is well known, that a ſmall charge of electricity, if put into a little vial, will occaſion a bright ſpark and loud noiſe when diſcharged. But if the ſame charge is put into a vial much larger, the ſpark and noiſe will be leſs in proportion; neither will the ſpark break through near ſuch a ſpace of air in the latter caſe as in the former; though the ſhock would in both caſes be the ſame to a perſon who received it through his body. If, inſtead of a large vial, we ſuppoſe the charge to be diffuſed all over a large battery, the ſhock would ſtill be the ſame, and yet the ſpark and noiſe attending it would be almoſt imperceptible. The caſe is juſt the ſame with the torpedo. Each of the electric organs is a battery compoſed of innumerable ſmall cylinders, which diſcharging themſelves all at once produce a formidable ſhock; but by reaſon of the ſmallneſs of the charge of each, the ſpark is imperceptible, and cannot break through the ſmalleſt ſpace of air. The truth of this was exemplified in Mr Walſh's artificial torpedo, which though it would give a very conſiderable ſhock through a conductor totally uninterrupted, yet on the leaſt breach therein, even for the breadth of a hair, no ſhock was felt.

In every other reſpect the electricity of the torpedo agrees with that exhibited by the common electrical machines. An inſulated perſon cannot receive a ſhock by touching one of the electric organs of the fiſh; but a violent ſtroke is given to the perſon, whether inſulated or not, who lays one hand on the poſitive and the other on the negative organ. The fiſh, as is reaſonable to imagine, ſeems to have this electric property in its own power; and appears ſenſible of his giving the ſhock, which is accompanied by a kind of winking of his eyes.

TORPOR, a numbneſs, or defect of feeling and motion. Galen ſays it is a ſort of intermediate diſorder between palſy and health.

TORREFACTION, in chemiſtry, is the roaſting or ſcorching of a body by the fire, in order to diſcharge a part either unneceſſary or hurtful in another operation. Sulphur is thus diſcharged from an ore before it can be wrought to advantage.

TORRENT, denotes a temporary ſtream of water falling ſuddenly from mountains, whereon there have been great rains, or an extraordinary thaw of ſnow.

TORRENTIUS (John), a painter of Amſterdam, born at Haerlem in 1589, who excelled in repreſenting objects of ſtill life, and ſometimes painted converſations which were admired for a lovely tone of colouring. While he practiſed in this manner, he lived in general eſteem and affluence; but, unhappily, he grew abandoned in his morals, and equally ſo in his ſtyle of painting, proſtituting a delicate pencil to the moſt obſcene and depraved purpoſes. At laſt, by inſtituting a ſecret ſociety of Adamites, he attracted the notice of the magiſtrates, who brought him to trial; and as he denied his own performances, and any connection with his deteſtable aſſembly, he was condemned to the torture, his lewd pictures were burned by the common executioner, and he was ſentenced to the houſe of correction for 20 years. He ſupported the torture with incredible obſtinacy; and after ſome time of confinement, being releaſed at the requeſt of the Engliſh ambaſſador, he went to London, where he reſided for a few years. But the Engliſh, who deteſted his profligacy more than they admired his art, diſcountenanced him ſo much that he retired to Amſterdam, where he died in obſcurity and contempt in 1640.

TORRICELLI (Evangeliſte), an illuſtrious Italian mathematician and philoſopher, born at Faenza in 1608. He was trained in Latin literature by his uncle a monk; and after cultivating mathematical knowledge for ſome time without a maſter, he ſtudied it under father Benedict Caſtelli, profeſſor of mathematics at Rome. Having read Galileo's dialogues, he compoſed a treatiſe on motion, on his principles, which brought him acquainted with Galileo, who took him home as an aſſiſtant: but Galileo died in three months after. He became profeſſor of mathematics at Florence, and greatly improved the art of making teleſcopes and microſcopes: but he is beſt known for finding out a method of aſcertaining the weight of the atmoſphere by quickſilver; the barometer being called, from him, the *Torricellian tube*. He publiſhed *Opera Geometrica*, 4to, 1644; and died in 1647.

TORRICELLIAN EXPERIMENT, a famous experiment made by Torricelli, a diſciple of the great Galileo, by which he demonſtrated the preſſure of the atmoſphere in oppoſition to the doctrines of ſuction, &c. finding that preſſure able to ſupport only a certain length of mercury, or any other fluid, in an inverted glaſs tube. See BAROMETER.

TORSK, or TUSK, in ichthyology. See GADUS.

TORTOISE, in zoology. See TESTUDO.

TORTOISE-*Shell*. The upper ſhell of the tortoiſe is compoſed of two diſſimilar ſubſtances: that which immediately inveſts the back of the animal is of the bony kind, and almoſt as hard as ſtone; the outer lamina is horny, flexible, here and there tranſparent. It is only this laſt that is called *tortoiſe-ſhell*, and in which the beautiful colours and variegations reſide. The horny ſhell conſiſts of ſeveral pieces, whoſe ſeams and junctures with one another, and with the bony part underneath, are ſufficiently diſtinguiſhable. The workmen ſplit them aſunder by certain inſtruments, and employ the elegant horn for a variety of toys and utenſils, combs, ſword-hilts, clock-caſes, boxes, coverings for muſical inſtruments, perſpective-glaſſes, &c. &c.

Working and joining of TORTOISE-*Shell*—Tortoiſe-ſhell and horn become ſoft in a moderate heat, as that of boiling water, ſo as to be preſſed, in a mould, into any form, the ſhell or horn being previouſly cut into plates of a proper ſize.

Plumier informs us, in his *Art de tourner*, that two plates are likewiſe united into one by heating and preſſing them; the edges being thoroughly cleaned, and made to fit cloſe to one another. The tortoiſe-ſhell is conveniently heated for this purpoſe by applying a hot iron above and beneath the juncture, with the interpoſition of a wet cloth to prevent the ſhell from being ſcorched by the irons: theſe irons ſhould be pretty thick, that they may not loſe their heat before the union is affected.

Both tortoiſe-ſhell and horns may be ſtained of a variety of colours, by means of the colouring drugs commonly uſed in dyeing, and by certain metallic ſolutions.

TORTURE, a grievous pain inflicted on criminals to make them confeſs the truth. See RACK.—The ſtatute-law of England doth very ſeldom, and the common law doth never, inflict any puniſhment extending to life or limb, unleſs upon the higheſt neceſſity.

But note—on an indictment for high-treaſon, or for the loweſt ſpecies of felony, viz. petit larceny, and in all miſdemeanors, ſtanding mute is equivalent to conviction. But upon appeals or indictment for other felonies or petit treaſon, the priſoner ſhall not be looked upon as convicted, ſo as to receive judgment for the felony; but ſhall, for his obſtinacy, receive the terrible ſentence of penance, or *peine forte & dure*. See ARRAIGNMENT, and PEINE *forte & dure*.

The rack, or queſtion, to extort a confeſſion from criminals is a practice of a different nature: this being only uſed to compel a man to put himſelf upon his trial; that being a ſpecies of trial in itſelf. And the trial by rack is utterly unknown to the law of England. No perſon to be ſubject to torture in Scotland, 7 Ann. c. 21.

TORUS, in architecture, a large round moulding uſed in the baſes of columns. See Plate XXIX. fig. 3.

TOUCAN, in ichthyology. See RHAMPHASTOS.

TOUCH-NEEDLE, among aſſayers, refiners, &c. little bars of gold, ſilver, and copper, combined together in all the different proportions and degrees of mixture; the uſe of which is to diſcover the degree of purity of any piece of gold or ſilver, by comparing the mark it leaves on the touch-ſtone with thoſe of the bars.

The metals uſually tried by the touch-ſtone are gold, ſilver, and copper, either pure, or mixed with one another in different degrees and proportions, by fuſion. In order to find out the purity or quantity of baſer metal in theſe various admixtures, when they are to be examined they are compared with theſe needles, which are mixed in a known proportion, and prepared for this uſe. The metals of theſe needles, both pure and mixed, are all made into laminæ or plates, one-twelfth of an inch broad, and of a fourth part of their breadth in thickneſs, and an inch and half long; theſe being thus prepared, you are to engrave on each a mark indicating its purity, or the nature and quantity of the admixture in it.

The black rough marbles, the baſaltes, or the ſofter kinds of black pebbles, are the moſt proper for touchſtones.

Now the method of uſing the needles and ſtone is this: The piece of metal to be tried ought firſt to be wiped well with a clean towel or piece of ſoft leather, that you may the better ſee its true colour; for from this alone an experienced perſon will, in ſome degree, judge beforehand what the principal metal is, and how and with what debaſed.

Then chooſe a convenient, not over large, part of the ſurface of the metal, and rub it ſeveral times very hardly and ſtrongly againſt the touchſtone, that in caſe a deceitful coat or cruſt ſhould have been laid upon it, it may be worn off by that friction: this, however, is more readily done by a grindſtone or ſmall file. Then wipe a flat and very clean part of the touchſtone, and rub againſt it, over and over, the juſt mentioned part of the ſurface of the piece of metal, till you have, on the flat ſurface of the ſtone, a thin metallic cruſt, an inch long and about an eighth of an inch broad: this done, look out the needle that ſeems moſt like to the metal under trial, wipe the lower part of this needle very clean, and then rub it againſt the touchſtone, as you did the metal, by the ſide of the other line, and in a direction parallel to it.

When this is done, if you find no difference between the colours of the two marks made by your needle and the metal under trial, you may with great probability pronounce that metal and your needle to be of the ſame alloy, which is immediately known by the mark engraved on your needle. But if you find a difference between the colour of the mark given by the metal, and that by the needle you have tried, chooſe out another needle, either of a darker or lighter colour than the former, as the difference of the tinge on the touchſtone directs; and by one or more trials of this kind you will be able to determine which of your needles the metal anſwers, and thence what alloy it is of, by the mark of the needle; or elſe you will find that the alloy is extraordinary, and not to be determined by the the compariſon of your needles.

TOUCHWOOD. See Boletus.

TOULON, an ancient, ſtrong, rich, and populous city of France, with a famous harbour, well covered from the north winds; and a biſhop's ſee. It is the principal town for naval ſtores on the Mediterranean ſea, and is fortified with ſtrong walls defended with baſtions. It has two moles, each ſeven hundred paces in length, which almoſt ſurround the harbour, and leave but a narrow entrance for ſhips. There are always men of war here, as well as other ſhips; and there is a very fine quay paved with bricks. Near the arſenal, on the ſide of the quay, are magazines full of naval ſtores. The cathedral is remarkable for its high altar, and two fine chapels on each ſide, where there are ſeveral ſilver ſhrines ſet with precious ſtones. There are ſeveral other churches and convents; and a ſchool for officers, where they are taught every thing that regards the land or ſea ſervice. The harbour is defended by ſeveral forts, and is one of the beſt in Europe. E. Long. 6. 2. N. Lat. 43. 7.

TOULOUSE, one of the principal cities of France, in Upper Languedoc, and capital of the whole province, with an archbiſhop's ſee, a famous univerſity, a parliament, a mint, and an academy of belles lettres. It is ſeated on the river Garonne, which divides it into two unequal parts, that communicate by a large ſtone-bridge. It is very large, but is not peopled in proportion to its extent. The ſtreets are very handſome, and the walls of the city, as well as the houſes, are built with brick. The metropolitan church ſtands in a large ſquare, adorned with a fountain. It has ſeveral fine chapels, and the choir is very magnificent. There are ſeveral other churches and convents, too numerous to mention in particular. The town-houſe, which they call the *Capitol*, is very magnificent. It is a place of ſome trade, and is ſeated at the end of the canal of Languedoc. E. Long. 1. 30. N. Lat. 42. 36.

TOUR (Henry de la), viſcount Turenne, a celebrated French general, was the ſecond ſon of Henry de la Tour duke of Bouillon, and was born at Sedan in 1611. He made his firſt campaigns in Holland under Maurice and Frederic Henry princes of Orange, who were his uncles by the mother's ſide; and even then diſtinguiſhed himſelf by his bravery. In 1634 he marched with his regiment into Lorraine; and having contributed to the taking of La Mothe, was, though very young, made mareſchal de camp. In 1636 he took Saverne, and the year following the caſtles of Hirſon and Sorle; on which occaſion he performed an action like that of Scipio's, with reſpect to a very beautiful woman whom he ſent back to her huſband. The viſcount Turenne continued to diſtinguiſh himſelf in ſeveral ſieges and battles, and in 1644 was made marſhal of France; but had the misfortune to be defeated at the battle of Mariendal in 1645. However, he gained the battle of Nortlingen three months after; reſtored the elector of Treves to his dominions; and the following year made the famous junction of the French army with that of Sweden commanded by general Wrangel, which obliged the duke of Bavaria to demand a peace. Afterwards that duke breaking the treaty he had concluded with France, he was defeated by the viſcount Turenne at the battle of Zumarſhauſen, and in 1648 driven entirely out of his dominions. During the civil wars in France he ſided with the princes, and was defeated at the battle of Rhetel in 1650; but ſoon after was reſtored to the favour of the king, who in 1652 gave him the command of his army. He acquired great honour at the battles of Jergeau, Gien, and the ſuburbs of St Anthony, and by the retreat he made before the army commanded by the princes at Ville-Neuve St-George. In 1654 he made the Spaniards raiſe the ſiege of Arras: the next year he took Condé, St Guilian, and ſeveral other places; gained the famous battle of Dunes; and made himſelf maſter of Dunkirk, Oudenarde, and almoſt all Flanders: this obliged the Spaniards to conclude the peace of the Pyrenees in 1660. Theſe important ſervices occaſioned his being made marſhal-general of the king's camps and armies. The war being renewed with Spain in 1667, Turenne commanded in Flanders; and took ſo many places, that in 1668 the Spaniards were obliged to ſue for peace. He commanded the French army in the war againſt the Dutch in 1672; took 40 towns in 22 days; purſued the elector of Brandenburg even to Berlin; gained the battles of Slintſheim, Ladenburg, Enſheim, Mulhauſen, and Turkeim; and obliged the Imperial army, which conſiſted of 70,000 men, to repaſs the Rhine. By this campaign the viſcount Turenne acquired immortal honour. He paſſed the Rhine to give battle to general Montecuculi, whom he followed as far as Saſpach; but mounting upon an eminence to diſcover the enemy's camp, he was killed by a cannon-ball in 1675. All France regretted the loſs of this great man, who by his military exploits had raiſed the admiration of Europe.

TOURAINE, a province of France, bounded on the north by Maine, on the eaſt by Orleanois, on the ſouth by Berri, and on the weſt by Anjou and Poitou. It is about 58 miles in length, and 55 in breadth where it is broadeſt. This country is watered by 17 rivers, beſides many brooks, which not only render it delightful, but keep up a communication with the neighbouring provinces. The air is temperate, and the ſoil is ſo fruitful, that it is called the *garden of France*. Tours is the capital town.

TOURNAY, a town of the Auſtrian Netherlands, in Flanders, and capital of a diſtrict called *Tournayſis*, with a biſhop's ſee. It is divided into two parts by the river Scheld; and is large, populous, well built, and carries on a great trade in woollen ſtuffs and ſtockings. The cathedral is a very handſome ſtructure, and contains a great many chapels with rich ornaments, and ſeveral magnificent tombs of marble and braſs. The town was taken by the allies in 1709; but was ceded to the houſe of Auſtria by the treaty of Utrecht, tho' the Dutch had a right to put in a garriſon. It was taken by the French in June 1745, who demoliſhed the fortifications. E. Long. 3. 36. N. Lat. 50. 41.

TOURNAMENTS, in chivalry, were honourable exerciſes formerly uſed by all perſons of note that deſired to ſignalize themſelves by their dexterity, &c. They were firſt inſtituted in Germany, according to hiſtorians, towards the beginning of the 10th century, and became afterwards a general practice: they derived their name from the French word *tourner*, i. e. "to turn round," becauſe to be expert in theſe exerciſes, much agility both of horſe and man was requiſite, they riding round a ring in imitation of the ancient Circi. They were the principal diverſion of the 13th and 14th century.

The following account of Engliſh tournaments, extracted from Maitland's Hiſtory of London, will not, it is hoped, be diſagreeable to the reader.—In the reign of Edward IV. Roch, who was better known by the appellation of the *Baſtard of Burgundy*, being greatly celebrated for his acts of chivalry, came over and challenged the Lord Scales, brother to the queen, to fight with him; which Scales readily accepting, the king commanded liſts to be prepared in Smithfield (wherein to perform combat), of the length of 370 feet, and breadth of 260, with magnificent galleries for the reception of the illuſtrious ſpectators; where aſſembled the king, the nobility, and the principal gentry of both ſexes. The firſt day they fought with ſpears, without a viſible advantage on either ſide. The ſecond they tournayed on horſeback, when the Lord Scales having a long pike fixed on his chaffron (pommel of his ſaddle), which as they cloſed, ran into the noſtrils of the Baſtard's horſe, by the anguiſh whereof he reared himſelf with that violence, that he ſtumbled backwards, whereby his rider was unfortunately unhorſed: which occaſioned him to cry out, "That he could not hold by the clouds;" and that though his horſe had failed him, he would not fail to meet his adverſary the next day. This being accordingly performed, they fought on foot with pole-axes; when Scales ſoon penetrating the Baſtard's helmet, the king threw down his warder, whereupon they were immediately parted by the marſhal. But the Baſtard inſiſting upon fighting out that weapon, a council was held to deliberate thereon. The reſult was, that if he perſiſted in renewing the combat, he muſt, according to the law of arms, be delivered to his adverſary in the ſame condition he was in at his horſe's misfortune: but rather than ſubmit to thoſe terms, he waved his pretenſion.

King Richard II. deſigning to hold a tournament at London on the Sunday after Michaelmas, ſent divers heralds to make proclamations of it in all the principal courts of Europe; and accordingly not a few princes, and great numbers of the prime nobility, reſorted hither from France, Germany, the Netherlands, &c. This ſolemnity began on Sunday afternoon, from the Tower of London, with a pompous cavalcade of 60 ladies, each leading an armed knight by a ſilver chain, being attended by their 'ſquires of honour, and, paſſing through Cheapſide, rode to Smithfield, where the juſts and tournaments continued ſeveral days with magnificent variety of entertainments; on which occaſion the king kept open houſe at the biſhop of London's palace for all perſons of diſtinction, and every night concluded with a ball.

Not long after this, three Scotch champions challenged three Engliſh to fight, which was performed in Smithfield with the greateſt ſolemnity; the earl of Mar againſt the Lord Nottingham; Sir William Dorrel the king of Scotland's banner-bearer, againſt Sir Pierce Courtney the king of England's ſtandard-bearer; Cockburne, Eſq; againſt Sir Nicholas Hawkirke. Mar and Cockburne were unhorſed; but the two ſtandard-bearers were ſo well matched, that betwixt them it was a drawn battle. Voltaire, in his Eſſay upon the Civil Wars of France, p. 4, obſerves, that this romantic and dangerous ſport was put an end to by the death of Henry II. king of France, who was killed at Paris in a tournament, which was the laſt in Europe.

TOURNEFORT (Joſeph Pitton de), a famous French botaniſt, born at Aix in Provence in 1656. He had a paſſion for plants from his childhood, which overcame his father's views in putting him to ſtudy philoſophy and divinity; therefore on his death he quitted theology, and gave himſelf up entirely to phyſic, natural hiſtory, and botany. He wandered over the mountains of Dauphine, Savoy, Catalonia, the Pyrenees, and the Alps, in ſearch of new ſpecies of plants, which he acquired with much fatigue and dandanger. His fame in 1683 procured him the employment of botanic profeſſor in the king's garden; and by the king's order, he travelled into Spain, Portugal, Holland, and England, where he made prodigious collections of plants. In 1700, Mr Tournefort, in obedience to another order, ſimpled over all the iſles of the Archipelago, upon the coaſts of the Black Sea, in Bithynia, Pontus, Cappadocia, Armenia, and Georgia; making obſervations on natural hiſtory at large, ancient and modern geography, religion, manners, and commerce. He ſpent three years in this learned voyage; and then reſuming his profeſſion, was made profeſſor of phyſic in the college-royal. He died in conſequence of an accidental cruſh of his breaſt by a cart-wheel, which brought on a ſpitting of blood and hydrothorax, that carried him off in 1708. He wrote Elements of Botany, both in French and Latin; A Relation of his Voyage into the Levant; with other pieces of leſs conſideration.

TOURNIQUET, in ſurgery, an inſtrument formed with ſcrews, for compreſſing any part with rollers, &c. for the ſtopping of hæmorrhagies. See SURGERY, n° 407, *et ſeq.*

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TOURAINE, a province of France, bounded on the north by Maine, on the eaſt by Orleanois, on the ſouth by Berri, and on the weſt by Anjou and Poitou. It is about 58 miles in length, and 55 in breadth where it is broadeſt. This country is watered by 17 rivers, beſides many brooks, which not only render it delightful, but keep up a communication with the neighbouring provinces. The air is temperate, and the ſoil is ſo fruitful, that it is called the *garden of France*. Tours is the capital town.

TOURNAY, a town of the Auſtrian Netherlands, in Flanders, and capital of a diſtrict called *Tournayſis*, with a biſhop's ſee. It is divided into two parts by the river Scheld; and is large, populous, well built, and carries on a great trade in woollen ſtuffs and ſtockings. The cathedral is a very handſome ſtructure, and contains a great many chapels with rich ornaments, and ſeveral magnificent tombs of marble and braſs. The town was taken by the allies in 1709; but was ceded to the houſe of Auſtria by the treaty of Utrecht, tho' the Dutch had a right to put in a garriſon. It was taken by the French in June 1745, who demoliſhed the fortifications. E. Long. 3. 36. N. Lat. 50. 41.

TOURNAMENTS, in chivalry, were honourable exerciſes formerly uſed by all perſons of note that deſired to ſignalize themſelves by their dexterity, &c. They were firſt inſtituted in Germany, according to hiſtorians, towards the beginning of the 10th century, and became afterwards a general practice: they derived their name from the French word *tourner*, i. e. "to turn round," becauſe to be expert in theſe exerciſes, much agility both of horſe and man was requiſite, they riding round a ring in imitation of the ancient Circi. They were the principal diverſion of the 13th and 14th century.

The following account of Engliſh tournaments, extracted from Maitland's Hiſtory of London, will not, it is hoped, be diſagreeable to the reader.—In the reign of Edward IV. Roch, who was better known by the appellation of the *Baſtard of Burgundy*, being greatly celebrated for his acts of chivalry, came over and challenged the Lord Scales, brother to the queen, to fight with him; which Scales readily accepting, the king commanded liſts to be prepared in Smithfield (wherein to perform combat), of the length of 370 feet, and breadth of 260, with magnificent galleries for the reception of the illuſtrious ſpectators; where aſſembled the king, the nobility, and the principal gentry of both ſexes. The firſt day they fought with ſpears, without a viſible advantage on either ſide. The ſecond they tournayed on horſeback, when the Lord Scales having a long pike fixed on his chaffron (pommel of his ſaddle), which as they cloſed, ran into the noſtrils of the Baſtard's horſe, by the anguiſh whereof he reared himſelf with that violence, that he ſtumbled backwards, whereby his rider was unfortunately unhorſed: which occaſioned him to cry out, "That he could not hold by the clouds;" and that though his horſe had failed him, he would not fail to meet his adverſary the next day. This being accordingly performed, they fought on foot with pole-axes; when Scales ſoon penetrating the Baſtard's helmet, the king threw down his warder, whereupon they were immediately parted by the marſhal. But the Baſtard inſiſting upon fighting out that weapon, a council was held to deliberate thereon. The reſult was, that if he perſiſted in renewing the combat, he muſt, according to the law of arms, be delivered to his adverſary in the ſame condition he was in at his horſe's misfortune: but rather than ſubmit to thoſe terms, he waved his pretenſion.

King Richard II. deſigning to hold a tournament at London on the Sunday after Michaelmas, ſent divers heralds to make proclamations of it in all the principal courts of Europe; and accordingly not a few princes, and great numbers of the prime nobility, reſorted hither from France, Germany, the Netherlands, &c. This ſolemnity began on Sunday afternoon, from the Tower of London, with a pompous cavalcade of 60 ladies, each leading an armed knight by a ſilver chain, being attended by their 'ſquires of honour, and, paſſing through Cheapſide, rode to Smithfield, where the juſts and tournaments continued ſeveral days with magnificent variety of entertainments; on which occaſion the king kept open houſe at the biſhop of London's palace for all perſons of diſtinction, and every night concluded with a ball.

Not long after this, three Scotch champions challenged three Engliſh to fight, which was performed in Smithfield with the greateſt ſolemnity; the earl of Mar againſt the Lord Nottingham; Sir William Dorrel the king of Scotland's banner-bearer, againſt Sir Pierce Courtney the king of England's ſtandard-bearer; Cockburne, Eſq; againſt Sir Nicholas Hawkirke. Mar and Cockburne were unhorſed; but the two ſtandard-bearers were ſo well matched, that betwixt them it was a drawn battle. Voltaire, in his Eſſay upon the Civil Wars of France, p. 4, obſerves, that this romantic and dangerous ſport was put an end to by the death of Henry II. king of France, who was killed at Paris in a tournament, which was the laſt in Europe.

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When his houſe at South Lambeth, then called *Tradeſcant's Ark*, came into Aſhmole's poſſeſſion, he added a noble room to it, and adorned the chimney with his arms, impaling thoſe of Sir William Dugdale, whoſe daughter was his third wife, where they remain to this day.

It were much to be wiſhed, that the lovers of botany has viſited this once famous garden, before, or at leaſt in the beginning of the preſent century. But this ſeems to have been totally neglected till the year 1749, when Dr Watſon and the late Dr Mitchell favoured Royal Society with the only account now extant of the remains of Tradeſcant's garden.

When the death of John Tradeſcant happened is not known; no mention being made thereof in the regiſter-booth of Lambeth church.

TRADITION, among eccleſiaſtical writers, denotes certain regulations concerning the rites, ceremonies, &c. of religion, which we ſuppoſe to have been handed down from the days of the apoſtles to the preſent time.

TRAGACANTH. See Gum *Tragacanth*.

TRAGEDY, a dramatic poem, repreſenting ſome ſignal action performed by illuſtrious perſons, and which has frequently a fatal iſſue or end. See Poetry, Part. II. ſect. I.

TRAGI-comedy, a dramatic piece, partaking both of the nature of tragedy and comedy; the event whereof is not bloody nor unhappy, and wherein is admitted a mixture of leſs ſerious characters.

TRAJAN (Marcus Ulpius), a celebrated Roman emperor, who gained many victories over the Parthians and Germans, puſhing the empire to its utmoſt extent on the eaſt and north ſides. He died at Silinunte, a city of Cilicia, which from him was called *Trajanopolis*, in the year 117.

Trajan's *Column*, a famous hiſtorical column erected in Rome, in honour of the emperor Trajan. It is of the Tuſcan order, though ſomewhat irregular; its height is eight diameters, and its pedeſtal Corinthian: it was built in a large ſquare there called *Forum Romanum*. Its baſe conſiſts of 12 ſtones of an enormous ſize, and is raiſed on a ſocle, or foot, of eight ſteps: withinſide is a ſtair-caſe illuminated with 44 windows. It is 140 feet high, which is 35 feet ſhort of the Antonine column, but the workmanſhip of the former is much more valued. It is adorned from top to bottom with baſſo relievos, repreſenting the great actions of the emperor againſt the Dacians.

TRAJECTUS rheni (anc. geog.), a town of Belgica; diſtant 15 miles by the Itinerary, but ſcarce ſix, from Mannaricium. Its name and ſituation ſhow it to be *Utrecht*, capital of the province of that name. E. Long. 5°, Lat. 52°, 7'. The appellation *Utrecht*, is from *Oud trecht*, the "old paſſage;" *Vetus Trajectus*, as it was called in Charlemagne's days; whence ſome barbarouſly form *Ultrajectum;* more elegantly called *Trajectus Rheni*, or *ad Rhenum*.

TRAIN, a line of gun-powder laid to give fire to a quantity thereof, in order to do execution by blowing up earth, works, buildings, &c.

Train *of Artillery*, includes the great guns and other pieces of ordnance belonging to an army in the field.

Train-*Oil*, the oil procured from the blubber of a whale by boiling.

TRALLIAN (Alexander), a Greek writer on phyſic, a native of Tralles in Lydia, who lived about the middle of the ſixth century. His works are divided into 12 books, in which he treats of diſtempers as they occur, from head to foot; he was the firſt who opened the jugular vein, and that uſed cantharides as a bliſter for the gout. Dr Friend, in his Hiſtory of Phyſic, ſtyles him one of the moſt valuable authors ſince the time of Hippocrates. Though he appears on the whole to have been a rational phyſician, yet there are things in his writings that favour of enthuſiaſm and ſuperſtition.

TRALOS montes, a province of Portugal, called in Latin *Tranſmontana;* becauſe ſituated on the eaſt ſide of a chain of hills that ſeparate it from Entre Minho e Douro. It is bounded on the north by Galicia; on the ſouth by the provinces of Beira and Leon; by the laſt of which it is bounded alſo to the eaſt. Its length from north to ſouth is upwards of 120 miles, and its breadth about 80. It is full of mountains, and produces little corn, but plenty of wine, fruits of ſeveral ſorts, and abundance of game.

TRANSACTION, an accommodation of ſome buſineſs or diſpute between two parties by a mutual and voluntary agreement between them.

TRANSCENDENTAL, or Transcendent, ſomething elevated, or raiſed above other things; which paſſes and tranſcends the nature of other inferior things.

TRANSCRIPT, a copy of any original writing, particularly that of an act or inſtrument inſerted in the body of another.

TRANSFER, in commerce, an act whereby a perſon ſurrenders his right, intereſt, or property in any thing moveable or immoveable to another.

TRANSFORMATION, in general, denotes a change of form, or the aſſuming a new form different from a former one.

TRANSFUSION, the act of pouring a liquor out of one veſſel into another.

Transfusion *of Blood*, an operation by which it was ſome time ago imagined that the age of animals would be renewed, and immortality, or the next thing to it, conferred on thoſe who had undergone it. The methods of performing it were as follow.

1. Take up the carotid artery of the dog, or other animal, whoſe blood is to be expended; ſeparate it from the nerve of the eighth pair, and lay it bare for above an inch. Then make a ſtrong ligature, not to be untied again, on the upper part of the artery; but

an inch below, viz. towards the heart, make another ligature with a running knot, which may be looſened or faſtened as occaſion requires. Having made theſe two knots, draw two threads under the artery, between the two ligatures; then open the artery, and put in a quill, or rather a crooked pipe of ſilver or braſs, ſo ſlender that one end may enter a quill, and having at the other end, which is to go into the artery, a ſmall knob. This being done, make faſt the artery to the pipe by means of the two threads abovementioned, ſtopping the end of the quill with a peg till there be occaſion for opening it. Perform a ſimilar operation on the jugular vein of another dog; and having made a communication between the two animals, let another vein be opened in the animal into which the blood is to be transfuſed, and let the blood run freely out from it. The blood from the animal which is to be killed will run into the jugular vein, and ſupply the place of that which runs out from him; and thus the one dog will be bled to death, while the other ſuffers nothing, but will run about briſkly as ſoon as he is unlooſed and the wounds tied up.

2. In making this experiment, the following circumſtances are to be attended to. 1. That the animals be faſtened at ſuch convenient diſtance from one another that the vein or artery be not ſtretched. 2. If the pulſe fails beyond the quill in the jugular vein, the paſſage will be ſtopped up by coagulated blood, in which caſe the quill muſt be taken out and cleaned.

3. It muſt alſo be conſidered, that after a few minutes the blood of the emittent animal will mix with the other, and run out at the orifice; therefore, in order to be aſſured that the recipient animal has none of his own blood in him, two or three or more animals may be prepared, and all of them bled into one.

4. The moſt probable uſe of this experiment may be, that from ſeveral ſound animals a diſeaſed one may be ſupplied with an entire new maſs of blood, and that without deſtroying or hurting in the leaſt the animals which give it; as an healthy animal could at any time ſpare a pretty large quantity of blood without any apparent detriment.

5. In this manner a maſtiff dog was bled into a curr; and the little dog emitted, at leaſt, double the quantity of blood which he could be ſuppoſed to poſſeſs naturally, when the maſtiff died. The curr being untied, ran away and ſhaked himſelf as if he had been thrown into water.

6. A communication was made between the jugular vein of a calf and a ſheep; the former being deſigned for the emittent, and the latter for the recipient animal. The ſheep loſt 49 ounces, avoirdupois weight, of blood, before any of the calf's blood was received; and at this time it was judged that the ſheep muſt have been very faint. The calf's blood was then ſuffered to run into a porringer for 40 ſeconds, in which time the animal had bled 10 ounces. This was done with a view to aſcertain the quantity which ſhould be received by the ſheep: but as it could not be ſuppoſed that the blood would run ſo faſt into the ſheep's vein as into the porringer, the calf was allowed to bleed for five minutes; when it was ſuppoſed that the ſheep had received as much blood as ſhe had loſt. Being then untied, ſhe ſeemed to have as much ſtrength as before the operation.

7. A ſheep, having bled 45 ounces, was ſupplied with as much or more from a calf; after which ſhe appeared not at all to be hurt by the experiment, but continued luſty and ſtrong.

8. A young land-ſpaniel was bled to 14 or 16 ounces, which was at the ſame time ſupplied by the blood of an old mongrel curr all over-run with the mange; but the ſpaniel was not in the leaſt hurt by the exchange, though the curr was cured of his mange by the evacuation.

9. The blood of a young dog being transfuſed into the veins of an old one almoſt blind with age, the latter began to leap and friſk, though he could hardly ſtir before. What became of him afterwards is not mentioned.

10. The blood of three calves was transfuſed into three dogs; after which all the dogs eat as well as before; and one from whom ſo much blood had been drawn the day before that he could ſcarcely ſtir, having been ſupplied the next morning with the blood of a calf, inſtantly recovered his ſtrength, and ſhowed a ſurpriſing vigour.

11. A bitch, having loſt 30 ounces of blood, and being ſupplied with an equal quantity from ſome other animal, not only ſurvived that experiment, but alſo the loſs of her ſpleen, which was afterwards cut out, without tying up the veſſels.

12. The blood of one lamb was entirely transfuſed into another; after which the lamb that had received the blood ſeemed to be well, and grew like other lambs; but in eight months after the operation it died; whether from the conſequences of the transfuſion or not, cannot be determined.

13. The blood of a lamb was transfuſed into the veins of a ſpaniel 13 years old, who for three years had been ſo deaf that he was inſenſible to the loudeſt noiſe. He walked very little, and was ſo feeble, that being unable to lift up his feet, he only trailed his body forward. After the operation he remained for an hour upon the table, then he leaped down, and went to ſeek his maſter who was in another room. Two days after he went abroad, and ran up and down the ſtreet with other dogs, without trailing his body as he had done formerly. He alſo began to recover his hearing, and in a month's time had recovered it ſo far that he always returned at the voice of his maſter.

14. The blood of four wedders was transfuſed into a horſe 26 years old, who by that means was much invigorated, and had his appetite greatly increaſed.

Lowthorp's Phil. Tranſ. abridged, vol. III. p. 231.

15. The experiment of transfuſing blood into an human vein was performed by Dr Richard Lower and Sir Edmund King, upon one Mr Arthur Coga, on the 23d of November 1667. The manner of doing it is related in the following words. "Having prepared the carotid artery in a young ſheep, we made an inciſion in the vein, obſerving the method above-mentioned without any alteration but in the ſhape of one of our pipes, which was found more convenient for our purpoſe. And having opened the vein in the man's arm with as much eaſe as in common venæſection, we let thence run out ſix or ſeven ounces of blood. Then we planted our ſilver pipe into the ſaid inciſion, and inſerted quills between the two pipes already advanced in the two ſubjects, to convey the arterial blood from the ſheep into the vein of the man. The blood ran

freely into the vein for the ſpace of two minutes at leaſt; ſo that we could feel a pulſe in the ſaid vein juſt beyond the end of the ſilver pipe. The patient ſaid he did not feel the blood hot, (as had been reported of a man upon whom the like transfuſion had been practiſed in France); which may very well be imputed to the length of the pipes, through which the blood paſſed, loſing thereby ſo much of the heat as to come into a temper very agreeable to the venous blood. That the blood did run all the time of thoſe two minutes we conclude from hence. Firſt, Becauſe we felt a pulſe during that time. Secondly, Becauſe when, upon the man's ſaying he thought he had enough, we drew the pipe out of the vein, the ſheep's blood ran through it in a full ſtream; which it would not have done if there had been any ſtop before, in the ſpace of thoſe two minutes, the blood being ſo very apt to coagulate in the pipes upon the leaſt ſtop, eſpecially as the pipes were as long as three quills. From the quantity of blood which run through the pipe into a porringer, we judged that about nine or ten ounces were received into the man's veins. The man, after the operation, as well as in it, found himſelf very well."

Theſe are very favourable teſtimonies for this practice. However, according to Heiſter, it could ſcarce be ventured upon even in the moſt deſperate caſes: "For (ſays he) almoſt all the patients who have been this way treated, have degenerated into a ſtupidity, fooliſhneſs, or a raving or melancholy madneſs; or elſe have been taken off with ſudden death, either in or not long after the operations. Theſe lamentable and fatal conſequences have brought the art of injections and transfuſion into neglect at preſent: ſo that being ſuſpected and condemned by proper judges at Paris, where they moſt flouriſhed, we are told they were in a little time prohibited by a public edict of that parliament."—Yet, a little after, the ſame author adds, "But whether or no this method of injecting proper medicines into the blood may ſucceed, eſpecially in deſperate apoplexies, anginas, hydrophobia, &c. and whether it may not be often uſeful to diſcharge the morbid blood, and transfuſe ſuch as is ſound, or warm milk or broth in its ſtead, ought, in my opinion, to be determined by future and repeated experiment. Burmannus, in his Surgery, (Part III. cap. 31.) tells us, that he has not only performed the operation with ſucceſs on others, but very happily on himſelf, being by this means cured not only of a troubleſome itch, but alſo of a ſtubborn fever."

On the whole, it ſeems yet to be a matter of doubt whether the infuſion of certain liquors, or the transfuſion of blood into the veins, ought to be accounted a poiſonous operation or a medicinal one; but if ever the transfuſion of blood is meddled with, common ſenſe ſeems to indicate that it is the blood of a human creature which ought to be received by one of the ſame ſpecies, and not that of a beaſt.

TRANSYLVANIA, a province of Europe, annexed to Hungary, and bounded on the north by Upper Hungary and Poland, on the eaſt by Moldavia and Walachia, on the ſouth by Walachia, and on the weſt by Upper and Lower Hungary. It is ſurrounded on all parts by high mountains, which, however, are not barren. The inhabitants have as much corn and wine as they want themſelves; and there are rich mines of gold, ſilver, lead, copper, quickſilver, and alum. It has undergone various revolutions; but it now belongs to the houſe of Auſtria. The inhabitants are of ſeveral ſorts of religions; as Papiſts, Lutherans, Calviniſts, Socinians, Photinians, Arians, Greeks, and Mahometans. It is about 162 miles in length, and 150 in breadth. The adminiſtration of affairs is conducted by 12 perſons; namely, three Roman Catholics, three Lutherans, three Calviniſts, and three Socinians. The militia is commanded by the governor, whoſe commiſſion is the more important, as Tranſylvania is the bulwark of Chriſtendom. It is divided into ſeveral ſmall diſtricts, called *palatinates* and *counties*; and is inhabited by three different nations, Saxons, Sicilians, and Hungarians. Hermanſtadt is the capital town.

TRAON, or **TRAW**, a ſtrong and populous town of the republic of Venice, in Dalmatia, with a biſhop's ſee, ſeated on the gulph of Venice, in a ſmall iſland, joined to Terra Firma by a long bridge of wood, and to the iſle of Bua by another of ſtone. It is not very large, but ſtrong and populous. E. Long. 17. 10. N. Lat. 43. 50.

TRAPANI, or **TRAPANO**, a town of Italy in Sicily, ſeated on the weſt ſide of it, in the Val-di-Mazara, with a harbour and a caſtle. It is ſeated in a ſmall peninſula, and built in the form of a ſickle; is a trading place, and the harbour defended by a fort. It is famous for its ſalt-works, and its fiſheries of tunnies and coral. E. Long. 12. 45. N. Lat. 38. 5.

TRANSIT, in aſtronomy, ſignifies the paſſage of any planet juſt by or over a fixed ſtar or the ſun; and of the moon, in particular, covering or moving over any ſtar. See ASTRONMY, n° 193.

TRANSITION, the paſſage of any thing from one place to another.

TRANSITION, in oratory. See ORATORY, n° 38.

TRANSITIVE, in grammar, an epithet applied to ſuch verbs as ſignify an action which paſſes from the ſubject that does it, to or upon another ſubject which receives it. Under the head of verbs tranſitive come what we uſually call *verbs active* and *paſſive*; other verbs, whoſe action does not paſs out of themſelves, are called *neuters*.

TRANSLATION, the act of transferring or removing a thing from one place to another; as we ſay, the tranſlation of a biſhop's ſee, a council, a ſeat of juſtice, &c.

TRANSLATION is alſo uſed for the verſion of a book or writing, out of one language into another.

TRANSMARINE, ſomething that comes from or belongs to the parts beyond ſea.

TRANSMIGRATION, the removal or tranſlation of a whole people into another country, by the power of a conqueror.

TRANSMIGRATION is particularly uſed for the paſſage of the ſoul out of one body into another, being the ſame with what we otherwiſe call METEMPSYCHOSIS.

TRANSMUTATION, the act of changing or transforming one nature into another.

TRANSMUTATION *of Acids*. See CHEMISTRY, n° 170, 192, 219.

TRANSMUTATION *of Metals*. See CHEMISTRY, n° 351, 374, 423.

TRANSOM, among builders, denotes the piece that is framed acroſs a double-light window.

TRANSOMS, in a ſhip, certain beams or timbers extended acroſs the ſtern-poſt of a ſhip, to fortify her after-part, and give it the figure moſt ſuitable to the ſervice for which ſhe is calculated.—Tranſoms are here defined beams or timbers, becauſe they partake equally of the form and purpoſe of thoſe pieces. Thus the deck-tranſom is the aftmoſt or hindmoſt beam of the lower deck, whereon all the deck-planks are rabbeted: and all the tranſoms are fixed athwart the ſtern-poſt, in the ſame manner as the floor-timbers are laid upon the keel. As the floor-timbers alſo, with regard to their general form and arrangement, have a riſing, by which the bottom becomes narrower as it aſcends towards the extremities; ſo the arms of the tranſoms, being gradually cloſer in proportion to their diſtance from the wing-tranſom downwards, give a ſimilar figure to that part of the ſhip, which accordingly becomes extremely narrow, from the counter towards the keel; and this general figure or curve is called the *flight of the tranſoms*.—Although theſe pieces are therefore extremely different in their figures, according to the extent of the angles formed by their branches or horns, each of them has nevertheleſs a double curve, which is partly vertical and partly horizontal, with regard to its ſituation in the ſhip. The former of theſe is called by the artificers the *round-up*, and the latter the *round-aft*.—As the tranſoms fill up the whole ſpace comprehended between the head of the ſtern-poſt above and the aftmoſt floor-timbers below, it is neceſſary to diſtinguiſh them by particular names. Thus the higheſt is called the *wing tranſom;* the next, the *deck-tranſom;* and afterwards follow the firſt, ſecond, and third tranſoms; together with the intermediate ones.—The vertical direction of the arms or angles of the tranſoms, with regard to the ſhip's length, are expreſſed in the plane of *Elevation*, and their horizontal curves are alſo delineated on the plane of *Projection*. See SHIP-*Building*.—The higheſt tranſoms are connected to the ſhip's quarter by knees, which are bolted to thoſe pieces and to the after-timbers.

TRANSPARENCY, in phyſics, a quality in certain bodies, whereby they give paſſage to the rays of light; in contradiſtinction to opacity, or that quality of bodies which renders them impervious to the rays of light.

It has been generally ſuppoſed by philoſophers, that tranſparent bodies have their pores diſpoſed in ſtraight lines, by which means the rays of light have an opportunity of penetrating them in all directions; but ſome experiments in electricity have made it apparent, that by the action of this fluid the moſt opaque bodies, ſuch as ſulphur, pitch, and ſealing-wax, may be rendered tranſparent as glaſs, while yet we cannot ſuppoſe the direction of their pores to be any way altered from what it originally was †. A curious inſtance of an increaſe of tranſparency we have in rubbing a piece of white paper over one that has been written upon or printed: while the white paper is at reſt, the writing or print will perhaps ſcarce appear through it; but when in motion, will be very eaſily legible, and continue ſo till the motion is diſcontinued.

TRANSPOSITION, in grammar, a diſturbing or diſlocating the words of a diſcourſe, or a changing their natural order of conſtruction, to pleaſe the ear by rendering the contexture more ſmooth, eaſy, and harmonious.

TRANSPOSITION, in muſic. See MUSIC, par. 236. the note.

TRANSUBSTANTIATION, in theology, the converſion or change of the ſubſtance of the bread and wine in the euchariſt, into the body and blood of Jeſus Chriſt; which the Romiſh church ſuppoſe to be wrought by the conſecration of the prieſt.

TRANSVERSALIS, in anatomy. See there, *Table of the Muſcles*.

TRANSVERSE, ſomething that goes acroſs another from corner to corner: thus bends and bars in heraldry are tranſverſe pieces or bearings; the diagonals of a parallellogram or a ſquare are tranſverſe lines.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines.

TRAPEZIUS, in anatomy. See there, *Table of the Muſcles*.

TRAPP (Dr Joſeph), an Engliſh divine of excellent parts and learning, was born at Cherington in Gloceſterſhire, of which place his father was rector in 1579. He was the firſt perſon choſen to the profeſſorſhip of poetry founded at Oxford by Dr Birkhead; and publiſhed his lectures under the title of *Prælectiones Poeticæ*, in which he laid down excellent rules for every ſpecies of poetry in very elegant Latin. He ſhowed afterwards, however, by his tranſlation of Virgil, that a man may be able to direct who cannot execute, and may have the critic's judgment without the poet's fire. In the early part of his life Dr Trapp is ſaid to have been chaplain to the father of the famous lord Bolingbroke: he obtained the living of Chriſt-church in Newgate Street, and St Leonard's, Foſter-lane, London; and his very high-church principles probably obſtructed his farther preferment. He publiſhed ſeveral occaſional poems, a tragedy called *Abramule*, tranſlated Milton's Paradiſe Loſt into Latin verſe, and died in 1747.

TRAVERSE, or TRANSVERSE, in general, denotes ſomething that goes athwart another; that is, croſſes and cuts it obliquely.

TRAVERSE, in navigation, implies a compound courſe, or an aſſemblage of various courſes, lying at different angles with the meridian. Thus fig. 6. Plate CCLXXVI. exhibits the traverſes formed by a ſhip, when making an oblique progreſſion againſt the direction of the wind, as explained in the article TACKING.

The true courſe and diſtance reſulting from this diverſity of courſes is diſcovered by collecting the difference of latitude and departure of each courſe, and reducing the whole into one departure and one difference of latitude, according to the known rules of trigonometry. This reduction will immediately aſcertain the baſe and perpendicular; or, in other words, will give the difference of latitude and departure to diſcover the courſe and diſtance. See NAVIGATION.

TRAVERSE-*Board*, a thin circular piece of board, marked with all the points of the compaſs, and having eight holes bored in each, and eight ſmall pegs hanging from the centre of the board. It is uſed to determine the different courſes run by a ſhip during the

† See *Electricity*, nº 4.

the period of the watch, and to aſcertain the diſtance of each courſe. This implement is particularly uſeful in light and variable winds, at which time the helmſman marks the courſe every half hour, by fixing a peg in that point of the compaſs whereon the ſhip had advanced. Thus, if the wind is northerly at the beginning of the watch, the ſhip, being cloſe-hauled on the larboard tack, will ſteer W. N. W. If, after the firſt half hour, the wind changes to N. by W. the ſhip will fall off to W. by N. both of theſe courſes are marked by the helmſman upon the traverſe-board, by putting in one peg for every half hour on which ſhe ſteers the ſame courſe; as, one peg into W. N. W. and two pegs into W. by N. if ſhe ſails an hour on the latter courſe; and ſo on. The lee-way and variation of the compaſs are afterwards allowed by the pilot, on ſumming up the whole,

TREACLE. See THERIACA.—Some alſo give the name *treacle* to melaſſes.

TREASON (*proditio*), in its very name (which is borrowed from the French) imports a betraying, treachery, or breach of faith. It therefore happens only between allies, ſaith the Mirror of Juſtice: for treaſon is indeed a general appellation, made uſe of by the law, to denote not only offences againſt the king and government; but alſo that accumulation of guilt which ariſes whenever a ſuperior repoſes a confidence in a ſubject or inferior, between whom and himſelf there ſubſiſts a natural, a civil, or even a ſpiritual relation; and the inferior ſo abuſes that confidence, ſo forgets the obligations of duty, ſubjection, and allegiance, as to deſtroy the life of any ſuch ſuperior or lord. This is looked upon as proceeding from the ſame principle of treachery in private life, as would have urged him who harbours it to have conſpired in public againſt his liege lord and ſovereign: and therefore for a wife to kill her lord or huſband, a ſervant his lord or maſter, and an eccleſiaſtic his lord or ordinary; theſe, being breaches of the lower allegiance, of private and domeſtic faith, are denominated *petit* treaſons. But when diſloyalty ſo rears its creſt, as to attack even majeſty itſelf, it is called by way of eminent diſtinction *high-treaſon*, *alta proditio*; being equivalent to the *crimen læſæ majeſtatis* of the Romans, as Glanvil denominates it alſo in our Engliſh law.

High-TREASON. As this is the higheſt civil crime, which (conſidered as a member of the community) any man can poſſibly commit, it ought therefore to be the moſt preciſely aſcertained. For if the crime of high-treaſon be indeterminate, this alone (ſays the preſident Monteſquieu) is ſufficient to make any government degenerate into arbitrary power. And yet, by the ancient common law, there was a great latitude left in the breaſt of the judges, to determine what was treaſon, or not ſo: whereby the creatures of tyrannical princes had opportunity to create abundance of conſtructive treaſons; that is, to raiſe, by forced and arbitrary conſtructions, offences into the crime and puniſhment of treaſon, which never were ſuſpected to be ſuch. But to prevent the inconveniences which began to ariſe in England from this multitude of conſtructive treaſons, the ſtatute 25 Edw. III. c. 2. was made; which defines what offences only for the future ſhould be held to be treaſon: in like manner as the *lex Julia majeſtatis* among the Romans, promulgated by Auguſtus Cæſar, comprehended all the ancient laws that had before been enacted to puniſh tranſgreſſors againſt the ſtate. This ſtatute muſt therefore be our guide, in order to examine into the ſeveral ſpecies of high-treaſon. And we ſhall find that it comprehends all kinds of high-treaſon under ſeven diſtinct branches.

"1. When a man doth compaſs or imagine the death of our lord the king, of our lady his queen, or of their eldeſt ſon and heir." Under this deſcription it is held that a queen-regnant (ſuch as queen Elizabeth and queen Anne) is within the words of the act, being inveſted with royal power and entitled to the allegiance of her ſubject: but the huſband of ſuch a queen is not compriſed within theſe words; and therefore no treaſon can be committed againſt him.

Let us next ſee what is a *compaſſing* or *imagining* the death of the king, &c. Theſe are ſynonymous terms: the word *compaſs* ſignifying the purpoſe or deſign of the mind or will; and not, as in common ſpeech, the carrying ſuch deſign to effect. And therefore an accidental ſtroke, which may mortally wound the ſovereign, *per infortunium*, without any traiterous intent, is no treaſon: as was the caſe of Sir Walter Tyrrel, who, by the command of king William Rufus, ſhooting at a hart, the arrow glanced againſt a tree, and killed the king upon the ſpot. But as this compaſſing or imagination is an act of the mind, it cannot poſſibly fall under any judicial cognizance, unleſs it be demonſtrated by ſome open or overt act. And yet the tyrant Dionyſius is recorded to have executed a ſubject barely for dreaming that he had killed him; which was held for a ſufficient proof, that he had thought thereof in his waking hours. But ſuch is not the temper of the Engliſh law; and therefore in this, and the three next ſpecies of treaſon, it is neceſſary that there appear an open or overt act of a more full and explicit nature, to convict the traitor upon. The ſtatute expreſsly requires, that the accuſed "be thereof upon ſufficient proof attainted of ſome open act by men of his own condition." Thus, to provide weapons or ammunition for the purpoſe of killing the king, is held to be a palpable overt act of treaſon in imagining his death. To conſpire to impriſon the king by force, and move towards it by aſſembling company, is an overt act of compaſſing the king's death; for all force, uſed to the perſon of the king, in its conſequence may tend to his death, and is a ſtrong preſumption of ſomething worſe intended than the preſent force, by ſuch as have ſo far thrown off their bounden duty to their ſovereign: it being an old obſervation, that there is generally but a ſhort interval between the priſons and the graves of princes.

Blackſt. Comment.

How far mere words ſpoken by an individual, and not relative to any treaſonable act or deſign then in agitation, ſhall amount to treaſon, has been formerly matter of doubt. We have two inſtances in the reign of Edward IV. of perſons executed for treaſonable words: the one a citizen of London, who ſaid he would make his ſon heir of the crown, being the ſign of the houſe in which he lived; the other a gentleman, whoſe favourite buck the king killed in hunting, whereupon he wiſhed it, horns and all, in the king's belly. Theſe were eſteemed hard caſes: and the chief juſtice Markham rather choſe to leave his place than aſſent to the latter judgment. But now it ſeems clearly to be agreed, that by the common law and the ſtatute of Edw. III. words ſpoken amount only to a high miſdemeanor, and no treaſon. For they may be ſpoken in heat, without any intention; or be miſtaken, perverted, or miſremembered by the hearers; their meaning depends always on their connection with other words and things; they may ſignify differently even according to the tone of voice with which they are delivered; and ſometimes ſilence itſelf is more expreſſive than any diſcourſe. As therefore there can be nothing more equivocal and ambiguous than words, it would indeed be unreaſonable to make them amount to high-treaſon. And accordingly, in 4 Car. I. on a reference to all the judges, concerning ſome very atrocious words ſpoken by one Pyne, they certified to the king, “that though the words were as wicked as might be, yet they were no treaſon: for unleſs it be by ſome particular ſtatute, no words will be treaſon.” If the words be ſet down in writing, it argues more deliberate intention; and it has been held, that writing is an overt act of treaſon; for *ſcribere eſt agere*. But even in this caſe the bare words are not the treaſon, but the deliberate act of writing them. And ſuch writing, though unpubliſhed, has in ſome arbitrary reigns convicted its author of treaſon: particularly in the caſes of one Peacham a clergyman, for treaſonable paſſages in a ſermon never preached; and of Algernon Sidney, for ſome papers found in his cloſet: which, had they been plainly relative to any previous formed deſign of dethroning or murdering the king, might doubtleſs have been properly read in evidence as overt acts of that treaſon which was ſpecially laid in the indictment; but being merely ſpeculative, without any intention (ſo far as appeared) of making any public uſe of them, the convicting the authors of treaſon upon ſuch an inſufficient foundation has been univerſally diſapproved. Peacham was therefore pardoned: and though Sidney indeed was executed, yet it was to the general diſcontent of the nation; and his attainder was afterwards reverſed by parliament. There was then no manner of doubt, but that the publication of ſuch a treaſonable writing was a ſufficient overt act of treaſon at the common law; though of late even that has been queſtioned.

2. The ſecond ſpecies of treaſon is, “if a man do violate the king's companion, or the king's eldeſt daughter unmarried, or the wife of the king's eldeſt ſon and heir.” By the king's companion is meant his wife; and by violation is underſtood carnal knowledge, as well without force as with it: and this is high-treaſon in both parties, if both be conſenting; as ſome of the wives of Henry VIII. by fatal experience evinced. The plain intention of this law is to guard the blood-royal from any ſuſpicion of baſtardy, whereby the ſucceſſion to the crown might be rendered dubious: and therefore, when this reaſon ceaſes, the law ceaſes with it; for to violate a queen or princeſs dowager is held to be no treaſon: in like manner as, by the feodal law, it was a felony, and attended with a forfeiture of the fief, if the vaſſal vitiated the wife or daughter of his lord; but not ſo if he only vitiated his widow.

3. The third ſpecies of treaſon is, “if a man do levy war againſt our lord the king in his realm.” And this may be done by taking arms, not only to dethrone the king, but under pretence to reform religion, or the laws, or to remove evil counſellors, or other grievances whether real or pretended. For the law does not, neither can it permit any private man, or ſet of men, to interfere forcibly in matters of ſuch high importance; eſpecially as it has eſtabliſhed a ſufficient power for theſe purpoſes in the high court of parliament: neither does the conſtitution juſtify any private or particular reſiſtance for private or particular grievances; though, in caſes of national oppreſſion, the nation has very juſtifiably riſen as one man, to vindicate the original contract ſubſiſting between the king and his people.

4. “If a man be adherent to the king's enemies in his realm, giving to them aid and comfort in the realm, or elſewhere,” he is alſo declared guilty of high-treaſon. This muſt likewiſe be proved by ſome overt act; as by giving them intelligence, by ſending them proviſions, by ſelling them arms, by treacherouſly ſurrendering a fortreſs, or the like.

5. “If a man counterfeit the king's great or privy ſeal,” this is alſo high-treaſon. But if a man takes wax bearing the impreſſion of the great ſeal off from one patent and fixes it to another, this is held to be only an abuſe of the ſeal, and not a counterfeiting of it: as was the caſe of a certain chaplain, who in ſuch a manner framed a diſpenſation for non-reſidence. But the knaviſh artifice of a lawyer much exceeded this of the divine. One of the clerks in chancery glued together two pieces of parchment; on the uppermoſt of which he wrote a patent, to which he regularly obtained the great ſeal, the label going through both the ſkins. He then diſſolved the cement, and taking off the written patent, on the blank ſkin wrote a freſh patent of a different import from the former, and publiſhed it as true. This was held no counterfeiting of the great ſeal, but only a great miſpriſion; and Sir Edward Coke mentions it with ſome indignation, that the party was living at that day.

6. The ſixth ſpecies of treaſon under this ſtatute is, “if a man counterfeit the king's money; and if a man bring falſe money into the realm counterfeit to the money of England, knowing the money to be falſe, to merchandiſe and make payment withal.” As to the firſt branch, counterfeiting the king's money; this is treaſon, whether the falſe money be uttered in payment or not. Alſo if the king's own minters alter the ſtandard or alloy eſtabliſhed by law, it is treaſon. But gold and ſilver money only are held to be within this ſtatute. With regard likewiſe to the ſecond branch, importing foreign counterfeit money in order to utter it here; it is held that uttering it, without importing it, is not within the ſtatute.

7. The laſt ſpecies of treaſon aſcertained by this ſtatute is, “if a man ſlay the chancellor, treaſurer, or the king's juſtices of the one bench or the other, juſtices in eyre, or juſtices of aſſize, and all other juſtices aſſigned to hear and determine, being in their places doing their offices.” Theſe high magiſtrates, as they repreſent the king's majeſty during the execution of their offices, are therefore for the time equally regarded by the law. But this ſtatute extends only to the actual killing of them; and not to wounding, or a bare attempt to kill them. It extends alſo only to the officers therein ſpecified; and therefore the barons of the exchequer, as ſuch, are not within the protection of this act: but the lord keeper or commiſſioners of the great ſeal now ſeem to be within it, by

virtue of the ſtatutes 5 Eliz. c. 18. and 1 W. and M. c. 21.

Temporary ſtatutes of late times enacted, have made ſome other offences treaſonable, as relating to Papiſts and the Proteſtant ſucceſſion.

The puniſhment of high-treaſon in general is very ſolemn and terrible. 1. That the offender be drawn to the gallows, and not be carried or walk; though uſually (by connivance, at length ripened by humanity into law) a ſledge or hurdle is allowed, to preſerve the offender from the extreme torment of being dragged on the ground or pavement. 2. That he be hanged by the neck, and then cut down alive. 3. That his entrails be taken out, and burned, while he is yet alive. 4. That his head be cut off. 5. That his body be divided into four parts. 6. That his head and quarters be at the king's diſpoſal.

The king may, and often doth, diſcharge all the puniſhment except beheading, eſpecially where any of noble blood are attainted. For beheading being part of the judgment, that may be executed, though all the reſt be omitted by the king's command. But where beheading is no part of the judgment, as in murder or other felonies, it hath been ſaid that the king cannot change the judgment, although at the requeſt of the party, from one ſpecies of death to another.

In the caſe of coining, which is a treaſon of a different complection from the reſt, the puniſhment is milder for male offenders; being only to be drawn and hanged by the neck till dead. But in treaſons of every kind the puniſhment of women is the ſame, and different from that of men. For as the natural modeſty of the ſex forbids the expoſing and publicly mangling their bodies, their ſentence (which is to the full as terrible to ſenſe as the other) is to be drawn to the gallows, and there to be burned alive.

For the conſequences of this judgment, ſee ATTAINDER, FORFEITURE, and CORRUPTION *of Blood*.

Petit TREASON, according to the ſtatute 25 Edward III. c. 2. may happen three ways: by a ſervant killing his maſter, a wife her huſband, or an eccleſiaſtical perſon (either ſecular or regular) his ſuperior, to whom he owes faith and obedience. See TREASON. A ſervant who kills his maſter whom he has left, upon a grudge conceived againſt him during his ſervice, is guilty of petit treaſon: for the traiterous intention was hatched while the relation ſubſiſted between them, and this is only an execution of that intention. So if a wife be divorced *a menſa et thoro*, ſtill the *vinculum matrimonii* ſubſiſts; and if ſhe kills ſuch divorced huſband, ſhe is a traitreſs. And a clergyman is underſtood to owe canonical obedience to the biſhop who ordained him, to him in whoſe dioceſe he is beneficed, and alſo to the metropolitan of ſuch ſuffragan or dioceſan biſhop; and therefore to kill any of theſe is petit treaſon. As to the reſt, whatever has been ſaid with reſpect to wilful MURDER, is alſo applicable to the crime of petit treaſon, which is no other than murder in its moſt odious degree; except that the trial ſhall be as in caſes of high-treaſon, before the improvements therein made by the ſtatutes of William III. But a perſon indicted of petit treaſon may be acquitted thereof, and found guilty of manſlaughter or murder: and in ſuch caſe it ſhould ſeem that two witneſſes are not neceſſary, as in caſe of petit treaſon they are. Which crime is alſo diſtinguiſhed from murder in its puniſhment.

The puniſhment of petit treaſon in a man, is to be drawn and hanged, and in a woman to be drawn and burned: the idea of which latter puniſhment ſeems to have been handed down to us from the laws of the ancient Druids, which condemned a woman to be burned for murdering her huſband; and it is now the uſual puniſhment for all ſorts of treaſons committed by thoſe of the female ſex. Perſons guilty of petit treaſon were firſt debarred the benefit of clergy by ſtatute 12 Henry VII. c. 7. which has ſince been extended to their aiders, abettors, and counſellors, by ſtatutes 23 Henry VIII. c. 1. and 4 & 5 P. and M. c. 4.

TREASURE, in general, denotes a ſtore or ſtock of money in reſerve.

TREASURE-*Trove*, in law, derived from the French word *trover*, "to find," called in Latin *theſaurus inventus*, is where any money or coin, gold, ſilver, plate, or bullion, is found hidden in the earth, or other private place, the owner thereof being unknown; in which caſe the treaſure belongs to the king: but if he that hid it be known, or afterwards found out, the owner and not the king is entitled to it. Alſo if it be found in the ſea, or upon the earth, it doth not belong to the king but the finder, if no owner appears. So that it ſeems it is the hiding, not the abandoning of it, that gives the king a property: Bracton defining it, in the words of the civilians, to be *vetus depoſitio pecuniæ*. This difference clearly ariſes from the different intentions which the law implies in the owner. A man that hides his treaſure in a ſecret place, evidently does not mean to relinquiſh his property, but reſerves a right of claiming it again when he ſees occaſion; and if he dies and the ſecret alſo dies with him, the law gives it the king in part of his royal revenue. But a man that ſcatters his treaſure into the ſea, or upon the public ſurface of the earth, is conſtrued to have abſolutely abandoned his property, and returned it into the common ſtock, without any intention of reclaiming it: and therefore it belongs, as in a ſtate of nature, to the firſt occupant or finder; unleſs the owner appear and aſſert his right, which then proves that the loſs was by accident, and not with an intent to renounce his property.

Formerly all treaſure-trove belonged to the finder; as was alſo the rule of the civil law. Afterwards it was judged expedient for the purpoſes of the ſtate, and particularly for the coinage, to allow part of what was found to the king, which part was aſſigned to be all hidden treaſure; ſuch as is caſually loſt and unclaimed, and alſo ſuch as is deſignedly abandoned, ſtill remaining the right of the fortunate finder. And that the prince ſhall be entitled to this hidden treaſure is now grown to be, according to Grotius, *jus commune, et quaſi gentium*: for it is not only obſerved, he adds, in England, but in Germany, France, Spain, and Denmark. The finding of depoſited treaſure was much more frequent, and the treaſures themſelves more conſiderable, in the infancy of our conſtitution than at preſent. When the Romans, and other inhabitants of the reſpective countries which compoſed their empire, were driven out by the northern nations, they concealed their money under ground, with a view of reſorting to it again when the heat of the irruption ſhould be over, and the invaders driven back to their deſarts. But as this never happened, the treaſures were never claimed; and on the death of the owners the ſecret alſo died along with them. The conquering generals being aware of the value of theſe hidden mines, made it highly penal to ſecrete them from the public ſervice. In England therefore, as among the feudiſts, the puniſhment of ſuch as concealed from the king the finding of hidden treaſure was formerly no leſs than death; but now it is only fine and impriſonment.

TREASURER, an officer to whom the treaſure of a prince or corporation is committed to be kept and duly diſpoſed of.

The lord high treaſurer of Great Britain, or firſt commiſſioner of the treaſury, when in commiſſion, has under his charge and government all the king's revenue which is kept in the exchequer. He holds his place during the king's pleaſure; being inſtituted by the delivery of a white ſtaff to him. He has the check of all the officers employed in collecting the cuſtoms and royal revenues: and in his gift and diſpoſition are all the offices of the cuſtoms in the ſeveral ports of the kingdom; eſcheators in every county are nominated by him; he alſo makes leaſes of the lands belonging to the crown.

TREASURY, the place wherein the revenues of a prince are received, preſerved, and diſburſed.

Lords of the TREASURY. In lieu of one ſingle director and adminiſtrator of his Majeſty's revenues under the title of *lord high treaſurer*, it is at preſent thought proper to put that office in commiſſion, *i. e.* to appoint ſeveral perſons to diſcharge it with equal authority, under the title of *lords commiſſioners of the treaſury*.

TREATISE, a ſet diſcourſe in writing on any ſubject.

TREATY, a covenant between two or more nations; or the ſeveral articles or conditions ſtipulated and agreed upon between ſovereign powers.

TREBLE, in muſic, the higheſt or moſt acute of the four parts in ſymphony, or that which is heard the cleareſt and ſhrilleſt in a concert.

TREBUCHET, TREBUCKET, *Tribuch*, (*Terbichetum*), a tumbrel or cucking ſtool. Alſo a great engine to caſt ſtones to batter walls.

TREE, the firſt and largeſt of the vegetable kind, conſiſting of a ſingle trunk, out of which proceed branches and leaves.—Trees are by Linnæus claſſed in the ſeventh family of the vegetable kingdom, and are diſtinguiſhed from ſhrubs in that their ſtems come up with buds on them: but this diſtinction holds not univerſally, there being rarely any buds on the large trees in India.

It has been directed by Dr Hales and Mr Evelyn to waſh and rub the ſtems of trees in order to promote their growth; and in the 67th vol. of the Philoſ. Tranſact. we have an account of the ſucceſs of this method. Mr Marſham, in his letter to the lord biſhop of Bath and Wells, informs us, that a tree ſo waſhed increaſed fully double the quantity in girth that an unwaſhed tree did. It was between 13 and 14 feet in height. He waſhed it from the ground to the beginning of the head, firſt uſing water and a ſtiff ſhoe-bruſh until the ſtem was well cleared from moſs and dirt, and then uſing only a coarſe flannel. The waſhing was begun as ſoon as the buds began to ſwell, and continued three four or five times a-week during all the dry time of the ſpring and forepart of the ſummer; but ſeldom after rains became frequent.—The ſame gentleman informs us, that a ſhort and ſpreading tree, having ample room, will increaſe twice or three times, and perhaps four times, as much as a tall ſmall-headed tree of the ſame age that ſtands near other trees.

TREFOIL, in botany. See TRIFOLIUM.

TREMELLA, in botany, a genus of aquatic plants of a middle nature between the alga and conferva, being of a pellucid and membranaceous, and frequently gelatinous, nature. There are nine ſpecies; the moſt remarkable of which is the plicata undulata, or gelly rain tremella, found in paſtures, and by the ſides of gravel-walks in gardens after rains; not uncommon in ſpring, ſummer, and autumn. It is a membranaceous, pellucid, and gelatinous ſubſtance, without any viſible root; of a yellowiſh dull green colour; aſſuming various forms, either round, angular, plaited or folded together irregularly, like the inteſtines or a pocket-handkerchief, an inch or two or more in diameter: ſoft to the touch when moiſt; but thin, membranaceous, and brittle, when dry; and of a black fuſcous colour.—The ancient alchemiſts called this vegetable *the flowers of heaven*, and imagined that from it they would procure the univerſal menſtruum: but all their reſearches ended in diſcovering that by diſtillation it yielded ſome phlegm, volatile ſalt, and empyreumatic oil. It has been extolled in wounds, ulcers, &c. but no regard is ever paid to it by judicious practitioners.

TREMELLIUS (Emmanuel), a Jew by birth, was born at Ferrara in the year 1510. He was ſo carefully educated as to become a great maſter of the Hebrew tongue; but was converted to Chriſtianity by the celebrated Peter Martyr. After travelling to Germany and England, he was made profeſſor of the Hebrew tongue, firſt at Heidelberg, and then at Sedan, where he died in 1580. He tranſlated the Hebrew Bible and Syriac Teſtament into Latin; in the former he was aſſiſted by Junius, who afterward corrected the ſecond edition in 1587. This work was received by the Proteſtant churches with great approbation.

TREMOR, an involuntary ſhaking, chiefly of the hands and head, ſometimes of the feet, and ſometimes of the tongue and heart.—Tremors ariſing from a too free uſe of ſpirituous liquors require the ſame treatment as palſies.

TRENCHES, in fortification, are ditches cut by the beſiegers, that they may approach the more ſecurely to the place attacked; whence they are alſo called *lines of approach*.

TRENCHARD (John), an eminent Engliſh writer, was deſcended from an ancient family, and born in the year 1669. He had a liberal education; and was bred to the law, in which he made great progreſs: but politics, and the place of commiſſioner of the forfeited eſtates of Ireland, which he enjoyed in the reign of king William, took him from the bar. He began early to diſtinguiſh himſelf by his writings: for, in 1697, he publiſhed, An argument ſhowing that a ſtanding army is inconſiſtent with a free government,

ment, and abſolutely deſtructive to the conſtitution of the Engliſh monarchy; and the year following he publiſhed a ſhort hiſtory of the ſtanding armies in England: which gave occaſion to ſeveral anſwers. In 1720, Mr Trenchard, in conjunction with Mr Thomas Gordon, began to publiſh in the London, and afterwards in the Britiſh Journal, a ſeries of letters, under the name of *Cato*, upon various public and important ſubjects, which were continued for near three years with great reputation, and afterwards collected and publiſhed by Mr Gordon in 4 vols 12mo, under the title of *Cato's Letters*. Mr Trenchard was member of parliament for Taunton in Somerſetſhire; and died in 1723. Mr Gordon gives him the character of being "one of the worthieſt, one of the ableſt, one of the moſt uſeful men, that ever any country was bleſſed withal."

TRENT (biſhopric of), a province of Germany, in the circle of Auſtria, near the frontiers of Italy, is bounded on the north by Tirol; on the eaſt, by the Feltrino and Belluneſe; on the ſouth, by Vicentino, the Veroneſe, Breſciano, and the lake de Garda; and on the weſt, by the Breſciano and the lake de Garda. The ſoil is ſaid to be pretty fruitful, and to abound in wine and oil.

Trent, a city of Germany, and capital of the biſhopric of that name; is a very ancient place, and ſtands in a fertile and pleaſant plain, in the midſt of of the high mountains of the Alps. The river Adige waſhes its walls, and, creeping for ſome time among the hills, runs ſwiftly into Italy. Trent has three conſiderable churches, the principal of which is the cathedral: this is a very regular piece of architecture. The church of St Maria Major, is all of red and white marble; and is remarkable for being the place where the famous council of Trent was held, whoſe deciſions are now the ſtanding rule of the Romiſh church. E. Long. 11. 5. N. Lat. 46. 10.

Trent, one of the largeſt rivers in England, which riſes in the Moorland of Staffordſhire, and runs ſouth-weſt by Newcaſtle-under-Line; and afterwards dividing the county in two parts, runs to Burton, then to Nottingham and Newark; and ſo continuing its courſe due north to Gainſborough on the confines of Lincolnſhire, it joins ſeveral rivers, and falls into the Humber.

TREPANNING, in ſurgery. See there, n° 511. *et ſeq.*

TRES TABERNÆ, (anc. geog.) a place in Latium, lying on the Via Appia, on the left or ſouth ſide of the river Aſtura, to the north of the Paludes Pomptinæ. Its ruins now ſeen near Ciſterna, a village in the Campagna di Roma, twenty-one miles from Rome, whence the Chriſtians went out to meet St Paul.

TRESPASS, in law, ſignifies any tranſgreſſion of the law, under treaſon, felony, or miſpriſion of either: but it is commonly uſed for any wrong or damage that is done by one private perſon to another, or to the king in his foreſt.

TRESSLE-trees, in ſhip-building, two ſtrong bars of timber fixed horizontally on the oppoſite ſides of the lower maſt-head, to ſupport the frame of the top and the weight of the top-maſt.

TRESSURE, in heraldry, a diminutive of an orle, uſually held to be half the breadth thereof.

TRET, in commerce, an allowance made for the waſte or the dirt that may be mixed with any commodity; which is always four pounds in every 104 pounds weight.

TREVERI, or **Treviri**, (anc. geog.) an ancient and a powerful people both in horſe and foot, according to Cæſar; extending far and wide between the Meuſe and the Rhine. In the lower age their capital, called *Auguſta Trevirorum*, aſſumed, after the manner of thoſe times, the name of the people, *Treviri*. Now *Triers* or *Treves*, capital of the electorate of that name, ſituate on the Moſelle. E. Long. 6. 10. Lat. 49. 55.

TREVES, an archbiſhopric of Germany; lies between Cologne, Berg, and Juliers on the north, Lorrain and the Palatinate on the ſouth, Luxemburg on the weſt, and the Wetterau on the eaſt. Its extent from ſouth to north is about 80 miles; but its breadth is very unequal. On the banks of the Rhine and Moſelle, the country is populous, and fruitful in corn and wine; but elſewhere mountainous and woody, yet abounding in game, and in metals and minerals of various kinds. It is watered not only by the Rhine and Moſelle, but alſo by the Saar and Kyll, and contains 28 towns. The ſtates conſiſt of the prelates or abbots, with the repreſentatives of the clergy, and of certain towns. The inhabitants are all Papiſts, except in ſuch places as the elector poſſeſſes in common with other princes, where there are ſome Proteſtants. Under the archbiſhop are five archdeacons, and, ſubordinate to theſe, 20 provincial deans. The church of Treves, is commonly accounted the moſt ancient of Germany. The chapter which elects the archbiſhop from among themſelves, and makes him ſwear to a capitulation, conſiſts of 16 capitulary canons, who are all of noble extraction, beſides 24 others, who are domiceled. At every new election, the pope receives large ſums for confirmation, the pallium, and for annats. The archiepiſcopal title is, By the grace of God, archbiſhop of Treves, of the holy Roman empire throughout Gaul and the kingdom of Arles, arch-chancellor and elector, and alſo adminiſtrator of Prum. He is the ſecond elector in rank, and at the election of an emperor has the firſt voice. His matricular aſſeſſment is 26 horſe and two-thirds, and 122 foot two-thirds, or 806 florins 40 kruitzers. In the diets of the circle he has the ſecond place, and nominates one aſſeſſor of the chamber judicatory, towards the maintenance of which he contributes, each term, 811 rix-dollars 58 kruitzers. The tolls on the Moſelle and Rhine, his demeſnes, and his office of noble guardian of the minors, with the taxes he lays on his ſubjects, are ſuppoſed to bring him in about 70,000 *per annum*. For the government of this electorate and the adminiſtration of juſtice, beſides the regency and reviſion-court, there are the two aulic judicatories, to which appeals lie from the inferior courts. There are alſo two ſpiritual high-courts. The hereditary officers are the marſhal, the chamberlain, the ſewer, and cupbearer. Among other prerogatives, this elector has power to baniſh excommunicated perſons out of the empire if they do not reconcile themſelves to the church within a-year, and to take poſſeſſion of the eſtates of minors till they are of age. He has alſo a right to reunite all the fiefs of his dioceſe, upon failure of heirs, to the domains of his church. His ſubjects may appeal to the chamber of the empire in all cauſes above a thouſand florins. The regular troops he maintains, beſides a militia, amount to between 1100 and 1200, beſides a life-guard of 40 men.

TREVES or *Triers*, in Latin *Trevere*, *Trevers*, *Treviris*, or *Auguſta Trevirorum*, the capital of a German archbiſhopric of the ſame name; ſtands 60 miles weſt of Mentz, 52 ſouth of Cologne, and 82 north Straſburg. This city vies with moſt in Europe for antiquity, having been a large and noted town before Auguſtus ſettled a colony in it. It was free and imperial till the year 1560, when it was ſurpriſed and ſubjected by its archbiſhop James III. It ſtands on the Moſelle, over which it has a fair ſtone bridge. The cathedral is a large building; and near it ſtands the elector's palace, which not long ago was rebuilt. Here are three collegiate and five pariſh-churches, three colleges of Jeſuits, thirteen monaſteries and nunneries, an univerſity founded in 1472, a houſe of the Teutonic order, and another of that of Malta, with ſome remains of the ancient Roman theatre. Roman coins and medals are often found in the ruins of the old city. In the cathedral they pretend to have our Saviour's coat and St Peter's ſtaff, to which they aſcribe miracles. The private houſes here are mean; and the city is neither well fortified, nor inhabited. E. Long. 6. 10. N. Lat. 49. 58.

TRIAL, in law, the examination of a cauſe according to the laws of the land before a proper judge; or it is the manner and order obſerved in the hearing and determining of cauſes. See SUIT, WRIT, PROCESS, PLEADINGS, ISSUE (in APPENDIX), PROSECUTION, ARRAIGNMENT, and PLEA.

Trials are either civil or criminal.

I. *Civil* TRIALS. The ſpecies of trials in civil caſes are ſeven: By *record;* by *inſpection*, or examination; by *certificate;* by *witneſſes;* by wager of *battel;* by wager of *law;* and by *jury*. The firſt ſix are only had in certain ſpecial or excentrical caſes, where the trial by jury would not be ſo proper or effectual: See them explained under their reſpective titles. The nature of the laſt, that principal criterion of truth in the law of England, ſhall be explained in this article.

The method of trial by jury, called alſo the trial *per pais*, or *by the country*, hath been uſed time out of mind in this nation, and ſeems to have been coeval with the firſt civil government thereof. Its uſe, though for a time greatly impaired and ſhaken by the introduction of the Norman trial by battel, was always ſo highly eſteemed and valued by the people, that no conqueſt, no change of government, could ever prevail to aboliſh it: and in *magna charta* it is more than once inſiſted on as the principal bulwark of our liberties.

Trials by jury in civil cauſes are of two kinds; *extraordinary* and *ordinary*.

1. The firſt ſpecies of *extraordinary* trial by jury is that of the grand aſſiſe, which was inſtituted by king Henry II. in parliament, by way of alternative offered to the choice of the tenant or defendant in a writ of right, inſtead of the barbarous and unchriſtian cuſtom of duelling. For this purpoſe a writ *de magna aſſiſa eligenda* is directed to the ſheriff, to return four knights, who are to elect and chooſe 12 others to be joined with them; and theſe all together form the grand aſſiſe, or great jury, which is to try the matter of right, and muſt now conſiſt of 16 jurors. Another ſpecies of extraordinary juries, is the jury to try an attaint; which is a proceſs commenced againſt a former jury for bringing a falſe verdict. See the article ATTAINT.

2. With regard to the *ordinary* trial by jury in civil caſes, the moſt clear and perſpicuous way of treating it will be by following the order and courſe of the proceedings themſelves.

When therefore an iſſue is joined by theſe words, "And this the ſaid A prays may be inquired of by the country;" or, "And of this he puts himſelf upon the country, and the ſaid B does the like;" the court awards a writ of *venire facias* upon the roll or record, commanding the ſheriff "that he cauſe to come here, on ſuch a day, twelve free and lawful men, *liberes et legales homines*, of the body of his county, by whom the truth of the matter may be better known, and who are neither of kin to the aforeſaid A nor the aforeſaid B, to recognize the truth of the iſſue between the ſaid parties." And ſuch writ is accordingly iſſued to the ſheriff. It is made returnable on the laſt return of the ſame term wherein iſſue is joined, *viz.* hilary or trinity terms; which, from the making up the iſſues therein, are uſually called *iſſuable terms*. And he returns the names of the jurors in a panel (a little pane or oblong piece of parchment) annexed to the writ. This jury is not ſummoned, and therefore not appearing at the day muſt unavoidably make default. For which reaſon a compulſive proceſs is now awarded againſt the jurors, called in the common pleas a writ of *habeas corpora juratorum*, and in the king's bench a *diſtringas*, commanding the ſheriff to have their bodies, or to diſtrain them by their lands and goods, that they may appear upon the day appointed. The entry therefore on the roll of record is, "That the jury is reſpited, thro' defect of the jurors, till the firſt day of the next term, then to appear at Weſtminſter; unleſs before that time, *viz.* on Wedneſday the fourth of March, the juſtices of our lord the king appointed to take aſſiſes in that county, ſhall have come to Oxford, that is, to the place aſſigned for holding the aſſiſes. Therefore the ſheriff is commanded to have their bodies at Weſtminſter on the ſaid firſt day of next term, or before the ſaid juſtices of aſſiſe, if before that time they come to Oxford, *viz.* on the fourth of March aforeſaid." And as the judges are ſure to come and open the circuit-commiſſions on the day mentioned in the writ, the ſheriff returns and ſummons this jury to appear at the aſſiſes; and there the trial is had before the juſtices of aſſiſe and *niſi prius:* among whom (as hath been ſaid *), are uſually two of the judges of the courts at Weſtminſter, the whole kingdom being divided into ſix circuits for this purpoſe. And thus we may obſerve, that the trial of common iſſues at *niſi prius*, was in its original only a collateral incident to the original buſineſs of the juſtices of aſſiſe; though now, by the various revolutions of practice, it is become their principal civil employment; hardly any thing remaining in uſe of the real aſſiſes but the name.

If the ſheriff be not an indifferent perſon, as if he be a party in the ſuit, or be related by either blood or affinity to either of the parties, he is not then truſted to return the jury; but the *venire* ſhall be directed to the coroners, who in this, as in many other inſtances,

* See the article ASSISE.

are the ſubſtitutes of the ſheriff to execute proceſs when he is deemed an improper perſon. If any exception lies to the coroners, the *venire* ſhall be directed to two clerks of the court, or two perſons of the county named by the court, and ſworn. And theſe two, who are called *eliſors*, or electors, ſhall indifferently name the jury, and their return is final; no challenge being allowed to their array.

When the general day of trial is fixed, the plaintiff or his attorney muſt bring down the record to the aſſiſes, and enter it with the proper officer in order to its being called on in courſe.

Theſe ſteps being taken, and the cauſe called on in court, the record is then handed to the judge, to peruſe and obſerve the pleadings, and what iſſues the parties are to maintain and prove, while the jury is called and ſworn. To this end the ſheriff returns his compulſive proceſs, the writ of *habeas corpora*, or *diſtringas*, with the panel of jurors annexed, to the judge's officer in court.

As the jurors appear when called, they ſhall be ſworn, unleſs challenged by either party. See the article Challenge.

If by means of challenges, or other cauſe, a ſufficient number of unexceptionable jurors doth not appear at the trial, either party may pray a tales. See the article Tales.

When a ſufficient number of perſons impanelled, or tales-men appear, they are then ſeparately ſworn, well and truly to try the iſſue between the parties, and a true verdict to give according to the evidence; and hence they are denominated "the jury," *jurata*, and "jurors," *ſc. juratores*.

The jury are now ready to hear the merits; and, to fix their attention the cloſer to the facts which they are impanelled and ſworn to try, the pleadings are opened to them by counſel on that ſide which holds the affirmative of the queſtion in iſſue. For the iſſue is ſaid to lie, and proof is always firſt required, upon that ſide which affirms the matter in queſtion: in which our law agrees with the civil, *ei incumbit probatio qui dicit, non qui negat; cum per rerum naturam factum-negantis probatio nulla ſit*. The opening counſel briefly informs them what has been tranſacted in the court above; the parties, the nature of the action, the declaration, the plea, replication, and other proceedings; and laſtly, upon what point the iſſue is joined, which is there ſent down to be determined. Inſtead of which, formerly the whole record and proceſs of the pleadings were read to them in Engliſh by the court, and the matter of iſſue clearly explained to their capacities. The nature of the caſe, and the evidence intended to be produced, are next laid before them by counſel alſo on the ſame ſide; and when their evidence is gone through, the advocate on the other ſide opens the adverſe caſe, and ſupports it by evidence; and then the party which began is heard by way of reply.

When the evidence is gone through on both ſides, the judge, in the preſence of the parties, the counſel, and all others, ſums up the whole to the jury; omitting all ſuperfluous circumſtances, obſerving wherein the main queſtion and principal iſſue lies, ſtating what evidence has been given to ſupport it, with ſuch remarks as he thinks neceſſary for their direction, and giving them his opinion in matters of law ariſing upon that evidence.

The jury, after the proofs are ſummed up, unleſs the caſe be very clear, withdraw from the bar to conſider of their verdict; and in order to avoid intemperance and cauſeleſs delay, are to be kept without meat, drink, fire, or candle, unleſs by permiſſion of the judge, till they are all unanimouſly agreed. A method of accelerating unanimity not wholly unknown in other conſtitutions of Europe, and in matters of greater concern. For by the golden bulle of the empire, if, after the congreſs is opened, the electors delay the election of a king of the Romans for 30 days, they ſhall be fed only with bread and water till the ſame is accompliſhed. But if our juries eat or drink at all, or have any eatables about them, without conſent of the court, and before verdict, it is fineable; and if they do ſo at his charge for whom they afterwards find, it will ſet aſide the verdict. Alſo if they ſpeak with either of the parties or their agents after they are gone from the bar, or if they receive any freſh evidence in private, or if to prevent diſputes they caſt lots for whom they ſhall find, any of theſe circumſtances will entirely vitiate the verdict. And it has been held, that if the jurors do not agree in their verdict before the judges are about to leave the town, though they are not to be threatened or impriſoned, the judges are not bound to wait for them, but may carry them round the circuit from town to town in a cart. This neceſſity of a total unanimity ſeems to be peculiar to our own conſtitution; or at leaſt, in the *nembda* or jury of the ancient Goths, there was required (even in criminal caſes) only the conſent of the major part; and in caſe of an equality, the defendant was held to be acquitted.

When they are all unanimouſly ageed, the jury return back to the bar; and before they deliver their verdict, the plaintiff is bound to appear in court, by himſelf, attorney, or counſel, in order to anſwer the amercement to which by the old law he is liable, in caſe he fails in his ſuit, as a puniſhment for his falſe claim. To be amerced, or *a mercie*, is to be at the king's mercy with regard to the fine to be impoſed; *in miſericordia domini regis pro falſo clamore ſuo*. The amercement is diſuſed, but the form ſtill continues; and if the plaintiff does not appear no verdict can be given; but the plaintiff is ſaid to be nonſuit, *non ſequitur clamorem ſuum*. Therefore it is uſual for a plaintiff, when he or his counſel perceives that he has not given evidence ſufficient to maintain his iſſue, to be voluntarily nonſuited, or withdraw himſelf: whereupon the crier is ordered to call the plaintiff; and if neither he, nor any body for him appears, he is nonſuited, the jurors are diſcharged, the action is at an end, and the defendant ſhall recover his coſts. The reaſon of this practice is, that a nonſuit is more eligible for the plaintiff than a verdict againſt him: for after a nonſuit, which is only a default, he may commence the ſame ſuit again for the ſame cauſe of action; but after a verdict had, and judgment conſequent thereupon, he is for ever barred from attacking the defendant upon the ſame ground of complaint. But in caſe the plaintiff appears, the jury by their foreman deliver in their verdict. See the article Verdict.

When the jury have delivered in their verdict, and it is recorded in court, they are then diſcharged; and ſo ends the trial by jury: a trial which ever has been, and it is hoped ever will be, looked upon as the glory of the Engliſh law. It is certainly the moſt tranſcendent privilege which any ſubject can enjoy or wiſh for, that he cannot be affected either in his property, his liberty, or his perſon, but by the unanimous conſent of 12 of his neighbours and equals.

Blackſt. Comment. vol. iii. chap. 23.

The impartial adminiſtration of juſtice, which ſecures both our perſons and our properties, is the great end of civil ſociety. But if that be entirely intruſted to the magiſtracy, a ſelect body of men, and thoſe generally ſelected by the prince or ſuch as enjoy the higheſt offices in the ſtate, their deciſions, in ſpite of their own natural integrity, will have frequently an involuntary bias towards thoſe of their own rank and dignity: it is not to be expected from human nature, that the few ſhould be always attentive to the intereſts and good of the many. On the other hand, if the power of judicature were placed at random in the hands of the multitude, their deciſions would be wild and capricious, and a new rule of action would be every day eſtabliſhed in our courts. It is wiſely therefore ordered, that the principles and axioms of law, which are general propoſitions flowing from abſtracted reaſon, and not accommodated to times or to men, ſhould be depoſited in the breaſts of the judges, to be occaſionally applied to ſuch facts as come properly aſcertained before them. For here partiality can have little ſcope; the law is well known, and is the ſame for all ranks and degrees: it follows as a regular concluſion from the premiſſes of fact pre-eſtabliſhed. But in ſettling and adjuſting a queſtion of fact, when intruſted to any ſingle magiſtrate, partiality and injuſtice have an ample field to range in; either by boldly aſſerting that to be proved which is not ſo, or more artfully by ſuppreſſing ſome circumſtances, ſtretching and warping others, and diſtinguiſhing away the remainder. Here therefore a competent number of ſenſible and upright jurymen, choſen by lot from among thoſe of the middle rank, will be found the beſt inveſtigators of truth, and the ſureſt guardians of public juſtice. For the moſt powerful individual in the ſtate will be cautious of committing any flagrant invaſion of another's right, when he knows that the fact of his oppreſſion muſt be examined and decided by 12 indifferent men not appointed till the hour of trial; and that when once the fact is aſcertained, the law muſt of courſe redreſs it. This therefore preſerves in the hands of the people that ſhare which they ought to have in the adminiſtration of public juſtice, and prevents the encroachments of the more powerful and wealthy citizens.

II. *Criminal* TRIALS. The ſeveral methods of trial and conviction of offenders, eſtabliſhed by the laws of England, were formerly more numerous than at preſent, through the ſuperſtition of our Saxon anceſtors; who, like other northern nations, were extremely addicted to divination: a character which Tacitus obſerves of the ancient Germans. They therefore invented a conſiderable number of methods of purgation or trial, to preſerve innocence from the danger of falſe witneſſes, and in conſequence of a notion that God would always interpoſe miraculouſly to vindicate the guiltleſs: as, 1. By ordeal; 2. By corſned; 3. By battel. See theſe articles.

4. A fourth method is that by the *peers of Great Britain*, in the *Court of* PARLIAMENT; or the *Court of the Lord High* STEWARD, when a peer is capitally indicted; for in caſe of an appeal, a peer ſhall be tried by jury. This differs little from the trial *per patriam*, or by jury; except that the peers need not all agree in their verdict; and except alſo, that no ſpecial verdict can be given in the trial of a peer: becauſe the lords of parliament, or the lord high ſteward (if the trial be had in his court) are judges ſufficiently competent of the law that may ariſe from the fact: but the greater number, conſiſting of 12 at the leaſt, will conclude, and bind the minority.

The trial by jury, or the country, *per patriam*, is alſo that trial by the peers of every Briton, which, as the great bulwark of his liberties, is ſecured to him by the great charter: *nullus liber homo capitatur, vel impriſonetur, aut exulet, aut aliquo alio modo deſtruatur, niſi per legale judicium parium ſuorum, vel per legem terræ.*

When therefore a priſoner on his ARRAIGNMENT has pleaded not guilty, and for his trial hath put himſelf upon the country, which country the jury are, the ſheriff of the county muſt return a panel of jurors, *liberos et legales homines, de viceneto*; that is, freeholders without juſt exception, and of the *viſne* or neighbourhood; which is interpreted to be of the county where the fact is committed. If the proceedings are before the court of king's bench, there is time allowed between the arraignment and the trial, for a jury to be impanelled by writ of *venire facias* to the ſheriff, as in civil cauſes: and the trial in caſe of a miſdemeanor is had at *niſi prius*, unleſs it be of ſuch conſequence as to merit a trial at bar; which is always invariably had when the priſoner is tried for any capital offence. But, before commiſſioners of oyer terminer and goal-delivery, the ſheriff, by virtue of a general precept directed to him beforehand, returns to the court a panel of 48 jurors, to try all felons that may be called upon their trial at that ſeſſion; and therefore it is there uſual to try all felons immediately or ſoon after their arraignment. But it is not cuſtomary, nor agreeable to the general courſe of proceedings, unleſs by conſent of parties, to try perſons indicted of ſmaller miſdemeanors at the ſame court in which they have pleaded not guilty, or traverſed the indictment.. But they uſually give ſecurity to the court to appear at the next aſſiſes or ſeſſion, and then and there to try the traverſe, giving notice to the proſecutor of the ſame.

In caſes of high-treaſon, whereby corruption of blood may enſue (except treaſon in counterfeiting the king's coin or ſeals) or miſpriſion of ſuch treaſon, it is enacted by ſtatute 7 W. III. c. 3. firſt, that no perſon ſhall be tried for any ſuch treaſon, except an attempt to aſſaſſinate the king, unleſs the indictment be found within three years after the offence committed: next, that the priſoner ſhall have a copy of the indictment, (which includes the caption) but not the names of the witneſſes, five days at leaſt before the trial, that is, upon the true conſtruction of the act, before his arraignment; for then is his time to take any exceptions thereto, by way of plea or demurrer: thirdly, that he ſhall alſo have a copy of the panel of jurors two days before his trial: and, laſtly, that he ſhall have the ſame compulſive proceſs to bring in his witneſſes for him, as was uſual to compel their appearance againſt him. And by ſtatute 7 Ann. c. 21. (which did not take place till after the deceaſe of the late pretender) all perſons indicted for high-treaſon, or miſpriſion thereof, ſhall have not only a copy of the indictment, but a liſt of all the witneſſes to be produced, and of the jurors impanelled, with their profeſſions and places of abode, delivered to him ten days before the trial, and in the preſence of two witneſſes, the better to prepare him to make his challenges and defence. And no perſon indicted for felony is, or (as the law ſtands) ever can be, entitled to ſuch copies before the time of his trial.

When the trial is called on, the jurors are to be ſworn as they appear, to the number of 12, unleſs they are challenged by the party. See the article CHALLENGE.

If by reaſon of challenges or the default of the jurors, a ſufficient number cannot be had of the original panel, a tales may be awarded as in civil cauſes, till the number of 12 is ſworn, "well and truly to try, and true deliverance make, between our ſovereign lord the king and the priſoner whom they have in charge; and a true vervict to give, according to their evidence." See TALES.

When the jury is ſworn, if it be a cauſe of any conſequence, the INDICTMENT is uſually opened, and the evidence marſhalled, examined, and enforced by the counſel for the crown, or proſecution. But it is a ſettled rule at comon law, that no counſel ſhall be allowed a priſoner upon his trial upon the general iſſue, in any capital crime, unleſs ſome point of law ſhall ariſe proper to be debated. A rule, which (however it may be palliated under cover of that noble declaration of the law, when rightly underſtood, that the judge ſhall be counſel for the priſoner; that is, ſhall ſee that the proceedings againſt him are legal and ſtrictly regular) ſeems to be not at all of a piece with the reſt of the humane treatment of priſoners by the Engliſh law. For upon what face of reaſon can that aſſiſtance be denied to ſave the life a man, which yet is allowed him in proſecutions for every petty treſpaſs? Nor indeed is it, ſtrictly ſpeaking, a part of our ancient law: for the Mirrour, having obſerved the neceſſity of counſel in civil ſuits, "who know how to forward and defend the cauſe by the rules of law and cuſtoms of the realm;" immediately afterwards ſubjoins, "and more neceſſary are they for defence upon indictments and appeals of felony, than upon other venial cauſes." And, to ſay the truth, the judges themſelves are ſo ſenſible of this defect in our modern practice, that they ſeldom ſcruple to allow a priſoner counſel to ſtand by him at the bar, and to inſtruct him what queſtions to aſk, or even to aſk queſtions for him, with regard to matters of fact; for as to matters of law ariſing on the trial, they are entitled to the aſſiſtance of counſel. But ſtill this is a matter of too much importance to be left to the good pleaſure of any judge, and is worthy the interpoſition of the legiſlature; which has ſhown its inclination to indulge priſoners with this reaſonable aſſiſtance, by enacting, in ſtatute 7 W. III. c. 3. that perſons indicted for ſuch high-treaſon as works a corruption of the blood or miſpriſion thereof, (except treaſon in counterfeiting the king's coins or ſeals), may make their full defence by counſel, not exceeding two, to be named by the priſoner and aſſigned by the court or judge; and this indulgence, by ſtatute 20 Geo. II. c. 30. is extended to parliamentary impeachments for high-treaſon, which were excepted in the former act.

When the evidence on both ſides is cloſed, the jury cannot be diſcharged till they have given in their VERDICT †. If they find the priſoner not guilty, he is then for ever quit and diſcharged of the accuſation; except he be appealed of felony within the time limited by law. And upon ſuch his acquittal, or diſcharge for want of proſecution, he ſhall be immediately ſet at large without payment of any fee to the goaler. But if the jury find him guilty, he is then ſaid to be convicted of the crime whereof he ſtands indicted. See the article CONVICTION; and, ſubſequent thereto, the articles JUDGMENT, ATTAINDER, FORFEITURE, EXECUTION, alſo *Benefit of* CLERGY, REPRIEVE, PARDON.

TRIANDRIA (from τρεις "three," and ανηρ "a man or huſband"), the name of the third claſs in Linnæns's ſexual ſyſtem, conſiſting of plants with hermaphrodite flowers, which have three ſtamina or male organs.

TRIANGLE, in geometry, a figure of three ſides and three angles.

TRIBE, in antiquity, a certain quantity, or number of perſons, when a diviſion was made of a city or people into quarters or diſtricts.

TRIBRACHYS, in ancient poetry, a foot conſiſting of three ſyllables, and theſe all ſhort; as, *melius*.

TRIBUNAL, in general, denotes the ſeat of a judge, called in our courts *bench*.

TRIBUNE, among the ancient Romans, a magiſtrate choſen out of the commons, to protect them againſt the oppreſſions of the great, and to defend the liberty of the people againſt the attempts of the ſenate and conſuls.

The tribunes of the people were firſt eſtabliſhed in the year of Rome 259. The firſt deſign of the creation was to ſhelter the people from the cruelty of uſurers, and to engage them to quit the Aventine mount, whither they had retired in diſpleaſure.

Their number at firſt was but two; but the next year, under the conſulate of A. Poſthumus Aruncius and Caſſius Viſcellinus, there were three more added; and this number of five was afterwards increaſed by L. Trebonius to ten.

Military TRIBUNE, an officer in the Roman army, commanded in chief over a body of forces, particularly the diviſion of a legion; much the ſame with our colonel, or the French maitre de camp.

TRIBUTARY, one who pays tribute to another, in order to live in peace with him or ſhare in his protection.

TRIBUTE, a tax or impoſt which one prince or ſtate is obliged to pay to another as a token of dependence, or in virtue of a treaty, and as a purchaſe of peace.

TRICEPS, in anatomy. See there, *Table of the Muſcles*.

TRICHECUS, the WALRUS; a genus of quadrupeds, belonging to the order of bruta. The characters are theſe. Two great tuſks in the upper jaw, point-

† See *Verdict*.

pointing downwards: four grinders on both ſides above and below: no cutting teeth: five palmated toes on each foot. There are two ſpecies.

1. The roſmerinus, morſe, or ſea-horſe, has a round head; ſmall mouth; very thick lips, covered above and below with pellucid briſtles as thick as a ſtraw; ſmall fiery eyes; two ſmall orifices inſtead of ears; ſhort neck; body thick in the middle, tapering towards the tail; ſkin thick, wrinkled, with ſhort browniſh hairs thinly diſperſed: legs ſhort; five toes on each, all connected by webs, and ſmall nails on each: the hind feet are very broad; each leg looſely articulated; the hind legs generally extended on a line with the body: the tail is very ſhort; penis long: length of the animal, from noſe to tail, ſometimes eighteen feet, and ten or twelve round in the thickeſt part: the teeth have been ſometimes found of the weight of 20 lb. each. Teeth of this ſize are only found on the coaſt of the Icy Sea, where the animals are ſeldom moleſted, and have time to attain their full growth.

They inhabit the coaſt of Spitzbergen, Nova Zembla, Hudſon's Bay, and the gulph of St Laurence; and the Icy Sea, as far as Cape Tſchuktſchi. They are gregarious; in ſome places appearing in herds of hundreds. They are ſhy animals, and avoid places which are much haunted by mankind; but are very fierce. If wounded in the water, they attempt to ſink the boat, either by riſing under it, or by ſtriking their great teeth into the ſides; they roar very loud, and will follow the boat till it gets out of ſight. Numbers of them are often ſeen ſleeping on an iſland of ice; if awoke, they fling themſelves with great impetuoſity into the ſea; at which time it is dangerous to approach the ice, leſt they ſhould tumble into the boat and overſet it. They do not go upon the land till the coaſt is clear of ice. At particular times, they land in amazing numbers: the moment the firſt gets on ſhore, ſo as to lie dry, it will not ſtir till another comes and forces it forward by beating it with its great teeth; this is ſerved in the ſame manner by the next; and ſo in ſucceſſion till the whole is landed, continuing tumbling over one another, and forcing the foremoſt, for the ſake of quiet, to remove further up. The method of killing them on the Magdalene iſles, in the gulph of St Laurence, according to Mr Pennant, is thus: The hunters watch their landing; and as ſoon as they find a ſufficient number for what they call a *cut*, they go on ſhore, each armed with a ſpear ſharp on one ſide like a knife, with which they cut their throats. Great care muſt be taken not to ſtand in the way of thoſe which attempt to get again to ſea, which they do with great agility by tumbling headlong; for they would cruſh any body to death by their vaſt weight. They are killed for the ſake of their oil, one walrus producing about half a tun. The knowledge of this chace is of great antiquity; Octher the Norwegian, about the year 890, made a report of it to king Alfred, having, as he ſays, made the voyage beyond Norway, for the more commoditie of fiſhing of horſe-whales, which have in their teeth bones of great price and excellency, whereof he brought ſome at his return unto the king. In fact, it was, in the northern world, in early times, the ſubſtitute to ivory, being very white and very hard. Their ſkins, Octher ſays, were good to cut into cables. M. de Buffon ſays, he has ſeen braces for coaches made of the ſkin, which were both ſtrong and elaſtic.

They bring one, or at moſt two young at a time: they feed on ſea herbs and fiſh; alſo on ſhells, which they dig out of the ſand with their teeth: they are ſaid alſo to make uſe of their teeth to aſcend rocks or pieces of ice, faſtening them to the cracks, and drawing their bodies up by that means. Beſides mankind, they ſeem to have no other enemy than the white bear, with whom they have terrible combats; but generally come off victorious, by means of their great teeth.

2. The manatus, manati, or ſea-cow. This animal, in nature, ſo nearly approaches the cetaceous tribe, that it ſcarce deſerves the name of a biped: what are called *feet* are little more than pectoral fins; they ſerve only for ſwimming: they are never uſed to aſſiſt the animal in walking or landing; for it never goes aſhore, nor ever attempts to climb the rocks, like the ſea-horſe and ſeal. It brings forth in the water, and like the whale, ſuckles its young in that element: like the whale, it has no voice; and like that animal, has an horizontal broad tail, without even the rudiments of hind feet. It inhabits the ſhores of Kamtſchatka, thoſe of the oppoſite coaſt of America, and of the intervening iſlands. It is found again on that of Mindanao, one of the Philippine iſlands, and on the coaſt of New Holland; on that of the iſle of France, and on that of Senegal; on the Moſquito ſhore, in the river Oronoque, and the lakes formed by it; and laſtly, in the river of Amazons; but in no other part of the Atlantic Ocean.

They live perpetually in the water, and frequent the edges of the ſhores; and in calm weather ſwim in great droves near the mouths of rivers: in the time of flood they come ſo near the land, that a perſon may ſtroke them with his hand: if hurt, they ſwim out to ſea; but preſently return again. They live in families, one near another; each conſiſts of a male, a female, a half-grown young one, and a very ſmall one. The females oblige the young to ſwim before them, while the other old ones ſurround and as it were guard them on all ſides. The affection between the male and female is very great: for if ſhe is attacked, he will defend her to the utmoſt; and if ſhe is killed, will follow her corpſe to the very ſhore, and ſwim for ſome days near the place it has been landed at. They copulate in the ſpring, in the ſame manner as the human kind, eſpecially in calm weather, towards the evening, The female ſwims gently about; the male purſues; till tired with wantoning ſhe flings herſelf on her back, and admits his embraces. Steller thinks they go with young about a year: it is certain that they bring but one young at a time, which they ſuckle by two teats placed between the breaſt. They are vaſtly voracious and gluttonous; and feed not only on the fuci that grow in the ſea, but ſuch as are flung on the edges of the ſhore. When they are filled, they fall aſleep on their backs. During their meals, they are ſo intent on their food, that any one may go among them and chooſe which he likes beſt. Peter Martyr gives an inſtance of one that lived in a lake of Hiſpaniola for 25 years, and was ſo tame as to come to the edge of the ſhore on being called; and would even perform the part of a ferry, and carry ſeveral people at a time on its back to the oppoſite ſhore.—Their back and their ſides are generally above water; and as their ſkin is filled with a ſpecies of louſe peculiar to them, numbers of gulls are continually perching on their backs and picking out the inſects.

They continue in the Kamtſchatkan and American ſeas the whole year; but in winter are very lean, ſo that you may count their ribs. They are taken by harpoons faſtened to a ſtrong cord; and after they are ſtruck, it requires the united force of thirty men to draw them on ſhore. Sometimes when they are transfixed, they will lay hold of the rocks with their paws, and ſtick ſo faſt as to leave the ſkin behind before they can be forced off. When a manati is ſtruck, its companions ſwim to its aſſiſtance; ſome will attempt to overturn the boat by getting under it; others will preſs down the rope, in order to break it; and others will ſtrike at the harpoon with their tails, with a view of getting it out, in which they often ſucceed. They have not any voice; but make a noiſe by hard breathing, like the ſnorting of a horſe.

They are of an enormous ſize; ſome are 28 feet long, and 8000lb. in weight. Thoſe of the Weſt Indies and other hot climates do not exceed 1200lb. in weight, and few arrive at that ſize. Probably they are not ſuffered to live their full time in thoſe countries, being perpetually perſecuted by the Moſquito and other Indians, who are very dexterous in ſtriking them. The head, in proportion to the bulk of the animal, is ſmall, oblong, and almoſt ſquare: the noſtrils are filled with ſhort briſtles: the gape, or rictus, is ſmall: the lips are double: near the junction of the two jaws the mouth is full of white tubular briſtles, which ſerve the ſame uſe as the laminæ in whales, to prevent the food running out with the water: the lips are alſo full of briſtles, which ſerve inſtead of teeth to cut the ſtrong roots of the ſea-plants, which floating aſhore are a ſign of the vicinity of theſe animals. In the mouth are no teeth, only two flat white bones, one in each jaw; one above, another below, with undulated ſurfaces, which ſerve inſtead of grinders.

The eyes are extremely ſmall, not larger than thoſe of a ſheep: the iris is black. The animal is deſtitute of ears, having only two orifices, ſo ſmall that a quill will ſcarce enter them: the tongue is pointed, and but ſmall: the neck is thick, and its junction with the head ſcarce diſtinguiſhable; and the laſt always hangs down: the circumference of the body near the ſhoulders is twelve feet, about the belly twenty, near the tail only four feet eight; the head thirty-one inches the neck near ſeven feet: and from theſe meaſurements may be collected the deformity of this animal. Near the ſhoulders are two feet, or rather fins, which are only two feet two inches long, and have neither fingers nor nails; beneath they are concave, and covered with hard briſtles: the tail is thick, ſtrong, and horizontal, ending in a ſtiff black fin, and like the ſubſtance of whalebone, and much ſplit in the forepart; the end ſlightly divided. The females have, between the pectoral fins, two large round and fair breaſts; and both ſexes have the parts of generation, and the navel, perfectly reſembling thoſe of the human ſpecies: there is no doubt, Mr Pennant thinks, but all the fables concerning mermaids, mermen, and ſyrens, took their riſe from an imperfect view of this animal.

The ſkin is very thick, black, and full of inequalities, like the bark of oak, and ſo hard as ſcarce to be cut with an ax, and has no hair on it: beneath the ſkin is a thick blubber, which taſtes like oil of almonds. The fleſh is coarſer than beef, and will not ſoon putrify. The young ones taſte like veal. The ſkin is uſed for ſhoes, and for covering the ſides of boats.

TRICOCCÆ, (τρεις "three," and κοκκος "a grain"), the name of thethirty-eighth order in Linnæus's Fragments of a Natural Method, conſiſting of plants with a ſingle three-cornered capſule, having three cells, or internal diviſions, each containing a ſingle ſeed. See Botany, p. 1313.

TRIDENT, an attribute of Neptune, being a kind of ſceptre which the painters and poets put into the hands of that god, in form of a ſpear or fork with three teeth; whence the word.

TRIENNIAL, an epithet applied chiefly to officers or employments which laſt for three years.

Triennial *Elections*. The utmoſt extent of time that the ſame parliament was allowed to ſit, by the ſtat. 6 W. & M. c. 2. was three years; after the expiration of which, reckoning from the return of the firſt ſummons, the parliament was to have no longer continuance. But by the ſtat. 1 Geo. I. ſt. 2. c. 38. this term was prolonged to ſeven years.

TRIENS, in antiquity, a copper money of the value of one third of an *as*, which on one ſide bore a Janus's head, and on the other a water rat.

TRIERS, or Treves. See Treves.

TRIESTE, a ſea-port town of Iſtria, ſeated on the gulph of Venice, and belonging to the houſe of Auſtria. It was formerly a free city, and is ſituated on the declivity of a rock, eight miles north of Capo d'Iſtria, and ſeventy-two miles north-eaſt of Venice. E. Long. 14. 12. N. Lat. 46. 10.

TRIFOLIUM, trefoil; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are 43 ſpecies; of which the moſt remarkable are, 1. The melilotis officinalis, or melilot, is a native of Britain, growing in corn-fields and by the wayſides, but not common. The ſtalk is erect, firm, ſtriated, branched, and two or three feet high: the leaves ternate, ſmooth, obtuſely oval, and ſerrated: the flowers are ſmall, yellow, pendulous, and grow in long cloſe ſpikes at the tops of the branches: the pod is very ſhort, turgid, tranſverſely wrinkled, pendulous, and contains either one or two ſeeds. The plant has a very peculiar ſtrong ſcent, and diſagreeable bitter acrid taſte, but ſuch, however, as is not diſpleaſing to cattle. The flowers are ſweet-ſcented. It has generally been eſteemed emollient and digeſtive, and been uſed in fomentations and cataplaſms, particularly in the plaſter employed in dreſſing bliſters; but is now laid aſide, as its quality is found to be rather acrid and irritating than emollient or reſolvent. It communicates a moſt loathſome flavour to wheat and other grain, ſo as to render it unfit for making bread.

2. The repens, white creeping trefoil, or Dutch trefoil, is common in meadows and paſtures. It is well known to be an excellent fodder for cattle; and the leaves are a good ruſtic hygrometer, as they are always relaxed and flaccid in dry weather, but erect in moiſt or rainy.

3. The pratenſe, purple trefoil or clover, frequent in meadows and paſtures. It affords a very plentiful fodder to horſes and other cattle; but when they feed too greedily on the freſh herb, it blows them up in ſuch a manner with wind, that unleſs they are ſpeedily relieved, by tapping them in the belly or ſome other ſimilar operation, they ſoon periſh. In Ireland the poor people, in a ſcarcity of corn, make a kind of bread of the dried flowers of this and the preceding plant reduced to powder. They call the plant *chambroch*, and eſteem the bread made of it to be very wholeſome and nutritive.

TRIGA, in antiquity, denotes a kind of carr or chariot drawn by three horſes; whence the name.

TRIGLA, in ichthyology, a genus of fiſhes, belonging to the order of thoracicæ. The head is loricated with rough lines, and there are ſeven rays in the membranes of the gills. There are nine ſpecies; of which the principal are the gurnardus, or grey gurnard; the cuculus, or red gurnard; the lyra, or piper; and the hirundo, or ſapphirine gurnard.

TRIGLYPHS, in architecture, a ſort of ornaments, repeated at equal intervals, in the Doric freeze.

TRIGONELLA, FENUGREEK; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are 10 ſpecies; of which the moſt remarkable is the fænum græcum, or common fenugreek, whoſe ſeeds are uſed in medicine. Where this plant grows naturally is uncertain; but it is cultivated in the fields in the ſouth of France, and in Germany, from whence great quantities of the ſeeds are annually imported here for uſe. It is alſo much cultivated in India. It is an annual plant, which riſes with a hollow, branching, herbaceous ſtalk a foot and a half high, garniſhed with trifoliate leaves, placed alternately, whoſe lobes are oblong, oval, indented on their edges, and have broad furrowed footſtalks. The flowers come out ſingly at each joint from the wings of the ſtalk; they are white, of the butterfly kind, and ſit very cloſe to the ſtalk: theſe are ſucceeded by long compreſſed pods, ſhaped ſomewhat like a broad ſword, ending in long points, having a broad membrane on one edge, filled with ſquare yellow ſeeds, indented on one ſide like a kidney. The whole plant has a very ſtrong odour.

The chief uſe of fenugreek ſeeds is as an ingredient in cataplaſms, fomentations, emollient glyſters, and in powders for horſes, &c.

TRIGONOMETRY,

IS that part of geometry which teaches how to meaſure the ſides and angles of triangles.

Trigonometry is either plane or ſpherical, according as the triangles are PLANE or SPHERICAL; of each whereof we ſhall treat in order.

PLANE TRIGONOMETRY.

PLANE TRIGONOMETRY, or that which teaches the menſuration of plane triangles, is commonly divided into *rectangular* and *oblique-angular*.

Of RECTANGULAR PLANE TRIGONOMETRY.

IF in any right-angled triangle, ABC, (Plate CCLXXXVII. fig. 1. n° 1.) the hypothenuſe be made the radius, and with that a circle be deſcribed on the one end, A, as a centre; then it is plain that BC will be the ſine of the angle BAC; and if with the ſame diſtance, and on the end B as a centre, a circle be deſcribed, it is plain that AC will be the ſine of the angle ABC: therefore, in general, if the hypothenuſe of a right-angled triangle be made the radius, the two legs will be the ſines of their oppoſite angles.

Again, if in a right-angled triangle DEF (*ibid.* n° 2.) one of the legs, as DF, be made the radius, and on the extremity D (at one of the oblique angles, *viz.* that which is formed by the hypothenuſe and the leg made radius) as a centre, a circle be deſcribed; it is plain that the other leg, EF, will be the tangent of the angle at D, and the hypothenuſe DE will be the ſecant of the ſame angle. The ſame way, making the leg EF the radius, and on the centre E deſcribing a circle, the other leg DF will become the tangent of the angle at E, and the hypothenuſe DE the ſecant of the ſame.

The chord, ſine, tangent, &c. of any arch or angle, in one circle, is proportionable to the chord, ſine, tangent, &c. of the ſame arch in any other circle: from which, and what has been ſaid above, the ſolutions of the ſeveral caſes of rectangular trigonometry naturally follow.

Since trigonometry conſiſts in determining angles and ſides from others given, there ariſe various caſes; which being ſeven in rectangular trigonometry, are as follow.

CASE I. The angles, and one of the legs, of a right-angled triangle being given, to find the other leg.

EXAMPLE. In the triangle ABC (*ibid.* n° 3.) right-angled at B, ſuppoſe the leg AB=86 equal parts, as feet, yards, miles, &c. and the angle A=33° 40′; required the other leg BC, in the ſame parts with AB.

I. *Geometrically:* Draw AB=86, from any line of equal parts; upon the point B, erect the perpendicular BC; and, laſtly, from the point A, draw the line AC, making with AB an angle of 33° 40′; and that line produced will meet BC in C, and ſo conſtitute the triangle. The length of BC may be found by taking it in your compaſſes, and applying it to the ſame line of equal parts that AB was taken from.

II. *By calculation:* Firſt, by making the hypothenuſe AC radius, the other two legs will be the ſines of their oppoſite angles, *viz.* AB the ſine of C, and CB the ſine of A. Now ſince the ſine, tangent, &c. of any arch in one circle is proportionable to the ſine, tangent, &c. of the ſame arch in any other circle, it is plain the ſines of the angles A and C in the circle deſcribed by the radius AC, muſt be proportional to the ſine of the ſame arches or angles, in the circle, that the table of artificial ſines, &c. was calculated for; ſo the proportion for finding BC will be

S, C : AB :: S, A : BC.

i. e. as the ſine of the angle C in the tables is to the length of AB (or ſine of C in the circle whoſe radius is AC), ſo is the ſine of the Angle A in the tables, to the length of BC (or ſine of the ſame angle in the circle whoſe radius is AC). Now the angle A being 33° 40′, the angle C muſt be 56° 20′; therefore looking in the table

table of artificial ſines, &c. for the ſines of the two angles, and in the table of logarithms for the logarithm of 86 the given leg, we ſhall find, by proceeding according to the foregoing proportion, that the required leg, BC, is 57.28; and the operation will ſtand as follows:

1.93450 AB 86
9.74380 S, A 33° 40′

11.67830
9.92027 S, C 56° 20′

1.75803 BC 57.28

Secondly, making AB the radius, it is plain BC, the leg required, will be the tangent of the given angle A; and ſo the proportion for finding BC, when AB is made the radius, will be:

R : T, A :: AB : BC.

i. e. as the radius in the tables is to the tangent of the angle A in the ſame; ſo the length of BA, or radius in the ſcheme, to the length of BC or tangent of A in the ſcheme: therefore looking in the tables for the parts given in the foregoing proportion, and proceeding with them according to that rule, we ſhall find BC to be 57.28 as before, and the operation will be as follows:

9.82352 T, A 33° 40′
1.93450 AB 86

11.75802
10.00000 Rad. 90°

175802 BC 57.28

Laſtly, by making BC, the leg required, the radius, it is plain that AB will be the tangent of C; and the proportion for finding BC will be as follows:

T, C : R :: AB BC.

i. e. as the tangent of C	56° 20′	10.17648
is to radius	90°	10.00000
ſo is the length of AB	86	1.93450
		11.93450
		10.17648
to the length of BC	57.28	1.75802

Case II. The angles and one of the legs given, to find the hypothenuſe.

Example: In the triangle ABC, (*ibid.* n° 4.) ſuppoſe AB 124, and the angle A 34° 20′; conſequently the angle C 55° 40′, required the hypothenuſe AC, in the ſame parts with AB.

I. *Geometrically:* This caſe is conſtructed after the ſame manner with the former; and the hypothenuſe, AC, is found by taking its length in your compaſſes, and applying that to the ſame line of equal parts from which AB was taken.

II. *By calculation:* Firſt, making AC the radius, we ſhall have the following proportion for finding AC, *viz.*

S, C : R :: AB : AC.

i. e. As the ſine of C	55° 40′	9.91686
is to radius	90°	10.00000
ſo is AB	124	2.09342
to AC	150.2	2.17656

Secondly, making AB the radius, we have this proportion. *viz.*

R : ſec. A :: AB : AC.

i. e. as the radius	90°	10.00000
as the ſecant of A	34° 20′	10.08314
ſo is AB	124	2.09342
to AC	150.2	2.17656

This may alſo be done without the help of the ſecants: for ſince R : ſec. :: Co-S. : R; therefore the former proportion will become,

Co-S, A : R :: AB : AC.

i. e. as the co-ſine of A	34° 20′	9.91686
is to the radius	90°	10.00000
ſo is AB	124	2.09342
to AC	150.2	2.17656

Thirdly, making BC the radius, we have the following proportion, *viz.*

T, C : ſec. C :: AB : AC.

i. e. as the tangent of C	55° 40′	10.16558
is to ſec. C	55° 40′	10.24872
ſo is AB	124	2.09342
to AC	150.2	2.17656

This likewiſe may be done without the help of ſecants; for ſince T, : Sec. :: S, : R; therefore the former analogy will be reduced to this, *viz.*

S, C : R :: AB : AC.

where no ſecants do appear; and it coincides with that in the firſt ſuppoſition of this caſe, ſo we ſhall not repeat the operation.

Case III. The angles and hypothenuſe given, to find either of the legs.

Example. In the triangle ABC, (*ibid.* n° 4.) ſuppoſe the hypothenuſe AC=146, and the angle A=36° 25′; conſequently the angle C=53° 35′; required the leg, AB.

I. *Geometrically:* Draw the line AB at pleaſure, and make the angle BAC equal to 36° 25′; then take AC equal to 146 from any line of equal parts; laſtly, from the point C, let fall the perpendicular CB, on the line AB. So the triangle is conſtructed, and AB may be meaſured from the line of equal parts.

II. *By calculation:* Firſt, making AC the radius, we ſhall have the following proportion, *viz.*

R : S, C :: AC : AB.

i. e. as radius	90°	10.00000
to the ſine of C	53° 35′	9.90565
ſo is AC	146	2.16435
to AB	117.5	2.07000

Secondly, making AB the radius, we have the following analogy, *viz.*

Sec. A : R :: AC : AB.

i.e. as the ſecant of A	36° 25′	10.09435
is to radius	90°	10.00000
ſo is AC	146	2.16435
to AB	117.5	2.07000

This may alſo be done without the help of ſecants; for ſince ſec. : R :: R : Co-S, the former proportion may be reduced to this, *viz.*

R : Co-S, A :: AC : AB,

which is the ſame with the proportion in the firſt ſuppoſition.

Thirdly, by ſuppoſing BC the radius, we have the following proportion, *viz.*

Sec. C : T, C :: AC : AB,

i. e. as the ſecant of C	53° 35′	10.22647
is to the tangent of C	53° 35′	10.13212
ſo is AC	146	2.16435
to AB	117.5	2.07000

Case IV. The two legs being given, to find the angles.

Example. In the triangle ABC, (*ibid.* n° 5.) ſuppoſe AB 94, and BC 56, required the angles A and C.

I. *Geometrically:* Draw AB equal to 94, from any line of equal parts; then from the point B raiſe BC perpendicular to AB, and take BC from the former line of equal parts equal to 56; laſtly, join the points A and C with the ſtraight line AC: ſo the triangle is conſtructed, and the angles may be meaſured by a line of chords.

II. *By calculation:* Firſt, ſuppoſing AB the radius, we have this analogy, *viz.*

AB : BC :: R : T, A.

i. e. as AB	94	1.97313
is to BC	56	1.74819
ſo is the radius	90°	10.00000
to the tangent of A	30° 47′	9.77506

Secondly, making BC the radius, we have this proportion, *viz.*

BC : BA :: RT, B.

i. e. as BC	56	1.74819
is to AB	94	1.97313
ſo is the radius	90°	10.00000
to the tangent of C	59° 13′	10.22494

Case V. The hypothenuſe and one of the legs given, to find the angles.

Example. In the triangle DEF, (*ibid.* n° 6.) ſuppoſe the leg DE=83, and the hypothenuſe DF=126; required the angles D and F.

I. *Geometrically:* Draw the line DE=83 from any line of equal parts; and from the point E raiſe the perpendicular EF: then take the length of DF=126, from the ſame line of equal parts; and ſetting one foot of your compaſſes in D, with the other croſs the perpendicular EF in E; laſtly, join D and F; and the triangle being thus conſtructed, the angles may be meaſured by a line of chords.

II. *By calculation:* Firſt, making DF the radius, we ſhall have this proportion, *viz.*

DF : DE :: R : S, F.

i. e. as DF	126	2.10037
is to DE	83	1.91908
ſo is radius	90°	10.00000
to the ſine of F	41° 12′	9.81871

Secondly, by ſuppoſing DE the radius, we have the following analogy, *viz.*

DE : DF :: R : Sec. D.

i. e. as DE	83	1.91908
is to DF	126	2.10037
ſo is radius	90°	10.00000
to the ſecant of D	48° 48′	10.18129

This may be done without the help of ſecants; for ſince R : ſec. :: Co-S, : R, the foregoing analogy will become this, *viz.*

DF : DE :: R : Co-S, D.

which gives the ſame anſwer with that deduced from the firſt ſuppoſition.

Case VI. The two legs being given, to find the hypothenuſe.

Example. In the triangle ABD, (*ibid.* n° 7.) ſuppoſe the leg AB=64, and BD=56: required the hypothenuſe.

I. *Geometrically:* The conſtruction of this caſe is performed the ſame way as in the fourth caſe; and the length of the hypothenuſe is found by taking it in your compaſſes, and applying it to the ſame line of equal parts that the two legs were taken from.

II. *By calculation:* This caſe being a compound of the fourth and ſecond caſes, we muſt firſt find the angles by the fourth, thus:

AB : DB :: R : T, A.

i. e. as the leg AB	64	1.80618
is to the leg DB	56	1.74819
ſo is the radius	90	10.00000
to the tangent of A	41° 11′	9.94201

Then by the ſecond caſe we find the hypothenuſe required, thus:

S, A : R :: BD : AD.

i. e. as the ſine of A	41°, 11′	9.81854
is to the radius	90°	10.00000
ſo is the leg BD	56	1.74819
to the hypoth. AD	85.05	1.92965

This caſe may alſo be ſolved after the following manner, *viz.*

From twice the logarithm of the greater ſide AB	3.61236
ſubtract the logarithm of the leſſer ſide BD	1.74819
and there remains	1.86417

the logarithm of 73.15; to which adding the leſſer ſide BD, we ſhall have 189.15, whoſe logarithm is 2.11093

to which add the logarithm of the leſſer ſide BD	1.74819
and the ſum will be	3.85912
the half of which is	1.92956

the logarithm of the hypothenuſe required.

Or it may be done by adding the ſquare of the two ſides together, and taking the logarithm of that ſum, the half of which is the logarithm of the hypothenuſe required: thus, in the preſent caſe,

the ſquare of AB (64) is 4096
the ſquare of BD (56) is 3136

the ſum of theſe ſquares is 7232
the logarithm of which is 3.85926
the half of which is 1.92962=
to the logarithm of 85.05, the length of the hypothenuſe required.

Case VII. The hypothenuſe and one of the legs being given, to find the other leg.

Example. In the triangle BGD, (*ibid.* n° 8.) ſuppoſe the leg BG=87, and the hypothenuſe BD=142; required the leg DG.

I. *Geometrically:* The conſtruction here is the ſame as in caſe V. the ſame things being given; and the leg DG is found by taking its length in your compaſſes, and applying that to the ſame line of equal parts the others were taken from.

II. *By calculation:* The ſolution of the caſe depends upon the 1ſt and 5th; and firſt we muſt find the oblique angles by caſe 5th, thus:

BD : BG :: R : S, D.

i. e. as the hypoth. DB	142	2.15229
is to the leg BG	87	1.93952
ſo is radius	90°	10.00000
to the ſine of D	37°, 47′	97.8723

Then, by caſe 1ſt, we find the leg DG required, thus:

R : S, B :: BD : DG.

i. e. as radius	90°	10.00000

is to the ſine of B	52° 13′	9.89781
ſo is the hypoth. DB	142	2.15229
to the leg DG	112.2	2.05010

The leg DG may alſo be found in the following manner, *viz.*

To the log. of the ſum of the hypothenuſe and given leg. *viz.* 229 - -	2.35984
add the logarithm of their difference, *viz.* 55	1.74036
and their ſum is	4.10020
the half of that is	2.05010
the log. of 112.2 the leg required	

Or it may be done by taking the ſquare of the given leg from the ſquare of the hypothenuſe, and the ſquare root of the remainder is the leg required: thus, in the preſent caſe,

The ſquare of the hypothenuſe (142) is	20164
The ſquare of the leg BG (87) is	7569
Their difference is	12595
Whoſe logarithm is	4.10020
The half of which is	2.05010

which anſwers to the natural number 112.2, the leg required.

Thus we have gone through the ſeven caſes of right-angled plane trigonometry; from which we may obſerve, 1. That to find a ſide, when the angles are given, any ſide may be made the radius. 2. To find an angle, one of the given ſides muſt of neceſſity be made the radius.

Of OBLIQUE-ANGLED PLANE TRIGONOMETRY.

IN oblique-angled plane trigonometry there are ſix caſes; but before we ſhow their ſolution, it will be proper to premiſe the following theorems.

THEOREM I. In any triangle ABC, (*ibid.* fig. 2. n° 2.) the ſides are proportional to the ſigns of the oppoſite angles: thus, in the triangle ABC, AB : BC :: S, C : S, A, and AB : AC :: S, C : S, B : alſo AC : BC :: S, B : S, A.

Demonſtration. Let the triangle ABC be inſcribed in a circle; then it is plain (from the property of the circle) that the half of each ſide is the ſine of its oppoſite angle: but the ſines of theſe angles, in tabular parts, are proportional to the ſines of the ſame in any other meaſure; therefore, in the triangle ABC, the ſines of the angles will be as the halves of their oppoſite ſides; and ſince the halves are as the wholes, it follows, that the ſines of the angles are as their oppoſite ſides; *i. e.* S, C : S, A :: AB : BC, &c.

THEOR. II. In any plane triangle, as ABC, (*ibid.* n° 2.) the ſum of the ſides, AB and BC, is to the difference of theſe ſides, as the tangent of half the ſum of the angles BAC, ABC, at the baſe, is to the tangent of half the difference of theſe angles.

Demon. Produce AB; and make BH equal to BC; join HC, and from B let fall the perpendicular BE; through B draw BD parallel to AC, and make HF equal to CD, and join BF; alſo take BI equal to BA, and draw IG parallel to BD or AC.

Then it is plain that AH will be the ſum, and HI the difference of the ſides AB and BC; and ſince HB is equal to BC, and BE perpendicular to HC, therefore HE is equal to EC; and BD being parallel to AC and IG, and AB equal to BI, therefore CD or HF is equal to GD, and conſequently HG is equal to FD, and half HG is equal to half FD or ED. Again, ſince HB is equal to BC, and BE perpendicular to HC, therefore the angle EBC is half the angle HBC; but the angle HBC is equal to the ſum of the angles A and C, conſequently the angle EBC is equal to half the ſum of the angles A and C. Alſo, ſince HB is equal to BC, and HF equal to CD, and the included angles BHF BCD equal, it follows that the angle HBF is equal to the angle DBC, which is equal to BCA; and ſince HBD is equal to the angle A, and HBF equal to BCA, therefore FBD is the difference, and EBD half the difference of the two angles A and BCA: ſo making EB the radius, it is plain EC is the tangent of half the ſum, and ED the tangent of half the difference of the two angles at the baſe. Now IG being parallel to AC, the triangles HIG and HAC will be equiangular; conſequently AH : IH :: CH : GH; but the wholes are as their halves, therefore AH : IH :: $\frac{1}{2}$CH : $\frac{1}{2}$GH; and ſince $\frac{1}{2}$CH is equal to EC, and $\frac{1}{2}$GH equal to $\frac{1}{2}$FD=ED, therefore AH : IH :: EC : ED. Now AH is the ſum and IH the difference of the ſides; alſo EC is the tangent of half the ſum, and ED the tangent of half the difference of the two angles at the baſe; conſequently, in any triangle, as the ſum of the ſides is to their difference, ſo is the tangent of half the ſum of the angles at the baſe to the tangent of half their difference.

THEOREM III. If to half the ſum of two quantities be added half their difference, the ſum will be the greater of them; and if from half their ſum be ſubtracted half their difference, the remainder will be the leaſt of them. Suppoſe the greater quantity to be $x=8$, and the leſſer $z=6$; then is their ſum 14, and difference 2:

wherefore, adding $\frac{14}{2}=7$ to $\frac{2}{2}=1$, we get 8 the greateſt of the two quantities: and, in the ſame manner, $\frac{14}{2}-\frac{2}{2}=7-1=6$, the leaſt of the two quantities.

THEOREM IV. In any right-lined triangle, ABD (*ibid.* n° 3.) the baſe AD is to the ſum of the ſides AB and BD, as the difference of the ſides is to the difference of the ſegments of the baſe made by the perpendicular BE, *viz.* the difference between AE ED.

Demon. Produce DB till BG be equal to BA the leſſer leg; and on B as a centre, with the diſtance BA or BG, deſcribe the circle AGHF, which will cut BD and AD in the points H and F: then it is plain GD is the ſum, and HD the difference of the ſides; alſo ſince AD is equal to EF, therefore FD is the difference of the ſegments of the baſe; but AD : GD :: HD : FD; therefore the baſe is to the ſum of the ſides, &c. as was to be proved.

Having eſtabliſhed theſe preliminary theorems, we ſhall now proceed to the ſolution of the ſix caſes of oblique-angled plane trigonometry.

CASE I. In any oblique-angled plane triangle, two ſides and an angle oppoſite to one of them being given, to find the angle oppoſite to the other.

EXAMPLE. In the triangle ABC, (*ibid.* n° 4.) ſuppoſe AB=156, BC=84, and the angle C (oppoſite to AB)=56° 30′; required the angle A, oppoſite to BC.

2. *Geometrically:* Draw the line AC, and at any point of it, ſuppoſe C, make the angle C=56° 30′; then take CB=84, and with the length of 156=AB taken in your compaſſes from the ſame ſcale of equal parts, fixing one point in B, with the other croſs AC in A. Laſtly, join A and B; ſo the triangle is conſtructed, and the required angle A may be meaſured by a line of chords.

2. *By calculation:* We have, by theor. 1. the following proportion for finding the angle A, *viz.*

AB : BC :: S, C : S, A.

i. e. as AB	156	2.19312
to BC	84	1.92428
ſo is S, C	56° 30′	9.92111
to S, A	26° 41′	9.65227

Case II. The angles, and a ſide oppoſite to one of them, being given, to find a ſide oppoſite to another.

Example. In the triangle HBG (*ibid.* n° 5.) ſuppoſe the angle H 46° 15’, and the angle B 54° 22’, conſequently the angle G 79° 23’, and the leg HB 125, required HG.

Geometrically: Draw HB 125, from any line of equal parts, and make the angle H 46° 15′, and B 54° 22′, then produce the lines HG and BG till they meet one another in the point G: ſo the triangle is conſtructed, and HG is meaſured by taking its length in your compaſſes, and applying it to the ſame line of equal parts that HB was taken from.

2. *By calculation:* By the firſt of the preceding theorems, we have this analogy for finding HG, *viz.*

S, G : HB :: S, B : HG.

i. e. as the ſine of G	79° 23’	9.99250
is to the leg HB	125	2.09691
ſo is the ſine of B	54° 22’	9.90996
to the leg HG	103.4	2.01437

Case III. Two ſides and an angle oppoſite to one of them given, to find the third ſide.

Example. In the triangle KLM (*ibid.* n° 6.) ſuppoſe the ſide CL 126 equal parts, and KM 130 of theſe parts, and the angle L (oppoſite to KM) 63° 20’, required the ſide ML.

1. *Geometrically:* The conſtruction of this caſe is the ſame with that in Caſe I (there being the ſame things given in both), and the leg ML may be meaſured by applying it to the ſame line of equal parts that the other two were taken from.

2. *By calculation:* The ſolution of this caſe depends upon the two preceding ones; and, firſt, we muſt find the other two angles by Caſe I. thus:

MK : S, L :: KL : S, M.

i. e. as the ſide MK	130	2.11394
to the ſine of L	63° 20′	9.95116
ſo is the ſide KL	126	2.10037
to the ſine of M	60° 1′	9.93759

Then by Caſe II. we have the required leg ML, thus:

S, L : S, K :: MK : ML.

i. e. as the ſine of L	63° 20′	9.95116
to the ſine of K	53° 39	9.90602
ſo is KM	130	2.11394
to ML	117.2	2.06850

Case IV. Two ſides and the contained angle being given, to find the other two angles.

Example. In the triangle ACD (*ibid.* n° 7.) ſuppoſe AC=103. AD=126, and the angle A=54° 30′; required the angles C and D.

1. *Geometrically:* Draw AD=126, and make the angle A=54° 30′; then ſet off 103 equal parts from A to C: laſtly, join C and D; and ſo the triangle is conſtructed, and the angles C and D may be meaſured by a line of chords.

2. *By calculation:* The ſolution of this caſe depends upon the ſecond and third of the preceding theorems; and firſt we muſt find the ſum and difference of the ſides, and half the ſum of the unknown angles, thus:

The leg AD is	126
The leg AC is	103
Their ſum is	229
And their difference is	23
The ſum of the three angles A, D, and C, is	180°
The angle A is	54° 30
So the ſum of the angles C and D will be	125° 30′
And half their ſum is	62° 45′

Then by theor. 2. we have the following proportion, *viz.*

As the ſum of the ſides AD and AC=229		2.35984
To their difference	23	2.36173
So is the tangent of half the ſum of the unknown angles C and D.	62° 45′	10.28816
To tang. of half their difference	11° 2′	9.29005

Now having half the ſum and half the difference of the two unknown angles C and D, we find the quantity of each of them by theorem 3. thus:

To half the ſum of the angles C and D, *viz.*	62° 45′
Add half their difference, *viz.*	11° 02′
And the ſum of the greater angle C	73° 47′
Again from half their ſum, *viz.*	62° 45′
Take half their difference, *viz.*	11° 02′
And there will remain the leſſer angle D	=51° 43′

N. B. The greater angle is always that ſubtended by the greater ſide: thus, in the preſent caſe, the greater angle C is ſubtended by the greater ſide AD; and the leſſer angle D is ſubtended by the leſſer ſide AC.

Case V. Two ſides and the contained angle being given, to find the third ſide.

Example. In the triangle BCD (*ibid.* n° 8.) ſuppoſe BC=154, BD=133, and the angle B=56° 03′; required the ſide CD.

1. *Geometrically:* The conſtruction of the caſe is the ſame with that of the laſt, and the length of DC is found by taking its length in your compaſſes, and applying it to the ſame line of equal parts that the two legs were taken from.

2. *By calculation:* The ſolution of this caſe depends upon the ſecond and fourth; and firſt we muſt find the angles by the laſt caſe; thus:

As the ſum of the ſides BD and BC 287		2.45788
Is to their difference 21		1.32222
So is the tangent of half the ſum of the angles D and C	61° 58’	10.27372
To the tangent of half their difference	7° 50’	9.13806

So by theorem 3. we have the angles D and C thus:

To half the ſum of the angles D and C	61° 58′
Add half their difference	7° 50′

And

And the ſum is the greater angle D	69° 48′
Alſo, from half the ſum	61° 58′
Take half the difference	7° 50′
And there remains the leſſer angle C	54° 08′

Then by Caſe II. we have the following analogy for finding DC, the leg required, *viz.*

S, C : BD :: S, B : DC.

i. e. as the ſine of C	54° 08′	9.90869
to BD	133	2.12385
ſo is the ſine of B	56° 03′	9.91883
to DC	136.2	2.13399

Case VI. Three ſides being given, to find the angles.

Example. In the triangle ABC, (*ibid.* n° 9.) ſuppoſe AB=156, AC=185.7, and BC=84; required the angles A, B, and C.

I. *Geometrically:* Make AC=185.7 from any line of equal parts; and from the ſame line taking 156=AB in your compaſſes, fix one foot of them in A, and with another ſweep an arch; then take 84=BC in your compaſſes, and fixing one foot in C, with the other ſweep an arch, which will croſs the former in B: laſtly, join the points B and A, and B and C; ſo the triangle will be conſtructed, and the angles may be meaſured by a line of chords.

II. *By calculation:* Let fall the perpendicular, BD, from the vertex B, upon the baſe AC; which will divide the baſe into two ſegments AD and DC, the lengths whereof may be found by theorem 4. thus:

As the baſe AC	185.7	2.26893
To the ſum of the ſides AB and BC	240	2.38031
So is the difference of the ſides	72	1.85733
To the diff. of the ſegments of the baſe	93	1.96871

And having the ſum of the ſegments, *viz.* the whole baſe, and their difference, we find the ſegments themſelves, by theorem 3. thus:

To half the ſum of the ſegments	92.8
And half their difference	46.5
And the ſum is the greater ſegment AD	139.3
Alſo from half the ſum of the ſegment	92.8
Take half their difference	46.5
The remainder is the leſſer ſegment DC	46.3

Now the triangle ABC is divided, by the perpendicular DB, into two right-angled triangles, ADB and DBC; in the firſt of which are given the hypothenuſe AB=156, and the baſe AD=139.3, to find the oblique angles, for which we have (by Caſe V. of rectangular trigonometry) the following analogy, *viz.*

as AB	156	2.19312
to AD	139.3	2.14395
ſo is the radius	90°	10.00000
to the co-ſine of the angle A	26° 40′	9.95083

Alſo the angle C is found by the ſame caſe, thus:

as BC	84	1.92428
to CD	46.3	1.66558
ſo is the radius	90°	10.00000
to the co-ſine of C	56° 30′	9.74130

Having found the two angles A and C, we have the third, B, by taking the ſum of the other two from 180, thus:

The ſum of all the three angles is	180°
The ſum of A and C is	83° 10′
The angle B is	96° 50′

All the proportions uſed for the ſolutions of the ſeveral caſes in plane trigonometry may be performed by the ſcale and compaſs. On the ſcale there are ſeveral logarithmic lines, *viz.* one of numbers, another of ſines, and one of tangents, &c.

And the way of working a proportion by theſe is this, *viz.* extend your compaſſes from the firſt term of your proportion, found on the ſcale, to the ſecond; and with that extent, fixing one foot in the third term, the other will reach the fourth term required.

SPHERICAL TRIGONOMETRY.

Spherical Trigonometry is the art whereby, from three given parts of a ſpherical triangle, we diſcover the reſt; and, like plane trigonometry, is either right-angled or oblique-angled. But before we give the analogies for the ſolution of the ſeveral caſes in either, it will be proper to premiſe the following theorems:

Theorem I. In all right-angled ſpherical triangles, the ſign of the hypothenuſe : radius :: ſine of a leg : ſine of its oppoſite angle. And the ſine of a leg : radius :: tangent of the other leg : tangent of its oppoſite angle.

Demonſtration. Let EDAFG, (*ibid.* fig. 3.) repreſent the eighth part of a ſphere, where the quadrantal planes EDFG, EDBC, are both perpendicular to the quadrantal plane ADFB; and the quadrantal plane ADGC is perpendicular to the plane EDFG; and the ſpherical triangle ABC is right-angled at B, where CA is the hypothenuſe, and BA, BC, are the legs.

To the arches GF, CB, draw the tangents HF, OB, and the ſines GM, CI, on the radii DF, DB; alſo draw BL the ſine of the arch AB, and CK the ſine of AC; and then join IK and OL. Now HF, OB, GM, CI, are all perpendicular to the plane ADFB. And HD, GK, OL, lie all in the ſame plane ADGC. Alſo FD, IK, BL, lie all in the ſame plane ADGC. Therefore, the right-angled triangles HFD, CIK, ODL, having the equal angles HDF, CKI, OLB, are ſimilar. And CK : DG :: CI : GM; that is, as the ſine of the hypothenuſe : rad. :: ſine of a leg : ſine of its oppoſite angle. For GM is the ſine of the arc GF, which meaſures the angle CAB. Alſo, LB : DF :: BO : FH; that is, as the ſine of a leg : radius :: tangent of the other leg : tangent of its oppoſite angle. Q. E. D.

Hence it follows, that the ſines of the angles of any oblique ſpherical triangle ACD (*ibid.* n° 2.) are to one another, directly, as the ſines of the oppoſite ſides. Hence it alſo follows, that, in right-angled ſpherical triangles, having the ſame perpendicular, the ſines of the baſes will be to each other, inverſely, as the tangents of the angles at the baſes.

Theorem II. In any right-angled ſpherical triangle ABC (*ibid.* n° 3.) it will be, As radius is to the co-ſine of one leg, ſo is the co-ſine of the other leg to the co-ſine of the hypothenuſe.

Hence, if two right-angled ſpherical triangles ABC, CBD (*ibid.* n° 2.) have the ſame perpendicular BC, the co-ſines of their hypothenuſes will be to each other, directly, as the co-ſines of their baſes.

Spherical.

Theorem III. In any ſpherical triangle it will be, As radius is to the ſine of either angle, ſo is the co-ſine of the adjacent leg to the co-ſine of the oppoſite angle.

Hence, in right-angled ſpherical triangles, having the ſame perpendicular, the co-ſines of the angles at the baſe will be to each other, directly, as the ſines of the vertical angles.

Theorem IV. In any right-angled ſpherical triangle it will be, As radius is to the co-ſine of the hypothenuſe, ſo is the tangent of either angle to the co-tangent of the other angle.

As the ſum of the ſines of two unequal arches is to their difference, ſo is the tangent of half the ſum of thoſe arches to the tangent of half their difference: and as the ſum of the co-ſines is to their difference, ſo is the co-tangent of half the ſum of the arches to the tangent of half the difference of the ſame arches.

Theorem V. In any ſpherical triangle ABC (*ibid.* n° 4. and 5.) it will be, As the co-tangent of half the ſum of half their difference, ſo is the co-tangent of half the baſe to the tangent of the diſtance (DE) of the perpendicular from the middle of the baſe.

Since the laſt proportion, by permutation, becomes co-tang. $\frac{AC+BC:}{2}$ co-tang. AE :: tang. $\frac{AC-BC:}{2}$ tang. DE, and as the tangents of any two arches are, inverſely, as their co-tangents; it follows, therefore, that tang. AE : tang. $\frac{AC+BC}{2}$ :: tang. $\frac{AC-BC}{2}$: tang. DE; or, that the tangent of half the baſe is to the tangent of half the ſum of the ſides, as the tangent of half the difference of the ſides to the tangent of the diſtance of the perpendicular from the middle of the baſe.

Theorem VI. In any ſpherical triangle ABC (*ibid.* n° 4.) it will be, As the co-tangent of half the ſum of the angles at the baſe is to the tangent of half their difference, ſo is the tangent of half the vertical angle to the tangent of the angle which the perpendicular CD makes with the line CF biſecting the vertical angle.

The Solution of the Cases of right-angled ſpherical Triangles, (*ibid.* n° 3.)

Caſe	Given	Sought	Solution
1	The hyp. AC and one angle A	The oppoſite leg BC	As radius : ſine hyp. AC :: ſine A : ſine BC (by the former part of theor 1.)
2	The hyp. AC and one angle A	The adjacent leg AB	As radius : co-ſine of A :: tang. AC tang. AB (by the latter part of theor. 1.)
3	The hyp. AC and one angle A	The other angle C	As radius : co-ſine of AC :: tang. A : co-tang. C (by theorem 4.)
4	The hyp. AC and one leg AB	The other leg BC	As co-ſine AB : radius :: co-ſine AC : co-ſine BC (by theorem 2.)
5	The hyp. AC and one leg AB	The oppoſite angle C	As ſine AC : radius :: ſine AB : ſine C (by the former part of theorem 1.)
6	The hyp. AC and one leg AB	The adjacent angle A	As tang. AC : tang. AB :: radius : co-ſine A (by theorem 1.)
7	One leg AB and the adjacent angle A	The other leg BC	As radius : ſine AB :: tangent A : tangent BC (by theorem 4.)
8	One leg AB and the adjacent angle A	The oppoſite angle C	As radius : ſine A :: co-ſine of AB : co-ſine of C (by theorem 3.)
9	One leg AB and the adjacent angle A	The hyp. AC	As co-ſine of A : radius :: tang. AB : tang. AC (by theorem 1.)
10	One leg BC and the oppoſite angle A	The other leg AB	As tang. A : tang. BC :: radius : ſine AB (by theorem 4.)
11	One leg BC and the oppoſite angle A	The adjacent angle C	As co ſine BC : radius :: co-ſine of A : ſine C (by theorem 3.)
12	One leg BC and the oppoſite angle A	The hyp. AC	As ſine A : ſine BC :: radius : ſine AC (by theorem 1.)
13	Both legs AB and BC	The hyp. AC	As radius : co-ſine AB :: co-ſine BC : co-ſine AC (by theorem 2.)
14	Both legs AB and BC	An angle, ſuppoſe A	As ſine AB : radius :: tang. BC : tang. A (by theorem 4.)
15	Both angles A and C	A leg, ſuppoſe AB	As ſine A : co-ſine C :: radius : co-ſine AB (by theorem 3.)
16	Both angles A and C	The hyp. AC	As tang. A : co-tang. C :: radius : co-ſine AC (by theorem 4.)

Note, The 10th, 11th, and 12th caſes are ambiguous; ſince it cannot be determined by the data, whether A, B, C, and AC, be greater or leſs than 90 degrees each.

The Solution of the Cases of oblique ſpherical Triangles, (*ibid.* n° 4. and 5.)

Caſe	Given	Sought	Solution
1	Two ſides AC, BC, and an angle A oppoſite to one of them	The angle B oppoſite to the other	As ſine BC : ſine A :: ſine AC : ſine B (by theorem 1.) Note, this caſe is ambiguous when BC is leſs than AC; ſince it cannot be determined from the data whether B be acute or obtuſe.
2	Two ſides AC, BC, and an angle A oppoſite to one of them	The included angle ACB	Upon AB produced (if need be) let fall the perpendicular CD : then (by theorem 4.) rad. : co-ſine AC :: tang. A : co-tang. ACD; but (by theorem 1.) as tang. BC : tang. AC :: co-ſine ACD : co-ſine BCD. Whence ACB=ACD ± BCD is known.
3	Two ſides AC, BC, and an angle oppoſite to one of them	The other ſide AB	As rad. : co-ſine A :: tang. AC : tang. AD (by theor. 1) and (by theor. 2.) as co-ſine AC : co-ſine BC :: co-ſine AD : co-ſine BD. Note, this and the laſt caſe are both ambiguous when the firſt is ſo.
4	Two ſides AC, AB, and the included angle A	The other ſide BC	As rad. : co-ſine A :: tang. AC : tang. AB (by theor. 1.) whence AD is alſo known : then (by theor. 2.) as co-ſine AD : co-ſine BD :: co-ſine AC : co-ſine BC.
5	Two ſides AC, AB, and the included angle A	Either of the other angles, ſuppoſe B	As rad. : co-ſine A :: tang. AC : tang. AD (by theor. 1.) whence BD is known : then (by theor. 4.) is ſine BD : ſine AD :: tang A : tang. B.
6	Two angles A, ACB, and the ſide AC betwixt them	The other angle B	As rad. : co-ſine AB :: tang. A : co-tang. ACD (by theorem 4.) whence BCD is alſo known : then (by theor. 3.) as ſine ACD : ſine BCD :: co-ſine A : co-ſine B.
7	Two angles A, ACB, and the ſide AC betwixt them	Either of the other ſides, ſuppoſe BC	As rad. : co-ſine AC :: tang. A : co-tang. ACD (by theorem 4.) whence BCD is alſo known : then, as co-ſine BCD : co-ſine ACD :: tang. AC : tang. BC (by theor. 1.)
8	Two angles A, B, and a ſide AC oppoſite to one of them	The ſide BC oppoſite the other	As ſine B : ſine AC :: ſine A : ſine BC (by theorem 1.)
9	Two angles A, B, and a ſide AC oppoſite to one of them	The ſide AB betwixt them	As rad. : co-ſine A :: tang. AC : tang. AD (by theor. 1.) and as : tang. B : tang. A :: ſine AD : ſine BD (by theorem 4.) whence AB is alſo known.
10	Two angles A, B, and a ſide AC oppoſite to one of them	The other angle ACB	As rad. : co-ſine AC :: tang. A : co-tang. ACD (by theorem 4.) and as co-ſine A : co-ſine B :: ſine ACD : ſine BCD (by theor. 3.) whence ACB is alſo known.
11	All the three ſides AB, AC, and BC	An angle, ſuppoſe A	As tang. $\frac{1}{2}$AB : tang. $\frac{AC+BC}{2}$ :: tang. $\frac{AC-BC}{2}$: tang DE, the diſtance of the perpendicular from the middle of the baſe (by theorem 6.) whence AD is known : then, as tang. AC : tang. : AD :: rad. : co-ſine A (by theor. 1.)
12	All the three angles A, B, and ACB	A ſide, ſuppoſe AC	As co-tang. $\frac{ABC+A}{2}$: tang. $\frac{ABC-A}{2}$ :: tang. $\frac{ACB}{2}$: tan. of the angle included by the perpendicular and a line biſecting the vertical angles; whence ACD is alſo known : then (by theorem 5.) tang. A : co-tang. ACD :: rad. co-ſine AC.

TRI

TRIHILATÆ, *tres* "three," and *hilum* "an external mark on the ſeed;" the name of the 23d claſs in Linnæus's Fragments of a Natural Method; conſiſting of plants with three ſeeds, which are marked with an external cicatrix or ſcar, where they are faſtened within the fruit. See Botany, p. 1237.

TRIM, implies in general the ſtate or diſpoſition by which a ſhip is beſt calculated for the ſeveral purpoſes of navigation.

Thus the trim of the hold denotes the moſt convenient and proper arrangement of the various materials contained therein relatively to the ſhip's motion or ſtability at ſea. The trim of the maſts and ſails is alſo their moſt appoſite ſituation with regard to the conſtruction of the ſhip and the effort of the wind upon her ſails.

As the ſtowage of the hold, or the diſpoſition of the ſeveral articles of the cargo, conſiderably affects the

Fig. 1. Rectangular TRIGONOMETRY

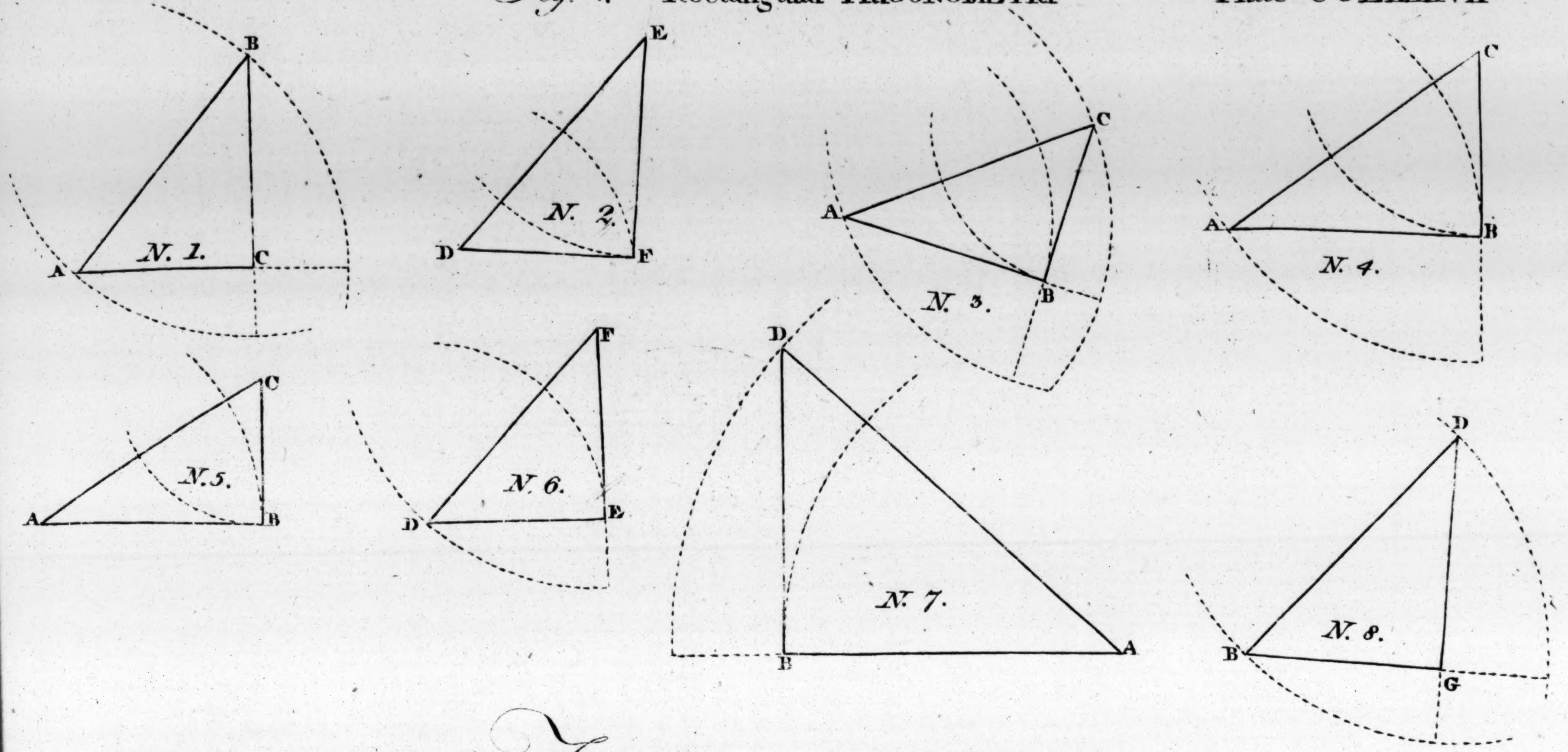

N. 1.
B
A
C
N. 2.
E
D
F
N. 3.
C
A
B
N. 4.
C
A
B
N. 5.
C
A
B
N. 6.
F
D
E
N. 7.
D
B
A
N. 8.
D
B
G

Fig. 2. Oblique angled TRIGONOMETRY

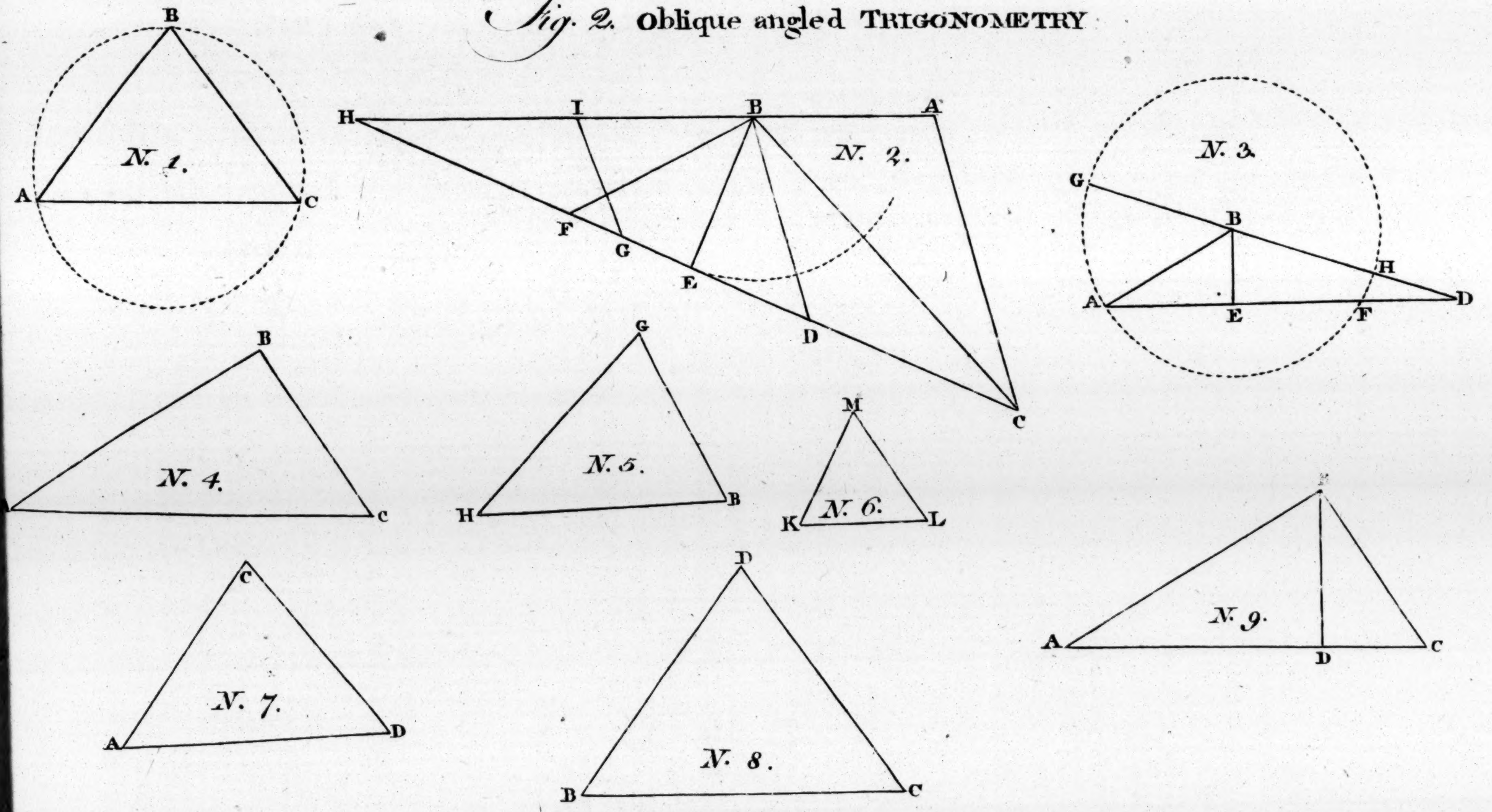
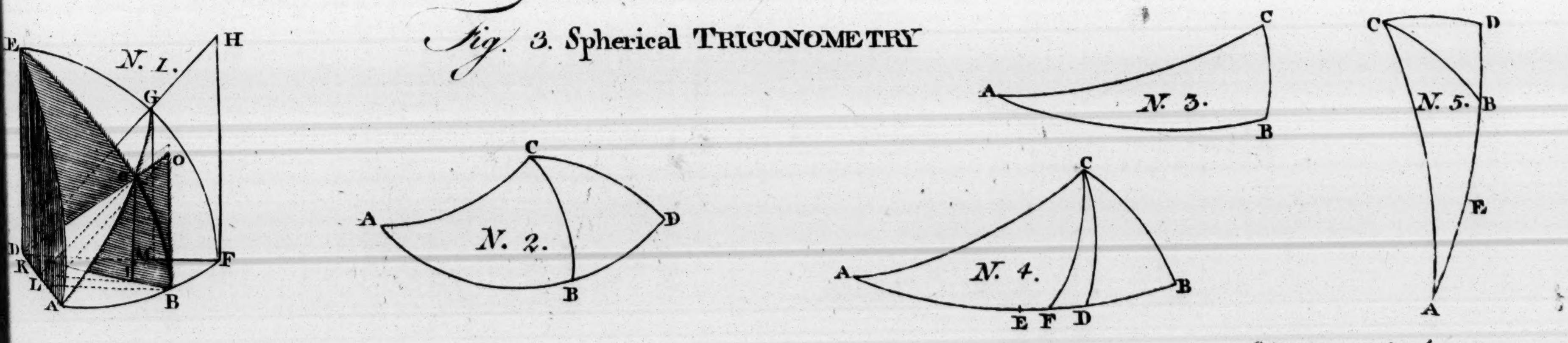

N. 1.
B
A
C
N. 2.
H
I
B
A
F
G
E
D
C
N. 3.
G
B
H
A
E
F
D
N. 4.
B
A
C
N. 5.
G
H
B
N. 6.
M
K
L
N. 7.
C
A
D
N. 8.
D
B
C
N. 9.
B
A
D
C

Fig. 3. Spherical TRIGONOMETRY


N. 1.
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A. Bell, Sculp.t

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Trim.

the ſhip's motion and ſtability, it will be neceſſary to give a general idea of the action of a heavy body upon the fluid that ſupports it, and the re-action of the fluid on the floating body.

The whole weight of any body, then, may be conſidered as united in its centre of gravity; ſo that, if it were ſuſpended by a line faſtened to this centre, the line would hang in a perpendicular poſition, as directed through the centre of gravity to the centre of the earth. A body which floats in a fluid is not, however, ſupported by its centre of gravity, but by the compreſſion of the ſurrounding filaments of water: and each of theſe, being conſidered as infinitely ſmall, will act upon a very minute portion of the ſurface of the floating body with regard to the ſpecific gravity, and conform to a principle applicable to all fluids, in proportion to the height of theſe filaments, viz. that the weight of a column of any fluid will be in proportion to the ſpecific gravity of the fluid and the height of the column multiplied by its baſe.

But as heavy bodies endeavour, by their gravity, to approach the centre of the earth in a vertical line paſſing through their centres; ſo the preſſure of fluids endeavours to carry bodies in a vertical, tending from the centre of the earth towards their ſurface, and paſſing through the centre of gravity of the ſubmerged part, which forces them towards the ſurface. So, in any ſubmerged body at reſt, theſe two oppoſite forces coincide in the ſame vertical, acting in a direction quite contrary to each other.

From this theory it reſults, that the ſtability or trim of a ſhip chiefly depends upon her conſtruction, as conſidering the bottom to be homogeneous. This, however, can only happen when her cargo conſiſts of the ſame materials throughout, as with corn, ſalt, or any ſpecies ſtowed in bulk, and when her hold is entirely filled. For if the ſhip has not ſufficient breadth to reſiſt the effort of the wind upon her ſails; or if ſhe is built too high or too ſharp in the floor, her centre of gravity will be too high, and ſhe will be very crank, i. e. apt to overturn.

But as the ſtiffneſs of a ſhip, or quality to carry ſail without danger of overturning, depends very much on the ſtowage of the hold, the centre of gravity may thereby be conſiderably lowered, by which her ſtability will be increaſed in proportion. It is a general maxim amongſt mariners, that a ſhip will not carry ſufficient ſail till ſhe is laden ſo deep that the ſurface of the water may glance on her extreme breadth amidſhips. She muſt therefore have a great deal of weight, as ballaſt, &c. to bring her to this ſituation, which is called a *good ſailing trim*.

Several circumſtances are alſo to be particularly conſidered with regard to the quality, weight, and ſtowage of the ballaſt. The centre of gravity being placed too high, will render the ſhip incapable of carrying a ſufficient quantity of ſail: and by having it too low, ſhe will be in danger of rolling away her maſts. When it is placed too far forward, the ſhip will pitch, and labour heavily; and when too far aft, ſhe will occaſionally be expoſed to the circumſtance of a pooping ſea. Theſe extremes being carefully avoided, it remains to proportion the contents of every part of the hold to its capacity, and to place the lighteſt materials uppermoſt.

Trim, Tringa.

Trim, when applied to the ſails, denotes the general arrangement which is beſt calculated to accelerate the ſhip's courſe, according to the direction of the wind.

If the ſhip were always to ſail before the wind, it would be a very ſimple operation to trim the ſails; becauſe nothing elſe could be required than to diſpoſe them ſo as to receive the greateſt poſſible effort of the wind, which is evidently performed by arranging them at right angles with its direction. But when the current of wind acts more directly upon the ſhip's ſide, it neceſſarily falls more obliquely on the ſurface of the ſails, ſo as to diminiſh their effort to puſh the ſhip forward, and to augment their tendency to make her incline to one ſide. Hence we may conclude, that an increaſe of the wind, when accompanied with a variation unfavourable to the ſhip's courſe, will by no means augment her velocity; becauſe the force previouſly employed to puſh her forward, will afterwards operate to overturn her; and becauſe this impreſſion renders it neceſſary to reduce the quantity of ſail; the effort of which is farther diminiſhed by the obliquity of the action of the wind upon its ſurface.

By this theory it appears, that the effect of the wind to advance the ſhip decreaſes in proportion to its obliquity with any ſail upon which it operates. The mechanical diſpoſition of the ſails, according to every direction of the wind upon their ſurfaces, is copiouſly deſcribed in the article Close-*Hauled*, Sailing, and and Tacking.

Trim, when expreſſed of the maſts, denotes their poſition with regard to the ſhip and to each other. Thus, in the latter ſenſe, they ſhould neither be too near nor too far apart, and in the former they ſhould not be too far forward or aft; and, according to the ſituation or quality which communicates a greater velocity to the veſſel, they ſhould either be upright, or inclining aft or forward.

TRINGA, the sandpiper, in ornithology, a genus of birds, belonging to the order of grallæ. The beak is ſomewhat cylindrical, and as long as the head; the noſtrils are linear; and there are four toes on the feet, the hind one conſiſting of one joint, and elevated above the ground. There are 23 ſpecies; of which the moſt remarkable are,

1. The vanellus, or lapwing, inhabits moſt of the heaths and marſhy grounds of this iſland. Their length is about 13½ inches, the breadth 2½ feet. The bill is black: the crown of the head of a ſhining blackneſs: the creſt of the ſame colour, conſiſting of about 20 ſlender unwebbed feathers of unequal lengths: the longeſt are 4 inches: the cheeks and ſides of the neck are white, but beneath each eye is a black line: the throat and fore-part of the neck are black: the plumage on the hind-part is mixed with white, aſh-colour, and red: the back and ſcapulars are of a moſt elegant gloſſy green; and the latter finely varied with purple: the leſſer covert feathers of the wings are of a reſplendent black blue and green: the greater quill-feathers black, but the ends of the four firſt are marked with a white ſpot: the upper half of the leſſer quill feathers are black: the lower white: the breaſt and belly are white: the vent-feathers and covers of the tail orange-colour: the tail conſiſts of 12 feathers; the outmoſt on each

ſide is white, marked on the upper end of the inner web with a duſky ſpot; the upper half of all the others are black, tipt with a dirty white; their lower half of a pure white: the legs are red: the irides hazel. The female is leſs than the male. Merret, in his Pinax, p. 182. ſays, that there is in Cornwal a bird related to this; but leſs than a thruſh, having blue feathers and a long creſt.—The lapwing lays four eggs, making a ſlight neſt with a few bents. The eggs have an olive caſt, and are ſpotted with black. The young, as ſoon as hatched, run like chickens: the parents ſhow remarkable ſolicitude for them, flying with great anxiety and clamour near them, ſtriking at either men or dogs that approach, and often flutter along the ground like a wounded bird, to a conſiderable diſtance from their neſt, to delude their purſuers; and to aid the deceit, become more clamorous when moſt remote from it: the eggs are held in great eſteem for their delicacy, and are ſold by the London poulterers for three ſhillings the dozen. In winter, lapwings join in vaſt flocks; but at that ſeaſon are very wild: their fleſh is very good, their food being inſects and worms. During October and November, they are taken in the fens in nets, in the ſame manner that ruffs are; but are not preſerved for fattening, being killed as ſoon as caught.

2. The ſquatarola, or grey ſandpiper, is in length 12 inches; in breadth 24: the bill black, about an inch long, ſtrong and thick: the head, back, and coverts of the wings are black, edged with greeniſh aſh-colour and ſome white: cheeks and throat white, marked with oblong duſky ſpots: the belly and thighs white: the exterior webs of the quill-feathers black, the lower part of the interior webs of the four firſt white; the rump white: the tail marked with tranſverſe bars of black and white: the legs of a dirty green: the back toe very ſmall. Theſe appear in ſmall flocks in the winter-time, but are not very common: their fleſh is very delicate.

3. The pugnax. The males of this ſpecies, called *ruffs*, aſſume ſuch variety of colours in ſeveral parts of their plumage, that it is ſcarce poſſible to ſee two alike; but the great length of the feathers on the neck, that gives name to them, at once diſtinguiſh theſe from all other birds. On the back of their necks is a ſingular tuft of feathers ſpreading wide on both ſides. Theſe, and the former, in ſome are black; in others white, yellow, or ferruginous; but this tuft and the ruffs frequently differ in colours in the ſame bird. The feathers that bear an uniformity of colouring through each individual of this ſex are the coverts of the wings, which are brown inclining to aſh-colour; the feathers on the breaſt, which are often black or duſky; the four exterior feathers of the tail, which are of a cinereous brown; and the four middle, which are barred with black and brown: the bill is black towards the end, red at the baſe. The legs in all are yellow. In moulting they loſe the character of the long neck-feathers, nor do they recover it till after their return to the fens the ſpring following. It is then they regain that ornament, and at the ſame time a ſet of ſmall pear-ſhaped yellow pimples break out in great numbers on their face above the bill.—The ſtags, or male birds of the firſt year, want theſe marks, and have ſometimes been miſtaken for a new ſpecies of tringa; but they may be eaſily known by the colours of the coverts of the wings, and the middle feathers of the tail.—The older the birds are, the more numerous the pimples, and the fuller and longer the ruffs.

The length of the male to the tip of the tail is one foot, the breadth two; of the reeve or female, ten inches, the breadth nineteen; the weight of the former when juſt taken is ſeven ounces and a half; of the latter only four. The reeves never change their colours, which are pale brown; the back ſpotted with black, ſlightly edged with white; the tail brown, the middle feathers ſpotted with black; the breaſt and belly white; the legs of a pale dull yellow.

Theſe birds appear in the fens in the earlieſt ſpring, and diſappear about Michaelmas. The reeves lay four eggs in a tuft of graſs, the firſt week in May, and ſit about a month. The eggs are white, marked with large ruſty ſpots. Fowlers avoid in general the taking of the females; not only becauſe they are ſmaller than the males, but that they may be left to breed.

Soon after their arrival, the males begin to hill, that is, to collect on ſome dry bank near a ſplaſh of water, in expectation of the females, who reſort to them. Each male keeps poſſeſſion of a ſmall piece of ground, which it runs round till the graſs is worn quite away, and nothing but a naked circle is left. When a female lights, the ruffs immediately fall to fighting. It is a vulgar error, that ruffs muſt be fed in dark leſt they ſhould deſtroy each other by fighting on admiſſion of light. The truth is, every bird takes its ſtand in the room as it would in the open fen. If another invades its circle, an attack is made, and a battle enſues. They make uſe of the ſame action in fighting as a cock, place their bills to the ground and ſpread their ruffs. Mr Pennant ſays, he has ſet a whole room-full a-fighting, by making them move their ſtations; and after quitting the place, by peeping through a crevice, ſeen them reſume their circles and grow pacific.

When a fowler diſcovers one of thoſe hills, he places his net over night, which is of the ſame kind as thoſe that are called *clap* or *day nets*; only it is generally ſingle, and is about fourteen yards long and four broad. The fowler reſorts to his ſtand at day-break, at the diſtance of one, two, three, or four hundred yards from the nets, according to the time of the ſeaſon; for the later it is, the ſhyer the birds grow. He then makes his firſt pull, taking ſuch birds as he finds within reach: after that he places his ſtuft birds or ſtales to entice thoſe that are continually traverſing the fen. An old fowler told our author that he once caught forty-four birds at the firſt hawl, and in all ſix dozen that morning. When the ſtales are ſet, ſeldom more than two or three are taken at a time. A fowler will take forty or fifty dozens in a ſeaſon.—Theſe birds are found in Lincolnſhire, the iſle of Ely, and in the Eaſt Riding of York. They viſit a place called *Martin-Mere* in Lancaſhire, the latter end of March or beginning of April; but do not continue there above three weeks; where they are taken in nets, and fattened for the table with bread and milk, hempſeed, and ſometimes boiled wheat; but if expedition is required, ſugar is added, which will make them in a fortnight's time a lump of fat: they then ſell for two ſhillings or half a crown a piece. Judgment is required in taking the proper time for killing them, when they are at the higheſt pitch of fatneſs; for if that is neglected, the birds are apt to fall away. The method of killing them is by cutting off their head with a pair of ſciſſars: the quantity of blood that iſſues is very great, conſidering the ſize of the bird. They are dreſſed like the woodcock, with their inteſtines; and, when killed at the critical time, ſay the Epicures, are the moſt delicious of all morſels.

4. The canutus, or knot, has the forehead, chin, and lower part of the neck, brown, inclining to aſh-colour; the back and ſcapulars deep brown, edged with aſh-colour; the coverts of the wings with white, the edges of the lower order deeply ſo, forming a white bar; the breaſt, ſides, and belly white, the two firſt ſtreaked with brown; the coverts of the tail marked with white and duſky ſpots alternately; the tail aſh-coloured, the outmoſt feather on each ſide white; the legs of a bluiſh grey; and the toes, as a ſpecial mark, divided to the very bottom; the weight four ounces and a half.—Theſe birds, when fattened, are preferred by ſome to the ruffs themſelves. They are taken in great numbers on the coaſts of Lincolnſhire, in nets ſuch as employed in taking ruffs; with two or three dozens of ſtales of wood painted like the birds, placed within; fourteen dozens have been taken at once. Their ſeaſon is from the beginning of Auguſt to that of November. They diſappear with the firſt froſts. Camden ſays they derive their name from king Canute, Knute, or Knout, as he is ſometimes called; probably becauſe they were a favourite diſh with that monarch. We know that he kept the feaſt of the purification of the Virgin Mary with great pomp and magnificence at Ely; and this being one of the fen-birds, it is not unlikely but he meet with it there.

5. The morinellus, turnſtone, or ſea-dottrel, is about the ſize of a thruſh; the forehead and throat are aſh-coloured; the head, whole neck and coverts of the wings, are of a deep brown, edged with a pale reddiſh brown; the ſcapular feathers are of the ſame colour, very long, and cover the back; that and the rump are white, the laſt marked with a large triangular black ſpot; the tail conſiſts of twelve feathers, their lower half is white, the upper black, and the tips white: the quill feathers are duſky, but from the third or fourth the bottoms are white; the legs are ſhort, and of an orange colour.—Theſe birds take their name from their method of ſearching for food, by turning up ſmall ſtones with their ſtrong bills to get at the inſects that lurk under them.

6. The ochropus, or green ſandpiper. This beautiful ſpecies is not very common in theſe kingdoms. The head and hind part of the neck are of a browniſh aſh-colour, ſtreaked with white; the under part mottled with brown and white; the back, ſcapular, and coverts of the wings are of a duſky green, gloſſy and reſplendent as ſilk, and elegantly marked with ſmall white ſpots; the leſſer quill-feathers of the ſame colours; the under ſides of the wings are black, marked with unmerous white lines pointing obliquely from edges of the feather to the ſhaft, repreſenting the letter V; the rump is white; the tail of the ſame colour.—Except in pairing time, it is a ſolitary bird: it is never found near the ſea; but frequents rivers, lakes, and other freſh waters. In France it is highly eſteemed for its delicate taſte; and is taken with limed twigs placed near its haunts.

7. The hypoleucos, or common ſandpiper, agrees with the former in its manners and haunts; but is more common: its note is louder and more piping than others of this genus. Its head is brown, ſtreaked with downward black lines; the neck an obſcure aſh-colour; the back and coverts of the wings brown, mixed with a gloſſy green, elegantly marked with tranſverſe duſky lines; the breaſt and belly are of a pure white; the quill-feathers and the middle feathers of the tail are brown; the legs of a dull pale green.

8. The alpina, or dunling ſandpiper, is at once diſtinguiſhed from the others by the ſingularity of its colours. The back, head, and upper part of the neck are ferruginous, marked with large black ſpots; the lower part of the neck white, marked with ſhort duſky ſtreaks; the coverts of the wings aſh-colour; the belly white, marked with large black ſpots, or with a black creſcent pointing towards the thighs; the tail is aſh-coloured; legs black; toes divided to their origin. In ſize it is ſuperior to that of a lark. Theſe birds are found on our ſea coaſts; but may be recknoned among the more rare kinds. They lay four eggs of a dirty white colour, blotched with brown round the thicker end, and marked with a few ſmall ſpots of the ſame colour on the ſmaller end. They are common on the Yorkſhire coaſts, and eſteemed a great delicacy.

9. The cinclus, or purre, is in length 7¼ inches; extent 14; the head and hind part of the neck are aſh-coloured, marked with duſky lines; a white ſtroke divides the bill and eyes; the back is of a browniſh aſh colour; the breaſt and belly white; the coverts of the wings and tail a dark brown, edged with light aſh-colour or white; the upper part of the quill-feathers duſky, the lower white; the legs of a duſky green; the toes divided to their origin. The bill an inch and a half long, ſlender and black; irides duſky.—Theſe birds come in prodigious flocks on our ſea-coaſts during the winter: in their flight they perform their evolutions with great regularity; appearing like a white or a duſky cloud, as they turn their backs or their breaſts towards you. They leave our ſhores in ſpring, and retire to ſome unknown place to breed. They were formerly a well known diſh at our tables, under the name of *ſtints*.

TRINIDAD, or TRINITY-ISLAND, is ſituated in the Atlantic or American ocean, between 60° and 62° of weſt longitude, and between 9° and 11° of north latitude; it is about 90 miles long, and 60 broad. The ſoil is fruitful, producing ſugar, cotton, fine tobacco, Indian, corn and fruits; but the air is unhealthy.

TRINIDAD, a port town of Mexico, in America, ſituated in the province of Guatimala, 120 miles ſouth-eaſt of the city of Guatimala. W. Long. 94° N. Lat. 13° It is an open town; but very important, becauſe there is no other harbour on this coaſt.

TRINITARIANS, thoſe who believe in the Trinity; thoſe who do not believe therein being called *Antitrinitarians*.

TRINITARIANS, alſo denote an order of religious inſtituted at Rome in the year 1198, under the pontificate of Innocent III. the founders whereof were John de Matha and Felix de Valois. His holineſs gave them permiſſion to eſtabliſh this order for the deliverance of captives, who groaned under the tyranny of the infidels: he gave them as a habit a white gown ornamented with a red and blue croſs. After the death of the two founders, pope Honorious III. continued the order; and their rule was approved by his ſucceſſor Clement IV. in 1367. At firſt they were not permitted to eat fleſh; and when they travelled, were to ride only upon aſſes. But their rule was corrected and mitigated by the biſhop of Paris, and the abbots of St Victor and St Genevieve, who allowed them to eat any kind of food, and to uſe horſes. This order poſſeſſes about 250 convents in 13 different provinces: ſix of which are in France; namely, France, Normandy, Picardy, Champaine, Languedoc, and Provence; three in Spain, viz. New Caſtile, Old Caſtile, and Arragon; one is in Italy, and one in Portugal. There was formerly the province of England, where this order had 43 houſes; that of Scotland, where it had nine; and that of Ireland, where it had 52; beſides a great number of monaſteries in Saxony, Hungary, Bohemia, and other countries. The convent of Cerfroy in France is head of the order.

TRINITY, in theology, the ineffable myſtery of three perſons in one God; Father, Son, and Holy Spirit.

Trinity-*Houſe*, is a kind of college at Deptford, belonging to a company or corporation of ſeamen, who have authority by the king's charter to take knowledge of thoſe that deſtroy ſea-marks; alſo to redreſs the faults of ſailors, and divers other things belonging to navigation. Eliz. c. 13. By a late ſtatute, pilots of ſhips coming up the Thames, are to be examined and approved by the maſter and wardens of Trinity-houſe, &c. 3 Geo. I. c. 13.

Trinity *Sunday*, a feſtival obſerved on the Sunday next after Whitſunday, in honour of the holy Trinity. The obſervation of this feſtival was firſt enjoined in the council of Arles, anno 1260.

Fraternity of the Trinity, a religious ſociety inſtituted at Rome by St Philip Neri in 1548. Theſe religious were appointed to take care of the pilgrims who came to viſit the tombs of St Peter and St Paul. The ſociety originally conſiſted of only fifteen religious, who aſſembled on the firſt Sunday of every month, in the church of St Saviour del Campo, to hear the exhortations of the founder; after whoſe death pope Paul IV. gave the fraternity the church of St Benedict, near which they have ſince built a large hoſpital for the reception of pilgrims. The fraternity is one of the moſt conſiderable in Rome, and moſt of the nobility of both ſexes have been members thereof.

TRINOBANTES, (anc. geog.) a people of Britain, ſuppoſed to have occupied Middleſex and Eſſex.

TRIO, in muſic, a part of a concert wherein three perſons ſing; or, more properly, a muſical compoſition conſiſting of three parts.

TRIPHTHONG, in grammar, an aſſemblage or concourſe of three vowels in one ſyllable; as, *quæ*.

TRIPLE, in muſic, is one of the ſpecies of meaſure or time. See Music.

TRIPOD, in antiquity, a famed ſacred ſeat or ſtool, ſupported by three feet, whereon the prieſts and ſybils were placed to render oracles. It was on the tripod that the gods were ſaid to inſpire the Pythias with that divine fury and enthuſiaſm wherewith they were ſeized at the delivery of their predictions.

TRIPOLI, a conſiderable town of Africa, and capital of a republic of the ſame name in Barbary, and under protection of the grand ſeignior, with a caſtle and a fort. It is pretty large, and the inhabitants are noted pirates. It was taken by Charles V. who ſettled the knights of Rhodes there; but they were driven away by the Turks in 1551. It was formerly very flouriſhing; and has now ſome trade in ſtuffs, ſaffron, corn, oil, wool, dates, oſtrich feathers, and ſkins: but they make more of the Chriſtian ſlaves which they take at ſea; for they either ſet high ranſoms upon them, or make them perform all ſorts of work. It is ſeated on the coaſt of the Mediterranean, in a ſandy ſoil, and ſurrounded by a wall, ſtrengthened by other fortifications. E. Long. 13. 10. N. Lat. 32. 54.

Tripoli, a kingdom of Africa, in Barbary; bounded on the north by the Mediterranean ſea; on the ſouth, by the country of the Beriberies; on the weſt, by the kingdom of Tunis, Biledulgerid, and a territory of the Gadamis; and on the eaſt, by Egypt. It is about 925 miles along the ſea-coaſt; but the breadth is various. Some parts of it are pretty fruitful; but that towards Egypt is a ſandy deſart. It had the title of a *kingdom*; but is now a republic, governed by a dey. He is not abſolute; for a Turkiſh baſhaw reſides here, who receives his authority from the grand ſeignior, and has a power of controling the dey, and levying taxes on the people. The dey is elected by the ſoldiers, who make no ſcruple of depoſing him when they pleaſe.

Tripoli, an ancient and conſiderable town of Aſia, in Syria, on the coaſt of the Mediterranean ſea. The inhabitants are near 60,000, conſiſting of Turks, Chriſtians, and Jews. There is one very handſome moſque; and all the houſes have fountains belonging to them. It is defended by a good citadel, with a garriſon of janiſaries. This town was anciently in Phœnicia, whoſe inhabitants were ſo famous for navigation in the early ages of the world. It is the reſidence of a baſhaw or ſangiack, who alſo governs the territory about it, where there are a great number of mulberry-trees, which enable them to carry on a ſilk-manufactory in the town. E. Long. 39. 0. N. Lat. 34. 15.

TRIQUETROUS, among botaniſts, expreſſes a fruit or leaf that has three ſides or faces all flat.

TRIREMIS, in antiquity, a galley with three ranks of oars on a ſide.

TRISMEGISTUS, an ephithet or ſurname given to one of the two Hermeſes. See Hermes.

TRISMUS, the locked jaw. See Medicine, n° 388.

TRISSYLLABLE, in grammar, a word conſiſting of three ſyllables.

TRITICUM, wheat; in botany, a genus of the digynia order, belonging to the triandria claſs of plants. See Agriculture, n° 112, &c.

TRITON, in zoology, a genus belonging to the order of vermes molluſca. The body is oblong; the tongue is ſpiral; it has 12 tentacula, ſix on each ſide, the hindmoſt ones having claws like a crab. There is but one ſpecies, found in holes of rocks about the ſhore.

TRITON, a ſea demigod, held by the ancients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders or commands from ſea to ſea.

TRITURATION, the act of reducing to ſolid body into a ſubtile powder; called alſo *pulveriſation* and *levigation*.

TRIUMPH, in Roman antiquity, a public and ſolemn honour conferred by the Romans on a victorious general by allowing him a magnificent entry in the city.

The greater triumph, called alſo *curulis*, or ſimply the *triumph*, was decreed by the ſenate to a general, upon the conquering of a province or gaining a ſignal victory. The day appointed for the ceremony being arrived, ſcaffolds were erected in the forum and circus, and all the other parts of the city where they could beſt behold the pomp: the ſenate went to meet the conqueror without the gate called *Capena* or *Triumphalis*, and marched back in order to the capitol; the ways being cleared and cleanſed by a number of officers and tipſtaffs, who drove away ſuch as thronged the paſſage or ſtraggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, ſetting forth his great exploits; his buſkins were beſet with pearl; and he wore a crown, which at firſt was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was drawn in a magnificent chariot, adorned with ivory and plates of gold, drawn uſually by two white horſes; though ſometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Marc Antony, by lions; that of Heliogabalus, by tygers; that of Aurelian, by deer, &c. His children were at his feet, and ſometimes on the chariot-horſes. The proceſſion was led up by the muſicians, who played triumphal pieces in praiſe of the general: theſe were followed by young men, who led the victims to the ſacrifice, with their horns gilded, and their heads adorned with ribbands and garlands; next came the carts and waggons, loaded with all the ſpoils taken from the enemy, with their horſes, chariots, &c. theſe were followed by the kings, princes, and generals, who had been taken captives, loaden with chains: after theſe appeared the triumphal chariot, before which, as it paſſed, they all along ſtrewed flowers, and the people with loud acclamations called out, *Io triumphe!* The chariot was followed by the ſenate, clad in white robes; and the ſenate by ſuch citizens as had been ſet at liberty or ranſomed; and the proceſſion was cloſed by the prieſts and their officers and utenſils, with a white ox led along for the chief victim. In this order they proceeded through the triumphal gate, along the via ſacra, to the capitol, where the victims were ſlain. In the mean time all the temples were open, and all the altars loaded with offerings and incenſe; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of three perſons who govern abſoutely, and with equal authority, in a ſtate. It is chiefly applied to the Roman government: Cæſar, Pompey, and Craſſus, were the firſt triumvirs who divided the government amongſt them. There were alſo other officers ſo called; as the triumviri or treſviri capitales, who were the keepers of the public goal: they had the office of puniſhing malefactors; for which purpoſe they kept eight lictors under them.

TROAS, (anc. geog.) a diſtrict compriſed between the two Myſiæ; and therefore diſtinct from the kingdom of Troy and the poſſeſſions of Priam; and was the Troas Propria; for, according to Homer, both the Myſiæ were under the empire of the Trojans, from the neighbourhood of the river Æſepus, and that of Cyzicene, to the river Caycus, (Strabo); called *Phrygia Minor*, (Ptolemy). Alexandria, a town in this diſtrict, was alſo called *Troas*, a Roman colony.

TROCHANTER, in anatomy. See there n° 37.

TROCHE, in pharmacy, a ſort of medicine made of glutinous ſubſtances into little cakes, and afterwards exſiccated. See PHARMACY, n° 836—853.

TROCHILUS, the HUMMING-BIRD, a genus belonging to the order of picæ. There are 60 ſpecies; all of them remarkable for the beauty of their colours, and moſt of them for the ſmallneſs of their ſize, though ſome are eight or nine inches in length.—They are divided into two families, viz. thoſe with crooked bills, and thoſe with ſtraight bills. Of theſe we ſhall deſcribe the three following ſpecies, from Mr Latham's Synopſis of birds.

1. The little humming-bird has a crooked bill, is an inch and an half in length; frequently weighing leſs 50 grains. The bill is black, and half an inch in length: the body greeniſh-brown, with a red, ſhining, inimitable gloſs: the head is creſted with a ſmall tuft, green at bottom, but of a ſparkling gold colour at top: quills and tail fine black. It is a native of Guiana; and the velocity of it in flying is ſo great, that the eye can ſcarce keep pace with its motion.

2. The moſchitus, or ruby-necked humming-bird, according to Marcgrave is the moſt beautiful of the whole genus. Its length is three inches four lines; the bill ſtraight, eight lines long, and blackiſh: the top of the head and hind part of the neck are as bright as a ruby, and of the ſame colour: the upper parts of the body are brown, with a faint mixture of green gold: the throat and fore part of the neck are the colour of the moſt brilliant topaz: the belly, ſides, and thighs, are brown; but on the lower part of the belly, on each ſide, is a ſpot of white: the tail is rufous purple, inclining to violet at the ends; the two middle feathers are ſhorteſt: the legs and claws blackiſh. The female has only a daſh of golden or topaz on the breaſt and fore part of the neck; the reſt of the under parts are greyiſh white. This ſpecies is found is Braſil, Curaſſoa, Guiana, and Surinam.

3. The minimus, or leaſt humming-bird, is exceeded, both in weight and dimenſions, by ſeveral ſpecies of bees. The total length is one inch and a quarter; and when killed, weighs no more, according to Sir Hans Sloane, than 20 grains. The bill is ſtraight and black, three lines and a half in length: the upper parts of the head and body are of a greeniſh gilded brown, in ſome lights appearing reddiſh: the under parts are greyiſh white; the wings are violet-brown; the tail of a bluiſh black, with a gloſs of poliſhed metal; but the outer feather, except one on each ſide, is grey from the middle to the tip, and the outer one wholly grey; legs and claws brown. The female is leſs than the male: the whole upper ſide of a dirty brown, with a ſlight

permiſſion to eſtabliſh this order for the deliverance of captives, who groaned under the tyranny of the infidels: he gave them as a habit a white gown ornamented with a red and blue croſs. After the death of the two founders, pope Honorious III. continued the order; and their rule was approved by his ſucceſſor Clement IV. in 1367. At firſt they were not permitted to eat fleſh; and when they travelled, were to ride only upon aſſes. But their rule was corrected and mitigated by the biſhop of Paris, and the abbots of St Victor and St Genevieve, who allowed them to eat any kind of food, and to uſe horſes. This order poſſeſſes about 250 convents in 13 different provinces: ſix of which are in France; namely, France, Normandy, Picardy, Champaine, Languedoc, and Provence; three in Spain, viz. New Caſtile, Old Caſtile, and Arragon; one is in Italy, and one in Portugal. There was formerly the province of England, where this order had 43 houſes; that of Scotland, where it had nine; and that of Ireland, where it had 52; beſides a great number of monaſteries in Saxony, Hungary, Bohemia, and other countries. The convent of Cerfroy in France is head of the order.

TRINITY, in theology, the ineffable myſtery of three perſons in one God; Father, Son, and Holy Spirit.

Trinity-*Houſe*, is a kind of college at Deptford, belonging to a company or corporation of ſeamen, who have authority by the king's charter to take knowledge of thoſe that deſtroy ſea-marks; alſo to redreſs the faults of ſailors, and divers other things belonging to navigation. Eliz. c. 13. By a late ſtatute, pilots of ſhips coming up the Thames, are to be examined and approved by the maſter and wardens of Trinity-houſe, &c. 3 Geo. I. c. 13.

Trinity *Sunday*, a feſtival obſerved on the Sunday next after Whitſunday, in honour of the holy Trinity. The obſervation of this feſtival was firſt enjoined in the council of Arles, anno 1260.

Fraternity of the Trinity, a religious ſociety inſtituted at Rome by St Philip Neri in 1548. Theſe religious were appointed to take care of the pilgrims who came to viſit the tombs of St Peter and St Paul. The ſociety originally conſiſted of only fifteen religious, who aſſembled on the firſt Sunday of every month, in the church of St Saviour del Campo, to hear the exhortations of the founder; after whoſe death pope Paul IV. gave the fraternity the church of St Benedict, near which they have ſince built a large hoſpital for the reception of pilgrims. The fraternity is one of the moſt conſiderable in Rome, and moſt of the nobility of both ſexes have been members thereof.

TRINOBANTES, (anc. geog.) a people of Britain, ſuppoſed to have occupied Middleſex and Eſſex.

TRIO, in muſic, a part of a concert wherein three perſons ſing; or, more properly, a muſical compoſition conſiſting of three parts.

TRIPHTHONG, in grammar, an aſſemblage or concourſe of three vowels in one ſyllable; as, *quæ*.

TRIPLE, in muſic, is one of the ſpecies of meaſure or time. See Music.

TRIPOD, in antiquity, a famed ſacred ſeat or ſtool, ſupported by three feet, whereon the prieſts and ſybils were placed to render oracles. It was on the tripod that the gods were ſaid to inſpire the Pythias with that divine fury and enthuſiaſm wherewith they were ſeized at the delivery of their predictions.

TRIPOLI, a conſiderable town of Africa, and capital of a republic of the ſame name in Barbary, and under protection of the grand ſeignior, with a caſtle and a fort. It is pretty large, and the inhabitants are noted pirates. It was taken by Charles V. who ſettled the knights of Rhodes there; but they were driven away by the Turks in 1551. It was formerly very flouriſhing; and has now ſome trade in ſtuffs, ſaffron, corn, oil, wool, dates, oſtrich feathers, and ſkins: but they make more of the Chriſtian ſlaves which they take at ſea; for they either ſet high ranſoms upon them, or make them perform all ſorts of work. It is ſeated on the coaſt of the Mediterranean, in a ſandy ſoil, and ſurrounded by a wall, ſtrengthened by other fortifications. E. Long. 13. 10. N. Lat. 32. 54.

Tripoli, a kingdom of Africa, in Barbary; bounded on the north by the Mediterranean ſea; on the ſouth, by the country of the Beriberies; on the weſt, by the kingdom of Tunis, Biledulgerid, and a territory of the Gadamis; and on the eaſt, by Egypt. It is about 925 miles along the ſea-coaſt; but the breadth is various. Some parts of it are pretty fruitful; but that towards Egypt is a ſandy deſart. It had the title of a *kingdom;* but is now a republic, governed by a dey. He is not abſolute; for a Turkiſh baſhaw reſides here, who receives his authority from the grand ſeignior, and has a power of controling the dey, and levying taxes on the people. The dey is elected by the ſoldiers, who make no ſcruple of depoſing him when the pleaſe.

Tripoli, an ancient and conſiderable town of Aſia, in Syria, on the coaſt of the Mediterranean ſea. The inhabitants are near 60,000, conſiſting of Turks, Chriſtians, and Jews. There is one very handſome moſque; and all the houſes have fountains belonging to them. It is defended by a good citadel, with a garriſon of janiſaries. This town was anciently in Phœnicia, whoſe inhabitants were ſo famous for navigation in the early ages of the world. It is the reſidence of a baſhaw or ſangiack, who alſo governs the territory about it, where there are a great number of mulberry-trees, which enable them to carry on a ſilk-manufactory in the town. E. Long. 39. 0. N. Lat. 34. 15.

TRIQUETROUS, among botaniſts, expreſſes a fruit or leaf that has three ſides or faces all flat.

TRIREMIS, in antiquity, a galley with three ranks of oars on a ſide.

TRISMEGISTUS, an ephithet or ſurname given to one of the two Hermeſes. See Hermes.

TRISMUS, the locked jaw. See Medicine, nº 388.

TRISSYLLABLE, in grammar, a word conſiſting of three ſyllables.

TRITICUM, wheat; in botany, a genus of the digynia order, belonging to the triandria claſs of plants. See Agriculture, nº 112, &c.

TRITON, in zoology, a genus belonging to the order of vermes molluſca. The body is oblong; the tongue is ſpiral; it has 12 tentacula, ſix on each ſide, the hindmoſt ones having claws like a crab. There is but one ſpecies, found in holes of rocks about the ſhore.

Triton, a ſea demigod, held by the ancients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders or commands from ſea to ſea.

TRITURATION, the act of reducing to ſolid body into a ſubtile powder; called alſo *pulveriſation* and *levigation*.

TRIUMPH, in Roman antiquity, a public and ſolemn honour conferred by the Romans on a victorious general by allowing him a magnificent entry in the city.

The greater triumph, called alſo *curulis*, or ſimply the *triumph*, was decreed by the ſenate to a general, upon the conquering of a province or gaining a ſignal victory. The day appointed for the ceremony being arrived, ſcaffolds were erected in the forum and circus, and all the other parts of the city where they could beſt behold the pomp: the ſenate went to meet the conqueror without the gate called *Capena* or *Triumphalis*, and marched back in order to the capitol; the ways being cleared and cleanſed by a number of officers and tipſtaffs, who drove away ſuch as thronged the paſſage or ſtraggled up and down. The general was clad in a rich purple robe, interwoven with figures of gold, ſetting forth his great exploits; his buſkins were beſet with pearl; and he wore a crown, which at firſt was only laurel, but afterwards gold; in one hand he bore a branch of laurel, and in the other a truncheon. He was drawn in a magnificent chariot, adorned with ivory and plates of gold, drawn uſually by two white horſes; though ſometimes by other animals, as that of Pompey, when he triumphed over Africa, by elephants; that of Marc Antony, by lions; that of Heliogabalus, by tygers; that of Aurelian, by deer, &c. His children were at his feet, and ſometimes on the chariot-horſes. The proceſſion was led up by the muſicians, who played triumphal pieces in praiſe of the general: theſe were followed by young men, who led the victims to the ſacrifice, with their horns gilded, and their heads adorned with ribbands and garlands; next came the carts and waggons, loaded with all the ſpoils taken from the enemy, with their horſes, chariots, &c. theſe were followed by the kings, princes, and generals, who had been taken captives, loaden with chains: after theſe appeared the triumphal chariot, before which, as it paſſed, they all along ſtrewed flowers, and the people with loud acclamations called out, *Io triumphe!* The chariot was followed by the ſenate, clad in white robes; and the ſenate by ſuch citizens as had been ſet at liberty or ranſomed; and the proceſſion was cloſed by the prieſts and their officers and utenſils, with a white ox led along for the chief victim. In this order they proceeded through the triumphal gate, along the via ſacra, to the capitol, where the victims were ſlain. In the mean time all the temples were open, and all the altars loaded with offerings and incenſe; games and combats were celebrated in the public places, and rejoicings appeared every where.

TRIUMVIR, one of three perſons who govern abſoutely, and with equal authority, in a ſtate. It is chiefly applied to the Roman government: Cæſar, Pompey, and Craſſus, were the firſt triumvirs who divided the government amongſt them. There were alſo other officers ſo called; as the triumviri or treſviri capitales, who were the keepers of the public goal: they had the office of puniſhing malefactors; for which purpoſe they kept eight lictors under them.

TROAS, (anc. geog.) a diſtrict compriſed between the two Myſiæ; and therefore diſtinct from the kingdom of Troy and the poſſeſſions of Priam; and was the Troas Propria; for, according to Homer, both the Myſiæ were under the empire of the Trojans, from the neighbourhood of the river Æſepus, and that of Cyzicene, to the river Caycus, (Strabo); called *Phrygia Minor*, (Ptolemy). Alexandria, a town in this diſtrict, was alſo called *Troas*, a Roman colony.

TROCHANTER, in anatomy. See there n° 37.

TROCHE, in pharmacy, a ſort of medicine made of glutinous ſubſtances into little cakes, and afterwards exſiccated. See Pharmacy, n° 836—853.

TROCHILUS, the humming-bird, a genus belonging to the order of picæ. There are 60 ſpecies; all of them remarkable for the beauty of their colours, and moſt of them for the ſmallneſs of their ſize, though ſome are eight or nine inches in length.—They are divided into two families, viz. thoſe with crooked bills, and thoſe with ſtraight bills. Of theſe we ſhall deſcribe the three following ſpecies, from Mr Latham's Synopſis of birds.

1. The little humming-bird has a crooked bill, is an inch and an half in length; frequently weighing leſs 50 grains. The bill is black, and half an inch in length: the body greeniſh-brown, with a red, ſhining, inimitable gloſs: the head is creſted with a ſmall tuft, green at bottom, but of a ſparkling gold colour at top: quills and tail fine black. It is a native of Guiana; and the velocity of it in flying is ſo great, that the eye can ſcarce keep pace with its motion.

2. The moſchitus, or ruby-necked humming-bird, according to Marcgrave is the moſt beautiful of the whole genus. Its length is three inches four lines; the bill ſtraight, eight lines long, and blackiſh: the top of the head and hind part of the neck are as bright as a ruby, and of the ſame colour: the upper parts of the body are brown, with a faint mixture of green gold: the throat and fore part of the neck are the colour of the moſt brilliant topaz: the belly, ſides, and thighs, are brown; but on the lower part of the belly, on each ſide, is a ſpot of white: the tail is rufous purple, inclining to violet at the ends; the two middle feathers are ſhorteſt: the legs and claws blackiſh. The female has only a daſh of golden or topaz on the breaſt and fore part of the neck; the reſt of the under parts are greyiſh white. This ſpecies is found is Braſil, Curaſſoa, Guiana, and Surinam.

3. The minimus, or leaſt humming-bird, is exceeded, both in weight and dimenſions, by ſeveral ſpecies of bees. The total length is one inch and a quarter; and when killed, weighs no more, according to Sir Hans Sloane, than 20 grains. The bill is ſtraight and black, three lines and a half in length: the upper parts of the head and body are of a greeniſh gilded brown, in ſome lights appearing reddiſh: the under parts are greyiſh white; the wings are violet-brown; the tail of a bluiſh black, with a gloſs of poliſhed metal; but the outer feather, except one on each ſide, is grey from the middle to the tip, and the outer one wholly grey; legs and claws brown. The female is leſs than the male: the whole upper ſide of a dirty brown, with a

ſlight gloſs of green; the under parts of a dirty white. Theſe birds are found in various parts of South America and the adjacent iſlands.—Our author received it from Jamaica.

Theſe birds ſubſiſt on the nectar or ſweet juice of flowers: they frequent thoſe moſt which have a long tube; particularly the *impatiens noli me tangere*, the *monarda* with crimſon flowers, and thoſe of the convolvulus tribe. They never ſettle on the flower during the action of extracting the juice, but flutter continually, like bees, moving their wings very quick, and making a humming noiſe; whence their name. They are not very ſhy, ſuffering people to come within a foot or two of the place where they are, but on approaching nearer fly off like an arrow out of a bow. They often meet and fight for the right to a flower, and this all on the wing: in this ſtate they often come into rooms where the windows ſtand open, fight a little, and go out again. When they come to a flower which is juiceleſs, or on the point of withering, they pluck it off as it were in anger, by which means the ground is often quite covered with them. When they fly againſt each other, they have, beſides the humming, a ſort of chirping noiſe like a ſparrow or chicken. They do not feed on inſects nor fruit; nor can they be kept long in cages, though they have been preſerved alive for ſeveral weeks together by feeding them with water in which ſugar had been diſſolved.

This bird moſt frequently builds in the middle of a branch of a tree, and the neſt is ſo ſmall that it cannot be ſeen by a perſon who ſtands on the ground; any one, therefore, deſirous of ſeeing it, muſt get up to the branch, that he may view it from above: it is for this reaſon that the neſts are not more frequently found. The neſt is in courſe very ſmall, and quite round: the outſide, for the moſt part, is compoſed of green moſs, common on old pales and trees; the inſide of ſoft down, moſtly collected from the leaves of the great mullein, or the ſilk-graſs; but ſometimes they vary the texture, making uſe of flax, hemp, hairs, and other ſoft materials: they lay two eggs of the ſize of a pea, which are white, and not bigger at one end than the other.

The above account of the manners will in general ſuit all the birds of this genus; for as their tongues are made for ſuction, it is by this method alone that they can gain nouriſhment: no wonder, therefore, they can ſcarcely be kept alive by human artifice. Captain Davies, however, informed our author, that he kept theſe birds alive for four months by the following method:—He made an exact imitation of ſome of the tubular flowers with paper, faſtened round a tobacco-pipe, and painted them of a proper colour; theſe were placed in the order of nature, in the cage wherein theſe little creatures were confined; the bottoms of the tubes were filled with a mixture of brown ſugar and water as often as emptied; and he had the pleaſure of ſeeing them perform every action; for they ſoon grew familiar, and took the nouriſhment in the ſame manner as when ranging at large, though cloſe under his eye.

TROGLODITES, in the ancient geography, a people of Ethiopia, ſaid to have lived in caves under ground. Pomponius Mela gives a ſtrange account of the Troglodites: he ſays, they did not ſo properly ſpeak as ſhriek; and that they lived on ſerpents. They are ranked by Linnæus with mankind; (ſee HOMO.) But we have given their character and natural hiſtory under SIMIA, among their proper companions. See that article.

TROGUS (Pompeius), Latin univerſal hiſtorian to the time of Auguſtus Cæſar, of whom we have only an abridgment by Juſtin, flouriſhed about 41. B. C.

TROIA (anc. geog.), a celebrated name denoting a diſtrict, at firſt called *Idæa*; and the city, *Ilium*. But the cuſtom has prevailed to call both diſtrict and city *Troia*; and this laſt more commonly *Troia* than *Ilium*, and both with the epithet *Vetus*. Trojani, the the people; often called *Phryges*, (Virgil); and *Troes*, from Tros, (Stephanus): *Trojanus*, *Troius*, and *Phrygius*, the epithets, (Virgil); *Troicus*, (Ovid). Whether the Phrygians before the Trojan times, or after the deſtruction of Troy, occupied that country, is hard to determine in ſuch a diſtant antiquity.

TROIS RIVIERES, a town of North America, in the province of Canada, ſituated on the river St Lawrence, 50 miles ſouth of Quebec. W. Long. 75° N. Lat. 46. 45.

TROLLIUS, the GLOBE-FLOWER, or *Lucken Gowan*; a genus of the polygynia order, belonging to the polyandria claſs of plants. There are two ſpecies; of which the moſt remarkable is the europæus, a native of the northern countries of Europe. The leaves are divided firſt into five ſegments down to the baſe; the ſegments are again divided, each about half way, into two or three lobes, which are ſharply indented on the edges. The ſtalk is a foot high, and ſcarcely branched; the flower is yellow, globoſe, and ſpecious. It grows at the foot of mountains, and by the ſides of rivulets. The country people in Sweden ſtrew their floors and pavements on holidays with the flowers, which have a pleaſant ſmell, and are ornamental in gardens.

TROMP (Martin Happertz Van), a celebrated Dutch admiral, was born at the Brille, in Holland. He raiſed himſelf by his merit, after having diſtinguiſhed himſelf on many occaſions, eſpecially at the famous engagement near Gibraltar in 1607. He paſſed for one of the greateſt ſeamen that had till that time appeared in the world; and was declared admiral of Holland, even by the advice of the prince of Orange. He in that character defeated a large Spaniſh fleet in 1630, and gained 32 other victories at ſea; but was killed when under deck, in an engagement with the Engliſh in 1653 †. The ſtates general cauſed medals to be ſtruck to his honour, and lamented him as one of the greateſt heroes of their republic. Van Tromp, in the midſt of the greateſt glory, conſtantly diſcovered a remarkable modeſty; for he never aſſumed a higher character than that of a burgher, and that of being the father of the ſailors.

TRONAGE, an ancient cuſtomary duty, or toll, for weighing of wool. According to Fleta, *trona* is a beam to weigh with, mentioned in the ſtat. Weſtm. 2. cap. 25. And tronage was uſed for the weighing wool in a ſtaple or public mart, by a common trona or beam; which, for the tronage of wool in London, was fixed at Leaden-Hall. The mayor and commonalty of London are ordained keepers of the beams and weights for weighing merchants commodities, with power to aſſign clerks, and porters, &c. of the great beam and balance; which weighing of goods and wares is called *tronage*;

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† See *Britain*, n° 174.

tronage: and no ſtranger ſhall buy any goods in London before they are weighed at the king's beam, on pain of forfeiture.

TRONE-WEIGHT, the moſt ancient of the different weights uſed in Scotland; and, tho' now forbidden by ſeveral ſtatutes, is ſtill uſed by many for home-commodities, and that in a very irregular manner; for the pound varies in different places, and for different purpoſes, from 20 to 24 Dutch ounces. The common allowance is 21½ oz. for wool, 20½ for butter and cheeſe, 20 for tallow, lint, hemp, and hay. It is divided into 16 of its own ounces, and 16 pounds make a ſtone.

TROOP, a ſmall body of horſe or dragoons, about 50 or 60, ſometimes more, ſometimes leſs, commanded by a captain, lieutenant, cornet, quarter-maſter, and three corporals, who are the loweſt officers of a troop.

TROPE. See ORATORY, n° 49—59.

TROPHONIUM ANTRUM or *Oraculum*, (anc. geog.), a cave near Lebadia in Bœotia, between Helicon and Chæronea, (Strabo): ſo called from Trophonius, an enthuſiaſtic diviner; who, deſcending into this cave, pretended to give anſwers and pronounce oracles; and was hence called *Jupiter Trophonius*, Such as went down to this cave never after ſmiled; hence the proverbial ſaying of a man who has loſt his mirth, That he is come out of Trophonius's cave. Though Pauſanias, who writes from experience, contradicts this; affirming that perſons came out of the cave affected indeed with a ſtupor, but that they ſoon after recover themſelves

TROPHY, (*Tropæum*), among the ancients, a monument of victory. As the term, ſo the cuſtom is of Greek original. At firſt it only conſiſted of the trunk of a tree, lopt of its branches, fixed in the earth on an eminence, and adorned with the armour taken from the enemy, (Virgil.) Afterwards the trophies were pillars of braſs or ſtone; but ſuch were in diſrepute among the Greeks, as ſerving to perpetuate contention, which ought to be buried in oblivion, (Plutarch.) They were accounted inviolable; none was to remove or deſtroy them: but, if conſumed by length of time, it was thought an invidious act and a renewal of grudge to reſtore them. On every trophy there was an inſcription, ſetting forth the cauſe of the war, and manner of the victory; with an account of the ſpoils with which they were adorned. Some of the ſpoils taken from the enemy were alſo hung up in the temples; and theſe too were called *trophies* and *anathemata*, becauſe ſuſpended or hung up in view.

TROPICS, in aſtronomy. See there n° 110, *&* *ſeq.*

TROS, king of Teucria, founder of the ancient city of Troy, and after whoſe name his ſubjects took the appellation of Trojans, flouriſhed about 1334 B. C.

TROTTER (Mrs Catharine), was the daughter of captain David Trotter, a Scots gentleman. He was a commander in the royal navy in the reign of Cha. II. and at his death left two daughters, the youngeſt of whom, Catharine, our celebrated author, was born in London, Auguſt 1679. She gave early marks of her genius; and learned to write, and alſo made herſelf miſtreſs of the French language, by her own application and diligence, without any inſtructor; but ſhe had ſome aſſiſtance in the ſtudy of the Latin grammar and logic, of which latter ſhe drew up an abſtract for her own uſe. The moſt ſerious and important ſubjects, and eſpecially religion, ſoon engaged her attention.—But notwithſtanding her education, her intimacy with ſeveral families of diſtinction of the Romiſh perſuaſion, expoſed her, while very young, to impreſſions in favour of that church; which not being removed by her conferences with ſome eminent and learned members of the church of England, ſhe embraced the Romiſh communion, in which ſhe continued till the year 1707. In 1695, ſhe produced a tragedy called *Agnes de Caſtro*, which was acted at the theatre-royal when ſhe was only in her 17th year. The reputation of this performance, and the verſes which ſhe addreſſed to Mr Congreve upon his Mourning Bride in 1697, were probably the foundation of her acquaintance with that celebrated writer. Her ſecond tragedy, Fatal Friendſhip, was acted in 1698, at the new theatre in Lincoln's Inn-Fields. This tragedy met with great applauſe, and is ſtill thought the moſt perfect of her dramatic performances. Her dramatic talents not being confined to tragedy, ſhe brought upon the ſtage, in 1701, a comedy called *Love at a loſs*, or *Moſt votes carry it*. In the ſame year ſhe gave the public her third tragedy, entitled the *Unhappy Penitent*, acted at the theatre-royal in Drury-lane. But poetry and dramatic writing did not ſo far engroſs the thoughts of our author but that ſhe ſometimes turned them to ſubjects of a very different nature; and diſtinguiſhed herſelf in an extraordinary manner in defence of Mr Locke's writings, a female metaphyſician being a remarkable phenomenon in the republic of letters.

She returned to the exerciſe of her dramatic genius in 1703, and fixed upon the revolution of Sweden, under Guſtavus Erickſon, for the ſubject of a tragedy. This tragedy was acted in 1706, at the queen's theatre in the Hay Market. In 1707, her doubts concerning the Romiſh religion, which ſhe had ſo many years profeſſed, having led her to a thorough examination of the grounds of it, by conſulting the beſt books on both ſides of the queſtion, and adviſing with men of the beſt judgment, the reſult was a conviction of the falſeneſs of the pretenſions of that church, and a return to that of England, to which ſhe adhered during the remainder of her life. In 1708, ſhe was married to the Rev. Mr Cockburn, then curate of St Dunſtan's in Fleet-ſtreet, but he afterwards obtained the living of Long-Horſely, near Morpeth in Northumberland. He was a man of conſiderable abilities; and, among ſeveral other things, wrote an account of the Moſaic Deluge, which was much approved by the learned.

Mrs Cockburn's remarks upon ſome writers in the controverſy concerning the foundation of moral duty and moral obligation, were introduced to the world in Auguſt 1743, in the Literary Journal, intitled *The Hiſtory of the Works of the Learned*. The ſtrength, clearneſs, and vivacity ſhown in her remarks upon the moſt abſtract and perplexed queſtions, immediately raiſed the curioſity of all good judges about the concealed writer; and their admiration was greatly increaſed when her ſex and advanced age were known. Dr Rutherforth's Eſſay on the Nature and Obligations of Virtue, publiſhed in May 1744, ſoon engaged her thoughts; and notwithſtanding the aſthmatic diſorder which had ſeized her many years before, and now left her ſmall intervals of eaſe, ſhe applied herſelf to the confutation of that elaborate diſcourſe, and finiſhed it with a ſpirit, elegance, and perſpecuity equal, if not ſuperior, to all her former writings.

The loſs of her huſband in 1748, in the 71ſt year of his age, was a ſevere ſhock to her; and ſhe did not long ſurvive him, dying on the 11th of May 1749, in her 71ſt year, after having long ſupported a painful diſorder with a reſignation to the Divine will, which had been the governing principle of her whole life, and her ſupport under the various trials of it.

Her works are collected into two large volumes 8vo, by Dr Birch; who has prefixed to them an account of her Life and Writings.

TROUBADOURS. See Poets *Provençal*.

TROVER, in law, an action that a man hath againſt one that, having found any of his goods, refuſeth to deliver them upon demand.

TROY. See Troia.

Troy-*Weight*, the moſt ancient of the different kinds uſed in Britain. The ounce of this weight was brought from Grand Cairo in Egypt, about the time of the cruſades, into Europe, and firſt adopted in *Troyes*, a city of Champagne; whence the name.

The pound *Engliſh* Troy contains 12 ounces, or 5760 grains. It was formerly uſed for every purpoſe; and is ſtill retained for weighing gold, ſilver, and jewels; for compounding medicines; for experiments in natural philoſophy; and for comparing different weights with each other.

Scots Troy *Weight* was eſtabliſhed by James VI. in the year 1618, who enacted, that only one weight ſhould be uſed in Scotland, *viz.* the French Troy ſtone of 16 pounds, and 16 ounces in the pound. The pound contains 7600 grains, and is equal to 17 oz. 6 dr. averdupois. The cwt. or 112 lb. averdupois, contains only 103 lb. 2½ oz. of this weight, though generally reckoned equal to 104 lb. This weight is nearly, if not exactly, the ſame as that of Paris and Amſterdam; and is generally known by the name of *Dutch weight*. Though prohibited by the articles of union, it is ſtill uſed in weighing iron, hemp, flax, moſt Dutch and Baltic goods, meal, butcher-meat, unwrought pewter and lead, and ſome other articles.

TRUFFLES. See Lycoperdon.

TRUMPET, a muſical inſtrument, the moſt noble of all the wind-kind, uſed chiefly in war among the cavalry, to direct them in the ſervice.

Speaking Trumpet. See Acoustics, nº 26.

TRUNCATED, in general, is an appellation given to ſuch things as have, or ſeem to have, their points cut off: thus we ſay, a truncated cone, pyramid, leaf, &c.

TRUNCHEON, a ſhort ſtaff or baton, uſed by kings, generals, and great officers, as a mark of their command.

TRUNDLE, a ſort of carriage with low wheels, whereon heavy and cumberſome burdens are drawn.

TRUNK, among botaniſts, that part of the herb which ariſes immediately from the root, and is terminated by fructification; the leaves, buds, and auxiliary parts of the herb not entering in its deſcription.

TRUNNIONS, or Trunions, of a piece of ordnance, are thoſe knobs or bunches of the metal which bear her up on the cheeks of the carriage.

TRUSS, a bundle, or certain quantity of hay, ſtraw, &c. A truſs of hay is to contain 56 pounds, or half an hundred weight: 36 truſſes make a load.

Truss is alſo uſed for a ſort of bandage or ligature made of ſteel, or the like matter, wherewith to keep up the parts in thoſe who have hernias or ruptures.

Truss, in a ſhip, a machine employed to pull a yard home to its reſpective maſt, and retain it firmly in that poſition.

TRUSTEE, one who has an eſtate, or money, put or truſted in his hands for the uſe of another.

TRUTH, a term uſed in oppoſition to falſehood, and applied to propoſitions which anſwer or accord to the nature and reality of the thing whereof ſomething is affirmed or denied. See Metaphysics, nº 214, &c.

TRYPHIODORUS, an ancient Greek poet, who lived ſome time between the reigns of Severus and Anaſtaſius. His writings were very numerous; yet none of them have come down to us, except an epic poem, on which Mr Addiſon has made ſome entertaining remarks in the Spectator, Nº 63. Treating of the ſeveral ſpecies of falſe wit among the ancients, he mentions the lipogrammatiſts, or letter-droppers of antiquity, and adds, "One Tryphiodorus was a great maſter in this kind of writing. He compoſed an Odyſſey, or epic poem, on the adventures of Ulyſſes, conſiſting of 24 books, having entirely baniſhed the letter A from his firſt book, which was called *Alpha*; as *lucus à non lucendo*, becauſe there was not an alpha in it. His ſecond book was inſcribed *Beta* for the ſame reaſon. In ſhort, the poet excluded the whole 24 letters in their turns; and ſhowed them, one after another, that he could do his buſineſs without them. It muſt have been very pleaſant to have ſeen this poet avoiding the reprobate letter as much as another would a falſe quantity; and making his eſcape from it thro' the ſeveral Greek dialects, when he was preſſed with it in any particular ſyllable: for the moſt apt and elegant word in the whole language was rejected, like a diamond with a flaw in it, if it appeared blemiſhed with a wrong letter."

The firſt edition of this extraordinary work was publiſhed by Aldus, at Venice, with Quintus Calaber's Paralipomena, and Coluthus's poem on the rape of Helen. It has been ſince reprinted at ſeveral places, particularly at Francfort in 1580 by Friſchlinus; who not only corrected many corrupt paſſages, but added two Latin verſions, one in verſe, and the other in proſe. That in verſe was reprinted in 1742, with the Greek, at Oxford, in 8vo, with an Engliſh tranſlation in verſe, and Notes, by Mr Merrick.

TUAM, a town of Ireland, in the province of Connaught, and county of Galway, with an archbiſhop's ſee. It was once a famous city, though now it is reduced to a village; yet it ſtill retains the title of a city, as being an archiepiſcopal ſee. It is ſeven miles from the borders of Mayo. W. Long. 9. 0. N. Lat. 53. 25.

TUB, in commerce, denotes an indetermined quantity or meaſure: thus, a tub of tea contains about 60 pounds; and a tub of camphor from 56 to 80 pounds.

TUBAL cain, the ſon of Lamech and Selſa, was born about the 2975th year before the Chriſtian æra. He invented the art of working in braſs, iron, and other metals; and many have imagined that from him the pagan authors took the idea of their Vulcan.

TUBE, in general, a pipe, conduit, or canal; a cylinder, hollow within-ſide, either of lead, iron, glaſs, wood, or other matter, for the air or ſome other matther to have a free conveyance through it.

Auricular Tube, or inſtrument to facilitate hearing. See Acoustics, n° 26.

TUBERCLES, among phyſicians, denote little tumours which ſuppurate and diſcharge pus; and are often found in the lungs, eſpecially of conſumptive perſons.

TUCUMAN, a province of South America, in Paraguay; bounded on the north by the provinces of Los-Chicas and Chaco; on the eaſt by Chaco and Rio-de-la-Plata, on the ſouth by the country of Chicuitos and Pampes, and on the weſt by the biſhopric of St Jago. The air is hot, and the earth ſandy: however, ſome places are fuitful enough, and the original natives have a good character. The Spaniards poſſeſs a great part of this country.

TUFO, a kind of ſtone, according to M. Raſpe, formed of volcanic aſhes ferruminated and concreted together. It is of various colours; blackiſh-grey, blueiſh-grey, and yellow; every colour having a different mixture and ſolidity: but all of them have the bad quality of mouldering down on long expoſure to the weather; notwithſtanding which, they have been uſed in buildings both ancient and modern. The yellow kind reſiſts the air leſs than any other.

TULIPA, the tulip; a genus of the monogynia order, belonging to the hexandria claſs of plants. There are three ſpecies, two of which only are known in the Engliſh gardens; and one of theſe in particular (the firſt ſort) is famous for the extraordinary beauty of its large noble flowers, moſt elegantly ſtriped and ſtained with a vaſt diverſity of rich colours, in a thouſand various forms; conſtituting ſo many different varieties, all very great ornaments to our gardens in April and May.

1. The geſneriana, Geſner's Turky tulip of Cappadocia, or common garden-tulip, hath a large, oblong, tunicated, ſolid, bulbous root, covered with a brown ſkin, ſending up long oval ſpear-ſhaped leaves; an upright round ſtalk, from half a foot to a yard high, garniſhed with a few leaves, and its top crowned with a large bell-ſhaped erect hexapetalous flower, of almoſt all colours and variegations in the different varieties.

The principal varieties are, early dwarf tulip (*præcocea*), riſing with ſhort ſtalks, from five or ſix to 10 or 12 inches high, with ſmalliſh flowers.—Tall late-flowering or common tulip (*ſerotina*), riſing from about half a yard to two or three feet high, with large well-formed flowers—Double tulip, riſing a foot or two high, or more, having large double flowers—Whole-blowing, or ſelf-coloured tulip, being all of one original colour, either purples, reds, violets, greys, copper-colours, yellows, &c. which gradually break into numerous variegations.—Variegated tulip, compriſing innumerable varieties, in reſpect to the different colourings, variegations, and ſtripes.

Each of the above varieties comprehends numerous intermediate ones, in reſpect to the colours and variegations of the flower; each, however, is originally all of one colour, eſpecially ſeedings, which, when arrived to a flowering ſtate, each ſeparate flower is either wholly red, purple, violet, grey, brown, black, or yellow, &c. without any variegations or ſtripes, conſiſting of ſelf-coloured flowers with white bottoms; ſelf-coloured flowers with yellow bottoms; and ſome alſo with blue, purple, and blackiſh bottoms; all of which, whilſt they retain this original ſame colour, are in the floriſts language called *whole blowers* or *breeders*, becauſe each flower is wholly of one ſelf-colour. The roots being planted a year or two in prepared ſoils, to breed, or diſpoſe them gradually to produce flowers that break from the original ſelf-colour into variegations and ſtripes in various different forms, they are then called *breakers*, each different variegation conſtituting a diſtinct variety; conſiſting of flowers with—white bottoms, broken with brown ſtripes, with blue ſtripes, violet ſtripes, roſe ſtripes, red ſtripes, &c. ſeparated by ſtreaks of white and other colours, variouſly diſpoſed—yellow bottoms, broken with different reds, crimſons, and golden-yellow flakes, and various other colours—blackiſh purple bottoms, &c. broken with ſtripes of dark colour, yellow, and tints of red: ſo that in theſe ſorts of breakers, or variegated tulips, with white and yellow bottoms particularly, there are alſo white and red ſtriped flowers—white and purple ſtriped—white and violet ſtriped—white and roſe ſtriped—white and brown ſtriped—violet and white flaked—red and white flaked—red and yellow flaked—brown, yellow, and red flaked and numerous other intermediate variegations and ſtripes, variouſly diſpoſed in an endleſs diverſity.

Thus the breakers or variegated tulips are diverſified with an infinity of colours in innumerable different ways, forming ſo many different varieties; the principal of which are by the floriſts diſtinguiſhed by pompous names, either of ſome great perſonages, eminent floriſts, places of their original growth, &c.: but as vaſt numbers of new varieties are annually obtained from ſeedlings in ſo many different places, diſtinguiſhed by various new names, and old ones rejected, and often the ſame flower, with a different name impoſed by different floriſts, it would be impoſſible to give any correct liſt here of the names of ſuch numerous varieties, ſo often changing every where.

2. The ſylveſtris, or wild European tulip, hath an oblong bulbous root, ſending up long narrow ſpear-ſhaped leaves; and a ſlender ſtalk, ſupporting at top a ſmall yellow flower, nodding on one ſide, having acute petals.

Both theſe ſpecies of tulipa are hardy perennials, durable in root, or at leaſt, altho' the old bulb decays annually, it perpetuates its ſpecies by off-ſets, and is annual in leaf and ſtalk; which riſing from the bulb early in the ſpring, arrives to a flowering ſtate in April and May, each plant having only one flower, ſupported on the top of the naked ſtalk without any calix or cup, and conſiſts of ſix large petals, three within and three without, moſtly in an erect poſition; the whole together forming a ſort of large cup, either bell or egg ſhaped, though the double tulip have the petals multiplied in an indeterminate number. All the varieties are ſucceeded by plenty of ripe ſeed in July and Auguſt, contained in an oblong capſule of three cells, having the ſeeds placed on each other in double rows. By the ſeeds numerous new varieties may be raiſed, which however will not attain a flowering ſtate till they are ſeven or eight years old; and after that will require two or three years or more to break into variegations, when the approved varieties may be marked, and increaſed by off-ſets of the root, as directed in their propagation.

Of the two ſpecies of tulip, the firſt ſort, *tulipa geſneriana*, or common garden-tulip, and its vaſt train of varieties, is the ſort ſo generally cultivated for the ornament of our gardens, and ſo much admired by all for its great variety and beautiful appearance: It grows freely in the open ground in any common ſoil of a garden, and proves a very great decoration to the beds and borders of the pleaſure-ground, for ſix weeks or two months in ſpring, by different plantings of early and late ſorts; planting the principal part in autumn, and the reſt towards Chriſtmas, and in January or February. The autumn plantings will come earlieſt into bloom, and flower the ſtrongeſt; and the others will ſucceed them in flowering; obſerving, that in ſummer, when the flowering is paſt, and the leaves and ſtalks aſſume a ſtate of decay, the bulbs of the choiceſt varieties are generally taken up, the off-ſets ſeparated, and the whole cleaned from filth; then put up to dry till October or November, and then planted again for the future year's bloom.

Of this ſpecies, which is the floriſts delight, the varieties may be divided into two principal claſſes, *viz.* 1. Early or dwarf ſpring-tulips (*præcocea.*) 2. Late-flowering tall tulips (*ſerotina.*)

Early tulips.—The early tulips are among floriſts diſtinguiſhed by the appellation of *præcoces* (early), becauſe they flower early in the ſpring, a month or more before the others; are much ſhorter ſtalked, and the flowers ſmaller; but are in greater reputation for their early bloom and their gay lively colours, both of ſelf-colours, and broken into flaked variegations; ſuch as reds, crimſon, ſcarlet, carnation, violets, purples, yellow, &c. with flowers of each, edged and flaked with red, yellow, and white, in many diverſities.

Late-flowering common tulips.—This claſs is denominated *late flowering*, and by the floriſts called *ſerotines*, becauſe they blow later in the ſpring, a month or more, than the præcoces, *i.e.* not coming into flower before the end of April, May, and June. They are all of tall growth, ſupporting large flowers, and furniſh an almoſt endleſs variety in the vaſt diverſity of colours, after they break from whole-blowers into variegations and ſtripes, exceeding all others of the tulip kind in beauty and elegance of flower.

Tulips are alſo ſubdivided into other claſſes, ſuch as whole blowers, and broken tulips.

Whole blowers or breeders.—Theſe are ſeedling tulips, having flowers wholly of one colour; they being raiſed from ſeed to a ſtate of flowering, the flowers remain two, three, or more years of one ſelf-colour, before they break into variegations; which are alſo divided into claſſes, according to the Dutch floriſts, called,—1. *Bizarres;* being generally almoſt of a brown copper colour, having at the bottom a ſmall round ſpot, either yellowiſh, or black mixed with a little yellow, which when broken into different colours become bizarres with yellow bottoms.—2. *Violettes;* being either all of a purple-violet, pale violet, grideline, cherry-crimſon, or red: having the ſpot at bottom, either a clear white, or blackiſh-grey mixed with a little white; and their production when broken into different colours become tulips with white bottoms, called by the Dutch *bybloemens*.

Broken or variegated tulips.—Such as are broken from the ſelf original colour of the whole-blower or breeding tulips, into variegations and ſtripes of different colours, obſerving they generally break into different variegations according to that of the former ſelf-colour; generally, however, either wholly expelling the original ſelf-colour of the breeder, or leave but very little remains thereof, which is a deſirable requiſite in theſe kind of flowers among profeſſed floriſts; and, when thus broken or variegated with different colours, they exhibit themſelves variouſly mixed, ſtriped, flaked, feathered, marbled, ſpotted, edged, &c. a thouſand different ways in an admirable manner; and are by the floriſts divided into the following claſſes, called by the Dutch

Baguette primo.—Tulips with white bottoms, ſtriped with brown, &c.

Baguette rigau.—Tulips with a white bottom, broken with dark-brown ſtripes, &c.

Bybloemens.—Tulips with a white bottom, ſtriped with violet and blackiſh brown, &c. White bottom tulips, ſtriped with roſe-colour, vermilion, and ruby.

Bizarres.—Yellow bottom tulips, ſtriped with various colours.

Among floriſts the principal properties requiſite in the above claſſes of tulips to conſtitute a fine flower, are—The ſtem muſt be tall, eſpecially of the ſerotines, from half a yard to two or three feet high, or more, being proportionably thick and ſtrong; the flower large, compoſed of ſix petals, as in the characteriſtic ſtate, theſe being broad, thick, rounded at top, and ſtand firmly erect without turning much inward or outward, but ſo as to cup well, and give the flower a regular form. The colours and ſtripes of the flower muſt be bright, ariſing unmixed, regularly and diſtinct from the bottom, with but little or none of the original ſelf-colour remaining.

The colours in greateſt eſtimation in the broken tulips, are the blacks, golden yellows, purple-violets, roſe, and vermilion, each of which being variegated various ways; and ſuch as are ſtriped with three different colours diſtinct and unmixed, with ſtrong regular ſtreaks, with but little or no tinge of the breeder, may be called the moſt perfect tulips. Though it is rare to meet with a tulip poſſeſſing all the properties.

As to the manner of obtaining this wonderful variety of colours in tulips, it is often accompliſhed principally by nature alone, which however is ſometimes aſſiſted and forwarded by ſome ſimple operations of art; ſuch as, that in the firſt place, when the ſeedling bulbs of the whole-blower or breeder are arrived to full ſize, and have flowered once, to tranſplant them into beds of any poor dry barren ſoil, in order that by a defect of nutriment in the earth the natural luxuriance of the plant may be checked, and cauſe a weakneſs in their general growth, whereby they generally in this weakened or infirm ſtate gradually change and break out into variegations, ſome the firſt year, others not till the ſecond or third; and according as they are thus broke, they ſhould be planted in beds of good earth.

Another method to aſſiſt nature in effecting the marvellous work of breaking the breeding tulips into diverſified colours, is to make as great a change as poſſible in the ſoil; if they were this year in a light poor ſoil, plant them the next in a rich garden mould, and another year in a compoſt of different earths and dung; or tranſplant them from one part of the garden to another, or into different gardens, &c. or from one country to another; all of which contributes in aſſiſting nature in producing this deſirable diverſity of colours and variegations.

The double tulip is alſo a variety of the common tulip, and is very beautiful, tho' not in ſuch eſtimation among the floriſts as the common ſingle variegated ſorts, not poſſeſſing ſuch a profuſion of variegations in the colours and regularity of ſtripes: they however exhibit an elegantly ornamental appearance, as they riſe with an upright, talliſh, firm ſtem, crowned with a very large double flower compoſed of numerous petals, multiplied in ſeveral ſeries one within another like a double peony, but far more beautiful in their diverſity of colours, variegations, and ſtripes of white and red, yellow and red, &c. ſo that they highly deſerve culture, both in beds alone near the other ſorts to increaſe their variety, alſo to plant in patches about the borders, in aſſemblage with the late variegated tulips, as they blow nearly about the ſame time, *i. e.* April and May.

Tulip-roots are ſold in full collection, conſiſting of numerous varieties, at moſt of the nurſeries and ſeedſmens, who both propagate them themſelves by off-ſets and ſeed, and import vaſt quantities annually from Holland; the Dutch being famous for raiſing the grandeſt collections of the fineſt tulips, and other bulbous flowers, in the greateſt perfection, for the ſupply of almoſt all the other European gardens; diſtinguiſhing every variety in their vaſt collections by ſome pompous name or other, as before obſerved, arranged in regular catalogues, charging prices in proportion to their eſtimation; which formerly was ſo great, among the Hollanders themſelves in particular, that there are accounts of a ſingle root being ſold for from 2000 to 5500 guilders; however, they are now more plentiful, and are ſold at from 5s. or 10s. to ſo many pounds *per* hundred, and even *per* root for very ſcarce capital ſorts.

TULIP-*Tree*. See LIRIODENDRON.

TULL (Jethro), an Oxfordſhire gentleman who farmed his own land, and introduced a new method of culture, to raiſe repeated crops of wheat from the ſame land without the neceſſity of manure: the principles of which he publiſhed about 30 years ſince, in A Treatiſe on Horſe-hoeing Huſbandry. See AGRICULTURE.

TUMBRELL, TUMBRELLUM, or *Turbichetum*, is an engine of puniſhment, which ought to be in every liberty that hath the view of frank-pledge, for the correction of ſcolds and unquiet women.

TUMEFACTION, the act of ſwelling or riſing into a tumour.

TUMOUR, in medicine and ſurgery, a preternatural riſing or eminence in any part of the body.

TUMOURS, in farriery. See there, § xxiv.

TUN, a large veſſel or caſk, of an oblong form, biggeſt in the middle, and diminiſhing towards its two ends, girt about with hoops, and uſed for ſtowing ſeveral kinds of merchandiſe for convenience of carriage; as brandy, oil, ſugar, ſkins, hats, &c.

TUN is alſo the name of a meaſure. A tun of wine is four hogſheads; of timber, a ſquare of 40 ſolid feet; and of coals, 20 Cwt.

TUN is alſo a certain weight whereby the burden of ſhips, &c. are eſtimated. See SHIP.

TUNBRIDGE, a town of Kent in England, ſituated on a branch of the river Medway, over which there is a bridge. It is a large well built place, noted for the mineral waters four or five miles ſouth of the town. E. Long. 0. 16. N. Lat. 54. 14.

TUNICA, a kind of waiſtcoat or under garment, in uſe among the Romans. They wore it within doors by itſelf, and abroad under the gown. The common people could not afford the toga, and ſo went in their tunics; whence Horace calls them *populus tunicatus*.

TUNICA, in anatomy, is applied to the membranes which inveſt the veſſels, and divers others of the leſs ſolid parts of the body; thus the inteſtines are formed of five tunics or coats.

TUNIS, a large and celebrated town of Africa, in Barbary, and capital of a kingdom of the ſame name. It is ſeated on the point of the Gulph of Goletta, about eight miles from the place where the city of Carthage ſtood. It is in the form of a long ſquare, and is five miles in circumference, with 10 large ſtreets, 5 gates, and 35 moſques. The houſes are all built with ſtone, though but one ſtory high; but the walls are very lofty, and flanked with ſeveral ſtrong towers. It has neither ditches nor baſtions, but a good citadel, built on an eminence on the weſt ſide of the city. Without the walls are two ſuburbs, which contain 1000 houſes. Within the walls are 10,000 families, and above 3000 tradeſmens ſhops. The divan, or council of ſtate, aſſembles in an old palace; and the dey is the chief of the republic, who reſides there. The harbour of Tunis has a very narrow entrance, through a ſmall canal. In the city they have no water but what is kept in ciſterns, except one well kept for the baſhaw's uſe. It is a place of great trade, and is 10 miles from the ſea. E. Long. 10. 51. N. Lat. 36. 40.

TUNIS, a kingdom of Africa, bounded on the north-eaſt by the Mediterranean Sea and the kingdom of Tripoli, on the ſouth by ſeveral tribes of the Arabs, and on the weſt by the kingdom of Algiers and the country of Eſab; being 300 miles in length from eaſt to weſt, and 250 in breadth from north to ſouth. This country was formerly a monarchy; but a difference ariſing between the father and ſon, one of which was for the protection of the Chriſtians, and the other for that of the Turks, in 1574 the inhabitants ſhook off the yoke of both. From this time it became a republic under the protection of the Turks, and pays a certain tribute to the baſhaw who reſides at Tunis. The air in general is healthy; but the ſoil in the eaſtern parts is indifferent for want of water. Towards the middle the mountains and valleys abound in fruits; but the weſtern part is the moſt fertile, becauſe it is watered with rivers. The environs of Tunis are very dry, upon which account corn is generally dear. The inroads of the Arabs oblige the inhabitants to ſow their barley and rye in the ſuburbs, and to incloſe their gardens with walls. However, there are plenty of citrons, lemons, oranges, dates, grapes, and other fruits. There are alſo olive-trees, roſes, and odoriferous plants. In the woods and mountains there are lions, wild beeves, oſtriches, monkeys, cameleons, roe-bucks, hares, pheaſants, partridges, and other ſorts of birds and beaſts.

The moſt remarkable rivers are the Guadilcarbar, Magrida, Magerada, and Caps. The form of government is ariſtocratic; that is, by a council, whoſe preſident is the dey, not unlike the doge of Venice. The members of the divan or council are choſen by the dey, and he in his turn is elected by the divan; which is compoſed of ſoldiers, who have more than once taken off the dey's head. The baſhaw is a Turk, reſiding at Tunis; whoſe buſineſs is to receive the tribute, and protect the republic: the common revenues are only 400,000 crowns a-year, becauſe the people are very poor; nor can they ſend above 40,000 men into the field; nor no more than 12 men of war of the line to ſea, even upon the moſt extraordinary occaſions. There are generally about 12,000 Chriſtian ſlaves in this country; and the inhabitants carry on a great trade in linen and woollen cloth. In the city of Tunis alone, there are above 3000 clothiers and weavers. They alſo have a trade in horſes, olives, oil, ſoap, oſtriches eggs and feathers. The Mahometans of this city have nine colleges for ſtudents, and 86 petty ſchools. The principal religion is Mahometaniſm; but the inhabitants conſiſt of Moors, Turks, Arabs, Jews, and Chriſtian ſlaves. However, the Turks, though feweſt in number, domineer over the Moors, and treat them little better than ſlaves.

TUNNAGE. See TONNAGE.

TUNNY, in ichthyology. See SCOMBER.

TURBAN, the head-dreſs of moſt of the eaſtern nations. It conſiſts of two parts, a cap and ſaſh of fine linen or taffety, artfully wound in divers plaits about the cap. The cap has no brim, is pretty flat, though roundiſh at top, and quilted with cotton; but does not cover the ears. There is a good deal of art in giving the turban a fine air; and the making of them is a particular trade. The ſaſh of the Turks turban is white linen; that of the Perſians red woollen. Theſe are the diſtinguiſhing marks of their different religions. Sophi king of Perſia, being of the ſect of Ali, was the firſt who aſſumed the red colour, to diſtinguiſh himſelf from the Turks, who are of the ſect of Omar, and whom the Perſians eſteem heretics.

TURBINATED, is a term applied by naturaliſts to ſhells which are ſpiral or wreathed conically, from a larger baſis to a kind of apex.

TURBITH, or TURPETH-*Root*, in the materia medica, the cortical part of the root of a ſpecies of convolvulus. See CONVOLVULUS.

TURBITH *Mineral*. See CHEMISTRY, n° 154.

TURBO, the WREATH, in zoology, a genus of inſects belonging to the order of vermes teſtacea. The animal is of the ſnail kind; the ſhell conſiſts of one ſpiral ſolid valve, and the aperture is orbicular. There are 49 ſpecies; of which the moſt remarkable are, 1. The littoreus, or periwinkle. This is abundant on moſt rocks far above low-water mark. The Swediſh peaſants believe that when theſe ſhells creep high up the rocks, they indicate a ſtorm from the ſouth. They are eaten by the poor people in moſt parts of this kingdom. Young lobſters are ſaid to take up their lodging in the empty ſhells of theſe animals, which has given occaſion to a notion that periwinkles are changed into lobſters. 2. The clathrus, or barbed wreath, has a taper ſhell of eight ſpires, diſtinguiſhed by elevated diviſions running from the aperture to the apex. There is a variety pellucid, with very thin edges. It is analogous to that curious and expenſive ſhell, the *wentle-trap*.

TURBOT, in ichthyology. See PLEURONECTES.

TURCÆ, or TURCI, (Mela); ſuppoſed to be the *Tuſci* of Ptolemy; whom he places between Caucaſus and the Montes Ceraunii. The name is ſaid to denote, "to deſolate, or lay waſte." Herodotus places them among the wild or barbarous nations of the north. There is a very rapid river called *Turk*, running into the Caſpian Sea, from which ſome ſuppoſe the Turks to take their name. They made no figure in the world till towards the 7th century; about the beginning of which they ſallied forth from the Portæ Caſpiæ, laid waſte Perſia, and joined the Romans againſt Choſroes king of Perſia. In 1042, they ſubdued the Perſians, in whoſe pay they ſerved, and from whom they derived the Mahometan religion: and afterwards pouring forth, over-ran Syria, Cappadocia, and the other countries of the Hither Aſia, under diſtinct heads or princes, whom Ottoman ſubduing, united the whole power in himſelf, which to this day continues in his family, and who fixed his ſeat of empire at Pruſa in Bithynia. His ſucceſſors ſubdued all Greece, and at length took Conſtantinople in 1453; which put a period to the Roman empire in the Eaſt, under Conſtantine the laſt emperor. It is a ſtanding tradition or prophecy among the Turks, that their empire will at length be overturned by the Franks or Chriſtians; which ſeems now to be drawing on apace towards accompliſhment.

TURCICA TERRA, *Turkey-Earth*, a very fine bole dug in great quantities in the neighbourhood of Adrianople, uſed by the Turks as a ſudorific and aſtringent, and famous among them in peſtilential diſeaſes.

TURCOISE, in natural hiſtory, an ore of copper. There are indeed two kinds of turcoiſes; the one a true and genuine ore of copper, and the other the bones of animals tinged to a beautiful blue colour by having been buried in places where copper ore has been near them.

TURCOMANIA, a province of Aſiatic Turkey, anſwering to the ancient kingdom of Armenia.

TURDUS, the THRUSH; a genus of birds belonging to the order of paſſeres. The bill is ſomewhat cylindrical and cultrated; the noſtrils are naked; the faux is ciliated; and the tongue is lacerated. There are 28 ſpecies, the moſt remarkable of which are,

1. The viſcivorus, or the miſſel, is the largeſt of the genus. Its length is 11 inches; its breadth 16½. The bill is ſhorter and thicker than that of other thruſhes; duſky, except the baſe of the lower mandible, which is yellow. The irides are hazel. Head, back, and leſſer coverts of the wings, are of a deep olive brown. The lower part of the back is tinged with yellow. The loweſt order of leſſer coverts, and the great coverts, are brown; the firſt tipped with white, the laſt both tipped and edged with the ſame colour. The inner coverts of the wings white. The tail is brown; the three outermoſt feathers tipped with white. The cheeks and throat are mottled with brown and white; the breaſt and belly are whitiſh yellow, marked with large ſpots of black; the legs are yellow.

Theſe birds build their neſts in buſhes, or on the ſide of ſome tree, generally an aſh, and lay four or five eggs: their note of anger or fear is very harſh, be-

Turdus.

tween a chatter and ſkriek; from whence ſome of its Engliſh names. Its ſong, however, is very fine; which it begins ſitting on the ſummit of a high tree, very early in the ſpring, often with the new year, in blowing ſhowery weather, which makes the inhabitants of Hampſhire to call it the *ſtorm cock*. It feeds on inſects, holly and miſſeltoe berries, which are the food of all the thruſh kind: in ſevere ſnowy weather, when there is a failure of their uſual diet, they are obſerved to ſcratch out of the banks of hedges, the root of arum, or the cuckoo pint; this is remarkably warm and pungent, and a proviſion ſuitable to the ſeaſon.

2. The pilaris, or fieldfare, is in length 10 inches, in breadth 17. The head is aſh-coloured inclining to olive, and ſpotted with black; the back and greater coverts of the wings of a fine deep cheſnut; the tail is black; the lower parts of the two middlemoſt feathers, and the interior upper ſides of the outmoſt feathers excepted; the firſt being aſh-coloured, the latter white. The legs are black; the talons very ſtrong.

This bird paſſes the ſummer in the northern parts of Europe; alſo in lower Auſtria. It breeds in the largeſt trees; feeds on berries of all kinds, and is very fond of thoſe of the juniper. Fieldfares viſit our iſlands in great flocks about Michaelmas, and leave us the latter end of February or the beginning of March.

Theſe birds and the redwings were the *turdi* of the Romans, which they fattened with crums of figs and bread mixed together. Varro informs us that they were birds of paſſage, coming in autumn, and departing in the ſpring. They muſt have been taken in great numbers; for, according to Varro (lib. 3. c. 5.) they were kept by thouſands together in their fattening aviaries. They do not arrive in France till the beginning of December.

3. The muſicus, or throſtle, is in length 9 inches, in breadth 13½. In colours it ſo nearly reſembles the miſſel-thruſh, that no other remark need to be added, but that it is leſs, and that the inner coverts of the wings are yellow.

The throſtle is the fineſt of our ſinging birds, not only for the ſweetneſs and variety of its notes, but for the long continuance of its harmony; for it obliges us with its ſong for near three parts of the year. Like the miſſel-bird, it delivers its muſic from the top of ſome high tree; but to form its neſt deſcends to ſome low buſh or thicket: the neſt is made of earth, moſs, and ſtraw, and the inſide is curiouſly plaiſtered with clay. It lays five or ſix eggs, of a pale bluiſh green, marked with duſky ſpots.

4. The iliacus, or redwing, has a very near reſemblance to the throſtle; but is leſs: their colours are much the ſame; only the ſides under the wings and the inner coverts in this are of a reddiſh orange, in the throſtle yellow; above each eye is a line of yellowiſh white, beginning at the bill and paſſing towards the hind part of the head.

Theſe birds appear in Great Britain a few days before the fieldfare: they come in vaſt flocks, and from the ſame countries as the latter. With us they have only a diſagreeable piping note; but in Sweden during the ſpring, they ſing very finely, perching on the top of ſome tree among the foreſts of maples. They build their neſts in hedges, and lay ſix bluiſh-green eggs ſpotted with black.

Turdus.

5. The merula, or black-bird, when it has attained its full age, is of a fine deep black, and the bill of a bright yellow; the edges of the eye-lids yellow. When young, the bill is duſky, and the plumage of a ruſty black, ſo that they are not to be diſtinguiſhed from the females; but at the age of one year they attain their proper colour.

This bird is of a very retired and ſolitary nature; frequents hedges and thickets, in which it builds earlier than any other bird: the neſt is formed of moſs, dead graſs, fibres, &c. lined and plaſtered with clay, and that again covered with hay or ſmall ſtraw. It lays four or five eggs of a bluiſh-green colour, marked with irregular duſky ſpots. The note of the male is extremely fine, but too loud for any place except the woods: it begins to ſing early in the ſpring, continues its muſic part of the ſummer, deſiſts in the moulting ſeaſon, but reſumes it for ſome time in September and the firſt winter-months.

6. The torquatus, or ring-ouzel, is ſuperior in ſize to the black-bird; the length is 11 inches, breadth 17. The bill in ſome is wholly black, in others the upper half is yellow; on each ſide the mouth are a few briſtles; the head and whole upper part of the body are duſky, edged with pale brown; the quill-feathers and the tail are black. The coverts of the wings, the upper part of the breaſt, and the belly, are duſky, ſlightly edged with aſh-colour. The middle of the breaſt is adorned with a white creſcent, the horns of which point to the hind part of the neck. In ſome birds this is of a pure white, in others of a dirty hue. In the females and in young birds this mark is wanting, which gave occaſion to ſome naturaliſts to form two ſpecies of them.

The ring-ouzel inhabits the Highland hills, the north of England, and the mountains of Wales. They are alſo found to breed in Dartmoor, in Devonſhire, and in banks on the ſides of ſtreams. The places of their retreat is not known. In Scotland and Wales they breed in the hills, but deſcend to the lower parts to feed on the berries of the mountain-aſh. They migrate in France at the latter ſeaſon; and appear in ſmall flocks about Montbard in Burgundy, in the beginning of October, but ſeldom ſtay above two or three weeks.

7. The cinclus, or water-ouzel. See STURNUS, ſpecies 2. where it was inſerted by miſtake as a ſpecies of that genus.

8. The polyglottus, or mocking-bird, is a native of America. It is about the ſize of a thruſh, of a white and grey colour, and a reddiſh bill. It is poſſeſſed not only of its own natural notes, which are muſical and ſolemn, but it can aſſume the tone of every other animal in the wood, from the wolf to the raven. It ſeems even to ſport itſelf in leading them aſtray. It will at one time allure the leſſer birds with the call of their males, and then terrify them when they have come near with the ſcreams of the eagle. There is no bird in the foreſt but it can mimick; and there is none that it has not at times deceived by its call. But, unlike ſuch as we uſually ſee famed for mimicking with us, and who have no particular merit of their own, the mock-bird is ever ſureſt to pleaſe when it is moſt itſelf. At thoſe times it uſually frequents the houſes of the American planters; and ſitting all night on the chimney-top, pours forth the ſweeteſt and the moſt various notes of any bird whatever. It would ſeem, if accounts be true,

that the deficiency of moſt other ſong-birds in that country is made up by this bird alone. They often build their neſts in the fruit-trees about houſes, feed upon berries and other fruits, and are eaſily rendered domeſtic.

TURGESCENCE, among phyſicians, denotes a ſwelling, or growing bloated.

TURIN, an ancient, populous, ſtrong, handſome, flouriſhing city of Italy, and capital of Piedmont, where the ſovereign reſides, with an archbiſhop's ſee, a ſtrong citadel, and an univerſity. It is ſeated on a vaſt plain, at the confluence of the rivers Doria and Po. It is one of the handſomeſt places in Italy; but the air is unhealthy in the autumn and winter, on account of the thick fogs. One half of this place is lately built; and the ſtreets are ſtraight and clean, being waſhed by an aqueduct. The two largeſt ſtreets are the New-ſtreet, and that of the Po, which are lighted in the winter time. The houſes are handſome, and all built of the ſame height. The ducal palace conſiſts of two magnificent ſtructures, joined together by a gallery, in which are ſeveral ſtatues, all ſorts of arms, the genealogy of the dukes of Savoy, a repreſentation of the celeſtial ſigns, a royal library, and many other curioſities. Beſides theſe two ſtructures, there is the palace of the prince of Carignan, the hoſpital of St John, the ſeminary of the Jeſuits, the royal hoſpital, and the metropolitan church of St John, wherein they pretend to keep the cloth in which is the print of the face of Jeſus Chriſt. Theſe are all ſuperb ſtructures. When the plague reigned at Marſeilles in 1720, a great number of artificers withdrew to Turin; inſomuch that there are now above 54,600 inhabitants, and 48 churches and convents. Turin is very well fortified, and extremely ſtrong; as the French found by experience in 1706, who then beſieged it a long while to no purpoſe. The citadel, which is flanked with five baſtions, is without doubt a maſterpiece of architecture. There are very fine walks on the ramparts, which require two hours to paſs round them. There are alſo very fine gardens on the ſide of the river Po; and the houſe commonly called *La Charite* is remarkable, as there is room for 3000 poor people. The college of the academy is very large and well-built, and has a great number of ancient inſcriptions. In the royal library are 19,000 manuſcripts, beſides 30,000 printed books; when the laſt king died, a preſent of 7000 was made to the univerſity. It is charmingly ſeated at the foot of a mountain, 62 miles north-eaſt of Genoa, 72 ſouth-weſt of Milan, and 280 north-weſt of Rome. E. Long. 7. 45. N. Lat. 44. 50.

TURKEY, in ornithology. See MELEAGRIS.

TURKEY, a very extenſive empire, comprehending ſome of the richeſt countries in Europe, Aſia, and Africa. See TURCÆ.

1 Conſtantinople becomes the capital of the Turkiſh dominions.

Under the article CONSTANTINOPLE, n°115, *et ſeq*, we have given an account of the origin and progreſs of the Turks, as far as ſeemed neceſſary for underſtanding the ſubſequent and more important part of their hiſtory. In 1453 they made themſelves maſters of the city of Conſtantinople, which from that time became the capital of their empire. Mohammed II. at that time the ſultan, after having treated the inhabitants with the greateſt cruelty, began to think of adding Servia to his dominions. Accordingly, in 1454, he entered that country at the head of 20,000 men, and obliged the inhabitants to pay him an annual tribute of 40,000 ducats. On his return to Adrianople, Mohammed re-peopled the towns and villages about Conſtantinople with 4000 men and women who fell to his ſhare; and going to that city, built a palace eight ſtadia in compaſs, which he lined with lead taken from the monaſteries. Next year a fleet was ſent againſt the the iſlands of Rhodes and Chios; but the attempt on both proved unſucceſsful: however, the iſland Cos was reduced, and ſome other places; after which the ſultan, turning his arms towards Hungary, laid ſiege to Belgrade. At firſt he met with ſucceſs; beat down part of the wall, and ſtopped the navigation of the river with 60 veſſels: but the celebrated John Hunniades, happening to arrive at that critical juncture, made a furious ſally, entirely routed the Turkiſh army, wounded Mohammed himſelf in the thigh, and burnt all his ſhips. Hunniades himſelf did not long ſurvive this engagement, dying ſoon after of a wound he had received therein, according to ſome, or of the plague, according to others.

2 Unſucceſsful attempt on Rhodes and Chios.

3 Mohammed repulſed at Belgrade.

4 Expedition againſt the Morea.

Mohammed being thus repulſed from Belgrade, ſet about the entire conqueſt of the Morea, the ancient Peloponneſus. The Grecian princes, among whom were two of the emperor's brothers, Thomas and Demetrius, were ſo terrified by the taking of Conſtantinople, and the great progreſs of the Turks, that they prepared to retire into Italy; upon which the Albanians ſeized on the country, chooſing one Manuel Cantacuzenus, a Greek, for their prince. Then falling on the Greeks who remained, they made an offer to the ſultan of the cities and fortreſſes, provided he would allow them to keep the open country; for the Albanians were ſhepherds, who had no fixed habitation. At this time, however, the ſultan choſe rather to ſupport the Greeks than let the country fall into the hands of ſuch barbarians; and having defeated the Albanians, was content to accept of a tribute from the Greeks. But the danger was no ſooner over, than the Grecian princes revolted anew; upon which Mohammed entering the country with a powerful army, prince Thomas, with his family, fled to Italy; while Demetrius thought it moſt eligible to ſubmit to the ſultan, by whom he was carried away, with many of the moſt conſiderable perſons of Lacedæmon, Achaia, &c. where Turkiſh governors were appointed. Two thouſand families were alſo carried away from the Morea, in order to be ſettled at Conſtantinople, and 2000 young men to be enrolled among the ſultan's troops. Many cities at this time fell into the hands of the Turks, among which the principal were Corinth and Athens. The Greeks, however, ſtill made ſome faint ſtruggles; but all in vain: for by the year 1459 the whole country was ſubdued, excepting ſome maritime places held by the Venetians; and prince Thomas was obliged finally to take up his abode at Rome, where he was lodged in the pope's palace, and had a penſion of 3000 livres a year allowed him for his expences.

5 One of the Greek princes ſubmits.

6 The whole country ſubdued.

7 War with Scanderbeg.

8 His ſucceſs againſt the Turks.

Mohammed now purſued his good fortune; and having made war on the emperor of Trebizond, he ſubdued his dominions, and put him to death. His career, however, was for ſome time ſtopped by Scanderbeg the Epirote. This prince had already defeated an army of 12,000 Turkiſh horſe, of whom only 5000 eſcaped the ſlaughter; and diſperſed another, with the loſs of their general, and 4120 of his men killed on the ſpot. Encouraged by this ſucceſs, he laid ſiege to Belgrade, which it ſeems was now in the hands of the Turks: but, through the treachery of his ſcouts, his army was defeated, and 5000 of his men killed; upon which, one of his generals, by name *Moſes*, went over to the Turks.

Scanderbeg, not at all diſpirited by this misfortune, proſecuted the war with the utmoſt vigour. His firſt enterpriſe was againſt his perfidious general Moſes, who had been immediately put at the head of an army by the ſultan. This army was by Scanderbeg totally deſtroyed, excepting about 4000 men; upon which Moſes fell into ſuch diſgrace with the Turks, that he returned to his old maſter, who forgave his treachery, and reſtored him to all his former poſts.

The bad ſucceſs of Moſes did not prevent Ameſa, the nephew of Scanderbeg, from following his example. Mohammed received him kindly, and ſent him with Iſhak baſhaw of Conſtantinople; whom he intruſted with an army of 50,000 men, againſt his uncle. Scanderbeg with only 6000 men, retired towards Lyſſa, a maritime city of the Venetians. The Turks purſued, contrary to the advice of Ameſa; and being ſurpriſed by Scanderbeg, were utterly defeated, with the loſs of their camp, 20,000, or, according to others, 30,000 men killed on the ſpot, and the treacherous Ameſa taken priſoner. With the like good fortune Scanderbeg defeated three other Turkiſh armies, one of 20,000, another of 30,000, and the third of 18,000 men. On this Mohammed ſent againſt him an old experienced commander, at the head of 40,000 choſen troops; but as he likewiſe was able to atchieve nothing, the ſultan thought proper to conclude a peace with Scanderbeg, in 1461.

Mohammed being thus freed from ſuch a troubleſome enemy, completed the conqueſt of the Greek iſlands; ſubdued Walachia, Boſnia, and Illyria, extending his empire nearly to the confines of Italy. But as it was eaſy to ſee that no conqueſt would ſatisfy the Turkiſh ambition, the Venetians, who found themſelves ill treated by their warlike neighbours, entered into an alliance with the Hungarians to repreſs the overgrown power of the Turks, and prevent the weſtern parts of the world from being totally over-run by them; and into this alliance Scanderbeg was ſoon drawn, notwithſtanding his treaty with Mohammed already mentioned. The Hungarians invaded the Turkiſh dominions on the weſt ſide, defeated ſome troops, and carried off 20,000 ſlaves: the Venetians invaded the Morea, where they made ſome conqueſts, but were ſoon obliged to abandon them: however, they recovered the iſland of Lemnos; but being defeated in two engagements at land, they were obliged to ſolicit aſſiſtance from France, Germany, and Spain. Having obtained conſiderable ſupplies from thoſe parts, they again entered the Morea; but meeting with ſtill worſe ſucceſs than before, they applied for aſſiſtance to Matthias, the ſon of John Hunniades king of Hungary. Matthias willingly made another incurſion into the Turkiſh dominions; ravaged Servia, and carried off a vaſt number of priſoners with a great booty.

In the mean time Mohammed, fearing leſt Scanderbeg ſhould be declared generaliſſimo of the Chriſtian forces, ſent to him, deſiring a renewal of the league between them. But this being refuſed, the war was renewed with the utmoſt vigour. Many Turkiſh armies were ſent againſt this hero; but they were utterly defeated and diſperſed, till the year 1466, when by his death the ſultan was freed from the moſt formidable enemy he had ever encountered.

13 Scanderbeg dies.

14 Epirus and Albania reduced.

The death of Scanderbeg was followed by the entire reduction of Epirus and Albania. The Venetians in 1469 defeated the Turks in a pitched battle; but were driven out of Negropont, at that time the ſtrongeſt city in Europe: after which they entered into an alliance with Ferdinand king of Naples, Lewis king of Cyprus, and the grand-maſter of Rhodes, at the ſame time that they ſent ambaſſadors to Uzun Haſſan king of Perſia, in order to perſuade him to attack the Turkiſh dominions on the eaſt ſide. Mohammed did not loſe his courage at the number of his enemies; but having defeated the Perſians, reduced the Venetians to ſuch diſtreſs, that they were obliged to conclude a treaty in 1479.

15 The Venetians obliged to ſue for peace.

In 1481 the war was renewed, and the city of Rhodes beſieged, but without ſucceſs; however, the city of Cephalonia was taken from the Venetians, Italy invaded, and the city of Otranto taken. This was the laſt of the exploits of Mohammed II. who died this year of the gout, and was ſucceeded by his ſon Bayezid, or Bajazet II. Under this prince a war commenced with the Mamalukes of Egypt, which, under his ſucceſſor Selim I. ended in the total ſubjection of that country. Bajazet, however, greatly facilitated Selim's conqueſt by the reduction of Circaſſia, from whence the Mamalukes drew their principal reſources. Caramania and Croatia were totally reduced; the cities of Lepanto, Modon, and Durazzo, taken by the Turks, though the Venetians recovered Cephalonia; Syria on the eaſt, and Moldavia on the weſt, were invaded and ravaged by the victorious armies of the ſultan; till at laſt a peace was concluded with the European powers in 1503.

16 Death of Sultan Mohammed.

17 Further conqueſts of the Turks.

18 Peace concluded.

The year 1509 is remarkable for a dreadful earthquake at Conſtantinople, which overturned a great number of houſes, and deſtroyed 13,000 people; being alſo followed by an epidemic diſtemper, which carried off great numbers. About this time alſo the ſultan, finding the infirmities of old age drawing on, and being deſirous of paſſing the remainder of his days in quiet, reſolved to reſign the throne to his eldeſt ſon Ahmed. But having engaged in this affair with too great precipitation, and before he had gained over the grandees, his ſecond ſon Selim, whom he had made governor of Trabezond, haſtily croſſing the Euxine ſea, dethroned and put to death his father, in the year 1512.

19 Earthquakes and plague at Conſtantinople.

20 Sultan Bajazet deſirous of reſigning in favour of his eldeſt ſon.

21 Is depoſed, and put to death by his ſecond ſon Selim.

The new emperor, who had not ſcrupled to ſacrifice his father to his ambition, did not heſitate at eſtabliſhing himſelf on the throne by the death of his brother alſo. Accordingly, as Ahmed, knowing he could be no where ſafe, reſolved to ſtand on his defence, Selim with a powerful army marched againſt him; and having defeated the few forces of his brother, took him priſoner, and put him to death. Having thus ſecured himſelf, he marched againſt the Perſians, whom he overthrew in a great battle: after which he took the city of Tauris; made ſome other conqueſts; and having ſecured tranquillity on the eaſtern ſide of his dominions, turned

22 Selim defeats the Perſians, and reduces Egypt.

turned his arms againſt ſultan Gauri of Egypt. Him he reduced in the manner related under the article EGYPT, n° 100. His farther deſigns of conqueſt were fruſtrated by his death, which happened in the year 1519.

23 His death.

24 Is ſucceeded by Solyman a warlike prince.

Selim was ſucceeded by his ſon Solyman I. ſurnamed *Kanuni*, or *The lawgiver*, who proved no leſs ambitious and warlike than his father. Having defeated and killed the governor of Damaſcus, who had rebelled againſt him, he attacked the European princes with a deſign to extend his dominions as far to the weſtward as he poſſeſſed to the eaſtward of his capital. In 1520, he ſet out with a great army to conquer Hungary. The city of Belgrade was immediately inveſted, and in a ſhort time taken. Rhodes alſo being attacked by a great force by ſea and land, was obliged to ſubmit, after a moſt deſperate reſiſtance, as is related under that article, n° 31 *et ſeq.*; and Solyman entered the city in triumph on Chriſtmas day 1522. His conqueſts for ſome time were ſtopped by a rebellion in Egypt; but this being ſoon quaſhed, the war with Hungary was renewed in 1525. King Lewis having raſhly engaged the Turkiſh army of 200,000 men with only 25,000, was utterly defeated, himſelf drowned in a ditch, and his whole army, excepting a few horſe, cut in pieces. This defeat was followed by the ſurrender of Buda, which, however, the Hungarians retook in 1528; but next year it was again taken by the Turks, and ſoon after, both the Moldavias ſubmitted to their juriſdiction. The city of Vienna was then inveſted; but after being reduced to the greateſt ſtraits, the ſultan was obliged to abandon the ſiege by the coming on of the autumnal rains; which, however, he did not without barbarouſly maſſacring all his priſoners.

25 The city of Rhodes reduced.

26 The king of Hungary defeated and killed.

27 Vienna beſieged without ſucceſs.

The raiſing the ſiege of Vienna was followed by an entire repulſe of the Turks from the German territories: on which Solyman, reſolving to extend his dominions on the eaſt, ſubdued the country of Georgia, and made himſelf maſter of the city of Bagdad; at the ſame time that his admiral, the celebrated Barbaroſſa, ravaged the coaſts of Italy, and took the cities of Biſerta and Tunis in Africa. But, in 1536, he was obliged to retire before Charles V. of Spain, who retook the city of Tunis. Solyman, to revenge this diſgrace, ſuſpended for a time the war in Perſia, in order to turn all his forces againſt Italy: but while this country was in danger of being totally overwhelmed, a Venetian captain having raſhly taken and ſunk ſome Turkiſh veſſels, Solyman changed his deſign of attacking Italy into that of chaſtiſing the Venetians. However, after ſome trifling encounters, a peace was concluded in 1540.

28 Georgia, Bagdad, &c. reduced.

29 Tunis reduced by Charles V.

This year the war was renewed in Hungary: the tranſactions were very unfortunate for the Chriſtians, and ended in the entire reduction of the kingdom to a Turkiſh province. The kingdom of France, being oppreſſed by its enemies, entered into an alliance with Solyman, who was now grown ſo powerful, that the whole European power ſeemed ſcarce able to reſiſt him. However, in 1565, he was baffled by the knights of MALTA, as is related under that article; and in 1566 an end was put to his ambition and his conqueſts by death.

30 Hungary reduced to a Turkiſh province.

31 Malta beſieged unſucceſsfully.

Solyman was ſucceeded by his ſon Selim II. ſurnamed *Meſt*, or *The Drunken*. Under him the empire at firſt loſt nothing of its luſtre. But in 1571 the maritime power of the Turks was almoſt entirely deſtroyed at Lepanto, where one of the moſt remarkable ſea engagements mentioned in hiſtory took place. The Chriſtian fleet was commanded by Doria the Venetian admiral; and conſiſted of 78 Spaniſh and 3 Malteſe galleys, under Don John of Auſtria, natural ſon to the emperor Charles V. Beſides theſe, under Venieri a Venetian officer, were 108 galleys, 6 galleaſſes, 2 tall ſhips, and a great many ſmall galliots. Colonna, a kinſman of the pope, had alſo 12 of his galleys under his command. On board this fleet were 20,000 good ſoldiers, many of them perſons of great quality, who went volunteers in the expedition. The Turkiſh fleet conſiſted of 335 ſail; but the moſt experienced officers were againſt fighting at that time, conſidering the great ſtrength of the confederates, and that there was no neceſſity for an engagement. But the opinion of Ali Paſha the chief admiral, who was for a battle, prevailing, Parteu Paſha, the next in command, took on board 12,000 janiſaries and ſpahis, drawn out of the neighbouring garriſons; beſides 4000 other ſoldiers. Then putting out of the gulf, the fleet ſteered their courſe for the iſle of Corzalates, of old Echinates, half-way between Lepanto and Patras. Their line of battle was thus: Parteu and Ali Paſhas commanded the centre, Mohammed Beg with 56 galleys was in the right wing, and Kilij Ali with 95 galleys in the left; while Morad Dragut, with 30 galleys, and ſeveral other ſmall veſſels, brought up the rear. Mean time, the Chriſtians moving towards them, both fleets came in ſight, October 7. afternoon. Hereupon Don John, having ordered the great enſigns of the confederates, which was the ſignal for engaging, to be hoiſted, clad in armour, went in his long boat to encourage the ſeveral quadrons of the centre under his command; while Doria did the like in the right wing, and Barbadico, the Venetian proveditor-general, in the left.

31 Accoun the battl Lepanto

The day was now well ſpent, when both fleets were ready for the battle, which was one of the moſt conſiderable that ever happened at ſea. The ſignal was no ſooner given, than the Turks, with a hideous cry, fell on ſix galleaſſes which lay at anchor near a mile a head of the confederate fleet; but thoſe ſhips fired ſo briſkly on them, firſt from their forecaſtles, and then as they paſſed by, ſo galled their galleys with whole broadſides, that ſeveral of them were ſunk, which made the reſt bear farther off. The wind likewiſe chopped about to the weſt, and incommoded the Turks with the ſmoke. However, they ſoon made good their diſordered ſquadrons, and came on with ſurpriſing reſolution. Ali Paſha obſerving the admiral's galley, ran upon her with ſuch violence, that both their beaks were broken off, and fell into the ſea. Hereupon enſued a moſt terrible fight between theſe two great commanders, and the other ſhips which ſeconded them; but as there were in Don John's galley 400 men picked out of the whole army, and conſiſting moſtly of officers, they entered the enemy's galleys three times to the very main-maſt, yet were as often repulſed.

Venieri, ſeeing how things went, haſtened to the general's relief; but on his way was encountered by Parteu Paſha with his galleys. Here the Turks behaved ſo bravely, that notwithſtanding the example and amazing courage of that admiral, now 70 years old, they entered the prow of his galley, and muſt have taken it, had not the ſudden coming of two brave Venetian captains to his relief turned the ſcale a little, though with the loſs of their own lives. At length Venieri's ſhip took two of the Turkiſh galleys, while Parteu Paſha fled out of the danger in a long boat. Not far from thence Colonna, the pope's admiral, being furiouſly engaged, made great ſlaughter of the enemy, and took one galley. Ligni the Genoeſe admiral did the like; on board of whom the prince of Parma, with other volunteers, gained immortal honour.

At the ſame time, Mohammed Beg falling on the galleaſſes with the right wing, and being ſorely damaged by them, to avoid this inconvenience, as alſo a ſhelve lying between him and the ſhore, he ſent Ali, a Genoeſe renegado, with great part of his galleys, round about on the right, to fall on the rear of Barbadico, who preſently tacked about to receive him. But as he had no fewer than five galleys at a time upon his own, he in this terrible fight grappling with the enemy, and ſhunning no danger, was ſtruck in at the left eye, and almoſt through the brain, with an arrow; of which wound he died three days after. This encouraged the Turks ſo much, that the galley muſt needs have been loſt, had not ſhe been ſpeedily relieved by Nani and Portia. Theſe preſently cleared her of her boarders, among whom they made a great ſlaughter: but were themſelves dangerouſly wounded; and had been loſt if more galleys had not come to their aſſiſtance; with which reinforcement they took one of the principal galleys of the enemy. Not far from thence, the noble Giovanni Contareni had a terrible engagement with Mohammed Beg; whoſe galley at length being taken, and all the men either ſlain or forced overboard, he was found half dead, and diſpatched out of the way.

Don John, who had been three hours engaged with Ali Paſha, finding himſelf in much danger notwithſtanding the aſſiſtance from Bacianono in the rear, on a ſudden called forth his 400 ſelect men from under the hatches, by whoſe valour that admiral's galley was ſoon taken. The Paſha himſelf being mortally wounded, and all over bloody, was ſlain outright; and his head being cut off, was held aloft on the point of a ſpear by Don John as a trophy of his victory. This fight, with the cry of victory through the Chriſtian fleet, ſo diſcouraged the reſt of the galleys which were ſtill valiantly fighting, that they fled towards the ſhore, about a mile diſtant: but ſeveral of them were taken by Canalis, who commanded the galleys of Candia. Among the ſlain was Karakoja, the famous renegado pirate; while Ahmed and Mohammed, the two ſons of Ali Paſha, and nephews of ſultan Selim, were both taken aboard their galley.

For all this good ſucceſs, the fortune of the day was ſtill doubtful in the right wing, where Doria was engaged with Kilij Ali, a valiant and expert commander. The Spaniſh admiral at firſt ſeemed to keep off, while the Turkiſh extended his wing as if to hem him in; yet offered not battle, expecting ſome advantage. This he ſoon obtained by incloſing 12 of the Venetian galleys ſeparated from the reſt, which he boarded and took; only Superantio, a nobleman, rather than fall into the enemy's hand, blew himſelf and his galley up. Mean time the noiſe of the firing in this part of the fleet brought Pietro Juſtiniani, admiral of Malta, to Doria's aſſiſtance; but coming up ſingly, he was preſently attacked by ſix Turkiſh galleys, which plied him ſo cloſe, that he was on the very brink of being loſt. But two of the other Malteſe galleys, which were engaged with three of the enemy's, ſeeing the danger their admiral was in, came preſently and reſcued him. Kilij Ali, by this time underſtanding that the centre and right wing of the fleet was overthrown, thought it beſt to make his eſcape; which with ſome difficulty he effected, with 25 galleys and 10 galliots, into the gulf of Lepanto.

33
The Turks defeated with great ſlaughter.

The number of Turks ſlain in this famous naval fight could not with certainty be known. An author, who wrote an account of this war, makes their number 32,000 beſides priſoners, who were about 3500. The galleys taken from them amounted to 161. Forty more were ſunk or burnt; and of galliots, with other ſmall veſſels, about 60 were taken. The Turkiſh admiral's galley was exceedingly rich and beautiful. In it was found Ali Paſha's caſket, with 6000 ducats in it. This, with a yearly penſion of 300 ducats, was given in reward to a Greek of Macedonia, who ſlew that admiral. He was likewiſe knighted for that exploit by Don John; and had the barrel of the Turkiſh ſtandard beſtowed on him. This barrel, on his return to Venice, he ſold to a goldſmith; and the ſenate bought it of the goldſmith, paying a ducat for every ounce, to repoſit it among the other trophies of that victory.

34
Little advantage reaped by the Chriſtians from the victory.

Notwithſtanding the prodigious loſs ſuſtained by the Turks on this occaſion, the confederates reaped but little advantage from this victory; and next year Kilij Ali Paſha, who had ſucceeded to the poſt of high admiral, fitted out a fleet of 250 galleys, with which he ravaged the coaſts of Chriſtendom wherever he came, and maintained his ground ſo well, that the confederates could never gain the leaſt advantage over him.

35
Decline of the Turkiſh power.

The Turkiſh power from this time, however, began to decline. The progreſs of civilization being much more quick among the weſtern nations, and their improvements in the art of war very conſiderable, the Turks found it not only impoſſible to extend their dominion over Germany, but even found it a matter of ſome difficulty to withſtand the power of the weſtern princes. During the remainder of the reign of Selim, the war was carried on in Hungary with little advantage on either ſide; but under his ſucceſſor, ſultan Morad III. the Turks met with ſeveral ſevere checks from the Germans.

36
Confederacy againſt them.

37
Miſfortunes of the Turks.

In 1594, Mohammed III. having ſucceeded his father Morad, deſtroyed his 19 brethren, in order to ſecure himſelf on the throne; and for the ſame reaſon cauſed ten of his father's wives and concubines to be thrown into the ſea, leſt any of them ſhould prove with child. The emperor Rodolph II. having entered into a confederacy againſt him with the princes of Tranſylvania, Walachia, and Moldavia, defeated the Turks and their Tartar auxiliaries in ſeveral engagements, and took many cities; while ſo grievous a famine and plague raged in Hungary, that of 85,000 Tartars who had entered the country the year before, ſcarce 8,000 remained alive. This was followed by new misfortunes; ſo that in the year following the

Turks were entirely driven out of Tranſylvania, Moldavia, and Walachia; notwithſtanding which the war continued for ſome time, though generally to the diſadvantage of the Turks.

38 War with Poland.

In 1621, under Othman, or Ozman, II. we find the Turks firſt engaged in a war with Poland. In this, however, the ſultan found himſelf unable to ſucceed, though he oppoſed an army of 30,000 ſtrong to 40,000 Poles and 8000 Germans.

39 The Poles firſt allowed to trade to Turkey.

A peace was therefore concluded the ſame year; the chief article of which was, that the Poles ſhould have a free trade in the Turkiſh dominions, and that for this their merchants ſhould pay 10,000 ſequins.

40 War with Ruſſia, Germany, and Poland.

The Turkiſh affairs continued pretty much in the ſame way till the year 1673, when a dreadful war broke out with Germany, Ruſſia, and Poland, whoſe army was at that time commanded by the celebrated John Sobieſki. The year before, hoſtilities had commenced on account of the Poles having endeavoured to detach the Coſſacks from their allegiance to the ſultan.

41 The Poles defeated, and become tributary.

At this time the Turks were ſucceſsful, through the diſſenſions which reigned among the Poles; and the latter were obliged to pay an annual tribute of 20,000 rixdollars, and to deliver up 48 towns and villages in the territory of Kaminieck.

42 The ſtate refuſe to ratify the treaty.

However, the articles of this treaty were never executed; for, in 1673, the ſtates of Poland ſent a letter to Kyoprili Ahmed Paſha the vizir at that time, informing him, that they conſidered as null the conditions of the treaty, being concluded without their conſent, and that they would rather ſuffer death than ſubmit to the infamy of paying one ſingle farthing by way of tribute.

43 The Turks defeated, and peace concluded.

On this the ſultan, Mohammed IV. determined to take a ſevere revenge on their perfidy, ſet out with a great army; but was entirely defeated, with the loſs of 20,000 men killed on the ſpot, all the baggage, 25,000 waggon-loads of proviſion and ammunition, and 2000 purſes of money for paying the army. Soon after this victory, John was proclaimed king of Poland: but his ſubjects, jealous of his glory, refuſed to ſupport him properly in proſecuting his advantage; ſo that, four years after, a treaty was concluded, by which the Poles for ever reſigned their pretenſions to Kaminieck and to the dominion of the Coſſacks in Podolia.

44 The Turks and Tartars defeated by the Ruſſians.

But though peace was thus made with Poland, the war was carried on very unſucceſsfully with Ruſſia. In 1678, an army of the Tartars was entirely cut in pieces or taken near the city of Cherin; which ſo intimidated another army of 40,000 Turks, who had waited for the arrival of theſe auxiliaries, that they threw away their arms, and fled without ſtopping till they had croſſed the river Bog.

45 Another army defeated, and reduced to great diſtreſs.

This defeat inclined the ſultan to peace; but the negotiations proving ineffectual, he, in 1679, again ſent a powerful army of 80,000 Turks, 30,000 Tartars, and 4000 Coſſacks, under the command of the wazir, to retrieve his loſt honour. This army, however, ſucceeded little better than the former: for the wazir was defeated in ſeveral engagements; and at laſt, according to cuſtom, put to death on account of the bad ſucceſs of the war.

46 War with the Venetians.

In 1684 the Venetians again declared war, while the Poles and Germans continued their hoſtilities with the utmoſt violence. The Turks were forced to yield to the ſuperior fortune and valour of their adverſaries; they were defeated in a great number of engagements, and loſt many places of importance.

47 The Turkiſh affairs retrieved by Kyoprili.

In ſhort, their affairs ſeemed to be totally going to wreck, when, in 1688, they were retrieved by the new wazir Ahmed Kyoprili, a man of great ſkill and experience in war, as well as of the moſt upright and blameleſs character. Having prevailed in the divan to have the war carried on, he applied his whole care to the raiſing of an army and providing warlike ſtores.

48 He rouſes the enthuſiaſm of the people.

But finding the people every where intimidated and unwilling to oppoſe the enemy, the treaſury exhauſted, and an univerſal languor prevailing, he made a new kind of proclamation, in which he told the people, that "as he found it neceſſary to truſt the command of the army againſt the haughty Germans to none but himſelf, ſo he would not employ in this expedition any ſoldiers forced into the ſervice; as knowing that the will was of more value with God than the deed: that he would only put the Muſſulmans in mind, that, by the precepts of God and his prophet, every one is commanded neither to avoid martyrdom, nor to deſpair of ſucceſs againſt Infidels," &c. Having thus once rouſed the enthuſiaſm of the common people, they flocked in great numbers to his ſtandard; after which, having reformed many abuſes both in the civil and military departments, he led them againſt the enemy. The good effects of his reformations were evident.

49 Is at laſt defeated and killed.

Great numbers of the enemy were cut off, and almoſt all the important places taken which had been loſt before, when, in 1691, he was defeated and killed by the Germans at Iſlankamen. After his death, the Turkiſh affairs again fell into diſorder, and, though the utmoſt efforts were uſed by ſucceeding vizirs, no progreſs could be made; and, in 1697, a prodigious overthrow was given them by prince Eugene at Zenta.

50 Peace concluded.

At laſt, in 1698, all parties being weary of ſuch an expenſive and ruinous war, a pacification took place at Carlowitz, but on different terms, with the different nations who had been at war with the Turks.

51 Terms made wi the empe ror.

The emperor made a truce for 25 years, upon condition that all Tranſylvania ſhould be reſigned to him: the city of Temeſwaer was to be reſtored to the Turks, and the navigation of the Teiſſe and Maros rivers be free to both nations; that the country between the Danube and the Teiſſe, called *Bachbak*, remain in the emperor's hands; that the boundary of the eaſtern part of Hungary, belonging to the emperor, ſhould be a right line drawn from the mouth of the Maros towards the banks of the Teiſſe to the mouth of the Boſſut, where it falls into the Save; that towards the ſouth the Save ſhould part the Turkiſh from the imperial limits, till it receives the Unna: and that no new caſtles beſides Belgrade and Peterwaradin ſhould be erected, or old ones fortified, any where within thoſe boundaries.

52 With th Ruſſian

The Ruſſian ambaſſador made a truce only for two years, upon the foot of each party poſſeſſing what he had taken. The Poles made a truce on the like terms with the ſultan; namely, that they ſhould have Kaminieck, Podolia, and Ukrania reſtored to them, in the ſame extent as poſſeſſed by them before ſultan Mohammed's firſt expedition into Poland; and, on the other hand, reſign Soczava, Nemoz, and Soraka, in Moldavia, to the Turks.

53 With th Veneti

The Venetians obtained theſe conditions: That all the Morea, as far as Hexamilos, ſhould belong to them; and the firm land, with Naupaktum (or Lepanto), Preveſa, and the caſtle of

Romania, which had been demoliſhed, ſhould be reſtored to the Turks; that the bay of Corinth ſhould be common to both, and the Venetians poſſeſs Lenkade with the adjacent iſlands. The yearly tribute paid by the iſlands in the Archipelago to the Venetians was to be aboliſhed; and Zakinth to be declared free from the like burden by the Turks. In Dalmatia, Knin, Cing, Kiklut, Verlika, Duare, and Vergoraz, were to be left to the republic, and fixed as the boundaries of their dominions on that ſide. The Raguſians were to continue free, and the Venetians to retain the caſtles of Caſtlenuovo and Riſano, with what they poſſeſſed in the neighbourhood. Both parties were allowed to fortify their borders with new fortreſſes; or to repair thoſe which were decayed, excepting Naupaktum, Preveſa, and the caſtle of Romania before mentioned.

54
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fairs to the
ar 1769.

From the concluſion of the peace of Carlowitz to the year 1769, nothing very remarkable occurs in the Turkiſh hiſtory, excepting their recovery of the Morea from the Venetians by the treaty of Paſſarowitz. See the article VENICE. Their war with the Ruſſians under Peter the Great has been taken notice of under the article RUSSIA; thoſe afterwards with PERSIA, under that article. None of theſe, indeed, were of any great conſequence; but, in 1769, a war commenced with Ruſſia, which threatened the Ottoman empire with deſtruction, and which has given it ſuch a ſevere check as it can ſcarcely recover.

55
ar with
ſſia.

The origin of this war is given under the article POLAND, n° 94; and during the courſe of it, an almoſt uninterrupted train of ſucceſs attended the Ruſſian arms.—About the end of March 1769, a body of Ruſſian troops made themſelves maſters of the important fortreſs of Aſoph, at the mouth of the river Don.

56
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In the end of April, prince Gallitzin, commander in chief of the Ruſſian army on the frontiers of Poland, paſſed the river Nieſter, hoping to take the fortreſs of Choczim by ſurpriſe; but being diſappointed, he was obliged to return. Near the beginning of July, however, he again paſſed that river, and on the 13th attacked and defeated the van of the grand vizir's army, conſiſting of about 50,000 or 60,000 men.

57
e Turks
eated.

Thirteen thouſand of the fugitives entered Choczim; which was next day inveſted by the Ruſſians: but they were at laſt obliged to raiſe the ſiege, and repaſs the Nieſter; which they could not effect without conſiderable loſs.

58
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vizir be
ded.

In the mean time both the Ottoman and Ruſſian courts were diſpleaſed with the conduct of their generals. The Turkiſh grand vizir was deprived of his command, and afterwards beheaded; and was ſucceeded by Moldovani Aga Pacha, a man of a bold and enterpriſing ſpirit. On his firſt taking the command of the army, finding it impoſſible to ſubſiſt where he was, he attempted to force a paſſage over the Nieſter; but being three times repulſed with great loſs, he made a precipitate retreat towards Bender, at the ſame time drawing the troops out of Choczim, which the Ruſſians immediately took poſſeſſion of.

59
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Ruſſi-
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Prince Gallitzin was now ſuperſeded by general Romanzow, who took the command of the army on the 29th of September. Soon after his arrival, he received news of the ſucceſs of general Elmpt, who, with a body of 10,000 men, had reduced the province of Yaſſy. He inveſted Bender; but finding the ſeaſon of the year too far advanced, he ſoon withdrew his troops, and put them into winter-quarters.

60
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ince of
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61
Unſucceſsful negotiations for peace.

This firſt campaign had proved ſo unpropitious to the Turkiſh affairs, that the court would gladly have concluded a peace, if they could have obtained it upon honourable terms; but the Ruſſians inſiſting upon the entire ceſſion of Moldavia and Walachia as a preliminary article, the negotiations came to nothing. A new campaign was therefore reſolved on; and this proved ſtill more unſucceſsful than before. The grand Ruſſian army under general Romanzow paſſed the Nieſter in the month of May 1770; and, having aſſembled at Choczim on the 3d of June, marched towards Pruth: at the ſame time their ſecond army, commanded by general Panin, arrived before Bender. The plan of operation was, that the latter ſhould form the ſiege of Bender, and Romanzow ſhould cover it.

62
Bender inveſted.

63
The Turks and Tartars defeated by General Romanzow.

On the 18th of July, general Romanzow attacked an army of 80,000 Turks and Tartars, commanded by the Khan of Crimea, and ſtrongly intrenched on an almoſt inacceſſible mountain, forced their intrenchments, and obliged them to flee in the utmoſt confuſion, leaving an immenſe quantity of ammunition and proviſions, &c. in their camp; which they totally abandoned to the victors.—After this victory, the Ruſſian general puſhed on towards the Danube; and on the 2d of Auguſt attacked another Turkiſh army, commanded by the grand vizir in perſon, and totally defeated it, making himſelf maſter of their camp, ammunition, 143 pieces of cannon, and above 7000 carriages loaded with proviſions. The loſs of the Turks on this occaſion was not reckoned leſs than 40,000 men, and ſome accounts raiſed it to 60,000.—

64
The grand vizir defeated with prodigious ſlaughter.

During the courſe of this ſummer alſo, the fortreſs of Kilia Nova, at the moſt northerly mouth of the Danube, ſurrendered by capitulation; and likewiſe that of Ackerman, or Bialogorod, near the mouth of the Nieſter. Bender was taken by ſtorm on the 27th of November; and the Ruſſians, enraged at the obſtinate reſiſtance they had met with, made a terrible ſlaughter of their enemies. It was computed that 30,000 Turks periſhed on this occaſion.

65
Bender taken, and the inhabitants maſſacred.

The fortreſs of Brailow, ſituated on the northern ſide of the Danube, was inveſted on the 26th of September; and the garriſon were ſo much intimidated by the taking of Bender, that they abandoned the place, and moſt of them were drowned in croſſing the river.—During this campaign, it was reckoned that the Ruſſians took 1000 pieces of cannon from their enemies.

66
Vaſt number of cannon taken by the Ruſſians.

67
A Ruſſian fleet lands ſome troops on the Morea.

This year alſo a Ruſſian fleet of 16 or 18 ſhips entered the Mediterranean, and landed a body of troops on the Morea. Theſe being joined by the Greeks, committed great cruelties on the Turks, and made themſelves maſters of almoſt the whole country. At laſt, however, the Porte, notwithſtanding their bad ſucceſs in other parts, found means to ſend a force into the Morea ſufficient to overpower the Ruſſians. The Greeks now ſuffered in their turn; and the Ruſſians, hearing that a Turkiſh fleet had paſſed the Dardanelles, abandoned the Morea, and ſailed to meet their antagoniſts. A battle enſued, in which the Turks were defeated; and having imprudently retired into a neighbouring harbour, they were next day entirely deſtroyed by the Ruſſian fire-ſhips, except one ſhip of 64 guns, which was taken. This fleet conſiſted of

68
They deſtroy the Turkiſh fleet.

15 ſhips of the line, from 96 to 60 guns, three large frigates, and ſeven large armed veſſels, beſides galleys. After this victory, the Ruſſian fleet blocked up the mouth of the Dardanelles, interrupted the Turkiſh trade, prevented the carrying of proviſions to Conſtantinople by ſea, and raiſed contributions from moſt of the iſlands in the Archipelago.

69 The Turks gain ſome advantages.

In 1771, matters did not at firſt go on ſo ſucceſsfully on the part of the Ruſſians. On the ſide of the Danube, they were obliged to keep on the defenſive. Another army, under prince Dolgorucki, had better ſucceſs; they reduced the whole peninſula of Crim Tartary in leſs than a month, though defended by an army of 50,000 men.

70 They take Giurgewo and defeat general Eſſen.

—During thoſe tranſactions the Turks made themſelves maſters of the fortreſs of Giurgewo; which enabled them to become ſo formidable on the ſide of Walachia, that prince Repnin durſt not attack them. Upon his refuſal to do ſo, he was deprived of his command; which was given to General Eſſen. On the 17th of Auguſt, he attacked the Turkiſh intrenchments; but, after a deſperate engagement of four hours, was defeated, with the loſs of upwards of 3000 men.

This was the only engagement of any conſequence in which the Turks had proved victorious ſince the beginning of the war; and, after it, their uſual bad fortune attended them. In conſequence of their victory, they determined to winter on the northern ſide of the Danube, which would have been of the utmoſt ſervice to them; and with which view they conſiderably reinforced their army in Walachia.

71 Are outwitted by General Romanzow.

But general Romanzow, by a train of maſterly diſpoſitions, not only thwarted all their ſchemes, but ſurpriſed them on their own ſide of the river. They had divided their army into two great bodies, which were ſtationed in the neareſt and moſt important poſts on the Turkiſh ſide of the Danube.

72 Two Turkiſh armies totally defeated.

On the 20th of October, one of theſe bodies was ſurpriſed at Tuliza by general Weiſman, and another at Maczin by general Milarodowits. The event was the ſame in both places. The intrenchments were forced, the Turks totally routed, and their artillery, ſtores, and magazines taken, together with the two towns and their caſtles.

73 The grand vizir defeated, and driven beyond mount Hemus.

Next day general Weiſman attacked the grand vizir himſelf, with the like ſucceſs. The intrenchments were forced, a vaſt quantity of artillery taken, and likewiſe the town and caſtle of Babadagh; while the vizir, with the remains of his army, fled 30 miles to ſeek refuge at Mount Hemus.

74 The Turks driven out of Walachia, &c.

A few days afterwards general Eſſen defeated another body of Turks, and retook the fortreſs of Giurgewo, driving the enemy totally out of Walachia. The Ruſſian fleet this year ſpread ruin and deſolation through the defenceleſs iſlands of the Archipelago and the coaſts of Aſia, ſtriking terror into the city of Conſtantinople itſelf. A dreadful peſtilence raged this year in the Turkiſh army; and in the autumn broke out at Moſcow, where it deſtroyed vaſt numbers.

75 They ſue for peace.

The affairs of the Turks were now in ſuch a deſperate condition, that they very eagerly ſued for peace. The only conditions on which this could be obtained, however, were, that the Crimea, Budziac Tartary, and all that vaſt tract of country on the coaſt of the Black Sea, as far as the north ſhore of the Danube, ſhould continue for ever under the dominion of Ruſſia; that the Ruſſians ſhould enjoy an unlimited freedom of navigation on the Black ſea, together with the poſſeſſion of the city of Aſoph, on the mouth of the Don; and that a ſum of money ſhould be paid them by way of indemnification for the expences of the war.

76 Negotiations broken off.

Theſe terms, however, were rejected; and the negotiations, which continued through the whole year 1772, at laſt came to nothing. The commiſſioners on both ſides retired from Buchareſt, the place where the congreſs was held, on the 22d of March 1773. For ſome time a deſultory kind of war was carried on between detachments from the two armies. But as this was very prejudicial to the Ruſſians, who could not be ſo eaſily recruited as the Turks, about the middle of June,

77 Romanzow paſſes the Danube.

Romanzow made preparations for paſſing the Danube with the grand Ruſſian army, conſiſting of 87,000 men: which, however, he did not accompliſh till the 24th; and then marched with his army, in large diviſions, towards the city of Siliſtria. He was terribly harraſſed on his march by large bodies of the Turkiſh cavalry, of whom the grand vizir had detached 27,000 for this purpoſe. At laſt, however, they arrived before the city, which was ſtrongly fortified, and defended by a body of troops conſiſting of about 24,000 men.

78 A Turkiſh army defeated by General Weiſman.

On the 29th of June, this body was defeated by General Weiſman, who commanded the van of the Ruſſian army, and forced to retire into Siliſtria. The grand vizir then detached 50,000 men to the relief of the place: upon this the Ruſſians found it neceſſary to retreat; which was not accompliſhed without very great difficulty and loſs.

79 Who is killed.

In this retreat General Weiſman was killed, and the army left all their magazines behind them.

Many other ſevere conflicts happened this campaign, which proved leſs glorious to the Ruſſians than any of the former ones. In 1774, however, their arms were attended with better ſucceſs. Romanzow's army was reinforced by 40,000 men; and, on the night between the 16th and 17th of June, paſſed the Danube, in ſpite of all oppoſition.

80 The Tur every wh defeated.

A continued ſeries of engagements then happened between the Ruſſian generals and different bodies of the Turks. In theſe the latter were always defeated; and at laſt became ſo much diſpirited, that a body of 40,000, or, according to ſome accounts, of 70,000 Turks, fled at the firſt ſight of a body of their enemies greatly inferior in number, leaving behind them all their tents and baggage, with a fine train of braſs artillery. From this time, diſorder, mutiny, and diſmay, ſeized all the Turkiſh armies, and they abſolutely refuſed to face their enemies. They plundered the baggage, robbed and murdered their officers, deſerted by thouſands, taking the road to Conſtantinople, and committing every kind of outrage by the way. The miniſters of ſtate, after having tried all methods to induce this lawleſs crew to return to their duty, were obliged to furniſh them with veſſels for their tranſportation into Aſia.

81 Almoſt t whole ar deſerts.

According to ſome accounts, no fewer than 140,000 of the Turkiſh troops deſerted in this manner. Even in the grand vizir's camp at Schumla, matters went on in the ſame manner. He was abandoned by his whole cavalry; his European and Aſiatic troops quarrelled, and cut one another to pieces before his face; and, in ſhort, the vaſt army he commanded was reduced almoſt to nothing. The Ruſſian general did not

82 Romanzow dictates terms of peace.

not fail to take advantage of theſe misfortunes. He placed the different diviſions of his army in ſuch advantageous ſituations, that he totally cut off all communication between the Turkiſh camp and every mean of ſubſiſtence. The unfortunate vizir, therefore, was obliged at laſt to ſubmit to the terms which Romanzow dictated to him. The principal articles were, the independency of the Crimea; the abſolute ceſſion of Kilburn, Kerche, and Jenickala, and all the country between the Bog and the Dniper; a free navigation in all the Turkiſh ſeas, in which was included the paſſage through the Dardanelles, with all the privileges and immunities which were granted to the moſt favoured nations. Ruſſia gave up all her conqueſts, except Aſoph and Taganrok. There were, beſides, ſeveral ſtipulations in favour of the inhabitants of Moldavia and Walachia, and the Greek iſlands which were reſtored by Ruſſia.

83 Account of he Turkiſh ominions.

The Turkiſh empire comprehends ſeveral countries in Europe, Aſia, and Africa. In Europe it is bounded on the ſouth by the Mediterranean; on the north, by Croatia, Sclavonia, and Tranſylvania; on the eaſt, by Poland, Ruſſia, and Aſia; and on the weſt, by the Adriatic and Dalmatia. The principal countries of Turkey in Europe are Romania, Bulgaria, Servia, Walachia, Moldavia, Beſſarabia, Greece, Macedonia, Albania, Theſſaly, Levadia, Morea, and the Archipelago iſlands. Turkey in Aſia is divided into Eaſtern and Weſtern. The Eaſtern comprehends Georgia, Turcomania, and Dearbekr; and the Weſtern, Anatolia, or Aſia Minor, Syria, and Paleſtine.—In Africa the Turkiſh dominions are Egypt, and ſome diſtricts of Barbary. But for an account of theſe different countries, ſee the articles as they occur in the order of the alphabet.

84 f the go- rnment, c. in Tur- y.

The grand ſignior, or emperor of the Turks, is reſtrained by no laws or compacts, the government being purely monarchical: but if he indulges not the humours of the people, and eſpecially of the mutinous janiſaries, he is in danger not only of being depoſed, but alſo of being put to death. Thoſe who have offices under the government he ſqueezes, diſgraces, and puts to death, upon the leaſt ſuggeſtion of their diſaffection or miſconduct, without giving them an opportunity of anſwering for themſelves, they being looked upon as more immediately his ſlaves: but others ſeem to enjoy almoſt as great a degree of ſecurity, both in their perſons and properties, as the ſubjects of other abſolute monarchies. Indeed, in all ſuch there is a gradation of governors and officers, of which the higher fleece and oppreſs thoſe below them, and the loweſt make repriſals upon the common people. In the ſucceſſion to the empire, no regard is paid to age or birth-right, the Turks thinking it ſufficient if, in their elections, they keep to the family. Women are excluded from the throne. The emperor's council is either ordinary or extraordinary. The firſt, meeting every Sunday and Thurſday, conſiſts of the great officers of ſtate, and is called the *galibe divani*. To the other, which is called *ajack divani*, are ſummoned all the great perſons and officers of the empire, and even the oldeſt and moſt experienced ſoldiers. The ſultan hears what paſſes from an adjoining chamber. At the head of the miniſtry is the grand vizir, who is as it were his lieutenant-general, with whom he divides, or rather to whom he leaves the care of the whole empire; he being entruſted not only with the finances, with foreign affairs, and the adminiſtration of juſtice in civil and criminal matters, but alſo with the conduct of the war, and the command of the army. Great and dangerous as this charge is, there have been men who have executed it with ſafety and ſucceſs, both in peace and war, and have died quietly in their beds; but that is not the caſe with the moſt of them, it being the uſual policy of the emperors to ſhelter themſelves from the clamours of the people by throwing the whole blame of any mal-adminiſtration upon him, and giving him up to the public reſentment. His income, without any breach of probity, may amount to 600,000 dollars, excluſive of preſents and other perquiſites. Notwithſtanding his high dignity, his palace is open to every one, and he gives audience to the meaneſt of the poor. When the ſultan names a grand vizir, he put into his hand the ſeal of the empire; and when he honours him with the command of an army, he takes out one of the plumes of his own turban at the head of the troops, and delivers it to him to place it in his own. The other great officers of ſtate are the kaimakan, or vizir's deputy, not to be confounded with the governor of Conſtantinople, who is alſo called *kaimakan;* the vizirs of the bench, or baſſas of three horſe-tails, becauſe three horſe-tails are carried before them when they march, and who ſit in the divan or courts of juſtice with him; the kadinlaſquiers, or chief juſtices of provinces; the beiglerbegs, or viceroys, of which the chief are thoſe of Romelia, Natolia, and Damaſcus; the ordinary baſſas, or governors of towns and diſtricts under the beiglerbegs; the reis effendi, or lord chancellor and ſecretary of ſtate; the teſterder, or high treaſurer; the aga of the janiſaries; the aga of the ſpahis; the aga of the ſiluds, &c. The chief officers of the ſeraglio are the kiſlaragaſi, who is ſuperintendant of the women, and has the command of all the black eunuchs; the capi aga, who has the command of all the white eunuchs, and to whom all petitions to be preſented to the prince are delivered. Both theſe are alſo eunuchs, and of the ſame complexion as thoſe of whom they have the command. Beſides the women and eunuchs, there are in the ſeraglio the ichoglans and azamoglans, mutes, dwarfs, and buffoons. The ichoglans are young men bred up in the ſeraglio, not only to ſerve about the prince, but to fill in time the firſt poſts of the empire. The azamoglans are trained up there for inferior employments.

No children are admitted into the ſeraglios of Conſtantinople, Pera, or Adrianople, till they are firſt reviewed and approved of by the grand ſignior. They are generally the moſt beautiful, well-made, and ſprightly, that can be met with. They are firſt taught, after being circumciſed, ſilence and a modeſt humble behaviour. Then they are inſtructed in the Mohammedan religion, to ſpeak and write the Turkiſh language, and afterwards the Perſian and Arabic. As they grow up, they are taught manly exerciſes, and whatever is thought requiſite to qualify them for ſtate-employments: but they are ſeldom preferred out of the ſeraglio until the age of 40.

The ladies of the haram are a collection of young beautiful virgins, either the preſents of governors, purchaſed, or captives taken in war; moſt of them being the children of Chriſtian parents. They are taught muſic, dancing, and other accompliſhments, and furniſhed with the richeſt cloaths and ornaments. Some of them frequently play and dance before the grand ſignior, while others divert him with their converſation. They have a great many female ſlaves to wait on them; but are ſcarce ever ſuffered to go abroad, except when the grand ſignior changes his place of reſidence; when a troop of black eunuchs convey them to the boats, which are encloſed with lattices: and when they go by land, they are put into cloſe chariots, and ſignals made at certain diſtances, to give notice that none may approach the road through which they are to paſs.

85 Dreſs, manners, &c. of the Turks.

The Turks are generally robuſt and well-ſhaped, of a good mien, and patient of hardſhips, which render them fit for war. They ſhave their heads; but wear their beards long, except the military and thoſe in the ſeraglio, who wear only whiſkers. They cover their heads with a white linen turban of an enormous ſize, and never pull it off but when they ſleep. None but Turks muſt preſume to wear a white turban. Their breeches or drawers are of a piece with their ſtockings; and they have ſlippers inſtead of ſhoes, which they pull off when they enter a temple or houſe. They wear ſhirts, with wide ſleeves, not gathered at the wriſts, and over them a veſt tied with a ſaſh; their upper garment being a looſe gown, ſomething ſhorter than the veſt.

The womens dreſs pretty much reſembles that of the men; only they have a ſtiffened cap with horns, ſomething like a mitre, on their heads inſtead of a turban, and wear their hair flowing down. When they go abroad, they are ſo wrapped up, that their faces cannot be ſeen.

The Turks ſit, eat, and ſleep, according to the cuſtom of the eaſt, on ſophas or cuſhions, mattraſſes, and carpets. Rice is their moſt general food, and coffee their common drink. Their moſt uſual ſalutation is to bow the head a little, laying the right-hand on their breaſts; but to perſons of rank they ſtoop ſo low as to touch the border of their veſt. The women are kept under a rigorous confinement. They have generally delicate ſkins, regular features, black hair and eyes, with an admirable cheſt. Many of them are complete beauties. Their cleanlineſs is extraordinary; for they bathe twice a-week, and ſuffer not the ſmalleſt hair, or the leaſt ſoil, to be upon their bodies. As to the qualities of their minds, they are ſaid to want neither wit, vivacity, nor tenderneſs; and to be exceedingly amorous. It is no doubt for this reaſon that the men never ſuffer their wives faces to be ſeen, not even by the deareſt friend they have in the world.

There is no need of much wit to behave one's ſelf well here; for a good mien and gravity ſupply the place of merit in the eaſt, and much gaiety would ſpoil all. Not that the Turks want wit; but they ſpeak little, and pride themſelves in ſincerity and modeſty more than eloquence. The Turks uſe no unneceſſary words, whereas the Greeks talk inceſſantly. Though theſe two nations are born under one climate, their tempers are more different than if they lived in the moſt diſtant countries. The Turks make profeſſion of candour and faithfulneſs, and are a charitable good-natured people, jealouſy excepted, and very ſober. On the other hand, they are extremely proud, inſolent, indolent, ſuperſtitious, and covetous. They are alſo much addicted to unnatural luſts; and deſpiſe all other nations in general, eſpecially thoſe which are not of their religion. The common appellation that they give the Chriſtians is that of dogs. An uniformity runs through all the actions of the Turks, and they never change their manner of living. They ſeem to have no kind of genius for the improvement of the arts and ſciences, though they live under the influence of the ſame heaven, and poſſeſs the ſame countries, as the ancient Grecians did. They generally loiter away their time, either among the women in the haram, or in ſmoking or taking opium; and though they herd together, you will obſerve as little converſation among them as amongſt ſo many horſes in a ſtable. They ſeldom travel, or uſe any exerciſe or rural ſports; and diſcover little or no curioſity to be informed of the ſtate of their own or any other country: but Turkey, after all, is not without men of parts, probity, and honour; nor without benevolent, liberal, converſible, and ingenious people. They behave very commendably to their ſlaves and ſervants, and frequently better than the Chriſtians do to theirs. There are no hereditary governments or titles of nobility in Turkey; and indeed the commonalty there enjoys the greateſt liberty.

86 Languages and learning.

The languages ſpoken in Turkey in Europe are the Turkiſh and Tartarian, which have a great affinity to one another; the modern Greek, which differs widely from the ancient; the Sclavonian, and Walachian. The Arabic is the language of the learned. Learning is at a very low ebb among the Turks: however, they have ſome ſchools, colleges, and academies; but they are on a very different footing from thoſe among us. Not many years ſince, a printing-houſe was ſet up at Conſtantinople, where books of all kinds were allowed to be printed, except on matters of religion. The moſt ingenious muſſelmen employ themſelves in reading the Alcoran and the commentators upon it, to which almoſt all their learning is confined. Some of them amuſe themſelves with poetry, in which they are ſaid to ſucceed very well. Other Turks delight in muſic, and ſpend the whole day in playing upon an inſtrument, without being tired, though they only repeat the ſame tune. It is ſaid there are a great many manuſcripts in the Turkiſh, Arabian, and Perſian languages, among the Turks; but it is not to be ſuppoſed that they contain any very deep, ſolid, ingenious, or uſeful learning.

87 Forces.

The Turkiſh regular troops are the ſpahis and timar-ſpahis, who are light-horſe. The latter, who have eſtates in land aſſigned them inſtead of pay, are obliged to bring a certain number of ſlaves into the field with them. The tributary princes of Moldavia and Walachia, and the Crim Tartars, are alſo obliged to ſend auxiliaries. But the flower of the Turkiſh army conſiſts of the janiſaries, who amount to about 40,000, and are all infantry. They have particular privileges, being ſubject to no juriſdiction but that of their aga or commander. Their pay is three aſpers a-day, beſides victuals, and a ſuit of cloaths every year. They are all lodged at Conſtantinople together in

Turkey. in a ſort of barracks, having been educated in the ſeraglio, and trained up to the exerciſe of arms from their infancy. Beſides the janiſaries, there is another body of foot called *capis*. The whole Turkiſh army, regulars and irregulars, amounts to above 300,000 men. Beſides the true janiſaries, or janiſaries of the porte, and in actual pay, there are great numbers all over the empire, who procure themſelves to be regiſtered in this body, in order to be entitled to their privileges. The bachelors only are capable of bearing offices in the barracks or chambers at Conſtantinople. When any of the janiſaries are diſabled in the ſervice, they have an allowance for life. To diſtinguiſh them, they wear a cap of a particular make. The emperor's guards are compoſed of them, and they are feared and reſpected every where, though they carry only a cane in their hand; for arms are not delivered to them but when they take the field. The chief commanders of the army are diſtinguiſhed by two or three horſe-tails carried before them. The Turkiſh navy is not ſo conſiderable as might be expected in ſuch extenſive dominions, ſituated on ſeveral ſeas, and abounding in commodious harbours. By their neglecting navigation and foreign commerce, they can never find ſailors to man a great fleet; and thoſe they have are unſkilful, as well as their pilots and officers. If they would apply themſelves to navigation, and make the moſt of their ſituation and advantages, they could not fail to become a very formidable maritime power. Their navy generally conſiſts of about 40 large ſhips, excluſive of galleys. In time of war they hire or buy merchant-ſhips, and others are ſent them from Algiers, Tunis, and Tripoli. The captain-baſſa, or admiral, is the ſecond officer in the empire, the grand vizir being the only officer above him. His power is abſolute when he is out of the Dardanelles; and not only the ſea-officers, but all the governors of the maritime provinces, receive orders from him. The pilots are moſtly Greeks, and the captains renegadoes. The captain-baſſa ſails round the Archipelago, in ſummer, to collect the capitation-tax, and learn the ſtate of affairs in thoſe parts.

88 Revenues. The revenues of the empire are paid either into the public treaſury, or into the ſultan's private treaſury. The former, called by the Turks *deitulmali muſlimim*, i. e. *the public money of the Muſſulmen*, is not to be touched but on the moſt preſſing exigency of the ſtate. The other the ſultan may diſpoſe of at pleaſure. Prince Cantimir ſays, in his time, 27,000 purſes, amounting to 13,000,000 and a half of crowns, were annually returned to both treaſuries; ariſing from the produce of the cuſtoms, demeſne lands, the capitation or tax paid by every ſubject of the empire who is not of the Mahometan religion; the annual tributes paid by the cham of the Crim Tartars, the princes of Moldavia, Walachia, the little republic of Raguſa, and part of Mingrelia; together with half a million of money out of a million and a half levied annually in Egypt. Theſe are the fixed revenues: but vaſt ſums are alſo raiſed by the confiſcations of the eſtates and effects of the baſſas and other officers, and from the eſtates of Turks dying without male iſſue.

89 Manufactures and commerce. The manufactures and commodities of Turkey are ſilks, carpets, goat's hair, wool, camel's hair, cotton-yarn, dimity, burdets, waxed linen, ſhagreen-ſkins, blue, red, and yellow Morocco leather; coffee, rhubarb, turpentine, ſtorax, gums, opium, galls, maſtic, emery, lemnian bole, pomegranate-ſhells, ſponges, dates, almonds, wine, oil, figs, raiſins, mother-of pearl, boxwood, ſaffron, &c. Theſe are exported in large quantities by the ſeveral European trading nations, who import their own goods and purchaſe thoſe of the country. The inland trade is carried on chiefly by the Jews and Armenians; and even the Turks ſend merchandiſe, both by land and water, from one part of the empire to another, but not to foreign Chriſtian countries. No nation is more advantageouſly ſituated for traffic than the Turkiſh; having the navigation of the Black Sea, the Levant, and the Red Sea, and conſequently greater opportunities of importing the rich merchandiſes of the Eaſt, and diſtributing them all over Europe, than any maritime power: but they never attempt diſtant voyages, and have but few merchant-ſhips, both their imports and exports being chiefly made in foreign bottoms. Tyre, Sidon, and Alexandria, which once commanded the navigation and trade of the world, are in their poſſeſſion, but make no figure in commerce at this day: and well it is for the Chriſtians that the Turks are ſuch an indolent generation; for their ſituation and vaſt extent of empire would enable them to monopolize the trade of the world, if they attended to it. Several European Chriſtian nations have envoys and reſidents at Conſtantinople, and conſuls in other ports. In this empire there is a great traffic in the human ſpecies; not only male ſlaves, but beautiful young girls, being publicly bought and ſold.

The empire is ſtyled the Ottoman kingdom or empire, the Ottoman Porte, the Sublime Porte, the Sublime Sultanian Porte, &c. The appellation of *Porte* is ſaid to be derived from the large gate built by Mohammed II. at the entrance of the ſeraglio at Conſtantinople; though the Orientals in general call a royal palace the *king's porte* or *gate*.

TURMERIC, in botany. See Curcuma.

TURNEBUS (Adrian), an eminent French critic, born of a genteel family in Normandy in 1512. He acquired ſo extenſive a reputation by his learning, that he had great offers made him from Italy, Germany, and England; but we are told he preferred poverty in his own country to riches in any other. He taught polite literature firſt at Toulouſe; but in 1547 went to be Greek profeſſor at Paris, whither his name drew ſcholars to him from all parts of Europe: in 1552, he took upon him the care of the royal Greek preſs for three years, when he quitted it on being admitted into the number of royal profeſſors. He died in 1565; and his works, which are all in Latin, were printed at Straſburg, in one vol. folio, 1600. His *Adverſaria*, 3 vols folio, had been printed at Paris before.

TURNEP, in botany, a ſpecies of braſſica. For the culture of them, ſee Agriculture, n° 125.

Turnep-*Bread*. See Bread.

TURNING, a branch of ſculpture, being the art of faſhioning hard bodies, as braſs, ivory, wood, &c. into a round or oval form in a lathe.

TURPENTINE, a tranſparent viſcous ſubſtance, flowing either naturally or by inciſion from ſeveral unctuous or reſinous trees; as the terebinthus, pine, larch, fir, &c. See Chemistry, n° 498, Materia Medica, *the Table*; and Pharmacy, ſect. x. and xi. *paſſim.*

Oil of Turpentine. See Chemistry, n° 498. and Pharmacy, n° 538.

TURQUOISE. See Turcoise.

TURRETIN (Francis), miniſter and profeſſor of divinity at Geneva, his native place, was born in 1623. Having ſtudied at Geneva, Leyden, Saumur, Montauban, and Niſmes, with great ſucceſs, he was admitted into the miniſtry in 1648, and ſerved at the ſame time the French and Italian churches at Geneva. Two years after, he was offered the profeſſorſhip of philoſophy, which he refuſed; but accepted the invitation of the church of Lyons. He was recalled to Geneva at a year's expiration, becauſe he was wanted to give lectures of divinity; and began them in 1653. He was ſent to Holland in 1661, to deſire the aſſiſtance of money which the city of Geneva had occaſion for. He had in that journey all the ſucceſs he could promiſe himſelf; and gained ſuch a character there, that he was ſtrongly importuned by the Walloon churches at the Hague and at Leyden to enter into their ſervice. On his return he reſumed the functions of his place, and continued there till his death with remarkable application. He died in 1687, with the character of a man of great merit; eloquent, judicious, laborious, learned, and zealous for orthodoxy. His works were publiſhed by his ſon John Alphonſus, in 3 and in 4 vols 4to, and are much eſteemed.

TURTLE, in ichthyology. See Testudo.

TUSCAN order, in architecture. See Architecture, n° 47.

Tuscan *Earth*, a yellowiſh kind of bole dug in many parts of Italy, particularly about Florence, where there is a ſtratum of it eight or ten feet thick, at the depth of five or ſix feet from the ſurface. It has an aſtringent property.

TUSCANY, a duchy of Italy, which makes part of the ancient Hetruria, excepting ſome ſmall detached parts, is encompaſſed by a part of the Mediterranean, called here the *Tuſcan Sea*; the eccleſiaſtical ſtate; the duchy of Modena; and the republic of Lucca; its extent from north to ſouth being about 116 Engliſh miles, and from eaſt to weſt about 80.

Though ſome parts of it are mountainous, yet both the hills and dales are covered with vines, olives, citron, lemon, and orange trees, &c. The mountains yield alſo copper, iron, alum, &c. and ſome quarries of the fineſt marble and porphyry. Here is alſo plenty of corn, rice, ſaffron, honey, wax, wool, flax, hemp, with mineral waters, rich paſture, ſalt-pits, ſulphur, alabaſter, chalcedony, lapis lazuli, borax, amethyſts, cornelians, jaſpers, quickſilver, cryſtals, and black ſlate. In ſome places the elms and aſhes yield manna.

The principal river in Tuſcany is the Arno, which has its ſource in the Appennine mountains, and falls into the ſea below Piſa. There are ſome other ſmaller rivers.

This duchy fell under the dominion of the Romans about 455 years before Chriſt. The Oſtrogoths poſſeſſed themſelves of it in the fifth century, and after them the Lombards, who were expelled by Charlemagne *anno* 800, in conſequence of which it became ſubject to the German emperors, who appointed governors over it. At laſt the cities of Florence, Piſa, Sienna, and ſome others, during the contentions between the pope and the emperor, and their reſpective adherents, the Guelphs and Gibbelines, withdrew themſelves from the dominion of both, and erected themſelves into ſeparate commonwealths. In that of Florence, John de Medicis, a popular nobleman, ſo inſinuated himſelf into the favour of his countrymen, that that they inveſted him with ſovereign power. Pope Pius V. conferred the title of grand duke on Coſmo de Medicis *anno* 1570, in whoſe family the duchy continued until the death of Gaſton de Medicis, who died *anno* 1737. The duchy was then transferred to the duke of Lorrain, the late emperor, in lieu of the duchy of Lorrain, which, by the peace of 1736, was given to king Staniſlaus during his life, and then was to be annexed to France. The grand duke's annual revenues are computed at about 500,000 l. ſterling, ariſing chiefly from the tenths of all eſtates that are ſold or alienated, and the ground-rents of the houſes in Leghorn, and the duties on almoſt all manner of proviſions.

The great duke is abſolute in his dominions. His ſtanding forces conſiſt only of three regiments of foot and two of dragoons, and his marine of a few galleys and galeaſſes; but, in caſe of neceſſity, it is ſaid he can bring 30,000 men into the field, and increaſe his marine with 20 men of war; but it does not appear how he can man them.

The only order of knighthood in this ſtate is that of St Stephen, inſtituted in 1554 by Coſmo I. which conſiſts of three claſſes, namely, the Cavalieri della Guiſtitia, della Gratia, and de Commenderie. The duke is always grand-maſter; and the badge of the order an octangular red croſs, with a golden border, worn on the breaſt.

The principal places are Florence, Piſa, Leghorn, Sienna, Orbitello, Piombino, and Arezzo.

TUSK, or Torsk, in ichthyology. See Gadus.

TUSCULANUM, a villa belonging to Cicero, near Tuſculum, where he wrote his *Quæſtiones Tuſculanæ*, ſo named from the place; thus become famous as well for the productions of genius as of nature. Formerly the villa of Sylla: now called *Grotta Ferrata*.—Another *Tuſculanum*, (inſcription), a town of the Tranſpadana, ſituated on the weſt ſide of the Lacus Benatus. Now ſaid to be called *Toſcolano*, in the territory of Breſcia, ſubject to Venice. Here many monuments of antiquity are dug up.

TUSCULUM, (anc. geog.), a town of Latium, to the north of Alba; ſituated on an eminence, and therefore called *Supernum*, (Horace, Strabo). In ſight of Rome, at about the diſtance of 100 ſtadia, or 12 miles. Adorned with plantations and princely edifices: The ſpot remarkable for the goodneſs of the ſoil, and its plenty of water. Built by Telegonus, who ſlew his father Ulyſſes, (Ovid, Horace); called the grandſon of Ulyſſes in Silius Italicus. A municipium, (Cicero); the birth-place of the elder Cato, (Nepos, Cicero). Now *Freſcati*, in the Campania of Rome.

TUSSILAGO, colts-foot, a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. There are nine ſpecies; of which the moſt remarkable are, 1. The farfara, or common coltsfoot, growing plentifully on the banks of rivulets, or in moiſt and clayey ſoils, in England and Scotland.—The leaves are ſmoked in the manner of tobacco, or a ſyrup or decoction of them and the flowers ſtand recommended in coughs and other diſorders of the breaſt and lungs. The preſent practice, however, ſeems almoſt entirely to have rejected it. The downy ſubſtance under the leaves, boiled in a lixivium with a little ſaltpetre, makes excellent tinder. 2. The petaſites, or common butter-bur, is frequent in wet meadows and by the ſides of rivers. Its leaves are the largeſt of any plant in Great Britain, and in heavy rains afford a ſeaſonable ſhelter to poultry and other ſmall animals. The root dug up in the ſpring is reſinous and aromatic. A drachm of it in a doſe has been ſometimes given as a ſudorific and alexipharmic; but as it poſſeſſes thoſe virtues but in a ſmall degree, it has loſt its reputation in the ſhops.

TUTOR, in the civil law, is one choſen to look to the perſons and eſtate of children left by their fathers and mothers in their minority. A perſon nominated tutor either by teſtament or by the relations of the minor, is to decline that office if he have five children alive; if he have any other conſiderable tutorage; if he be under 25 years of age; if he be a prieſt or a regent in an univerſity; or if he have any law-ſuit with the minors, &c. The marriage of a pupil without the conſent of his tutor is invalid. Tutors may do any thing for their pupils, but nothing againſt them; and the ſame laws which put them under a neceſſity of preſerving the intereſt of the minors, put them under an incapacity of hurting them.

TUTTY, *tutia*, a recrement of mixed metals, in which lapis calaminaris, or zinc in its metallic form, is an ingredient, collected in the furnaces where braſs is made from copper and calamine, and where the mixed metals are run. In theſe furnaces they place, under the roof and about the upper parts of the ſides, rods of iron, and ſometimes rolls of dry earth, about which the tutty is afterwards found. Therefore the tutty which we uſe in the ſhops at this time owes its origin truly and properly to zinc, which ſublimes with a very ſmall fire into a kind of flowers; and when fuſed with any other metal, flies from it in abundance under this form, and alſo frequently takes ſome part of that metal, more or leſs, up with it. Hence it is evident, that the tutty or cadmia of the ancients muſt have been wholly different from ours, as they uſed no zinc nor any of its ores in the furnace where they collected it.

Our tutty, then, is a hard and heavy ſemimetallic recrement, ſometimes met with in the ſhops in thin flat pieces or flakes; but moſt abundantly in tubular cylindric pieces, reſembling ſegments of the barks of trees puſhed off from the branches without breaking; theſe are of different lengths and diameters. The fineſt tutty is that of a fine deep brown on the outſide, and of a yellowiſh tinge within; the thickeſt, brighteſt, and moſt granulated; the hardeſt to break; and that which has leaſt foulneſs amongſt it.

Tutty is celebrated as an ophthalmic, and frequently employed as ſuch in unguents and collyria.

TWEED, a river of Scotland, which riſes on the confines of the ſhire of Clydeſdale, and running eaſtward through Tweedale, and dividing the ſhire of Mers from Teviotdale and Northumberland, falls into the German Sea at Berwick.

TWEEDALE, or PEEBLES, a county of Scotland, taking the name of Tweedale from the river Tweed, that runs through the whole length of the county, ſtretches about 25 miles in length, and at ſome places 18 in breadth; bounded on the eaſt by Ettrick Foreſt, on the ſouth by Annandale, on the weſt by Clydeſdale, and on the north by Mid-Lothian. Tweedale is a hilly country, well watered with the Tweed, the Yarrow, and a great number of ſmaller ſtreams, that fertilize the valleys, which produce good harveſts of oats and barley, with ſome proportion of wheat. All the rivers of any conſequence abound with trout and ſalmon. The lake called *Weſt-Water-Loch*, ſwarms with a prodigious number of eels. In the month of Auguſt, when the weſt wind blows, they tumble into the river Yarrow in ſuch ſhoals, that the people who wade in to catch them run the riſk of being overturned. There is another lake on the borders of Annandale, called *Lochgennen*, which forms a cataract over a precipice 250 paces high: here the water falls with ſuch a momentum as to kill the fiſh underneath. About the middle of this county is the hill or mountain of Braidalb; from the top of which the ſea may be ſeen on each ſide of the iſland. Tweedale abounds with limeſtone and freeſtone. The hills are generally as green as the downs in Suſſex, and feed innumerable flocks of ſheep, that yield great quantities of excellent wool. The country is well ſhaded with woods and plantations, abounds with all the neceſſaries of life, and is adorned with many fine ſeats and populous villages. The earls of March were hereditary ſheriffs of Tweedale, which beſtows the title of *marquis* on a branch of the ancient houſe of Hay, earls of Errol, and hereditary high conſtables of Scotland. The family of Tweedale is, by the female ſide, deſcended from the famous Simon de Fraſer, proprietor of great part of this country, who had a great ſhare in obtaining the triple victory at Roſlin. In the neighbourhood of Peebles, near the village of Romana, on the river Lene, we ſee the veſtiges of two Roman caſtella, or ſtationary forts; and a great many terraces on the neighbouring hills, which perhaps have ſerved as itinerary encampments. In the ſhire of Tweedale there are many ancient and honourable families of the gentry. Among theſe Douglas of Cavers, who was hereditary ſheriff of the county, ſtill preſerves the ſtandard and the iron mace of the gallant lord Douglas, who fell in the battle of Otterburn, juſt as his troops had defeated and taken Henry Piercy, ſurnamed *Hotſpur*. In the church-yard of Drumalzier, belonging to an ancient branch of the Hay family, the famous Merlin is ſuppoſed to lie buried. There was an old traditional prophecy, that the two kingdoms ſhould be united when the waters of the Tweed and the Panſel ſhould meet at his grave. Accordingly the country people obſerve, that this meeting happened in conſequence of an inundation, at the acceſſion of James VI. to the crown of England.

TWELFTH-DAY, the feſtival of the Epiphany, or the manifeſtation of Chriſt to the Gentiles; ſo called, as being the twelfth day, excluſive, from the nativity, or Chriſtmas-day.

TWILIGHT, that light, whether in the morning before ſun-riſe, or in the evening after ſun-ſet, ſuppoſed to begin and end when the leaſt ſtars that can be ſeen by the naked eye ceaſe or begin to appear. By means of the atmoſphere, it happens that though none of the ſun's direct rays can come to us after it is ſet, yet we ſtill enjoy its reflected light for ſome time, and night approaches by degrees. For after the ſun is hid from our eyes, the upper part of our atmoſphere remains for ſome time expoſed to its rays, and from thence the whole is illuminated by reflection. But as the ſun grows lower and lower, that portion of the atmoſphere which is above our horizon becomes enlightened till the ſun has got 18° below it; after which it ceaſes to be illuminated thereby, till it has got within as many degrees of the eaſtern ſide of the horizon; at which time it begins to illuminate the atmoſphere again, and in appearance to diffuſe its light throughout the heavens, which continues to increaſe till the ſun be up. Hence it is that during that part of the year in which the ſun is never 18° below our horizon, there is a continued twilight from ſun-ſetting to ſun-riſing.

As the twilight depends on the quantity of matter in the atmoſphere fit to reflect the ſun's rays, and alſo on the height of it; for the higher the atmoſphere is, the longer will it be before the upper parts of it will ceaſe to be illuminated, the duration of it will be various. For inſtance, in winter, when the air is condenſed with cold, and the atmoſphere upon that account lower, the twilight will be ſhorter; and in ſummer, when the limits of the atmoſphere are extended by the rarefaction and dilatation of the air, of which it conſiſts, the duration of the twilight will be greater. And for the like reaſon, the morning twilight, the air being at that time condenſed and contracted by the cold of the preceding night, will be ſhorter than the evening one, when the air is more dilated and expanded.

TWINKLING *of the* STARS. See STARS.

TWINS, two young ones delivered at a birth, by an animal which ordinarily brings forth but one.

TYGER, or TIGER, in zoology. See FELIS.

TYLE, or TILE, in building, a ſort of thin laminated brick uſed on the roofs of houſes: or more properly a kind of fat clayey earth kneaded and moulded of a juſt thickneſs, dried and burnt in a kiln like brick, and uſed in the covering and paving of houſes.

TYMPAN, among printers, a double frame belonging to the preſs, covered with parchment, on which the blank ſheets are laid in order to be printed off. See PRINTING-*Preſs*.

TYMPANUM, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed ſtaves for the more eaſily turning the axis in order to raiſe a weight required. The tympanum is much the ſame with the peritrochium; but that the cylinder of the axis of the peritrochium is much ſhorter and leſs than the cylinder of the tympanum.

TYMPANUM, in anatomy. See there, n° 405, c.

TYMPANY, in medicine. See MEDICINE, n° 435.

TYNDALE (William), a learned divine, the firſt tranſlator and publiſher of the Old and New Teſtament in the Engliſh language, was born near the borders of Wales, and educated at Oxford, chiefly in Magdalen-hall. We are told that he was admitted a canon of the new college founded by Wolſey; but Anthony Wood diſputes this fact. Having imbibed the opinions of Luther, and being apprehenſive of perſecution, he removed to Cambridge, where he finiſhed his academical ſtudies. From thence he went to the houſe of Sir John Welch at Little Sodbury in Glouceſterſhire, in the capacity of tutor to that gentleman's children; and being then in orders, frequently preached at Briſtol, and in that neighbourhood: but his doctrine being by the clergy of thoſe times deemed heretical, he was obliged once more to fly from perſecution. He now removed to London, where he preached for ſome time in St Dunſtan's in the Weſt. Having conceived an idea of biſhop Tonſtal's moderation from the character given him by Eraſmus, he made an attempt to be admitted one of his chaplains; but not ſucceeding, and now deſtitute of ſupport, he was taken into the houſe of Mr Humphrey Monmouth, alderman of London, where he continued about half a year. In this ſituation he firſt meditated the tranſlation of the New Teſtament into Engliſh, as the moſt effectual means to bring about a reformation in religion; but as this could not be ſafely attempted in England, he embarked for Germany, ſupported by his friends with a penſion of 10*l. per annum.* Having firſt paid a viſit to Martin Luther, at that time in Saxony, he ſettled at Antwerp, and immediately began his tranſlation of the New Teſtament, which was firſt printed in 1526, in 8vo. The goſpel was always beholden to perſecution for its propagation. The whole impreſſion was in a ſhort time conſumed, and Tyndale by that means enabled to publiſh a ſecond much more numerous.

Having now finiſhed his firſt work, the indefatigable Tyndale began his tranſlation of the Old Teſtament; and the five books of Moſes being ready for the preſs, he embarked for Hamburgh with an intention to print them; but the ſhip being caſt away, all his papers, books, and money, were loſt. However, he arrived ſafe at Hamburgh; where, with the help of Miles Coverdale, he began the work anew, and finiſhed the Pentateuch, which was printed in 1530. To this he added the book of Jonas, which was publiſhed the year following.

The matter now grew ſerious. The Papiſts were alarmed; and Tyndale's tranſlations were at all events to be ſuppreſſed. The moſt conſcientious Defender of the Faith aſſembled the heads of the clergy in the ſtar-chamber, and, with their approbation, iſſued his royal proclamation for the total extinction of the Engliſh Bible, with all other books containing peſtilential and damnable hereſies. The Bibles, as many as were brought in, were accordingly burnt: but this was not enough. To appeaſe the offended genius of Popery, it was neceſſary that the tranſlator himſelf ſhould alſo burn. Poor Tyndale, in conſequence of an application from the court of London, was ſeized by the emperor's procurator-general at Bruſſels, confined in the caſtle of Vilvorden, 18 miles from Antwerp; and after 18 months impriſonment, in the year 1536, condemned and executed. They had however the humanity to ſtrangle him firſt; after which his body was reduced to aſhes. Thus died this very honeſt and learned divine, for having tranſlated and, as was falſely pretended, perverted the ſcriptures.

TYPE, a copy, image, or reſemblance of ſome model. The word is much uſed among divines, to ſignify a ſymbol, ſign, or figure of ſomething to come; in which ſenſe it is commonly uſed with relation to antitype,

titype, which is the thing itſelf, whereof the other is a type or figure.

Type, among letter-founders and printers, the ſame with letter. See Letter.

Type is alſo uſed to denote the order obſerved in the intenſion and remiſſion of fevers, pulſes, &c.

TYPHA, CAT'S TAIL; a genus of the triandria order, belonging to the monoecia claſs of plants. There are two ſpecies; of which the moſt remarkable is the latifolia, great cat's-tail or reed-mace, frequent in ponds and lakes. The ſtalk is ſix feet high; the leaves a yard long, hardly an inch wide, convex on one ſide: the amentum, or cylindrical club, which terminates the ſtalk, is about ſix inches long, of a dark brown or fiſcous colour. Cattle will ſometimes eat the leaves, but Schreber thinks them noxious: the roots have ſometimes been eaten in ſallads, and the down of the amentum uſed to ſtuff cuſhions and matraſſes. Linnæus informs us, that the leaves are uſed by the coopers in Sweden to bind the hoops of their caſks.

TYPHON. See Whirlwind.

TYPOGRAPHY, the art of printing. See Printing.

TYRANNION, a celebrated grammarian in Pompey's time, was of Amiſus in the kingdom of Pontus. He was the ſcholar of Dionyſius of Thrace at Rhodes. He fell into the hands of Lucullus, when that general of the Roman army defeated Mithridates, and ſeized his dominions. This captivity of Tyrannion was no diſadvantage to him, ſince it procured him an opportunity of being illuſtrious at Rome, and raiſing a fortune. He ſpent it, among other things, in making a library of above 30,000 volumes. He died very old, being worn out with the gout. His care in collecting books contributed very much to the preſervation of Ariſtotle's works.

TYRANT, among the ancients, denoted ſimply a king or monarch; but the ill uſe which ſeveral perſons inveſted with that ſacred character made of it, has altered the import of the word; and tyrant now carries with it the idea of an unjuſt or cruel prince, who invades the people's liberty, and rules in a more deſpotic manner than the laws of nature or of the country allow.

TYRE. See Tyrus.

TYRONE, a county of Ireland, in the province of Ulſter, 46 miles in length, and 37 in breadth; bounded on the north by Londonderry, on the eaſt by Armagh and Lough-Neagh, on the ſouth by Fermanagh, and on the weſt by Donnegal. It is a rough and rugged country, but tolerably fruitful; contains 12,683 houſes, 30 pariſhes, 4 baronies, 4 boroughs, and ſends 10 members to parliament. The principal town is Dungannon.

TYRREL (James), author of a hiſtory of England, was the eldeſt ſon of Sir Timothy Tyrrel of Shotover, near Oxford, and born in London in 1642. He was educated at queen's college in Oxford, where he took his degrees; and removing thence to the Inner Temple in London, applied himſelf to the ſtudy of the law, but never practiſed. He employed himſelf in ſtudying the hiſtory and conſtitution of his country, of which he at length rendered himſelf a thorough maſter, as appears from his anſwer to Sir Robert Filmer, and his Political Dialogues; as alſo from his Hiſtory of England, which reaches no farther than the end of the reign of king Richard II. He died in 1718.

TYRTÆUS, an Athenian general and muſician, is celebrated by all antiquity for the compoſition of military ſongs and airs, as well as the performance of them. He was called to the aſſiſtance of the Lacedæmonians in the ſecond war with the Meſſenians, about 685 B. C.; and a memorable victory which they obtained over that people is attributed by the ancient ſcholiaſts upon Horace to the animating ſound of a new military flute or clarion, invented and played upon by Tyrtæus. Plutarch tells us that they gave him the freedom of their city; and that his military airs were conſtantly ſung and played in the Spartan army to the laſt hour of the republic. And Lycurgus the orator, in his oration againſt Leocrates, ſays, "The Spartans made a law, that whenever they were in arms, and going out upon any military expedition, they ſhould all be firſt ſummoned to the king's tent to hear the ſongs of Tyrtæus;" thinking it the beſt means of ſending them forth in a diſpoſition to die with pleaſure for their country. Fragments of this poetry, in elegiac verſe, are preſerved in Stobæus, Lycurgus Orat. In Fulvius Urſinus, at the end of Poems by illuſtrious Women; and in the Oxford edition of *Eleg. & Lyric. Frag. & Scholia*, printed 1759. Τα Συζομενα, &c.

TYRUS, a very famous and ancient city of Phœnicia, built by the Sidonians, (Juſtin); conſequently of a later date than Sidon. No mention made of Tyre before David's time; none by Homer, who mentions Sidon and the Sidonians, (Strabo). Tyre was a very large rich city, and powerful at ſea, the rival of Sidon: formerly ſituated on an iſland; but after the time of Alexander, on the continent, or in a peninſula, formed by Alexander's mole or cauſeway, thrown up at the ſiege of it, (Curtius, Ovid, Strabo). Famous for its colonies, both within and without the pillars of Hercules, (Strabo, Pliny); and its purple dye. In Hebrew called *Zor* or *Sor;* and, according to another dialect, *Syr, Sar;* whence the adjoining country was called *Syria;* and by the Armenians or Syrians, *Tor, Tur, Tyr,* and with a Greek termination, *Tyros;* alſo *Sarra.* Their principal deity was Hercules, which Nonnus ſays was the ſun; called *Hercules Tyrius,* (Diodorus); and Tyre itſelf was called *Tyrus Eraclia,* (Coins). Out of a regard to its fame and antiquity, it enjoyed its liberty both under the Seleucidæ and the Romans, (Strabo); it alſo received a Roman colony, and was then called *Colonia Septimia,* (Coins). Of Tyre were Porphyry, the famous antagoniſt of Chriſtianity; Maximus, the Platonic philoſopher; and Ulpian, the celebrated civilian. Now commonly called *Tyre,* a port-town on the coaſt of the Levant. E. Long. 36°. N. Lat. 32. 32.

U, V.

U or u, the 20th letter and 5th vowel of our alphabet, is formed in the voice by a round configuration of the lips, and a greater extruſion of the under one than in forming the letter o, and the tongue is alſo more cannulated. The ſound is ſhort in *curſt*, *muſt*, *tun*, *tub*; but is lengthened by a final *e*, as in *tune*, *tube*, *&c.* In ſome words it is rather acute than long; as in *brute*, *flute*, *lute*, *&c.* It is moſtly long in polyſyllables; as in *union*, *curious*, *&c.* but in ſome words it is obſcure, as in *nature*, *venture*, *&c.* This letter in the form of V, or v, is properly a conſonant, and as ſuch is placed before all the vowels; as in *vacant*, *venal*, *vibrate*, *&c.* Though the letters v and u had always two ſounds, they had only the form v till the beginning of the fourth century, when the other form was introduced, the inconvenience of expreſſing two different ſounds by the ſame letter having been obſerved long before. In numerals V ſtands for five; and with a daſh added at top, thus $\bar{V}$, it ſignifies 5000.

In abbreviations, amongſt the Romans, V. A. ſtood for *veterani aſſignati*; V. B. *viro bono*; V. B. A. *viri boni arbitratu*; V. B. F. *vir bonæ fidei*; V. C. *vir conſularis*; V. C. C. F. *vale, conjux chariſſime, feliciter*; V. D. D. *voto dedicatur*; V. G. *verbi gratia*; Vir. Ve. *virgo veſtalis*; VL. *videlicet*; V. N. *quinto nonarum*.

VACCINIUM, the WHORTLEBERRY, or *Bilberry*; a genus of the monogynia order, belonging to the octandria claſs of plants. There are 12 ſpecies; of which the moſt remarkable are, 1. The myrtillus, blackwhorts, whortle-berries, or bilberries, growing in woods and on heaths abundantly. The flowers frequently vary, with five ſegments at the rim, and with ten ſtamina. The berries when ripe are of a blueiſh black colour; but a ſingular variety, with white berries, was diſcovered by his grace the duke of Athol, growing in the woods, about mid-way between his two ſeats of Dunkeld and Blair. The berries have an aſtringent quality. In Arran and the Weſtern Iſles they are given in diarrhœas and dyſenteries with good effect. The Highlanders frequently eat them in milk, which is a cooling agreeable food; and ſometimes they make them into tarts and jellies, which laſt they mix with whiſkey to give it a reliſh to ſtrangers. They dye a violet colour; but it requires to be fixed with alum. The grous feed upon them in the autumn.

2. The uliginoſum, or great bilberry-buſh, is found in low moiſt grounds, and almoſt at the ſummits of the Highland mountains, as upon Creg-Chailleach in Breadalbane, upon the higher hills about Loch-Rannoch in Athol, upon the mountains of Roſs-ſhire, about Loch-Broom, and Inverneſs-ſhire about Loch-Urn, &c. and in the low boggy grounds of the iſland of Mull, and near the duke of Argyle's, at Inverary, &c. The leaves are full of veins, ſmooth and glaucous, eſpecially on the under ſide; the berries are eatable, but not ſo much eſteemed as the preceding; as they are apt, if eaten in any quantity, to give the headach.

3. The vitis idæa, or red whortle-berries, being frequent in dry places in heaths, woods, and on mountains. The berries have an acid cooling quality, uſeful to quench the thirſt in fevers. The Swedes are very fond of them made into the form of a rob or jelly, which they eat with their meat as an agreeable acid, proper to correct the animal alkali.

4. The oxycoccos, cran-berries, moſs-berries, or moor-berries, frequent on peat-bogs in the Lowlands, but not ſo common in the Highlands of Scotland. The ſtalks are long, ſlender, woody, weak, and trailing: the leaves are ſtiff, acutely oval, glaucous underneath, their edges turned back, and grow alternate; two or three flowers grow ſingly on long red footſtalks out of the extremity of the branches; the flowers are red, divided deeply into four acute ſegments, which are reflexed quite backwards; the filaments are downy, the antheræ ferrugineous, and longer than the filaments: the berries red, and about the ſize of the hawthorn-berries. At Longtown, on the borders of Cumberland, they are made ſo conſiderable an article of commerce, that, at the ſeaſon when they are ripe, not leſs than 20l. or 30l. worth are ſold by the poor people each market-day for five or ſix weeks together, which are afterwards diſperſed over different parts of the kingdom, for making the well-known cranberry tarts.

VACUUM, in philoſophy, denotes a ſpace empty or devoid of all matter or body.

It has been a matter of much diſpute among philoſophers, whether there is a poſſibility of producing in nature a perfect vacuum, or ſpace void of all body whatever. The Carteſians have violently contended againſt the poſſibility of this; while the Newtonians have argued as ſtrenuouſly, not only for the poſſibility, but even the actual exiſtence of a vacuum. In ſome inſtances, however, the arguments on both ſides have been very inconcluſive, The Carteſians have argued, from the aſcent of water in pumps, that nature abhorred a vacuum. The Newtonians have diſproved this by ſhowing that the aſcent of water in thoſe machines is owing to the preſſure of the atmoſphere, and cannot be extended beyond a certain ſpace. In like manner the limited aſcent of mercury in a barometer, ſhows that it is occaſioned only by the preſſure of the atmoſphere, and not by any power of ſuction or abhorrence of a vacuum, which would be equivalent to the preſſure of any column of mercury, however high. Another argument in favour of a vacuum is drawn from the motions of the celeſtial bodies, meeting with no apparent reſiſtance in the heavenly ſpaces. As no body with which we are acquainted can move through a fluid without ſenſible reſiſtance, Sir Iſaac Newton concludes, for the reaſon above-mentioned, that "it is neceſſary the celeſtial ſpaces be void of all matter, excepting perhaps ſome few and much rarefied effluvia of planets and comets, and the paſſing rays of light." An argument of the ſame kind is deduced from the motion of pendulums in an exhauſted receiver meeting with no ſenſible reſiſtance from the medium therein contained.—Sir Iſaac alſo contends, that the deſcent of gravitating bodies proves the exiſtence of a vacuum. "If all ſpaces (ſays he) were equally full, the ſpecific gravity of that fluid with which the region of the air would in that caſe be filled, would not be leſs than the ſpecific gravity of quickſilver or gold, or any other the moſt denſe body; and therefore neither gold, nor any other body, could deſcend therein.—For bodies do not deſcend in a fluid, unleſs that fluid be ſpecifically lighter than the body.—But by the air-pump we can exhauſt a veſſel, till even a feather ſhall fall with a velocity equal to that of gold in the open air: the medium, therefore, through which the feather falls muſt be rarer than that through which the gold falls.

"The quantity of matter, therefore, in a given ſpace, may be diminiſhed by rarefaction: and why may not it be diminiſhed *in infinitum?* Add, that we conceive the ſolid particles of all bodies to be of the ſame denſity: and that they are only rarefiable by means of their pores; whence a vacuum evidently follows."

The ſtrongeſt argument, however, for a vacuum, perhaps is, that we cannot have any idea of the poſſibility of motion without a vacuum. The force of this argument will be increaſed from the two following conſiderations. 1. That all motion is either in a ſtraight line, or in a curve which returns into itſelf, as the circle and ellipſis; or in a curve that does not return into itſelf, as the parabola, &c. And, *2dly*, that the moving force muſt always be greater than the reſiſtance.

For hence it follows, that no force, even though infinite, can produce motion where the reſiſtance is infinite; conſequently, there can be no motion either in a ſtraight line or a non-returning curve; becauſe, in either of thoſe caſes, the protruſion, and conſequently the reſiſtance, would be infinite.—There remains, therefore, only the motion in a revolving curve practicable; which muſt either be a revolution upon an axis, or an annular motion round a quieſcent body; both which are, again, impoſſible in an elliptic curve: and conſequently all motion muſt be in circles geometrically true; and the revolving bodies muſt either be ſpheres, ſpheroids, cylinders, or portions of them, exactly geometrical; otherwiſe their revolutions in a plenum would be impoſſible: but ſuch motions, or ſuch figured bodies, we do not know in nature. Therefore there is a vacuum.

Again, ſay theſe philoſophers, that there are interſperſed vacuities, appears from matter's being actually divided into parts, and from the figures of thoſe parts: for, on ſuppoſition of an abſolute plenitude, we do not conceive how any part of matter could be actually divided from that next adjoining, any more than it is poſſible to divide actually the parts of abſolute ſpace from another: for by the actual diviſion of the parts of a continuum from one another, we conceive nothing elſe underſtood, but the placing thoſe parts at a diſtance from one another, which, in the continuum, were at no diſtance from one another; but ſuch diviſions between the parts of matter muſt imply vacuities between. As for the figures of the parts of bodies, upon the ſuppoſition of a plenum, they muſt either be all rectilinear, or all concavo-convex, otherwiſe they would not adequately fill ſpace; which we do not find to be true in fact. *Laſtly*, The denying a vacuum, ſuppoſes what it is impoſſible for any one to prove to be true, viz. that the material world has no limits.

To every one of theſe arguments, however, the aſſertors of a plenum, now, when aſſiſted by the diſcoveries concerning the electric fluid, are able to give pretty ſatisfactory anſwers. In the caſes of pumps of all kinds they contend, that the ſpace once occupied by the air is inſtantly filled up by the electric fluid which flows in through the ſides of the receiver, or otherwiſe during the time the air is extracting; and they are able to give proofs of the exiſtence of this fluid even in the moſt perfect vacuum which we can make. With regard to the celeſtial motions it is contended, that the fluids of light and electricity are the ſame, and that though, by means of this etherial fluid, a very violent reſiſtance might be occaſioned, yet were its ſtrength and agility applied to the purpoſes of giving motion, there is not the leaſt doubt that every one of the celeſtial motions might be continued by its means; and that not only *might* this be the caſe, but there are ſtrong reaſons for believing that it actually *is* ſo.

The arguments drawn from the deſcent of bodies, they alſo contend, are inconcluſive. There can only, they ſay, be two ſources of reſiſtance to a body moving through a fluid; one is the friction of the parts of the fluid upon one another, and the other when the fluid itſelf has a tendency to move in a direction contrary to the moving body. If we ſuppoſe the fluid to be totally devoid both of friction, and of any tendency to move towards a centre or otherwiſe, it not only can make no reſiſtance to motion, but if once a motion is begun in it, it will continue it for ever. Therefore, in the caſe of pendulums vibrating in an exhauſted receiver, they contend, that the medium in which they move, though equally *denſe* as before, is yet much more devoid of gravity and of friction than the common atmoſphere, and therefore the reſiſtance of it is much leſs; whence the vibrations of the pendulum are much longer continued than in the open air.—The advocates for a plenum alſo deny that rarefaction implies a diminution of the quantity of matter in any body. They contend, that there are two kinds of matter, one of which is ſubject to the laws of gravity, and the other not; conſequently, if bodies are compounded of thoſe two kinds of matter, they will to us appear to be rare or denſe, as the one or the other kind prevails.

As to the arguments taken from the nature of motion, we know not the figure, nor indeed, when we come to examine the ſubject ſtrictly, can we have any idea of the ultimate component particles of matter; ſo that we muſt reſolve every thing into the action of infinite wiſdom and power in the conſtruction of the univerſe. If the particles of matter are infinitely diviſible, according to *one* of Sir Iſaac Newton's ſuppoſitions; then they muſt yield to motion in every direction as eaſily as if nothing was preſent, provided the body moved with force ſufficient to break them; and this force we may, indeed, we muſt ſuppoſe to be *infinitely ſmall*. If, according to *another* of Sir Iſaac Newton's hypotheſes, we ſuppoſe matter to be compoſed of ſolid hard particles which cannot be broken by any power whatevre, then indeed theſe particles muſt have a certain determinate figure, either ſpherical, concavo-convex, or ſome other which perhaps has not occurred to human ingenuity. If they are ſpheres, we are then ſure that there muſt be what is called a *vacuum diſſeminatum* or *interſperſum* equal to the whole quantity of matter in the univerſe. But there is no neceſſity for ſuppoſing this; nor will our inability to produce motion, or to know how it can be produced, ever be an argument for its being done in this or that particular way; nor can we at all argue with regard to the figure of the component parts of matter, or concerning the bounds of the univerſe; our faculties being limited to thoſe things which are the objects of our ſenſes, either naturally or by ſome kind of ſimilitude.

It has been obſerved of late, that in the moſt perfect vacuum which can be produced, not only in an air-pump, but even in the upper part of a barometer, evaporation both of water and of mercury takes place: it may not be amiſs to inquire into the manner in which this proceſs can be ſuppoſed to go on. The phenomenon has already been taken notice of under the article EVAPORATION, n° 5, and may receive a ſatisfactory explanation on the principles there laid down. It is there proved, that all kinds of vapour conſiſt of an union of the principle of heat with the evaporating ſubſtance. In conſequence of this union the vapours are exceeding light; and becauſe fire may well be ſuppoſed devoid of gravity altogether, therefore they will riſe till they come to a region where the medium is of equal gravity with their own. In rarefied air the vapours will ſtill riſe, though the proportion of heat they have in them muſt then be greater, to make them aſcend in a medium of ſo little ſpecific gravity. It would ſeem therefore, that even the medium left behind the mercury when ſinking down in the barometer is ſtill ſomewhat heavier than extremely ſubtile vapours, as they will ariſe even in that medium, and condenſe on the upper part of the tube.—It is natural to ſuppoſe that the quantity of heat contained in theſe vapours is very great in proportion to the quantity of terreſtrial matter they contain.

VACUUM, or *Vacuum Boyleanum*, is alſo uſed to expreſs that approach to a real vacuum which we are ſuppoſed to arrive at by means of the air-pump. See AIR-PUMP. Thus, any thing put in a receiver ſo exhauſted, is ſaid to be put *in vacuo:* and thus moſt of the experiments with the air-pump, are performed *in vacuo*, or *in vacuo Boyleano.*

Some of the principal phenomena obſerved of bodies in vacuo are, that the heavieſt and lighteſt bodies, as a guinea and a feather, fall here with equal velocity: That fruits, as grapes, cherries, peaches, apples, &c. kept for any time in vacuo, retain their nature, freſhneſs, colour, &c. and thoſe withered in the open air, recover their plumpneſs in vacuo:—All light, and fire, becomes immediately extinct in vacuo:—The coalition of flint and ſteel in vacuo produces no ſparks:—No ſound is heard even from a bell rung in vacuo:—A ſquare viol, full of common air, well cloſed, breaks in vacuo; a round one does not:—A bladder half full of air, will heave up forty pound weight in vacuo:—Cats, and moſt other animals, readily expire in vacuo.

By experiments made in 1704, Mr Derham found, that animals which have two ventricles, and no foramen ovale, as birds, dogs, cats, mice, &c. die in leſs than half a minute; counting from the firſt exſuction: a mole died in one minute, a bat lived ſeven or eight.—Inſects, as waſps, bees, graſhoppers, &c. ſeemed dead in two minutes; but, being left in vacuo 24 hours, came to life again in the open air: ſnails continued 24 hours in vacuo, without appearing much concerned.

Seeds planted in vacuo do not grow:—Small-beer dies, and loſes all its taſte in vacuo:—Lukewarm water boils very vehemently in vacuo:—Air, ruſhing through mercury into a vacuum, throws the mercury in a kind of ſhower upon the receiver, and produces a great light in a dark room.

The air-pump can never produce an entire extraction of the air, as is evident from its ſtructure and the manner of its working: in effect, every exſuction only takes a part of the air; ſo that there will ſtill be ſome left after any finite number of exſuctions.—Add, that the air-pump has no longer any effect, than while the ſpring of the air remaining in the receiver is able to lift up the valves: when the rarefaction is come to that degree, you can come no nearer to a vacuum. Sir Iſaac Newton, obſerving that a thermometer ſuſpended in vacuo, and in that ſtate removed to a warm or a cold room, receives the heat or cold, riſes or falls, almoſt as ſoon as another in open air, takes thence occaſion to ſuſpect that the heat of the warm room is conveyed through the vacuum by the vibrations, of a much ſubtiler medium than air, which remained in the vacuum after the air was drawn out.

VADIUM, a pledge in law, is either *vivum* or *mortuum.*

VADIUM *Vivum*, or *Living Pledge*, is when a man borrows a ſum (ſuppoſe 200l.) of another; and grants him an eſtate, as of 20l. *per annum*, to hold till the rents and profits ſhall repay the ſum ſo borrowed. This is an eſtate conditioned to be void as ſoon as ſuch ſum is raiſed. And in this caſe the land or pledge is ſaid to be living: it ſubſiſts, and ſurvives the debts; and, immediately on the diſcharge of that, reſults back to the borrower.

VADIUM *Mortuum*, or *Dead Pledge.* See MORTGAGE.

VAGABOND, or VAGRANT, one who wanders illegally, without a ſettled habitation. Such perſons are cognizable by the laws. See IDLENESS.

VAGINA, properly ſignifies a ſheath or ſcabbard; and the term *vagina* is uſed in architecture for the part of a terminus, becauſe reſembling a ſheath out of which the ſtatue ſeems to iſſue.

VAGINA, in anatomy, a large canal, formed of a robuſt or ſtrong membrane, and reaching from the external orifice, or os pudendi, of women, to the uterus.

VAILLANT (John Foy), a phyſician and great medaliſt, to whom, according to Voltaire, France was indebted for the ſcience of medals, and Lewis XIV. for one half of his cabinet, was born at Beauvais in 1632. Through the means of the miniſter Colbert he travelled into Italy, Greece, Egypt, and Perſia, to collect medals for the royal cabinet; and returned with ſo many as made the king's cabinet ſuperior to any in Europe. In one of his voyages the ſhip he ſailed in was fallen upon and taken by an Algerine corſair.

After a captivity of near five months he was permitted to return to France, and received at the ſame time 20 gold medals, which had been taken from him. He embarked in a veſſel bound for Marſeilles, and was carried on with a favourable wind for two days, when another corſair appeared, which, in ſpite of all the ſail they could make, bore down upon them within the reach of cannon-ſhot. Mr Vaillant, dreading the miſeries of a freſh ſlavery, reſolved, however, to ſecure the medals which he had received at Algiers, and in order thereto ſwallowed them. But a ſudden turn of the wind freed them from this adverſary, and caſt them upon the coaſts of Catalonia; where, after expecting to run aground every moment, they at length fell among the ſands at the mouth of the Rhone. Mr Vaillant got to ſhore in a ſkiff, but felt himſelf extremely incommoded with the medals he had ſwallowed, which might weigh altogether five or ſix ounces, and therefore did not paſs like Scarborough waters. He had recourſe to a couple of phyſicians, who were a little puzzled with the ſingularity of his caſe; however, nature relieved him from time to time, and he found himſelf in poſſeſſion of the greateſt part of his treaſure when he got to Lyons. Here he explained, with much pleaſure to his friends, thoſe medals which were already come to hand, as well as thoſe which were daily expected; among which laſt was an Otho, valuable for its rarity. He was much careſſed on his return; and when Lewis XIV. gave a new form to the academy of inſcriptions in 1701, Mr Vaillant was firſt made aſſociate, and then penſionary. He wrote ſeveral works relating to ancient coins, and died in 1706.

VAIR, or VAIRE, a kind of fur, formerly uſed for lining the garments of great men and knights of renown. It is repreſented in engraving by the figures of little bells reverſed, ranged in a line; ſee HERALDRY, Pl. CLXIV, fig. 2. n° 15. Of this fur is ſometimes formed a croſs, a bend, &c. M. de la Colombiére obſerves, that when furriers firſt made this lining, they uſed ſmall pieces, moſt frequently of an azure colour, which they fitted to white furs; and he infers from that, that thoſe who have ſettled the rules of heraldry decreed, in relation to vair, that this fur in its natural blazon ſhould always be argent and azure; ſo that if it be ſaid, ſuch a family bears vair, it is ſuppoſed to be argent and azure; but if there be any other tincture, the ſame muſt be expreſſed, ſaying, ſuch a family bears vairy, or, and gules, or otherwiſe. The ſame author relates an account of this fur being firſt introduced into French armory, but too tedious to be inſerted here.

VAIRY, in heraldry, expreſſes a coat, or the bearings of a coat, when charged or chequered with vairs.

VALAIS, a valley in Swiſſerland, which extends from the ſource of the river Rhone to the lake of Geneva. It is near 100 miles in length, but the breadth is very unequal. It is bounded on the north by the Alps, which ſeparate it from the cantons of Bern and Uri, on the eaſt by the mountains of Forche, on the ſouth by the duchy of Milan and the Val d'Aoſte, and on the weſt by Savoy and the republic of Geneva. The inhabitants profeſs the Roman-Catholic religion, and are ſubject to the ſwelling of the throat, called *bronchocele*; and idiots are ſaid to abound among them more than in any other place of the globe. They are naturally hardy, enterpriſing, and good-natured. It is ſurrounded on all ſides by very high mountains, moſt of which are covered with ſnow and ice, that never thaw. However, the ſoil is fertile in corn, wine, and good fruit. The muſcat-wine, which is produced here, is excellent, and well known all over Europe. There are mineral waters, plenty of game, and ſome mines. This country comprehends 55 large pariſhes, to which one biſhop only belongs, whoſe ſee is at Sion, the capital. The mountains afford good paſture for their cattle in ſummer, and their harveſt continues from May to October; it being ſooner or later, according to the ſituation of the place.

VALENCIA, a province of Spain, which has the title of a kingdom; and is bounded on the eaſt and ſouth by the Mediterranean ſea, on the north by Catalonia and Arragon, and on the weſt by New Caſtile and the kingdom of Mercia. It is about 165 miles in length, and 63 in breadth. It is one of the moſt populous and agreeable parts of Spain, and where they enjoy almoſt a perpetual ſpring. The great number of rivers wherewith it is watered render it extremely fertile, particularly in fruits and wine. There are very rugged mountains in it, which contain mines of alum and other minerals.

VALENCIA, a city of Spain, and capital of the kingdom of the ſame name. It contains about 12,000 houſes, beſides thoſe of the ſuburbs and the ſummer-houſes round it. It has an univerſity, and an archbiſhop's ſee; and was taken from the Moors by the Chriſtians in the 13th century. The town is handſome, and adorned with very fine ſtructures. It is not very ſtrong, though there are ſome baſtions along the ſides of the walls. They have manufactures in wool and ſilk, which bring in great ſums to the inhabitants. It is ſeated on the river Guadalaviar, over which there are five handſome bridges; and it is about three miles from the ſea, where there is a harbour, 110 miles north of Murcia, and 165 eaſt by ſouth of Madrid. This city ſurrendered to the earl of Peterborough in the year 1705; but it was loſt again in 1707. W. Long. 0. 5. N. Lat. 39. 30.

VALENS (Flavius), emperor of the Eaſt, a great patron of the Arians. Killed by the Goths in the year 379. See CONSTANTINOPLE, n° 74—80.

VALENTINIAN I. emperor of the Weſt, a renowned warrior, but a tyrant over his ſubjects. See ROME, n° 523.

VALENTINIAN II. emperor of the Weſt, a prince celebrated for his virtues, and above all for his moderation; yet a conſpiracy was formed againſt him by Arbogaſtes, the commander in chief of his armies; and he was ſtrangled in the year 392. See ROME, n° 536.

VALENTINIANS, in church-hiſtory, a ſect of Chriſtian heretics, who ſprung up in the ſecond century, and were ſo called from their leader Valentinus.

The Valentinians were only a branch of the Gnoſtics, who realized or perſonified the Platonic ideas concerning the Deity, whom they called *Pleroma*, or *Plenitude*. Their ſyſtem was this: the firſt principle is Bythos, *i. e.* Depth, which remained many ages unknown, having with it Ennoe, or Thought, and Sige, or Silence; from theſe ſprung the Nous, or Intelligence, which is the only ſon, equal to and alone capable of comprehending the Bythos; the ſiſter of Nous they called *Aletheia*, or *Truth*: and theſe conſtituted the firſt quaternity of æons, which were the ſource and original of all the reſt: for Nous and Aletheia produced the World and Life; and from theſe two proceeded Man and the Church. But beſides theſe 8 principal æons, there were 22 more, the laſt of which, called *Sophia*, being deſirous to arrive at the knowledge of Bythos, gave herſelf a great deal of uneaſineſs, which created in her Anger and Fear, of which was born Matter. But the Horos, or Bounder, ſtopped her, preſerved her in the Pleroma, and reſtored her to perfection. Sophia then produced the Chriſt and the Holy Spirit, which brought the æons to their laſt perfection, and made every one of them contribute their utmoſt to form the Saviour. Her Enthymeſe, or Thought, dwelling near the Pleroma, perfected by the Chriſt, produced every thing that is in the world by its divers paſſions. The Chriſt ſent into it the Saviour, accompanied with angels, who delivered it from its paſſions, without annihilating it: from thence was formed corporeal matter. And in this manner did they romance concerning God, nature, and the myſteries of the Chriſtian religion.

VALERIAN, or VALERIANUS, (Publius Licinius), emperor of Rome, remarkable for his captivity and cruel treatment by Sapor I. king of Perſia. See ROME, n° 491.

VALERIANA, VALERIAN; a genus of the monogynia order, belonging to the triandria claſs of plants. There are 20 ſpecies; the moſt remarkable of which is the officinalis, or great wild valerian, growing naturally in Britain, in ditches, marſhy places, and ſometimes in dry mountainous paſtures. The root is much uſed in medicine, and conſiſts of a number of ſtrings or fibres matted together, iſſuing from one common head; of a whitiſh or pale browniſh colour: its ſmell is ſtrong, like a mixture of aromatics with fetids; the taſte unpleaſantly warm, bitteriſh, aud ſubacrid. The London college have reſtrained the ſhops to that which grows in dry places, and is conſiderably the ſtrongeſt, and loſes of its quality if tranſplanted into ſuch ſoils as the other naturally delights in. The roots produced in low watery grounds have a remarkably faint ſmell in compariſon of the others, and ſometimes ſcarce any at all. Wild valerian is a medicine of great uſe in nervous diſorders; and is particularly ſerviceable in epilepſies proceeding from a debility of the nervous ſyſtem. It was firſt brought into eſteem in theſe caſes by Fabius Columna, who by taking the powdered root in the doſe of half a ſpoonful, was cured of an inveterate epilepſy after many other medicines had been tried in vain. Repeated experience has ſince confirmed its efficacy in this diſorder; and the preſent practice lays conſiderable ſtreſs upon it. The common doſe is from a ſcruple to a dram; in infuſion from one to two drams. Its unpleaſant flavour is moſt effectually concealed by a ſuitable addition of mace.—Cats are very fond of the ſmell of this root, and ſeem to be intoxicated by it.

VALERIUS MAXIMUS, a Latin hiſtorian, ſprung from the families of the Valerii and Fabii, which made him take the name of *Valerius Maximus*. He ſtudied polite literature, and afterwards followed Sextus Pompey to the wars. At his return he compoſed an account of the actions and remarkable ſayings of the Romans and other great men; and dedicated that work to the emperor Tiberius. Many of the learned think that this is the ſame that is now extant and bears the name of *Valerius Maximus;* but others maintain, that what we have now is only an abridgment of the work written by this celebrated hiſtorian, and that this abridgment was made by one Nepotian of Africa. However, this work is well written, and contains a great number of memorable examples and facts performed by the Greeks and Romans that are worthy of being read.

VALET, a French term, uſed as a common name for all domeſtic men-ſervants employed in the more ſervile offices, as grooms, footmen, coachmen, &c. But with us it is only uſed in the phraſe *valet de chambre*, which is a ſervant whoſe office is to dreſs and undreſs his maſter, &c.

VALETUDINARY, among medical writers, denotes a perſon of a weak and ſickly conſtitution, and frequently out of order.

VALGUS, *Bow* or *Bandy Legged*. Some children are bow-legged from their birth; others become ſo from ſetting them on their feet too early. The tibia of ſome is crooked; the knees of others are diſtorted; from a fault in the ankle, the feet of ſome are turned inwards, theſe are called *vari;* and in others they turn outwards, theſe are called *valgi*. The beſt method of preventing theſe diſorders in weakly children, is to exerciſe them duly, but not violently; by dancing or toſſing them about in one's arms, and not ſetting them much on their feet, at leaſt not without properly ſupporting them: if the diſorder attends at the birth, or increaſes after it is begun, apply emollients, then apply boots of ſtrong leather, wood, &c. as required to diſpoſe the crooked legs gradually to a proper form; or other inſtruments may be uſed inſtead of boots, which, when not too coſtly, are uſually to be preferred. Slighter inſtances of theſe diſorders yield to careful nurſing without inſtruments.

VALID, in law, an appellation given to acts, deeds, tranſactions, &c. which are clothed with all the formalities requiſite to their being put into execution, and to their being admitted in a court of juſtice.

VALLADOLID, an ancient, large, and handſome city of Spain, in Old Caſtile, and capital of a principality of the ſame name, with a biſhop's ſee and an univerſity. It is ſurrounded with ſtrong walls, embelliſhed with handſome buildings, large public ſquares, piazzas, and fountains. It is large and populous, containing 11,000 houſes, with fine long and broad ſtreets, and large high houſes, adorned with balconies. The market-place, called *El Campo*, is 700 paces in circumference, ſurrounded with a great number of convents, and is the place where the fairs are kept. There is another ſquare in the middle of the city, ſurrounded with handſome brick houſes, having under them piazzas, where people may walk dry in all weathers. Within theſe piazzas merchants and tradeſmen keep their ſhops; all the houſes are of the ſame height, being four ſtories; and there are balconies at every window, of iron gilt. In the whole there are 70 monaſteries and nunneries; the fineſt of which is that of the Dominicans, remarkable for its church, which is one of the moſt magnificent in the city. The kings reſided a long while at this place; and the royal palace, which ſtill remains, is of very large extent, though but two ſtories high; within are fine paintings of various kinds, and at one of the corners a curious clock, made in the ſame manner as that of Straſburg. The houſe of the inquiſition is an odd ſort of ſtructure, for there are no windows, but a few holes to let in the light. The environs of the city are a fine plain, covered with gardens, orchards, vineyards, meadows, and fields. It is ſeated on the rivers Eſcurva and Peſuerga, in W. Long. 4. 1. N. Lat. 41. 42.

VALSALVA (anthony Maria), an eminent phyſician and anatomiſt, was born at Immola in 1666, and was the diſciple of Malpighi. He taught anatomy at Bologna with uncommon applauſe, and died in 1723. He wrote an excellent treatiſe on the Ear, and other works in Latin, printed at Venice, in 4to.

VALUE, in commerce, denotes the price or worth of any thing.

VALUE, in muſic. Sounds are either comparatively high or low, long or ſhort. In either of theſe caſes they may be ſaid to have a value. In the firſt their value is relative to harmony, in the laſt to rhythmus. The value of any particular ſound, conſidered as high or low, is the degree in which it is placed with relation to any other ſound above or beneath it, aſcertained by compariſon.

VALVE, in hydraulics, pneumatics, &c, is a kind of lid, or cover of a tube or veſſel ſo contrived as to open one way, but which, the more forcibly it is preſſed the other way, the cloſer it ſhuts the aperture; ſo that it either admits the entrance of a fluid into the tube or veſſel, and prevents its return; or admits its eſcape, and prevents its re-entrance.

Valve, in anatomy, a thin membrane applied on ſeveral cavities and veſſels of the body, to afford a paſſage to certain humours going one way, and prevent their reflux towards the place from whence they came.

VAMPYRE, a ſpecies of bat. See Vespertilio.

VAN, a term derived from the French *avant*, or *avaunt*, ſignifying before or foremoſt of any thing; thus we ſay, the van-guard of the army, &c.

VANBRUGH (Sir John), a celebrated Engliſh dramatic writer and architect, was deſcended of a family in Cheſhire which came from France, though by his name he appears to have been originally of Dutch extraction. He was born about the middle of the reign of Charles II. and received a liberal education. His firſt comedy, called the *Relapſe*, or *Virtue in Danger*, was acted in the year 1697 with great applauſe; which gave him ſuch encouragement, that he wrote 11 more comedies. He was the friend of Mr Congreve, whoſe genius was naturally turned for dramatic performances; and theſe two gave new life to the Engliſh ſtage, and reſtored its reputation, which had been ſome time ſinking: but their making vicious perſons their moſt amiable and ſtriking characters, and their bordering too much on obſcenity, could be of no ſervice to the cauſe of virtue; and therefore it was not without reaſon that they were attacked by Mr Collier, in his piece on the Immorality and Profaneneſs of the Stage. However, either the reputation Sir John gained by his comedies, or his ſkill in architecture, procured him very conſiderable advantages. He was appointed Clarencieux king at arms, which he afterwards diſpoſed of. In 1716 he was appointed ſurveyor of the works at Greenwich hoſpital; he was likewiſe made comptroller-general of his Majeſty's works, and ſurveyor of all the gardens and waters. He was an able architect; but his performances in that way are eſteemed heavy. Under his direction were raiſed Blenheim-houſe in Oxfordſhire, Claremont in Surry, and his own houſe at Whitehall. He died of a quinſey in 1726.

VANDYCK (Sir Anthony), a celebrated painter, was born at Antwerp in the year 1599. It is ſaid that Vandyck's mother was paſſionately fond of embroidery, that ſhe excelled in it, and embroidered ſeveral hiſtorical ſubjects with ſuch ſurpriſing ſkill, that they have been eſteemed maſterpieces by proficients in that art. Being deſirous to have her ſon inſtructed in the firſt rudiments of grammar, ſhe began by ſending him to ſchool to learn reading and writing. As he had ink, paper, and pens, at command, he amuſed himſelf more with drawing figures, and other ſlight ſketches, than with making letters. One day his maſter having threatened to whip one of his ſchool-fellows, Vandyck poſitively aſſured him, that he need not fear his maſter's threats, as he would take care to prevent his receiving the threatened correction.—"How ſo?' replied his ſchool-fellow. "I'll paint (replied Vandyck) a face on your poſteriors;" which he did with ſuch ſkill, that when the maſter drew up the curtain, he laughed ſo immoderately, that he forgave the culprit. After giving ſeveral early proofs of his excellent genius, he became the diſciple of the illuſtrious Rubens. In the church of the Auguſtines at Antwerp, at the high altar, is a celebrated picture of Rubens, repreſenting, in one part, the Virgin Mary ſitting with the child Jeſus in her lap, and in another part ſeveral ſaints and ſainteſſes ſtanding. The breaſt of one of theſe, St Sebaſtian, is ſaid to have been painted by Vandyck when he was only a diſciple of Rubens. This great maſter being engaged one day abroad, his diſciples went into his painting-room, where, after having been ſome time employed in admiring his works, they began to play or romp in ſuch a manner, that the breaſt of St Sebaſtian, which was not yet dry, was bruſhed away by a hat thrown at random. This accident put an end to their play: they were very anxious to reſtore it, fearing that if Rubens diſcovered it they ſhould all be diſcarded. At length it was agreed that Anthony ſhould undertake to mend the ſaint's breaſt. In ſhort, taking his maſter's pallet and bruſhes, he ſucceeded ſo well, that his companions imagined Rubens would overlook it. They were miſtaken; for Rubens at his return knew immediately that ſome one had touched upon his performance: calling his diſciples, he aſked them why any one had dared to meddle with his painting? They were ſome time doubtful whether they ſhould confeſs or deny the fact. Threats at length prevailed: they owned that Vandyck had thrown his hat upon it. Upon this, cloſeting Vandyck, inſtead of chiding him, he told him, that "it was proper and even neceſſary for him to travel into Italy, the only ſchool that produced excellent painters; and that, if he would take his advice, he would arrive at the higheſt perfection." Vandyck replied, that "he was very deſirous of it; but that his purſe was not equal to ſuch a journey, and that he feared he ſhould be obliged to ſell his hat on the road." Rubens aſſured him that that ſhould be his concern; and accordingly, a few days after, he made him a preſent of a purſe full of piſtoles, and added to that gift a dapple grey horſe, of great beauty, to carry him thither. In return for this, Vandyck painted his maſter a chimney-piece; and afterwards ſet out for Italy, about the year 1621, being then about 21 or 22 years of age. Having ſtaid a ſhort time at Rome, he removed to Venice, where he attained the beautiful colouring of Titian, Paul Veroneſe, and the Venetian ſchool, which appeared from the many excellent pictures he drew at Genoa.

After having ſpent a few years abroad, he returned to Flanders, with ſo noble, ſo eaſy and natural a manner of painting, that Titian himſelf was hardly his ſuperior; and no other maſter could equal him in portraits. Soon after his return, he accidentally met with D. Teniers, who accoſted him with great politeneſs, and aſked him whether he had much buſineſs ſince he came from Rome? "What buſineſs, think you, can I have had time to do? (replied Vandyck), I am only juſt arrived here. Would you believe, that I offered to draw that fat brewer's picture who juſt paſſed by us for two piſtoles, and that the looby laughed in my face, ſaying it was too dear? I aſſure you, that if the cards do not turn up better, I ſhall make no long ſtay at Bruſſels." Soon after this, he painted thoſe two famous pictures, the Nativity, and a dying Chriſt; the firſt in the pariſh-church, the ſecond in that of the Capuchins, at Termond.

When he was in Holland he was very deſirous to ſee Francis Hals the painter, who had great reputation then for portraits. On entering his room, he aſked to have his picture drawn. Hals, who knew Vandyck only by fame, undertook it, and went to work. The latter ſeeing his head finiſhed, roſe up, ſaying, that it was a ſtriking likeneſs. Afterwards he propoſed to Hals, that if he would ſit in return, he would alſo draw his picture; to which Hals having agreed, merely from curioſity, exclaimed, on ſeeing his picture ſo ſoon finiſhed, "Thou art the devil, or elſe Vandyck." This picture of Hals has been engraved by Cotter, at the Hague.

Vandyck finding he could not make a fortune in his own country, took a reſolution of going over into England. Accordingly he borrowed ſome guineas of Teniers, and ſet out, furniſhed with letters of recommendation. His ſuperior genius ſoon brought him into great reputation; and above all, he excelled in portraits, which he drew with an inconceivable facility, and for which he charged a very high price, according to the inſtructions which had been given him on that head. It is affirmed, that for ſome of them he received 400 guineas apiece. He ſoon found himſelf loaded with honours and riches; and as he had a noble and generous heart, he made a figure ſuitable to his fortune. He married one of the faireſt ladies of the Engliſh court, a daughter of the lord Ruthven, earl of Gowry; and, though ſhe had but little fortune, maintained her with a grandeur anſwerable to her birth. He himſelf was generally richly dreſſed; his coaches and equipage were magnificent, and his retinue was numerous. His table was elegant, and plentifully furniſhed; and he often entertained his gueſts after dinner with a concert performed by the beſt Engliſh muſicians of London. In ſhort, his houſe was ſo frequented by perſons of the greateſt quality of both ſexes, that his apartments rather reſembled the court of a prince than the lodgings of a painter. Notwithſtanding this expence, he amaſſed great wealth; when a chemiſt had the art to inſinuate himſelf into his eſteem, and inſpired him with a deſire of converting copper into gold: but the ſecret had no other effect, than making him convert his gold into ſmoke. Rubens being informed of it, wrote to his diſciple: he acknowledged his error, and corrected it. At length Vandyck being at an early age ſubject to the gout, it undermined him by degrees, and carried him to the grave in the year 1641, at the age of 42. He was buried in St Paul's; and left to his heirs a conſiderable eſtate, which ſome have made to amount to 40,000l. ſterling.

VANE, a thin ſlip of bunting hung to the maſt-head, or ſome other conſpicuous place in the ſhip, to ſhow the direction of the wind. It is commonly ſewed upon a wooden frame called the *ſtock*, which contains two holes whereby to ſlip over the ſpindle, upon which it turns about as the wind changes.

VANILLA, or **Vanillo**. See Epidendrum.

VAPOUR, in philoſophy, the particles of bodies rarefied by heat, and thus rendered ſpecifically lighter than the atmoſphere, in which they riſe to a conſiderable height. See Evaporation, Damp, Gas, &c.

Many kinds of vapour are unfriendly to animal life, but the moſt noxious are thoſe which ariſe from metallic ſubſtances. In the ſmelting and refining of lead, a white vapour ariſes, which, falling upon the graſs in the neighbourhood, imparts a poiſonous quality to it, ſo that the cattle which feed there will die; and in like manner ſtagnant waters impregnated with this vapour will kill fiſh. Phlogiſtic vapours are alſo extremely noxious; and hence painters, and others who are expoſed to theſe vapours, are generally unhealthy. In ſome places the earth exhales vapours of a very noxious quality; ſuch as the Grotto del Cani, and other places in Italy, where a mephitic vapour conſtantly hovers over the ſurface of the ground, proving inſtantly fatal to ſuch animals as are immerſed in it. But the moſt formidable kind of vapours are thoſe which iſſue from the mouths of volcanoes, and which ſeem to be a combination of all others, joined to ſuch a quantity of electric matter as to produce the greateſt miſchiefs. In ſome parts of the world there have been inſtances of people killed, and almoſt torn to pieces, by a vapour ſuddenly burſting out of the earth under their feet.

Of the aqueous vapour raiſed from the earth by the ſun's heat are formed the clouds; but though theſe are commonly at no great height from the earth, we cannot from thence determine the height to which the vapours aſcend. Indeed, conſidering the great propenſity of water, and even quickſilver, to evaporate in the moſt perfect vacuum we can make, it is by no means probable that any limit can be fixed for this aſcent.

Vapours, in medicine, a diſeaſe properly called *hyps*, or the *hypochondriacal diſeaſe*; and in men particularly, the *ſpleen*. See Medicine, n° 385.

VARENIUS (Auguſtus), a famous Lutheran divine, was born in the duchy of Lunenburgh in 1620. He became ſo well ſkilled in the Hebrew tongue, that he was conſidered in Germany as the beſt ſkilled in that language of all the Proteſtants, except the Buxtorfs; and he had ſuch a prodigious memory, that he knew the Hebrew text of all the Old Teſtament by heart. He wrote a Commentary on the prophecy of Iſaiah, and many other works.

He ought not to be confounded with *Bernard Varenius*,

renius, a Dutchman and an able phyſician, who wrote an eſteemed geographical treatiſe, intitled *Geographia univerſalis, in qua Affectiones generales Telluris explicantur*, which was tranſlated by Sir Iſaac Newton.

VARI, in medicine, little, hard, and ruddy tumours, which frequently infeſt the faces of young perſons of a hot temperament of body.

VARIATION, the angle contained between the true meridian and the magnetic meridian.

After the diſcovery of that moſt uſeful property of the magnet, or loadſtone, namely, the giving hardened iron and ſteel a polarity, the compaſs was for many years uſed without knowing that its direction in any wiſe deviated from the poles of the world: and about the middle of the 16th century, ſo certain were ſome of its inflexibly pointing to the north, that they treated with contempt the notion of the variation, which about that time began to be ſuſpected. However, careful obſervations ſoon diſcovered, that in England and its neighbourhood, the needle pointed to the eaſtward of the true north: but the quantity of this deviation being known, mariners became as well ſatisfied as if the compaſs had none; becauſe they imagined that the true courſe could be obtained by making allowance for the true variation.

From ſucceſſive obſervations made afterwards, it was found, that the deviation of the needle from the north was not a conſtant quantity, but that it gradually diminiſhed; and at laſt, about the year 1660, it was found at London that the needle pointed due north, and has ever ſince been getting to the weſtward; and now the variation is more than 20° to the weſtward of the north: ſo that in any one place it may be ſuſpected the variation has a kind of libratory motion, traverſing through the north to unknown limits eaſtward and weſtward. But the ſettling of this point muſt be left to time.

During the time of the ſaid obſervations it was alſo diſcovered, that the variation of the needle was different in different parts of the world, it being weſt in ſome places when it was eaſt in others; and in places where the variation was of the ſame name, yet the quantity of it greatly differed. It was therefore found neceſſary, that mariners ſhould every day, or as often as they had opportunity, make during their voyage proper obſervations for an amplitude or azimuth; whereby they might be enabled to find the variation of the compaſs in their preſent place, and thence correct their courſes.

Dr Halley publiſhed in the laſt century a theory of the variations of the compaſs. In this work he ſuppoſes there are four magnetic poles in the earth; two of which are fixed and two moveable, by which he explains the different variation of the compaſs at different times in the ſame place. But it is impoſſible to apply exact calculations to ſo complicated an hypotheſis. M. Euler, ſon of the celebrated geometrician of that name, has however ſhown, that two magnetic poles placed on the ſurface of the earth will ſufficiently account for the ſingular figure aſſumed by the lines which paſs through all the points of equal variation in the chart of Dr Halley.

M. Euler firſt examines the caſe wherein the two magnetic poles are diametrically oppoſite; ſecond, he places them in the two oppoſite meridians, but at unequal diſtances from the poles of the world; third, he places them in the ſame meridians. Finally, he conders them ſituated in two different meridians. Theſe four caſes may become equally important; becauſe, if it is determined that there are only two magnetic poles, and that theſe poles change their ſituations, it may ſometime hereafter be diſcovered that they paſs through all the different poſitions.

Since the needle of the compaſs ought always to be in the plane which paſſes through the place of obſervation and the two magnetic poles, the problem is reduced to the diſcovery of the angle contained between this plane and the plane of the meridian. M. Euler, after having examined the different caſes, finds that they alſo expreſs the earth's magnetiſm, repreſented in the chart publiſhed by Meſſ. Mountaine and Dodſon in 1744, particularly throughout Europe and North America, if the following principles are eſtabliſhed.

Between the arctic pole and the magnetic pole 14° 53′.

Between the antarctic pole and the other magnetic pole 29° 23′.

53° 18′ the angle at the north pole, formed by the meridian's paſſing through the two magnetic poles.

250° the longitude of the meridian, which paſſes over the northern magnetic pole.

As the obſervations which have been collected with regard to the variation are for the moſt part looſe and inaccurate, it is impoſſible to repreſent them all with preciſion; and the great variations obſerved in the Indian Ocean ſeem to require, ſays M. Euler, that the three firſt quantities ſhould be 14, 35, and 65 degrees. In the mean time, the general agreement is ſufficiently ſatisfactory.

The high reputation of Dr Halley's magnetical chart renders it more particularly neceſſary to point out the errors contained therein. There is evidently too little diſtance between the lines of no variation, of which one croſſes the equator 17° weſtward of London, and the other 119° to the eaſtward. This makes 136° only; whereas it ſhould neceſſarily exceed 180, and even 200, inaſmuch as the pole of the world is ſuppoſed further diſtant from the magnetic pole towards the ſouth than in the north, as is required by the other phenomena. Again, upon the coaſts diſcovered by Diemen, there was no variation in 1642; and Dr Halley alſo ſuppoſes there was none in 1700. Meanwhile, by the alteration obſerved at Paris, the line of no variation ſhould be advanced 60° towards the ſouth, which will agree better with the calculations, and prove that the diſtance of the two interſections was really greater than Dr Halley had eſtabliſhed.

The table of variation of Meſſ. Mountaine and Dodſon is accompanied with ſeveral intereſting particulars, which equally deſerve to be inſerted here.

At Barbadoes (ſays Captain Snow), the variation ſeems very nearly at a ſtand: for in the road I obſerved 5° eaſt; and by Dr Halley's draught, in the year 1701, 5½°. In 1747, at Port Royal keys, Jamaica, I obſerved the variation 7° 20′ E.; and on the coaſt of Carthagena, the ſame week, off the high land of Santa Martha, 7° 45′ nearly ſouth of Port Royal. Therefore theſe curves are not much altered: the curve at Jamaica is nearly at a ſtand, as though tied, and the ſouth part of them with the reſt dropping to the weſtward.

Under the equator, in longitude 40° E. of London, the higheſt variation during the whole 56 years appears to be 17° $\frac{1}{4}$ W. and the leaſt 16° $\frac{1}{2}$ W.: and in latitude 15° N. longitude 60° W. from London, the variation has been conſtantly 5° E. But in other places the caſe has been widely different. For in the latitude of 10° S. longitude 60° E. from London, the variation has decreaſed from 17° W. to 7° $\frac{1}{4}$ W.; and in latitude 10° S. longitude 5° W. from London, from 2° $\frac{1}{4}$ W. to 12° $\frac{3}{4}$ W.; and in latitude 15° N. longitude 20°, it has increaſed from 1° W. to 9° W.

But there is ſtill a more extraordinary appearance in the Indian ſea. For inſtance, under the equator:

LONGITUDE E. from London.	MAGNETICAL VARIATION in 1700.	in 1756.
Degrees.	Degrees.	Degrees.
40	16$\frac{3}{4}$ Weſt.	16$\frac{1}{4}$ Weſt.
45	17$\frac{3}{4}$ W.	14$\frac{1}{2}$ W.
50	17$\frac{1}{2}$ W.	11$\frac{3}{4}$ W.
55	16$\frac{1}{2}$ W.	8$\frac{3}{4}$ W.
60	15$\frac{1}{4}$ W.	6 W.
65	13$\frac{1}{2}$ W.	4$\frac{1}{2}$ W.
70	11$\frac{1}{2}$ W.	3$\frac{1}{4}$ W.
75	9$\frac{3}{4}$ W.	1 W.
80	7$\frac{3}{4}$ W.	0$\frac{1}{4}$ Eaſt.
85	5$\frac{1}{2}$ W.	1$\frac{1}{4}$ E.
90	4$\frac{1}{4}$ W.	1 E.
95	3$\frac{1}{4}$ W.	0$\frac{1}{2}$ Weſt.
100	2$\frac{1}{2}$ W.	1 W.

Where the weſt variation, in the longitude 40° E. is the ſame in both the above years; and in 1700 the weſt variation ſeemed to be regularly decreaſing from longitude 50° E. to the longitude 100° E.: but in 1756, we find the weſt variation decreaſing ſo faſt, that we have eaſt variation in the longitude 80°, 85°, and 90° E. and yet in the longitude 95° and 100° E. we have weſt variation again.

To theſe remarks may be ſubjoined the following extracts from the *Expoſition du calcul aſtronomique*, by M. de la Lande.

"At the royal obſervatory in Paris, a magnetical needle of four inches deviated from the N. 18° 10′ towards the weſt, on the 15th of February 1759: and on the 22d of April 1760, the ſame needle varied 18° 20′. It is indeed natural to conceive, that nothing can be preciſely aſcertained by 10′ upon a circle whoſe diameter is only four inches. It is nevertheleſs ſufficiently evident, that this variation continues to increaſe at Paris. In 1610 the needle declined 8° towards the eaſt, ſo that the variation has changed 26° 20′ in the ſpace of 150 years; and this appears particularly ſince 1740: for the ſame needle, which has always been uſed by M. Maraldi, is more than 3° advanced towards the weſt, beyond what it was at that period; and this makes 9′ in one year."

VARIETY, a change, ſucceſſion, or difference, in the appearance or nature of things; in oppoſition to *uniformity*. See UNIFORMITY *and Variety*.

VARIETY, in botany, a plant changed by ſome accidental cauſe, which being removed, the variety or mutation diſappears, and the ſpecies is reſtored. As many plants of different form and appearance as are produced from ſeed of the ſame ſpecies, are to be regarded as genuine varieties, and in all caſes to be diſtinguiſhed with great accuracy from the ſpecies.

In the form and diſpoſition of the parts of each individual of the ſame ſpecies, there exiſts, in general, a conſtant uniformity. Different cauſes, however, as culture, climate, expoſure, age, diſeaſes, luxuriance or poverty of nouriſhment, contuſions, and other circumſtances, produce monſtrous appearances and accidental varieties in the parts of plants.

It is known, that a ſuperabundance of nouriſhment gives riſe to the numerous tribe of double and prolific flowers: the ſame cauſe gives to all the parts of the plant a thickneſs and extent by no means natural to them. Hence, likewiſe, the prodigious multiplication of the leaves of ſome plants, which increaſe to ſuch a degree, as frequently to injure the flower and fruit.

The leaves of young trees and of new ſhoots are much larger, and leſs cut and ramified, than thoſe of a grown tree of the ſame ſpecies. In holly, the leaves loſe their prickles when the tree waxes old.

The lower leaves of aquatic plants, as crow-foot and water-drop-wort, are frequently finely cut like hairs, whilſt thoſe above are of a different form. Plants of the ſame ſpecies that grow in another ſoil have no diverſity in the form of their upper and under leaves. Again, in mountainous plants, the lower leaves are generally more entire; the upper ones more divided. Burnet, ſaxifrage, aniſe, and coriander, furniſh examples.

The ſeeds or grains of many graſſes, particularly of rye, are ſometimes prolonged into a horny appearance of a fungous ſubſtance, that is pretty hard, and as it were cartilaginous. Some of theſe monſtrous productions are more than two inches long. Rye diſeaſed in this manner, is frequently attended with fatal conſequences to ſuch as eat of the bread prepared from it. The ſame appearance has been obſerved in *gramen aquaticum fluitans*, and carex. This diſeaſe, termed by Linnæus *clavus*, is common in moiſt years and rainy ſeaſons, and ſeems to be principally owing to a defect of perſpiration.

The flowers and ſeeds of many of the eſculent graſſes, and ſome other plants, are frequently reduced into a black powder. This appearance has been particularly obſerved in wheat, rye, barley, oats, perſicaria, marſh-ſcorzonera, goats-beard, ſope-wort, and ſome of the lychnis, pink, and chick-weed tribe. In the greater number, the diſeaſe, when it attacks the flower, begins by the receptacle under the form of ſmall black points, which inſenſibly reach the other parts of the flower; as the flower-cup, petals, and ſtamina, without attacking the piſtil or female organ, which however commonly proves abortive.

The diſeaſe termed *uſtilago*, or burning, differs from that juſt mentioned, in that it is contagious and hereditary; the ſeeds being the only parts that are affected by it. It has been diſcovered in the ſame ſpecies of graſſes as the former, but more abundantly on Indian millet. M. Aymen, a French academician, attributes both theſe diſeaſes to an internal fault in the ſap.

The upper ſurface of the leaves of ſome plants, particularly of hop, melon, dead-nettle, hedge-nettle, maple, and gromwell, is ſubject to be covered with a white appearance, which makes the leaves ſeem thicker, more weighty, and more opake. Plants which are attacked by this diſeaſe, termed by botaniſts *eryſiphe*, rarely produce any fruit; or if they do, it is badly formed, and has a crude diſagreeable taſte.

On the under ſurface of the leaves of ladies mantle, and a ſpecies of euphorbia with cypreſs leaves, is occaſionally diſperſed a yellowiſh duſt, which, from its reſemblance to ruſty iron, has occaſioned the name of *rubigo*, or *ruſt*, to be given to this particular diſeaſe; which, like the former, appears to proceed from a defect of perſpiration.

White ſpots are frequently obſerved on ſome leaves, which thence appear empty, and as it were tranſparent: it is occaſioned by the influence of a burning ſun acting upon them when very much moiſtened, either in conſequence of continued rain or a ſtrong dew. When all the leaves are attacked with this diſeaſe, which has obtained the name of *candor*, that is, "the whites," the plant commonly periſhes a few days after.

Certain plants of warm climates are ſubject to loſe their petals when cultivated in cold countries; and that even when the fruit arrives at maturity.

Plants which grow in the ſhade, or in places that are deprived of a proper current of air, are apt to become meagre, and, without taking the conſiſtence which is ſuitable, to periſh before they have produced any fruit. Experiments demonſtrate, that the feebleneſs of ſuch plants proceeds leſs from a defect of heat, than from a privation of light.

Other cauſes alter the colour of leaves, and occaſionally produce the beautifully variegated leaves ſo much in requeſt among gardeners. Some leaves are ſubject to aſſume a deep red; this is particularly the caſe with herb Robert, a ſpecies of crane's bill.

The branches of aſh and willow are frequently flattened in ſeveral irregular ways. This is ſuppoſed to be in conſequence of two buds being naturally grafted in each other before the unfolding of the branch. Two leaves, two fruits, engrafted in this manner, produce other monſtrous appearances. By means of artificial grafting, we may in like manner vary the form of leaves, ſtems, flowers, and fruit.

Laſtly, certain inſects depoſiting their eggs under the bark of the leaves and ſtems of ſeveral plants, occaſion an extravaſation of the ſap; and hence give birth to certain ſingular productions, which in different bodies reſemble either nuts, muſhrooms, or ſponges; and are either round or long, hard or ſoft, covered with leaves, or guarded with briſtly threads.

Such are the galls of oak, which enter into the compoſition of ink; thoſe of elm, lime, ciſtus, ground-ivy, a ſpecies of hawk-weed, the aſpen-tree, and ſeveral ſpecies of willow. Thoſe of a ſpecies of ſage, called *ſalvia baccifera*, are ſold in the markets of the Levant by the name of *ſage-apples*. Tournefort relates that they are round, nine or ten lines in diameter; of the colour of aſhes, cottony, with a white pulp that is ſomewhat tranſparent, ſweet, and of a very agreeable taſte. Thoſe of the ſcarlet-oak are two lines in diameter; the ſubſtance is very red, and being dried, is the kermes, or ſcarlet-paſtel, ſo well known by the dyers.

Of the ſame nature with the galls juſt mentioned, are thoſe ſtrange bodies covered with green, red, or yellow fibres, termed *bedeguar*, which a fly of the ſame kind produces upon the wild roſe: ſuch are likewiſe the ſmall bladders on the ſurface of the elm-leaves, which are filled with gnats, and with an aſtringent balmy liquor that is an excellent vulnerary.

Such are the principal accidents to which the parts of plants are ſubject, and which give riſe to the numerous tribes of varieties in the vegetable kingdom.

VARIOLA, the SMALL-POX. See MEDICINE, n° 326—328.

VARIX, in medicine, the dilatation of a vein, ariſing from the too great abundance or thickneſs of the blood. See SURGERY, n° 14, *et ſeq.*

VARNISH, a thick, viſcid, ſhining liquor, uſed by painters, gilders, and various other artificers, to give a gloſs and luſtre to their works; as alſo to defend them from the weather, duſt, &c.

There are ſeveral kinds of varniſhes in uſe, and many receipts have been publiſhed for the preparation of them; but very few of theſe can be depended on. The following are extracted from Dr Lewis's Commerce of Arts, and ſeem to be well authenticated.

1. *Gold-coloured Varniſh, or Lacquer.*—Silver, coated with a tranſparent gold-coloured varniſh, is made to reſemble gold ſo exactly, as wholly to ſupply the place of gold in ſome of the works called *gilt*. The baſis of the varniſh, or what gives adheſiveneſs and gloſſineſs to the colouring matter, is a ſolution of lac made in ſpirit of wine.

Stick-lac is only to be uſed for varniſhes: what is called *ſhell-lac*, or the grains formed into plates by melting them in boiling water, does not anſwer ſo well. The ſpirit muſt be highly rectified, or freed as much as poſſible from any admixture of phlegm or water*. Some ſeed-lac, reduced into fine powder, is then added to it, in the proportion of about three ounces to a pint: the veſſel being ſet in a moderate warmth for 24 hours and frequently ſhaken, a part of the lac diſſolves; and the ſpirit, now tinged of a reddiſh brown colour, is ſtrained off from the undiſſolved part, and ſet by for a day or two to ſettle. The digeſtion ſhould be performed in a wide-mouthed veſſel, covered ſo as to prevent the exhalation of the ſpirit: the undiſſolved lac ſoftens into a viſcous maſs, ſo as ſcarce to be got out through a narrow aperture.

In different portions of the foregoing ſolution, poured off clear after the ſtraining and ſettling, ſome gamboge and annotto are diſſolved ſeparately; the gamboge communicates a high yellow colour, and the annotto a deep reddiſh yellow. The ſolution of the gamboge is mixed with about half its quantity of that of the annotto, and trial made of the mixture on ſome ſilver leaf: if the colour inclines too much to the yellow or the red, more of the one or the other liquor is added till the true golden colour is obtained. There are ſundry other materials, from a due mixture of which a like colour may be produced; ſuch as turmeric, ſaffron, dragon's-blood, &c.

The ſilver leaf being fixed on the ſubject, in the ſame manner as gold leaf, by the interpoſition of proper glutinous matters, the varniſh is ſpread upon the piece with a bruſh or pencil. The firſt coat being dry, the piece is again and again waſhed over with the varniſh till the colour appears ſufficiently deep. What is called *gilt leather*, and many picture-frames, have no other than this counterfeit gilding. Waſhing them with a little rectified ſpirit of wine affords a proof of this; the ſpirit diſſolving the varniſh, and leaving the ſilver leaf of its own whiteneſs. For plain frames, thick tin-foil may be uſed inſtead of ſilver. The tin-leaf, fixed on the piece with glue, is to be burniſhed, then poliſhed with emery and a fine linen cloth, and afterwards with putty applied in the ſame manner: being then lacquered over with the varniſh five or ſix times, it looks very nearly like burniſhed gold. The ſame varniſh, made with a leſs proportion of the colouring materials, is applied alſo on works of braſs; both for heightening the colour of the metal to a reſemblance with that of gold, and for preſerving it from being tarniſhed or corroded by the air.

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* See *Diſtillation*, n° 6.

2. *Spirit Varniſh.* Black varniſh, for japanning on wood or leather, is prepared by mixing lamp-black or ivory-black with a proper quantity of a ſtrong ſolution of gum lac in ſpirit of wine, ſuch as that above-deſcribed. The lamp-black is commonly preferred to the ivory-black, on account of its uniting better with the fluid, and working ſmoother. The thicker part of the varniſh, which ſettles at the bottom, is uſed with the lamp-black for the firſt coatings, and the mixture applied at different times, in a hot room, one layer after another is dry, till a full body of colour is obtained: after which the piece is waſhed over in the ſame manner, ſeveral times, with the finer part of the varniſh, juſt tinged with the black, ſo as to make a coating of ſufficient thickneſs to bear poliſhing with tripoli.

3. *Amber Varniſhes for Papier Maché, &c.* Papier maché is made of cuttings of white or brown paper, boiled in water, and beaten in a mortar, till they are reduced into a kind of paſte; and then boiled with ſolution of gum-arabic or of ſize, to give tenacity to the paſte, which is afterwards formed into different toys, &c. by preſſing it into oiled moulds. When dry, it is done over with a mixture of ſize and lamp-black, and afterwards varniſhed. The black varniſh for theſe toys is prepared as follows. Some colophony, or turpentine boiled down till it becomes black and friable, is melted in a glazed earthen veſſel, and thrice as much amber in fine powder ſprinkled in by degrees, with the addition of a little ſpirit or oil of turpentine now and then: when the amber is melted, ſprinkle in the ſame quantity of ſarcocolla, continuing to ſtir them, and to add more ſpirit of turpentine, till the whole becomes fluid; then ſtrain out the clear through a coarſe hair-bag, preſſing it gently between hot boards. This varniſh, mixed with ivory-black in fine powder, is applied, in a hot room, on the dried paper paſte; which is then ſet in a gently heated oven, next day in a hotter oven, and the third day in a very hot one, and let ſtand each time till the oven is grown cold. The paſte thus varniſhed is hard, durable, gloſſy, and bears liquors hot or cold.

A more ſimple amber-varniſh, of great uſe for many purpoſes, and ſaid to be the baſis of the fine varniſhes which we ſee on coaches, &c. is prepared, by gently melting the amber in a crucible till it becomes black; then reducing it into a powder, which looks brown; and boiling the powder in linſeed oil, or in a mixture of linſeed oil and oil of turpentine. Drying oil is commonly made choice of by the workmen; but it ſeems more eligible here to take the oil unprepared, that the boiling requiſite for giving it the drying quality may be employed at the ſame time in making it act upon the amber.

By the previous melting of the amber, its nature is changed, and part of its oily and ſaline matter expelled, as happens in the common diſtillation of it. When the diſtillation is not far protracted, the caput mortuum, or ſhining black maſs which remains in the retort, anſwers as well as the amber melted on purpoſe. Hence ſome of our chemiſts, inſtead of urging the diſtillation to the utmoſt, by which the amber would be reduced to a mere coal, find it more advantageous to diſcontinue the proceſs when the thinner oil and greater part of the ſalt have ariſen, that the remaining maſs may be in great meaſure ſoluble in oils, ſo as to ſupply the common demand of the varniſh-makers.

It has generally been thought, that amber will not at all diſſolve in oils till it has thus ſuffered a degree of decompoſition by fire. Hoffmann relates an experiment in his *Obſervationes Phyſico-chemicæ*, which diſcovers the ſolubility of this concrete in its natural ſtate. Powdered amber, with twice its quantity of oil-olive, was put in a wide-mouthed glaſs, and a digeſtor, or ſtrong copper veſſel, being filled about one-third with water, the glaſs was placed in it, the cover of the digeſtor ſcrewed down tight, and a moderate fire continued an hour or more: when cold, the amber was found diſſolved into a gelatinous tranſparent maſs.

In Dr Stockar's very curious *Specimen inaugurale de ſuccino*, printed at Leyden in 1760, there are ſundry more important experiments on this ſubject, made by himſelf and Mr Ziegler of Winterthur. They found, that by continuing a ſimmering heat 12 hours, and confining the vapour as much as ſtone-ware veſſels would bear without burſting (the danger of which was avoided by making a ſmall notch in the cork-ſtoppers) powdered amber diſſolved perfectly in expreſſed oils, in turpentine, and in balſam of copaiba: a ſtrong copper veſſel, with a cover ſcrewed on it, ſeems moſt eligible, and for the greater ſecurity, a valve may be made in the cover, kept down by a ſpring that ſhall give way before the confined vapour is of ſufficient force to be in any danger of burſting the veſſel. Though ſuch a heat as converts part of the oil into ſtrong elaſtic vapours, and the forcible compreſſure of the vapour, are expedient for haſtening the diſſolution, they do not appear to be eſſentially neceſſary; for by digeſtion for a week in cloſe-ſtopped glaſs-veſſels, in which the compreſſure could not be very great, ſolutions equally perfect were obtained.

The ſolution in rape-ſeed oil, and in oil of almonds, was of a fine yellowiſh colour; in linſeed-oil, gold-coloured; in oil of poppy-ſeeds, yellowiſh red; in oil olive, of a beautiful red; in oil of nuts, deeper coloured; and in oil of bays, of a purple red. It is obſervable that this laſt oil, which of itſelf, in the greateſt common heat of the atmoſphere, proves of a thick butyraceous conſiſtence, continued fluid when the amber was diſſolved in it. The ſolutions made with turpentine, and with balſam of copaiba, were of a deep red colour, and on cooling hardened into a brittle maſs of the ſame colour. All the ſolutions mingled perfectly with ſpirit of turpentine. Thoſe made with the oils of linſeed, bays, poppy-ſeeds, and nuts, and with balſam of copaiba and turpentine, being diluted with four times their quantity of ſpirit of turpentine, formed hard, tenacious, gloſſy varniſhes, which dried ſufficiently quick, and appeared greatly preferable to thoſe made in the common manner from melted amber.

4. *Varniſh for Metals.* Iron ſnuff-boxes, mourning-buckles, &c. are coloured black, by making them conſiderably hot, and applying on them in this ſtate a thick mixture of lamp black, with a certain varniſh called *gold ſize.* There is a gold-ſize uſed for gilding, or fixing gold-leaf on wood, &c.† The ſize here meant is a compoſition of a different kind, conſiſting of drying oil, turpentine, and the pigment called *Naples yellow;* which laſt ingredient is uſed for giving a high gold colour to the mixture, to fit it for ſome of the other purpoſes for which it is employed.

† See Gilding, n° 5,

The workmen are ſaid frequently to employ for this purpoſe a mixture of lamp-black with the ſcummings, &c. of different oil-paints: the mixture is applied with a pencil, and the piece afterwards baked in an oven, with a heat ſomewhat greater than that uſed for the papier mache. Naples yellow, a ſuperfluous ingredient in the black varniſh, is the baſis of the dark brown which we ſee on ſome iron ſnuff-boxes, this pigment changing to a brown in baking with the varniſh.

Laying on of VARNISHES. 1. If you varniſh wood, let your wood be very ſmooth, cloſe-grained, free from greaſe, and rubbed with ruſhes. 2. Lay on your colours as ſmooth as poſſible; and if the varniſh has any bliſters in it, take them off by a poliſh with ruſhes. 3. While you are varniſhing, keep your work warm, but not too hot. 4. In laying on your varniſh, begin in the middle, and ſtroke the bruſh to the outſide; then to another extreme part, and ſo on till all be covered; for if you begin at the edges, the bruſh will leave blots there, and make the work unequal. 5. In fine works, uſe the fineſt tripoli in poliſhing: do not poliſh it at one time only; but after the firſt time, let it dry for two or three days, and poliſh it again for the laſt time. 6. In the firſt poliſhing you muſt uſe a good deal of tripoli, but in the next a very little will ſerve: when you have done, waſh off your tripoli with a ſponge and water: dry the varniſh with a dry linen-rag; and clear the work, if a white ground, with oil and whiting; or if black, with oil and lamp-black.

VARNISH alſo ſignifies a ſort of ſhining coat, wherewith potter's ware, delft-ware, china-ware, &c. are covered, which gives them a ſmoothneſs and luſtre. Melted lead is generally uſed for the firſt, and ſmalt for the ſecond. See GLAZING.

VARNISH, among medaliſts, ſignifies the colours antique medals have acquired in the earth.

The beauty which nature alone is able to give to medals, and art has never yet attained to counterfeit, enhances the value of them: that is, the colour which certain ſoils in which they have a long time lain tinges the metals withal; ſome of which are blue, almoſt as beautiful as the turquoiſe; others with an inimitable vermilion-colour; others with a certain ſhining poliſhed brown, vaſtly finer than Braſil figures.

The moſt uſual varniſh is a beautiful green, which hangs to the fineſt ſtrokes without effacing them, more accurately than the fineſt enamel does on metals.

No metal but braſs is ſuſceptible of this; for the green ruſt that gathers on ſilver always ſpoils it, and it muſt be got off with vinegar or lemon-juice.

Falſifiers of medals have a falſe or modern varniſh, which they uſe on their counterfeits, to give them the appearance or air of being antique. But this may be diſcovered by its ſoftneſs; it being ſofter than the natural varniſh, which is as hard as the metal itſelf.

Some depoſit their ſpurious metals in the earth for a conſiderable time, by which means they contract a ſort of varniſh, which may impoſe upon the leſs knowing; others uſe ſal armoniac, and others burnt paper.

VARRO (Marcus Terentius), the moſt learned of all the Romans, was born 28 B. C. He was a ſenator of the firſt diſtinction, both for birth and merit; and bore many great offices. He was an intimate friend of Cicero; and this friendſhip was confirmed and immortalized by a mutual dedication of their learned works to each other. Thus Cicero dedicated his Academic Queſtions to Varro; and Varro dedicated his treatiſe on the Latin tongue to Cicero. In the civil wars he was zealouſly attached to Pompey; but after his defeat ſoon ſubmitted to Cæſar, who was reconciled to him. From thence he applied his whole time to letters, and had the charge of the Greek and Latin libraries at Rome. He was above 70 when Antony proſcribed him; however, he found means to eſcape and ſave his life, though he could not ſave ſome of his works and his library from being plundered by the ſoldiers. After this ſtorm was over, he purſued his ſtudies as uſual; and Pliny relates, that he continued to ſtudy and to write when he was 88 years of age. He was 80 when he wrote his three books *De re Ruſtica,* which are ſtill extant. Five of his books *De lingua Latina,* which he addreſſed to Cicero, are alſo extant. There remain, too, divers fragments of his works, particularly of his Menippean Satires, which are medleys of proſe and verſe; and Scaliger has collected ſome of his epigrams from among the *Catalecta Virgilii.* His books *De lingua Latina,* and *De re Ruſtica,* were printed with the notes of Joſeph Scaliger, Turnebus, and Victorius, by Henry Stephens at Paris, 1573, in 8vo, and have been publiſhed ſeparately ſince among the *Auctores de lingua Latina,* and the *Auctores de re Ruſtica.*

There was another Varro of antiquity, called *Atacinus,* who was born about ten years after the firſt, at a ſmall town near Narbonne. Though infinitely below the Roman in learning, he was at leaſt as good, if not a better, poet; which perhaps has made Lilius Gyraldus and other critics confound them. He compoſed many works in verſe; ſome fragments of which were collected, and publiſhed with thoſe of other ancient poets, at Lyons in 1603. His chief works were, A poem on the war with the Sequani, a people of Gaul; and the Aſtronomics, that went under the name of Planciades the grammarian. But the *Argonautics,* in four books, was what gained him the greateſt reputation: and though indeed nothing but a tranſlation of Apollonius Rhodius, yet was ſo well done, as to be commended by Quintilian.

VASCULAR, ſomething conſiſting of divers veſſels, as arteries, veins, &c.

VASE, a term frequently uſed for ancient veſſels dug from under ground, or otherwiſe found, and preſerved in the cabinets of the curious. In architecture, the appellation *vaſe* is alſo given to thoſe ornaments placed on corniches, ſochles, or pedeſtals, repreſenting the veſſels of the ancients, particularly thoſe uſed in ſacrifice, as incenſe-pots, flower-pots, &c.

VASSAL, in our ancient cuſtoms, ſignified a tenant or feudatory; or perſon who vowed fidelity and homage to a lord, on account of ſome land, &c. held of him in fee; alſo a ſlave or ſervant, and eſpecially a domeſtic of a prince. *Vaſſallus* is ſaid to be *quaſi inferior ſocius*; as the vaſſal is inferior to his maſter, and muſt ſerve him; and yet he is in a manner his companion, becauſe each of them is obliged to the other. See FEODAL *Syſtem*.

VATICAN, a magnificent palace of the pope, in Rome, which is ſaid to conſiſt of ſeveral thouſand rooms: but the parts of it moſt admired are the grand ſtair-caſe, the pope's apartment, and eſpecially the library, which is one of the richeſt in the world, both in printed books and manuſcripts.

VAUBAN (Sebaſtian le Preſtre, ſeigneur de), marſhal of France, and the greateſt engineer that country ever produced, was born in 1633. He diſplayed his knowledge of fortification in the courſe of many ſieges, and his ſervices were rewarded with the firſt military honours. He was made governor of Liſle in 1668, commiſſary-general of the fortifications of France in 1678, governor of the maritime parts of Flanders in 1689, and a marſhal of France in 1703. He died in 1707, after having brought the arts of attacking and defending fortified places to a degree of perfection unknown before. His writings on theſe ſubjects are in the higheſt eſteem.

VAULT, in architecture, an arched roof, ſo contrived that the ſtones which form it ſuſtain each other.

Vaults are on many occaſions to be preferred to ſoffits or flat cielings, as they give a greater height and elevation, and are beſides more firm and durable.

VAYER. See MOTHE.

UBES (St), a ſea-port town of Portugal, in the province of Eſtramadura, ſeated on a bay of the Atlantic Ocean, 21 miles ſouth of Liſbon. It ſtands on an eminence, with a very ſtrong caſtle built on a rock. The ſoil about it is fertile in corn, wine, and fruits; and it is furniſhed with good fiſh from the ſea, and a ſmall lake in the neighbourhood. Here they make great quantities of fine ſalt, which is carried to the American plantations. E. Long. 9. 30. N. Lat. 38. 36.

UBIQUITARIANS, in church-hiſtory, a ſect of heretics who ſprung up in Germany about the year 1590, and maintained that the body of Chriſt is *ubique*, "everywhere," or in every place, at the ſame time. However, they were not quite agreed among themſelves; ſome holding that the body of Jeſus Chriſt, even during his mortal life, was every where; and others dating the ubiquity of his body from the time of his aſcenſion only.

UBIQUITY, OMNIPRESENCE; an attribute of the Deity, whereby he is always intimately preſent to all things; gives the *eſſe* to all things; knows, preſerves, and does all in all things.

UDDER, in comparative anatomy, that part in brutes wherein the milk is prepared, anſwering to the mammæ, or breaſts, in women. See COMPARATIVE *Anatomy*, n° 42.

VEDAM, among the Indian Bramins or Brachmans, is the book of their law, containing all that they are to believe and practiſe. See BRACHMANS.

The vedam is written in what they call the *Samſcortan tongue*, which is underſtood by ſuch of the Bramins as never traffic. It is divided into four parts; namely, 1ſt, *Rogo-Vedam*, which treats of the firſt cauſe, of the firſt matter, of the angels, of the ſoul, of rewards and puniſhments, of the generation and corruption of creatures, of ſin, and in what manner it may be remitted, &c. 2d, *Iſſoure-Vedam*, which treats of the powers that preſide over and govern all things. 3d, *Sama-Vedam*, containing a ſyſtem of morality. And, 4th, *Addaravana-Vedam*, which treated of the religious ceremonies, temples, ſacrifices, and feaſts: but this laſt part has been loſt for many years; and to this the Bramins impute the diminution of their honours, and the powers they formerly enjoyed. This book is of indiſputable authority among them: but as they uſed frequently to diſpute about interpreting it, the ſenſe of it has been fixed by the jaſtras or declarations.

VEDETTE, in war, a centinel on horſeback, with his horſe's head towards the place whence any danger is to be feared, and his carabine advanced, with the butt-end againſt his right thigh. When the enemy has encamped, there are vedettes poſted at all the avenues, and on all the riſing grounds, to watch for its ſecurity.

The vedettes to the out-poſts ſhould always be double, for the following reaſons: Firſt, that whenever they make any diſcovery, one may be detached to the commanding officer of the out-poſts; ſecondly, that they may keep each other watchful; and thirdly, that the vigilance of both may render it impoſſible for any thing to come near them without being ſeen. They ſhould be at no greater diſtance from their detachment than 80 or 100 paces.

To VEER *and* HAUL, to pull a rope tight, by drawing it in and ſlackening it alternately, till the body to which it is applied acquires an additional motion, like the increaſed vibrations of a pendulum, ſo that the rope is ſtraitened to a greater tenſion with more facility and diſpatch. This method is particularly uſed in hauling the bowlines.

The wind is ſaid to veer and haul when it alters its direction, and becomes more or leſs fair. Thus it is ſaid to veer aft and to haul forward.

VEER, *Ter-Veer*, anciently *Camp-Veer*, a town of Zealand in the United Provinces, ſtanding at the mouth of the Eaſt Schelde, about four miles from Middleburgh, and eight from Fluſhing. Veer, in Dutch, ſignifies a paſſage or ferry over an arm of the ſea or a river; and as there was once a ferry here over the Schelde to the village of Compen, on the iſland of North Beveland, the town thereby got the name of *Veer*, *Camp-Veer*, and *Ter-Veer*. It is well fortified, and enjoys a good trade, eſpecially to Scotland; the natives of which enjoy particular privileges here. The harbour is very good, and the arſenal the beſt furniſhed in the world. The Calviniſts alone are allowed the public exerciſe of their religion in this town. Hence the Veres, anciently earls of Oxford, are ſaid to have derived both their origin and name.

VEERING, the operation by which a ſhip, in changing her courſe from one board to the other, turns her ſtern to windward. Hence it is uſed in oppoſition to TACKING, wherein the head is turned to the wind and the ſtern to leeward.

Thus a ſhip, having made the neceſſary diſpoſitions to veer, bears away gradually before the wind, till it blows obliquely upon the oppoſite ſide, which was formerly to leeward; and as the ſtern neceſſarily yields to this impreſſion of the wind, aſſiſted by the force of the helm, and the action of the waves upon the ſame quarter, the ſide which was formerly to leeward ſoon becomes to windward.

Since by this movement a ſhip loſes ground conſiderably more than by tacking, it is rarely practiſed except in caſes of neceſſity or delay: as when the violence of the wind and ſea renders tacking impracticable; or when her courſe is ſlackened to wait for a pilot, or ſome other ſhip in company, &c.

It has been obſerved in the article Tacking, that the change of motion in any body will be in proportion to the moving force impreſſed, and made according to the right-line in which that force operates. Hence it is evident, that veering as well as tacking is a neceſſary conſequence of the ſame invariable principle; for as in the latter, almoſt the whole force of the wind and of the helm are exerted on the hind-part of the ſhip, to turn the prow to windward; ſo in the former, the ſame impreſſion, aſſiſted by the efforts of the helm, falls upon the prow to puſh it to leeward; and the motion communicated to the ſhip muſt in both caſes neceſſarily conſpire with the action of the wind.

Thus, when it becomes neceſſary to veer the ſhip, the ſails towards the ſtern are either furled or brailed up, and made to ſhiver in the wind; whilſt thoſe near the head are ſpread abroad, ſo as to collect the whole current of air which their ſurfaces can contain. Hence, while the whole force of the wind is exerted on the fore-part of the ſhip to turn her about, its effect is conſiderably diminiſhed, or altogether deſtroyed, on the ſurfaces of the after-ſails. The fore-part accordingly yields to the above impulſe, and is put in motion; and this movement, conſpiring with that of the wind, puſhes the ſhip about as much as is neceſſary to produce the effect required. When ſhe is turned ſo that the wind will act upon that quarter which was formerly to leeward, her circular motion will be accelerated by extending ſome of the ſails near the ſtern, as the mizen, and by placing thoſe at the prow more obliquely, which will wheel the veſſel round with her bow to the windward; in the ſame ſituation, with regard to the wind, as when cloſe-hauled or tacking.

When the tempeſt is ſo violent as to prevent the uſe of ſails, the effort of the wind operates almoſt equally on the oppoſite ends of the ſhip, ſo that the maſts and yards ſituated at the head and ſtern counterbalance each other. The effect of the helm is alſo conſiderably diminiſhed, becauſe the head-way, which gives life and vigour to all its operations, is at this time feeble and ineffectual. Hence it is neceſſary to deſtroy this equilibrium which ſubſiſts between the maſt and yards afore and abaſt, and to throw the balance forward, in order to prepare for veering. This is accordingly performed by bracing the foremoſt yards acroſs the direction of the wind, and arranging thoſe on the main-maſt and mizen-maſt directly in the line of the wind. If this expedient proves unſucceſsful, and it is abſolutely neceſſary to veer in order to ſave the ſhip from deſtruction, by overſetting or running aſhore, the mizen-maſt muſt inſtantly be cut away, and even the main-maſt, if ſhe yet remains incapable of anſwering the helm by bearing away before the wind.

VEGA (Lopez de), a celebrated Spaniſh poet, alſo called *Lope Felix de Vega Carpio*, was born at Madrid in 1562; and became ſecretary to the biſhop of Avila, and afterwards to the count of Lemos, the duke of Alva, &c. At length having embraced the eccleſiaſtical ſtate, he received prieſts orders, and became knight of Malta. He died in 1635. He wrote in Spaniſh a great number of theatrical pieces and poems that are admired.

VEGETATION, in phyſiology, the act whereby plants receive nouriſhment and grow. See Plant.

The proceſs of nature in the vegetation of plants is very accurately delivered by the excellent Malpighi, to the effect following: The egg or ſeed of the plant being excluded out of the ovary, called *pod* or *huſk*, and requiring further foſtering and brooding, is committed to the earth; which having received it into her fertile boſom, not only does the office of incubation by her own warm vapours and exhalation, joined with the heat of the ſun, but by degrees ſupplies what the ſeed requires for its further growth; as abounding every where with canals and ſinuſes, wherein the dew and rain-water, impregnated with fertile ſalts, glide, like the chyle and blood in the arteries, &c. of animals. This moiſture meeting with a new-depoſited ſeed, is percolated, or ſtrained through the pores or pipes of the outer rind or huſk, correſponding to the ſecundines of the fœtuſes, on the inſide whereof lies one or more, commonly two, thick ſeminal leaves, anſwering to the placenta in women, and the cotyledons in brutes.

Theſe ſeed-leaves conſiſt of a great number of little veſiculæ, or bladders, with a tube correſponding to the navel-ſtring in animals. In theſe veſiculæ is received the moiſture of the earth, ſtrained through the rind of the ſeed; which makes a ſlight fermentation with the proper juice before contained therein. This fermented liquor is conveyed by the umbilical veſſel to the trunk of the little plant; and to the germ or bud, which is contiguous thereto: upon which a vegetation and increaſe of the parts ſucceed.

Such is the procedure in the vegetation of plants; which the illuſtrious author exemplifies in a grain of wheat, as follows: The firſt day the grain is ſown it grows a little turgid; and the ſecundine, or huſk, gapes a little in ſeveral places: and the body of the plant, being continued by the umbilical veſſel to a conglobated leaf (which is called the *pulp* or *fleſh* of the ſeed, and is what conſtitutes the flower) ſwells; by which means, not only the germ or ſprout (which is to be the future ſtem) opens, and waxes green, but the roots begin to bunch out; whence the placenta, or ſeed-leaf, becoming looſe, gapes. The ſecond day, the ſecundine, or huſk, being broke through, the ſtem, or top of the future ſtraw, appears on the outſide thereof, and grows upwards by degrees: in the mean time the ſeed-leaf guarding the roots, becomes turgid with its veſiculæ, and puts forth a white down. And the leaf being pulled away, you ſee the roots of the plant bare; the future buds, leaves, and reſt of the ſtalk, lying hid. Between the roots and the aſcending ſtem the trunk of the plant is knit by the navel knot to the flower-leaf, which is very moiſt, though it ſtill retains its white colour and its natural taſte. The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it received from the earth fermenting with its own.

Thus the plant increaſing in bigneſs, and its bud or ſtem becoming taller, from whitiſh turns greeniſh; the lateral roots alſo break forth greeniſh and pyramidal from the gaping ſheath, which adheres chiefly to the plant; and the lower root grows longer and hairy, with many fibres ſhooting out of the ſame.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips; and theſe fibres are ſeen to wind about the ſaline particles of the ſoil, little lumps of earth, &c. like ivy; whence they grow curled. Above the lateral roots there now break out two other little ones.

The fourth day, the ſtem mounting upwards, makes a right angle with the ſeminal leaf: the laſt roots put forth more; and the other three growing larger, are cloathed with more hairs, which ſtraitly embrace the lumps of earth; and where they meet with any vacuity, unite into a kind of net-work.

From this time forward the root puſhes with more regularity downward, and the ſtalk upward, than before. There is, however, this great difference in their growth, that the ſtalk and branches find no reſiſtance to their ſhooting up, while the roots find a great deal to their ſhooting downward by means of the ſolidity of the earth, whence the branches advance much faſter and farther in their growth than the roots; and theſe laſt often finding the reſiſtance of a tough earth unſurmountable, turn their courſe, and ſhoot almoſt horizontally.

As to the manner in which vegetation is effected, very little can be ſaid. That heat, air, and light are neceſſary for this purpoſe, is known to every one; but in what manner they act, ſeems to be totally undiſcoverable by us. The loweſt degree of vegetation ſeems to be that of the cryſtallization of ſalts. This indeed has ſcarce been allowed really to be a vegetation, tho' it certainly is owing to the ſame cauſes. Whether cryſtallization will ſucceed *in vacuo*, indeed, has not been determined; but it certainly may go on without light, and in much lower degrees of heat than thoſe in which any vegetable will grow. Light indeed ſeems not abſolutely neceſſary to vegetation; for the roots of all plants grow below ground, where they are very much deprived of light. This element ſeems only neceſſary for giving a green colour to the upper part of vegetables, and perhaps ſtrengthening them, ſo that they can better bear the inclemency and changes of the weather. But whatever may be the differences between the powers which produce vegetation and thoſe of cryſtallization, water is the medium by which only both can act; for if a ſalt is perfectly dry, it will not cryſtallize, more than a ſeed will grow in dry ſand or duſt. Some kinds of cryſtallization indeed reſemble vegetation ſo much, that we can ſcarce avoid aſcribing them to the ſame cauſe. Of theſe the moſt remarkable is the arbor Dianæ, or compound of nitrous acid and ſilver †. Several curious cryſtallizations, or vegetations as they are called, may alſo be formed with other metals; but that which moſt of all reſembles a true vegetation, is the *caput mortuum* of Glauber's ſpirit of nitre. This is a combination of very pure vegetable fixed alkali with vitriolic acid. If a large quantity of the latter has been employed in the diſtillation, and the maſs is expoſed to a moiſt air, a great number of cryſtallizations will take place on the ſurface, exactly reſembling the vegetations of ſome kinds of ſhrubs. See CRYSTALLIZATION, PLANTS, GERMINATION, &c.

VEGETATIVE SOUL, among philoſophers, denotes that principle in plants by virtue of which they vegetate, or receive nouriſhment and grow. See the preceding article.

VEHICLE, in general, denotes any thing that carries or bears another along; but is more particularly uſed in pharmacy for any liquid ſerving to dilute ſome medicine, in order that it may be adminiſtered more commodiouſly to the patient.

VEII (anc. geog.), a city of Etruria, the long and powerful rival of Rome; diſtant about 100 ſtadia, or 12 miles, to the north-weſt: ſituated on a high and ſteep rock. Taken after a ſiege of 10 years by Camillus, ſix years before the taking of Rome by the Gauls; and thither the Romans, after the burning of their city, had thoughts of removing; but were diſſuaded from it by Camillus, (Livy). It remained ſtanding after the Punic war; and a colony was there ſettled, and its territory aſſigned to the ſoldiers. But after that it declined ſo gradually, as not to leave a ſingle trace ſtanding. Famous for the ſlaughter of the 300 Fabii on the Cremera, (Ovid). The ſpot on which it ſtood lies near Iſola, in St Peter's patrimony, (Holſtenius).

VEIL, a piece of ſtuff, ſerving to cover or hide any thing.

In the Romiſh churches, in time of Lent, they have veils or curtains over the altar, crucifix, images of ſaints, &c.

A veil of crape is wore on the head by nuns, as a badge of their profeſſion: the novices wear white veils, but thoſe who have made the vows black ones. See the article NUN.

VEIN, in anatomy, is a veſſel which carries the blood from the ſeveral parts of the body to the heart. See ANATOMY, n° 387.

VEIN, among miners, is that ſpace which is bounded with woughs, and contains ore, ſpar, canck, clay, chirt, croil, brownhen, pitcher-chirt, cur, which the philoſophers call the *mother of metals*, and ſometimes *ſoil of all colours*. When it bears ore, it is called a *quick vein*; when no ore, a *dead vein*.

VELA, a remarkable cape on the coaſt of Terra Firma, in South America. W. Long. 73. 20. N. Lat. 12. 0.

VELARIUS, in antiquity, an officer in the court of the Roman emperors, being a kind of uſher, whoſe poſt was behind the curtain in the prince's apartment, as that of the chancellor's was at the entry of the baluſtrade; and that of the oſtiarii at the door. The velarii had a ſuperior of the ſame denomination, who commanded them.

VELEZ DE GOMERA, a town of Africa, in the kingdom of Fez, and in the province of Eriff. It is the ancient ACARTH; which ſee. With a harbour and a handſome caſtle, where the governor reſides. It is ſeated between two high mountains, on the coaſt of the Mediterranean Sea. W. Long. 5. 0. N. Lat. 35. 0.

VELITES, in the Roman army, a kind of ancient ſoldiery, who were armed lightly with a javelin, a caſk, cuiraſs, and ſhield.

VELITRÆ (anc. geog.), the firſt town of the Volſci, in Latium, beyond the Mons Albanus, 20 miles to the eaſt of Rome: afterwards a colony, which was ſoon after increaſed. Of this place was the family of Auguſtus, and one of the principal in it, (Suetonius).

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† See *Chemiſtry*, n° 198.

Now *Velletri*, in the Campania of Rome. E. Long. 13 20. N. Lat. 41. 40.

VELLEIUS Paterculus. See Paterculus.

VELLEITY, in the ſchool-philoſophy, is uſually defined a languid, cold, and remiſs will. Others ſay it denotes an impotence of acquiring what we deſire.

VELOCITY *of a* Body, denotes the quantity of motion neceſſary to make it run over a certain ſpace in a given time.

VELVET, a rich kind of ſtuff, all ſilk, covered on the outſide with a cloſe, ſhort, fine, ſoft ſhag, the other ſide being a very ſtrong cloſe tiſſue.

The nap or ſhag, called alſo the *velveting*, of this ſtuff, is formed of part of the threads of the warp, which the workman puts on a long narrow-channeled ruler or needle, which he afterwards cuts, by drawing a ſharp ſteel tool along the channel of the needle to the ends of the warp. The principal and beſt manufactories of velvet are in France and Italy; particularly in Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, ſet up by the French refugees; whereof that at Haerlem is the moſt conſiderable: but they all come ſhort of the beauty of thoſe in France, and accordingly are ſold for 10 or 15 *per cent.* leſs. There are even ſome brought from China; but they are the worſt of all.

VENAL, or Venous, in anatomy, ſomething that bears a relation to the veins. This word is alſo uſed for ſomething bought with money, or procured by bribes.

VENEERING, Vaneering, or *Fineering*, a kind of marquetry or inlaying, whereby ſeveral thin ſlices or leaves of fine woods, of different kinds, are applied and faſtened on a ground of ſome common wood.

VENEREAL, ſomething belonging to venery; as the lues venerea, &c.

VENERY, is uſed for the act of copulation, or coition, of the two ſexes.

Venery alſo denotes the act or exerciſe of hunting wild beaſts, which are alſo called *beaſts of venery*, and *beaſts of the foreſt*.

VENESECTION, or Phlebotomy, in ſurgery. See Surgery, n° 346, *et ſeq.*

VENETIAN Bole, a fine red earth uſed in painting, and called in the colour-ſhops *Venetian red.* —It is dug in Carinthia, and ſent from Venice to all parts of the world; but the uſe of it here is very much ſuperſeded by a bright coliothar of vitriol.

VENICE, a celebrated city of Italy, and capital of a republic of the ſame name, ſituated on the Lagunes or Small Iſlands, about five miles from the continent; in E. Long. 130. N. Lat. 45. 40.

1
Derivation the me.

The name of Venice is evidently derived from *Venetia*, one of the Roman provinces of Italy; and this again from the *Henetians*, a people of Paphlagonia, who ſettled in that part of the country. The city is ſaid to have been founded about the year 451 or 452; when Attila, having deſtroyed the cities of Aquileia, Verona, Mantua, Trevigio, &c. ſuch of the inhabitants as eſcaped the ſlaughter, fled to the iſlands on their coaſt, and there took up their reſidence.

2
cellent racter of firſt in itants.

Hiſtorians are profuſe in their commendations of the virtue of the Venetians during the infancy of their city; and Caſſiodorus informs us, that one would have taken the inhabitants rather for an aſſembly of philoſophers, living at their eaſe and cultivating the duties of religion, than for what they really were, a diſtreſſed and confuſed rabble who had eſcaped from the calamities of war. Nothing remarkable, however, occurs in the hiſtory of Venice for ſome time, excepting the change of government from the conſular to the tribunitial form, which happened about 30 years after the building of the city.

3
When the republic began to make a figure.

The republic firſt began to be of conſequence after the deſtruction of Padua by the Lombards. About this time they were become maſters of a fleet, and a body of land-forces. They engaged in a quarrel with the Lombards, of which we know not the particulars. In a ſhort time, however, they diſtinguiſhed themſelves againſt the Iſtrian pirates, who had committed depredations on their coaſts, and the Tergeſtines, or inhabitants of Trieſte, who had ſuddenly carried off a number of the citizens of Venice. Theſe exploits procured them a conſiderable degree of reputation and eſteem among their neighbours; and by improving every opportunity of increaſing their trade, and augmenting the number of manufactures, &c. the city very ſoon arrived at a high pitch of affluence and power.

4
Aſſiſts the Roman general Narſes, and honoured by him on that account.

In the war carried on by Juſtinian with the Goths in Italy, the Venetians gave conſiderable aſſiſtance to Narſes the Roman general, inſomuch that he expreſſed his gratitude by ſeveral rich preſents, ſome high marks of diſtinction, and particularly by building two fine churches dedicated to the ſaints Theodore and Germinian; the oldeſt public buildings, beſide St Mark's and St Peter's, in Venice.

From the time of Juſtinian to the year 697, hiſtorians are ſilent with regard to the Venetian affairs.

5
Firſt election of a doge, or duke.

A great revolution now took place in the government: the tribunes having abuſed their power were aboliſhed; and in their ſtead was elected a *doge* or duke, in whom was veſted the ſupreme authority. He was to repreſent the honour and majeſty of the ſtate; to have reſpect and diſtinction paid him beyond what the tribunes, or even the conſuls, enjoyed: he was to aſſemble and preſide at the great council; to have a caſting-vote in all diſputed points; to nominate to all offices, places, and preferments; and laſtly, to enjoy the ſame authority in the church as in the ſtate.

6
Changes of government.

This form of government was changed in 737, for what reaſon we know not, and a ſupreme magiſtrate choſen, with the title of *maſter of the horſe, or general of the forces*. His power was to continue only for a year, by which means it was thought that the ſhort duration of his power would be a ſufficient ſecurity againſt the abuſe of it. But in five years after the doges were reſtored, Giovanni Fabritio, the fourth and laſt maſter of the horſe, had been depoſed, and his eyes put out, but for what fault we know not.

7
Quarrel with Charlemagne.

Under the doges, the power and wealth of the Venetian republic continued to increaſe. In 764 the Heracleans and Jeſulans, ſubjects to the republic, having formed ſome deſigns agaiſt the ſtate, put themſelves under the protection of Charlemagne. That conqueror, not finding it convenient to give them preſent aſſiſtance, ſettled them in Malamoc until he could give them more effectual ſuccour.

8
Pepin declares war againſt the republic.

The Venetians, however, diſregarding the protection of that powerful monarch, attacked and inſtantly drove them out of the place where he had ſettled them. Incenſed at this, Charlemagne ordered his ſon Pepin to declare war againſt the republic. This was immediately done; but the blow was for ſome time diverted by Aſtolphus king of the Lombards, who, committing great devaſtations in the territories of the pope, obliged Pepin to come to the aſſiſtance of his holineſs. However, after having afforded the neceſſary ſuccour to the pope, Pepin proſecuted the war with Venice.

9 The Venetians declare themſelves independent.

The event is uncertain: all we know is, that about this time the Venetians declared themſelves a free and independent ſtate; which makes it probable that his ſucceſs had not been great. But in 804 the war was renewed with the utmoſt fury.

10 The city beſieged by Pepin.

Pepin having quarrelled with Nicephorus the Greek emperor, and finding Obelerio the Venetian doge inclined to favour his adverſary, determined to exterminate the very name of the republic. After having laid waſte the province of Venetia, he led his army directly to Venice, blocking the city up at the ſame time by his fleet. The Venetians were not diſheartened at the number of their enemies, the reputation of Pepin, or the civil diviſions among themſelves; their animoſities were laid aſide, and a ſtrict union formed againſt the common enemy: the chief command was given to Valentin, as Obelerio was ſuppoſed too nearly allied to Pepin to fight with that good-will and cheerfulneſs the ſervice of his country required.

11 The citizens reduced to great ſtraits.

The Venetians, notwithſtanding the moſt obſtinate defence, the moſt vigorous ſallies, and their ſelling every inch of ground at an incredible expence of blood, were at length reduced to that part of the city ſouth of the Rialto; this ſtream, and their own bravery, being now their only defence. While Pepin was preparing to lay a bridge over the canal, they reſolved, as a laſt effort, to attack Pepin's fleet, and to vanquiſh or die in defence of their liberty. Embarking all the troops they could ſpare, they bore down, with the advantage of the wind and tide, upon the enemy, and began the attack with ſuch fury, as obliged the French admiral to give way.

12 The French fleet entirely deſtroyed.

The lightneſs of their ſhips, and their knowledge of the ſoundings, gave the Venetians every advantage they could wiſh: the enemy's fleet was run aground, and the greater part of their troops periſhed in attempting to eſcape; the ſhips were all, to a few, either taken or deſtroyed. During this action at ſea, Pepin reſolved to aſſault the city by land, not doubting but the garriſon was ſo weakened by the number of forces they had ſent on board the fleet, as to be able to make but a ſlight reſiſtance. Having for this purpoſe thrown a bridge over the Rialto, he was marching his troops acroſs it when he found himſelf attacked on every ſide by the Venetians from their boats, and others who had poſted themſelves on the bridge. The battle was long, bloody, and doubtful, until the Venetians employed all their power to break down the bridge; which at laſt yielding to their obſtinate endeavours, a prodigious ſlaughter of the French enſued:

13 And great part of their army.

however, they fought like men in deſpair, ſeeing no hopes of ſafety but in victory; but all communication being cut off with the troops on ſhore, they were to a man either killed or drowned. The number of ſlain was ſo great, that the ſpace between the Rialto and Malamoc was covered with dead bodies, and has ever ſince gone by a name expreſſive of the prodigious ſlaughter.

14 The ſiege raiſed.

Pepin was ſo ſtruck with the intrepidity of the Venetians, that he raiſed the ſiege, abandoned the enterpriſe, and concluded a peace with the republic: he afterwards came to Venice to intercede for Obelerio, that he might be reſtored; which the Venetians granted, more out of reſpect to the requeſt of ſo great a prince, than love to the unhappy Obelerio.

15 The doge torn in pieces by the populace.

The people had a notion that Obelerio had encouraged Pepin to declare war upon the republic, and that a correſpondence between them was carried on during the ſiege; Pepin was therefore no ſooner withdrawn, than the populace ſeizing upon Obelerio, tore his body in pieces, and ſcattered his limbs and bowels about the city. His wife ſhared the ſame fate; for as ſhe was the ſiſter of Pepin, it was not doubted but her influence was the cauſe of her huſband's perfidy.

In 839 we find the Venetians engaged in an alliance offenſive and defenſive againſt the Saracens with Michael the Greek emperor.

16 The Venetians defeated at ſea by the Saracens.

A fleet of 60 gallyes was immediately equipped, who joined the Grecian fleet and engaged the enemy; but during the heat of the engagement, the Greeks having baſely deſerted their allies, the Venetians were ſo completely defeated, that ſcarce a ſingle veſſel remained to carry the news of their misfortune to Venice. This defeat threw the city into the utmoſt conſternation, as it was not doubted that the Saracens would immediately lay ſiege to the capital; but from theſe fears they were ſoon relieved, by certain intelligence that the Saracens had gone to Ancona, which they had pillaged and deſtroyed. The Narentines, however, a piratical people, no ſooner heard of the defeat of the Venetians, than they laid waſte the coaſts of Dalmatia, and ravaged the country for a conſiderable way; at the ſame time that the city was diſtracted by internal diſſenſions and tumults, in one of which the doge was murdered.

17 Affairs of the republic reſtored.

It was not till the year 881 that the Venetian affairs were thoroughly re-eſtabliſhed. By the prudent and vigorous adminiſtration of Orſo Participato the power of the Saracens was checked, the Narentines utterly defeated, and peace and domeſtic tranquillity reſtored.

18 A great victory gained over the Huns.

From this time the republic continued to flouriſh; and in 903 her reputation for arms became famous all over the world by a great victory gained over the Hunns, who had invaded Italy, defeated Berengarius, and threatened the country with total deſtruction. For a long time after, we meet with no remarkable tranſactions in the Venetian hiſtory; but in general the republic increaſed in wealth and power by its indefatigable application to maritime affairs and to commerce. About the year 1040 it was ordained that no prince ſhould aſſociate a colleague with him in the ſupreme power, a ſtatute which has ever ſince continued unaltered.

19 Venetians become powerful.

Towards the cloſe of the 11th century, Venice began to make a very conſiderable figure among the Italian ſtates, and to carry on wars with ſeveral of them. In 1084 the republic was by the emperor of Conſtantinople inveſted with the ſovereignty of Dalmatia and Croatia, which, however, had been held long before by right of conqueſt.

20 Take a principal ſhare in the cruſades.

As ſoon as the Croiſade was preached up, the Venetians fitted out a fleet of 200 ſail againſt the infidels; but before this armament was in a condition to put to ſea, war broke out with Piſa. The doge Vitalis Michael took upon him the command of the fleet, when, after having defeated the Piſans in a bloody action at ſea, he ſet ſail for

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for Smyrna, and from thence to Aſcalon, at that time beſieged by the Chriſtians. To his valour was owing the conqueſt of this city, as well as thoſe of Caipha and Tiberias; but before he had time to puſh his good fortune further, he was recalled on account of an invaſion of the Normans in Dalmatia. Here he was equally ſucceſsful: the Normans were every where defeated; and Michael returned home loaded with booty; but died ſoon after, to the great grief of all his ſubjects. He was ſucceeded by Ordelapho Faliero, under whom the Venetians aſſiſted Baldwin in the ſiege of Ptolemais, and are ſaid to have been the chief inſtruments of its conqueſt; and Baldwin, in recompence for the ſervices of the republic, inveſted her with the ſovereignty of that city, which he endowed with many extraordinary privileges, in order to render his preſent more valuable. This good fortune, however, was overbalanced by a rebellion in Dalmatia and Croatia. The former was reduced; but, in a battle with the Croatians, the doge was killed, and his army entirely defeated: by which diſaſter the Venetians were ſo much diſpirited, that they clapped up a peace on the beſt terms they could, giving up all thoughts of Croatia for the preſent.

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Under the government of Domenico Micheli, who ſucceeded Ordelapho, the Pope's nuncio arrived at Venice, and excited ſuch a ſpirit of enthuſiaſm among all ranks and degrees of men, that they ſtrove whoſe names ſhould be firſt enrolled for the holy war. The doge, having fitted out a fleet of 60 galleys, ſailed with it to Joppa, which place the Saracens were at that time beſieging. The garriſon was reduced to the laſt extremity when the Venetian fleet arrived, ſurpriſed, and defeated that of the enemy with great ſlaughter; ſoon after which the Saracens raiſed the ſiege with precipitation. Tyre was next beſieged, and ſoon was obliged to capitulate; on which occaſion, as well as on the taking of Aſcalon, the Venetians ſhared two-thirds of the ſpoils. But in the mean time the emperor of Conſtantinople, jealous of the increaſing power and wealth of the republic, reſolved to make an attack upon Venice, now weakened by the abſence of the doge and ſuch a powerful fleet. But the ſenate, having timely notice of the emperor's intentions, recalled the doge, who inſtantly obeyed the ſummons. Stopping at Rhodes, in his way home to refreſh and water the fleet, the inhabitants refuſed to furniſh him with the neceſſaries he demanded. Incenſed at this denial, he levelled their city with the ground; and from thence ſailing to Chios, he laid waſte and deſtroyed the country, carrying off the body of St Iſidore, in thoſe days accounted an ineſtimable treaſure. After this he ſeized on the iſlands of Samos, Leſbos, Andros, and all thoſe in the Archipelago belonging to the emperor; and having reduced Zara, Spolatra, and Trahu, places in Dalmatia which had revolted during his abſence, he returned in triumph to Venice, where he was received with great joy.

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The Venetians now became very formidable throughout all Europe. The Sicilians, Paduans, with the ſtates of Verona and Ferrara, felt the weight of their power; and in 1173 they ventured to oppoſe Frederic Barbaroſſa emperor of Germany. The occaſion of this quarrel was, that Pope Alexander had taken ſhelter in Venice in order to avoid the reſentment of Barbaroſſa, who had conceived an implacable averſion againſt him. The Venetians diſpatched ambaſſadors to him; but he anſwered them in a rage, "Go tell your prince and people, that Frederic the Roman emperor demands his enemy, who is protected by them. If they ſend him not inſtantly bound hand and foot, he will overturn every law, human and divine, to accompliſh his revenge; he will bring his army before their city, and fix his victorious ſtandards in the market-place, which ſhall float in the blood of its citizens." On the return of the ambaſſadors with this terrible menace, it was agreed to equip a fleet with all expedition, and prepare for repelling the attacks of ſuch a formidable and haughty enemy. But before the armament could be prepared, Otho, the emperor's ſon, arrived before the city with a fleet of 75 galleys. The doge Sebaſtiano Ziani ſailed out with the few veſſels he had got equipped, to give the enemy battle. The fleets met off the coaſt of Iſtria, and a terrible engagement enſued, in which the imperial fleet was totally defeated, Otho himſelf taken priſoner, and 48 of his ſhips deſtroyed. On the doge's return, the pope went out to meet him, and preſented him with a ring, ſaying, "Take this, Ziani, and give it to the ſea, as a teſtimony of your dominion over it. Let your ſucceſſors annually perform the ſame ceremony, that poſterity may know that your valour has purchaſed this prerogative, and ſubjected this element to you, even as a huſband ſubjecteth his wife." Otho was treated with the reſpect due to his rank; and ſoon conceived a great friendſhip for Ziani. At laſt, being permitted to viſit the imperial court on his parole, he not only prevailed on his father to make peace with the Venetians, but even to viſit their city, ſo famed for its commerce and naval power. He was received with all poſſible reſpect, and on his departure attended to Ancona by the doge, the ſenate, and whole body of the nobility. During this journey he was reconciled to the pope; and both agreed to pay the higheſt honours to the doge and republic.

27
Haughty meſſage of the emperor.

28
His ſon Otho defeated and taken priſoner by the Venetians.

29
Inſtitution of the cuſtom of marrying the ſea.

30
Peace concluded with the emperor.

31
Venetians invited to the aſſiſtance of the emperor of Conſtantinople.

32
The city taken by the French and Venetians.

In the beginning of the 13th century, the Venetians, now become exceedingly powerful and opulent, by reaſon of the commerce which they carried on with the richeſt countries of the world, were invited by young Alexis, ſon to the emperor of Conſtantinople, to his father's aſſiſtance, who had been depoſed and blinded by a rebellious faction. In conjunction with the French, they undertook to reſtore him; and eaſily ſucceeded. But the old emperor dying ſoon after, his ſon was elected in his room, and a few days after murdered by his own ſubjects; on which the empire was ſeized by Myrtillus, a man of mean birth, who had been raiſed by the favour of old Alexis. As the allied army of French and Venetians was encamped without the city, Myrtillus reſolved immediately to drive them out of his dominions, and for this purpoſe attempted to ſurpriſe their camp; but being repulſed, he ſhut himſelf up in the city, with a reſolution to ſtand a ſiege. The allies aſſaulted it with ſo much vigour, that the uſurper was obliged to fly; and though the citizens held out after his departure, they were obliged in leſs than three months to capitulate. This proved a ſource of greater acquiſition to Venice than all that had yet happened. All the chief offices of the city were filled up with Venetians, in recompence for their ſervices:

Venice.

ſervices: the allies entered Thrace, and ſubdued it; Candia, and all the Greek iſlands, alſo fell under the dominion of the republic.

33 Wars between Venice and Genoa.

In the mean time the Genoeſe, by their ſucceſsful application to commerce, having raiſed themſelves in ſuch a manner as to be capable of rivalling the Venetians, a long ſeries of wars took place between the republic; in which the Venetians generally had the advantage, though ſometimes they met with terrible overthrows. Theſe expenſive and bloody quarrels undoubtedly weakened the republic in the main, notwithſtanding its ſucceſſes. In the year 1348, however, the Genoeſe were obliged to implore the protection of Viſconti duke of Milan, in order to ſupport them againſt their implacable enemies the Venetians. Soon after this, in the year 1352, the latter were utterly defeated, with ſuch loſs, that it was thought the city itſelf muſt have fallen into the hands of the Genoeſe, had they known how to improve their victory. This was in a ſhort time followed by a peace; but from this time the power of the republic began to decline. Continual wars with the ſtates of Italy, with the Hungarians, and their own rebellious ſubjects, kept the Venetians employed ſo that they had no leiſure to oppoſe the Turks, whoſe rapid advances ought to have alarmed all Europe. After the deſtruction of the eaſtern empire, the Turks came more immediately to interfere with the republic. The conſequences are related under the article TURKEY. Whatever valour might be ſhown by the Venetians, or whatever ſucceſſes they might boaſt of, it is certain that the Turks ultimately prevailed; ſo that for ſome time it ſeemed ſcarce poſſible to reſiſt them. What contributed alſo greatly to the decline of the republic, was the diſcovery of a paſſage to the Eaſt Indies by the Cape of Good Hope in 1497. To this time the greateſt part of the Eaſt India goods imported into Europe paſſed through the hands of the Venetians; but as ſoon as the above-mentioned diſcovery took place, the carriage by the way of Alexandria almoſt entirely ceaſed. Still, however, the Venetian power was ſtrong; and in the beginning of the 16th century they maintained a war againſt almoſt the whole power of France, Germany, and Italy; but ſoon after we find them entering into an alliance with ſome Italian ſtates and the king of France, againſt the emperor. Theſe wars, however, produced no conſequences of any great moment; and in 1573 tranquillity was reſtored by the concluſion of a peace with the Turks. Nothing of conſequence happened in the affairs of the Venetian republic till the year 1645, when the Turks made a ſudden and unexpected deſcent on the iſland of Candia. The ſenate of Venice did not diſplay their uſual vigilance on this occaſion. They had ſeen the immenſe warlike preparations going forward, and yet allowed themſelves to be amuſed by the grand ſeignior's declaring war againſt Malta, and pretending that the armament was intended againſt that iſland. The troops landed without oppoſition; and the town of Canéa was taken, after an obſtinate defence.

34 The Genoeſe put themſelves under the protection of the duke of Milan.

35 Cauſes of the decline of the Venetian power.

36 Candia invaded by the Turks.

37 Extraordinary methods taken by the Venetians to carry on the war.

This news being brought to Venice, excited an univerſal indignation againſt the Turks; and the ſenate reſolved to defend to the utmoſt this valuable part of the empire. Extraordinary ways and means of raiſing money were fallen upon: among others, it was propoſed to ſell the rank of nobility. Four citizens offered 100,000 ducats each for this honour; and, notwithſtanding ſome oppoſition, this meaſure was at laſt carried. Eighty families were admitted into the grand council, and to the honour and privileges of the nobility. What an idea does this give of the wealth of the inhabitants of Venice?

38 Remarkable ſiege the capi of Candia.

The ſiege of Candia, the capital of the iſland of that name, is, in ſome reſpects, more memorable than that of any town which hiſtory, or even which poetry, has recorded. It laſted 24 years. The amazing efforts made by the republic of Venice aſtoniſhed all Europe; their courage intereſted the gallant ſpirits of every nation: volunteers from every country came to Candia to exerciſe their valour, to acquire knowledge in the military art, and aſſiſt a brave people whom they admired.

39 Deſperat valour of the Venetians.

During this famous ſiege, the Venetians gained many important victories over the Turkiſh fleet. Sometimes they were driven from the walls of Candia, and the Turkiſh garriſon of Canéa was even beſieged by the Venetian fleets. Great ſlaughter was made of the Turkiſh armies; but new armies were ſoon found to ſupply their place, by a government which boaſts ſuch populous dominions, and which has deſpotic authority over its ſubjects.

40 Cruelty of the Turk ſultan.

Mahomet the fourth, impatient at the length of this ſiege, came to Negropont, that he might have more frequent opportunities of hearing from the vizir, who carried on the ſiege. An officer, ſent with diſpatches, was directed by the vizir to explain to Mahomet the manner in which he made his approaches, and to aſſure him that he would take all poſſible care to ſave the lives of the ſoldiers. The humane emperor anſwered, That he had ſent the vizir to take the place, and not to ſpare the lives of the ſoldiers; and he was on the point of ordering the head of the officer who brought this meſſage to be cut off, merely to quicken the vizir in his operations, and to ſhow him how little he valued the lives of men.

41 The city capitulat

In ſpite of the vizir's boaſted parſimony, this war is ſaid to have coſt the lives of 200,000 Turks. Candia capitulated in the year 1668. The conditions on this occaſion were honourably fulfilled. Morſini, the Venetian general, marched out of the rubbiſh of this well-diſputed city with the honours of war.—The expence of ſuch a tedious war greatly exhauſted the reſources of Venice, which could not now repair them ſo quickly as formerly, when ſhe enjoyed the rich monopoly of the Aſiatic trade.

42 New war with the Turks.

This republic remained in a ſtate of tranquillity, endeavouring, by the arts of peace and cultivation of that ſhare of commerce which ſhe ſtill retained, to fill her empty exchequer, till ſhe was drawn into a new war, in the year 1583, by the inſolence of the Ottoman court. The Venetians had for ſome time endeavoured, by negociation and many conciliatory repreſentations, to accommodate matters with the Turks; and though the haughty conduct of her enemies afforded ſmall hopes of ſucceſs, yet ſuch was her averſion to war on the preſent occaſion, that ſhe ſtill balanced, whether to bear thoſe inſults or repel them by arms; when ſhe was brought to deciſion by an event which gave the greateſt joy to Venice, and aſtoniſhed all Europe. This was the great victory gained over the Turkiſh army before the walls of Vienna, by Sobieſki king of Poland,

43 e Morea quered the Ve- jans.

In this new war, their late General Morſini again had the command of the fleets and armies of the republic, and ſuſtained the great reputation he had acquired in Candia. He conquered the Morea, which was ceded formerly to Venice, with ſome other acquiſition, at the peace of Carlowitz, in the laſt year of the laſt century.

During the war of the ſucceſſion, the ſtate of Venice obſerved a ſtrict neutrality. They conſidered that diſpute as unconnected with their intereſts, taking care, however, to keep on foot an army on their frontiers in Italy, of ſufficient force to make them reſpected by the contending powers, But, ſoon after the peace of Utrecht, the Venetians were again attacked by their old enemies the Turks; who, beholding the great European powers exhauſted by their late efforts, and unable to aſſiſt the republic, thought this the favourable moment for recovering the Morea, which had been ſo lately raviſhed from them. The Turks obtained their object; and at the peace of Paſſarowitz, which terminated this unſucceſsful war, the Venetian ſtate yielded up the Morea; the grand ſeignior, on his part, reſtoring to them the ſmall iſlands of Cerigo and Cerigotto, with ſome places which his troops had taken during the courſe of the war in Dalmatia. Thoſe, with the iſlands of Corfou, Santa Maura, Zante, and Cephalonia, the remains of their dominions in the Levant, they have ſince fortified, at a great expence, as their only barriers againſt the Turk.

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45 e of ice ſince time.

Since this period no eſſential alteration has taken place in the Venetian government, nor has there been any eſſential increaſe or diminution in the extent of their dominions. They have little to fear at preſent from the Turks, whoſe attention is ſufficiently occupied by a more formidable enemy than the republic and the Houſe of Auſtria united. Beſides, if the Turks were more diſengaged, as they have now ſtripped the republic of Cyprus, Candia, and their poſſeſſions in Greece, what remains in the Levant is hardly worth their attention.

The declenſion of Venice did not, like that of Rome, proceed from the increaſe of luxury, or the revolt of their own armies in the diſtant colonies, or from civil wars of any kind. Venice has dwindled in power and importance from cauſes which could not be foreſeen, or guarded againſt by human prudence although they had been foreſeen. In their preſent ſituation, there is little probability of their attempting new conqueſts; happy if they are allowed to remain in the quiet poſſeſſion of what they have. Venice has a moſt formidable neighbour in the emperor, whoſe dominions border on thoſe of this republic on all ſides. The independency of the republic entirely depends on his moderation; or, in caſe he ſhould loſe that virtue, on the protection of ſome of the great powers of Europe.

46 ription e capi-

VENICE, the capital of the republic, ſtands at leaſt four miles from any part of the Terra Firma, upon a cluſter of iſlands. Its appearance at a diſtance is very ſtriking, looking like a great town half-floated by a deluge. Betwixt the city and the Terra Firma are a great many ſhallows, on which at low water you may almoſt every where touch the bottom with a pole; but all poſſible care is taken to prevent their becoming dry land. On the ſouth ſide of the city are alſo ſhallows; but on theſe there is a greater depth of water. The channels betwixt them are marked out by ſtakes or poles, which on the approach of an enemy would certainly be taken away. The city is divided by a vaſt number of canals, on which ply the gondoliers, or watermen, in their black gondolas or boats. The ſtreets are very clean and neat, but narrow and crooked. There are no carriages, not ſo much as a chair, to be ſeen in them. Though the city, by its ſituation and the great number of ſteeples towering above the water, ſtrikes one with admiration at a diſtance, yet when he is got into it, it does not anſwer his expectation; for excepting the ſquare of St Mark, and a few other places, there is nothing grand or beautiful in it, at leaſt in compariſon of many other cities of Italy. Of the canals, that called *Il Canale Maggiore*, or the "great canal," is by far the largeſt and longeſt, and conſequently the moſt beautiful. Here races are ſometimes run for prizes in the gondolas. On its banks are alſo ſeveral ſtately houſes. Over theſe canals are a great number of handſome bridges of one arch, but without any fence on either ſide: they are alſo built of white ſtone, with which the ſtreets are all paved, except the Rialto over the great canal, which is all of marble, and coſt the republic 250,000 ducats, the arch being 90 feet wide. The canals in ſummer emit a bad ſmell, from the great quantities of filth continually running into them. The fineſt gondolas are thoſe in which the foreign miniſters make their public entries, being richly decorated with gilding, painting, and ſculpture. The number of iſlands on which the city ſtands, according to ſome, is 60; according to others, 72. The circumference is about ſix Italian miles; and it takes up about two hours to make the circuit of it in a gondola. The inhabitants are ſuppoſed to be about 200,000, including thoſe of the iſlands Murano, La Guideca, and thoſe who live on board the barges. There are near 200 ſprings of freſh water in the city; but the water of many of them is ſo indifferent, that the principal families preſerve rain-water in ciſterns, or are ſupplied with water from the Brenta. The moſt remarkable places in the city are the ducal palace, the ſquare, and church of St Mark, who is the tutelar ſaint of Venice; the mint, public library, grand arſenal, ſeveral of the palaces of the nobles, churches, convents, and hoſpitals. In theſe laſt is a prodigious collection of the fineſt paintings; Venice, in this reſpect, even ſurpaſſing Rome itſelf. The diverſions of the Venetians are chiefly maſquerading, eſpecially during the carnival and other feſtivals; ridottos, operas, plays, which are generally wretched performances, and concerts of vocal and inſtrumental muſic. During their feſtivals, debauchery, riot, and licentiouſneſs, are carried to the greateſt height. The courtezans here, we are told, are abſolutely loſt to all ſenſe of modeſty and common decency. The grand ſcene of all the ſhows and follies of the feſtivals is the ſquare of St Mark, in which bulls are ſometimes baited. In the doge's palace all the high colleges hold their aſſemblies; but we are told by ſeveral travellers, which ſeems very ſtrange, that the ſtairs are no better than a privy. In this palace is a ſmall arſenal, furniſhed with arms againſt any ſudden inſurrection of the people, together with a ſtate-priſon, a great many exquiſite paintings, and ſeveral curioſities, among which are ſome *clauſtra caſtitatis*. One ſide of it is towards St Mark's ſquare, and the lower gallery on that ſide, with the hall under the new procuratie facing it, are called the *Broglio*, where the nobility, and none elſe, at leaſt while they are preſent, are allowed to walk. The ſquare of St Mark is the greateſt ornament of the city, and hath the form of a parallelogram. In this ſquare, beſides the church and palace of St Mark, are two towers, on one ſide of which is a curious clock; and the other has ſtairs ſo conſtructed, that one may ride up on horſeback: the latter is alſo ſo high, that it is ſaid, in a clear day, and when the gilding of the ſpire was freſh, it could plainly be diſcerned 100 miles from Venice. Oppoſite to the ducal palace is the public library of the commonwealth; containing a large collection of books and manuſcripts, with ſome fine paintings, ſtatues, and curioſities. Hard by St Mark's ſquare is the zecca, or mint: from zecca the gold coin called *zecchino* takes its name. One of the ſmalleſt pieces of money at Venice is called *gazetta;* and the firſt newſpapers publiſhed there, on a ſingle leaf, having been ſold for that a-piece, all kinds of newſpapers were from thence ſtyled *gazettes*. The grand arſenal is two and a half Italian miles in circuit, and contains vaſt quantities of naval and other warlike ſtores: ſome pretend that it could furniſh arms for 10,000 horſe and 100,000 foot: here are the trophies of Scanderbeg and others, with the helmet of Attila, &c. The rope-walk is 444 common paces in length, and the ropes and cables are valued at 2,000,000 of ſilver ducats. In the foundery none but braſs cannon are caſt; and 100 men are generally at work in the forges. The ſalt-petre works here deſerve a traveller's notice: there is a veſſel filled with wine and water four times a-day, where the workmen, though 1000 or more, may drink as much and as often as they pleaſe. Cloſe to the Rialto is the bank. The trade of the city at preſent is far ſhort of what it was formerly. Their chief manufactures are cloth; eſpecially ſcarlet, ſilks, looking-glaſſes, gold and ſilver ſtuffs, brocades, velvets, and paper, of which, and wine, oil, fruit, ſweetmeats, anchovies, and ſeveral ſorts of drugs uſed in phyſic and painting, the exports are ſtill conſiderable. Venice has neither walls, gates, nor citadel, to defend it; its ſituation ſupplying the want of all theſe. In the treaſury of relics is the protocoll, or original manuſcript, as they pretend, of St Mark's goſpel: it is rarely ſhown; and the writing, by length of time, is ſo defaced, that the greateſt connoiſſeurs in manuſcripts cannot determine whether it was wrote in Greek or Latin. Beſides what is properly called the city, there is a multitude of little iſlands lying round, which are covered with buildings, and make each of them a kind of ſeparate town; the moſt conſiderable of which is that called *Guideca*, or the "Jews Quarter," which is large and populous; with St Eroſmo, St Helena, St Georgio, Chioſa, Il Lido de Paleſtrina, Il Lido de Malamocco, and Murano: theſe iſlands are a ſort of fence to the city, breaking the violence of the waves. To diſtinguiſh them from others, the Jews here muſt wear a bit of red cloth in their hats. The gardens in this city are few and inconſiderable. In the iſland of Murano are made thoſe beautiful looking-glaſſes, and other glaſs-works, for which Venice is ſo much noted: here the family of Cornaro hath a palace, with a gallery of paintings, little ſhort of an Italian mile in length. The ſalt-works in the iſland of Chioſa are of great benefit to the Venetians, and yield a very conſiderable revenue. There are ſeveral other ſmall iſlands about Venice beſides thoſe we have mentioned; but they are inconſiderable.

47 Government, &c. of Venice. As to the government of this ſtate, it was, as above related, at firſt veſted in conſuls, afterwards in tribunes. About the beginning of the 8th century, a doge, or duke, was elected, and veſted with unlimited power; but in 1171, the power of the doge was much abridged, and a council of 240 perſons, compoſed of commons as well as nobles, was appointed. Soon after, under duke Marino Moroſini, the preſent form of electing the doge was introduced. In 1296, the government became ariſtocratical; the privilege of ſitting in the great council being then confined to the nobility, in whom alone the ſupreme authority at preſent is veſted. The number of nobles amounts to about 2000. All thoſe are members of the ſenate; but, according to their antiquity, ſome are accounted more honourable than others. One claſs, and that the loweſt, conſiſts of the poſterity of thoſe who, in the neceſſitous times of the commonwealth, purchaſed their nobility for 100,000 ducats. The nobles have the title of *Excellency;* and wear, at leaſt when in the city, a black furred gown reaching to their heels, with long caps and periwigs. Some of them are ſo poor, that they are fain to beg of the rich. The nobility in their dominions on the continent, tho' ſome of them are of very ancient families, are excluded from all offices, and treated with great inſolence and contempt by their haughty lords. At the head of the government is the doge, whoſe office was once hereditary and power abſolute; but the former is now elective, and the latter very much circumſcribed: indeed he is no more than a gaudy ſlave, loaded with fetters, which one would think could not be much the lighter for being gilt; yet ſo much is the human heart captivated with external pomp and pageantry, that the office, for the moſt part, is eagerly ſought after: but ſhould one otherwiſe inclined be choſen, he cannot decline it, without expoſing himſelf to baniſhment and confiſcation of his effects. Though the power of the doge is very ſmall, his ſtate and retinue are very ſplendid: his title is that of *Serenity*, and his office for life: he is ſaid to be a king with regard to his robes, a ſenator in the council-houſe, a priſoner in the city, and a private man out of it. The yearly revenue of his office is about 4000 l.; and though he may be depoſed, he cannot reſign his dignity. All the nobility have a ſeat in the great council, unleſs they are under 25 years of age. In this council the ſupreme authority and legiſlative power is veſted. Next to it is the ſenate, or pregradi, which conſiſts of about 250 members, who have the power of making peace or war, and foreign alliances; of appointing ambaſſadors; fixing the ſtandard of the coins; impoſing duties and taxes; and all offices by ſea and land are in their gift. The third council conſiſts of the doge and his ſix counſellors, in which all letters and inſtruments relating to the ſtate are read, ambaſſadors admitted to audience, and other important affairs tranſacted. The other colleges are the council of ten; which decides all criminal

caſes without appeal, and to which even the doge himſelf is ſubject: the procurators of St Mark, whoſe office is very lucrative; and who decide with reſpect to wills, guardianſhips, and the making a proper proviſion for the poor; and the ſtate-inquiſition, whoſe buſineſs it is to provide for the public tranquillity. In the wall of the ducal palace are heads of lions and leopards, with open mouths, to receive informations of any plot or treaſon againſt the ſtate. The eccleſiaſtical, or *holy inquiſition* as it is called; but the power of this court, ſo formidable in other countries, is here under great reſtrictions. Here is alſo a particular college for the regulation of dreſs, but their juriſdiction does not extend to ſtrangers. The method of electing the doge is no leſs ſingular than complicated; and effectually calculated to prevent all kind of bribery or corruption. 47 thod of oſing the e. All the members of the grand council who are paſt 30 years of age, being aſſembled in the hall of the palace, as many balls are put into an urn as there are members preſent; 30 of theſe balls are gilt, and the reſt white. Each counſellor draws one; and thoſe who get the gilt balls go into another room, where there is an urn containing 30 balls, nine of which are gilt. The 30 members draw again; and thoſe who by a ſecond piece of good fortune get the gilt balls, are the firſt electors, and have a right to chooſe 40, among whom they comprehend themſelves.

Thoſe 40, by balloting in the ſame manner as in the former inſtances, are reduced to 12 ſecond electors, who chooſe 25, the firſt of the 12 naming three, and the remaining 11 two a piece. All thoſe being aſſembled in a chamber apart, each of them draws a ball from an urn containing 25 balls, among which are 9 gilt. This reduces them to 9 third electors, each of whom chooſes five, making in all 45; who, as in the preceding inſtances, are reduced by ballot to 11 fourth electors, and they have the nomination of 41, who are the direct electors of the doge. Being ſhut up by themſelves, they begin by chooſing three chiefs, and two ſecretaries; each elector being then called, throws a little billet into an urn which ſtands on a table before the chiefs. On this billet is inſcribed the perſon's name whom the elector wiſhes to be doge.

The ſecretaries then, in the preſence of the chiefs, and of the whole aſſembly, open the billets. Among all the 41 there are generally but a very few different names; as the election for the moſt part balances between two or three candidates. Their names, whatever is the number, are put into another urn, and drawn out one after another. As ſoon as a name is extracted the ſecretary reads it, and if the perſon to whom it belongs is preſent, he immediately retires. One of the chiefs then demads with a loud voice, whether any crime can be laid to this perſon's charge, or any objection made to his being raiſed to the ſovereign dignity? If any objection is made, the accuſed is called in and heard in his own defence; after which the electors proceed to give their deciſion, by throwing a ball into one of the two boxes, one of which is for the Ayes, the other for the Noes. The ſecretaries then count the balls; and if there are 25 in the firſt, the election is finiſhed; if not, another name is read, and the ſame inquiſition made as before, till there are 25 appearing balls.

49 r of thood The principal Venetian order of knighthood is that of St Mark; the badge of which is a large gold medal dependent on the breaſt. The order of Conſtantine knights wear a croſs hanging from a gold chain.

50 Religion. With reſpect to religion, that of the Venetians is the Roman Catholic; but they are no bigots. We have already obſerved, that the court of inquiſition here is under very great reſtrictions; and the pope is conſidered as little more than a temporal prince, his ſupremacy being rejected.

51 Military force and revenues. The Venetians are ſtill the greateſt naval power in Italy. They pretend they could fit out, in caſe of neceſſity, 60 men of war, 100 galleys, and 10 galeaſſes; though one can hardly imagine how they could man half that number. The army is ſaid to conſiſt of between 20,000 and 30,000 men; the greateſt part of which are Dalmatians and Switzers. The commander in chief, ſtyled *Capitano*, is always a foreigner of diſtinction. General Græme, a Scotchman, lately enjoyed that honourable poſt. The ordinary revenues of the ſtate are computed at about 1,200,000 l. ſterling; but in time of war they can raiſe them greatly. A conſiderable part of the revenue ariſes from the cuſtoms, and the duty on ſalt made at Corfu and Chioza.

VENIRE FACIAS, in law, is a judicial writ lying where two parties plead and come to iſſue; directed to the ſheriff, to cauſe 12 men of the ſame neighbourhood to meet and try the ſame, and to ſay the truth upon the iſſue taken.

VENTER, ſignifies the belly; but it is alſo uſed for the children by a woman of one marriage: there is in law a firſt and ſecond venter, &c. where a man hath children by ſeveral wives; and how they ſhall take in deſcents of lands.

VENTER *Inſpiciendo*, is a writ to ſearch a woman that ſaith ſhe is with child, and thereby withholdeth lands from the next heir: the trial whereof is by a jury of women.

VENTILATOR, a well known machine, by which the noxious air of any confined place, as an hoſpital, goal, ſhip, chamber, &c. may be changed for freſh air.

VENTRICLE, properly denotes any little cavity; but is more particularly uſed by phyſicians and anatomiſts, for the ſtomach, and certain cavities of the heart and brain.

VENTRILOQUOUS, a term applied to perſons who ſpeak inwardly; having a peculiar art of forming ſpeech, by drawing the air into the lungs, ſo that the voice, proceeding out of the thorax, to a by-ſtander ſeems to come from a diſtance. The word is compounded of *venter*, "belly;" and *loquor*, "I ſpeak."

VENUS, in pagan worſhip, the goddeſs of love and beauty. Cicero mentions two other deities of this name; Venus, ſtyled *Urania* and *Celeſtis*; and the *Venus Pandemos*, or *Popularis*, the wife of Vulcan, and the goddeſs of wanton and effeminate love. To the firſt the Pagans aſcribed no attributes but ſuch as were agreeable to the ſtricteſt chaſtity and virtue; and of this deity they admitted no corporeal reſemblance, ſhe being only repreſented by the form of a globe, ending conically. Her ſacrifices were termed *nephalia*, on account of their ſobriety. To her honey and wine were offered, and no animal except the heifer; and on her altars the wood of figs, vines, or mulberries, were not ſuffered to be burnt. The Romans dedicated a temple to this goddeſs, to whom they gave the name of *Verticordia*;

ticordia; becauſe ſhe turned the hearts of lewd women, and inſpired modeſty and virtue.

But the moſt famous of theſe goddeſſes is the wife of Vulcan; who is repreſented as ſpringing from the froth raiſed by the genitals of Saturn, when cut off by Jupiter and thrown into the ſea. As ſoon as ſhe was formed, ſhe was laid in a beautiful ſhell embelliſhed with pearl, and wafted by gentle zephyrs to the iſle of Cytherea, whence ſhe ſailed to Cyprus. At her landing, flowers roſe beneath her feet: ſhe was received by the Hours, who braided her hair with golden fillets; and then wafted her to heaven, where her charms appeared ſo attractive, that moſt of the gods deſired her in marriage; but Vulcan, by the advice of Jupiter, gained poſſeſſion by putting poppies into her nectar. As Venus was the goddeſs of love and pleaſure, the poets have been laviſh in the deſcription of her beauties; and the painters and ſtatuaries have endeavoured to give her the moſt lovely form. Sometimes ſhe is repreſented cloathed in purple, glittering with gems, her head crowned with roſes, and drawn in an ivory car by ſwans, doves, or ſparrows; at others, ſhe ſtands attended by the Graces; but in all poſitions, her ſon Cupid is her inſeparable companion. She was honoured as the mother of Hymeneus, Cupid, Æneas, and the Graces, and was paſſionately fond of Adonis and Anchiſes.

This goddeſs was principally worſhipped at Paphos and Cyprus; and the ſacrifices offered to her were white goats and ſwine, with libations of wine, milk, and honey. Her victims were crowned with flowers, or wreaths of myrtle.

VENUS's *Fly-Trap*. See DIONÆA *Muſcipula*.

VENUS, in zoology, a genus of inſects belonging to the order of vermes teſtacea. Its animal is a tethys; the hinge with three teeth near each other, one placed longitudinally and bent inwards. There are a great many ſpecies; of which the moſt remarkable is the merenaria, or commercial, with a ſtrong, thick, weighty ſhell, covered with a brown epidermis; pure white within; ſlightly ſtriated tranſverſely. Circumference above 11 inches. Theſe are called in North America *clams;* they differ from other ſpecies only in having a purple tinge within. Wampum, or Indian money, is made of them.

VEPRECULÆ, diminutive from *vepres*, a "briar, or bramble;" the name of the 31ſt order in Linnæus's Fragments of a Natural Method. See BOTANY, p. 1311.

VERA-CRUZ, a ſea-port town of North America, in New Spain, with a very ſecure and commodious harbour, defended by a fort. Here the Flotilla annually arrives from Spain to receive the produce of the gold and ſilver mines of Mexico. And at the ſame time a fair is held here, for all manner of rich merchandize brought from China and the Eaſt Indies by way of the South Sea, and for the merchandize of Europe by the way of the Atlantic Ocean. This town is not two miles in circumference; and about it there is a wall of no great ſtrength on the land-ſide. The air is unwholeſome; and there are very few Spaniards here unleſs when the Flotilla arrives, and then it is crowded with people from all parts of Spaniſh America. It is 200 miles ſouth-eaſt of Mexico. W. Long. 102. 15. N. Lat. 18. 41.

VERAGUA, a province of New Spain, bounded on the eaſt by that of Coſta Rica, on the weſt by Panama, on the north by Darien and the Gulph of Mexico, and on the ſouth by the South Sea. It is about 125 miles in length from eaſt to weſt, and 60 in breadth from north to ſouth. It is a mountainous barren country; but has plenty of gold and ſilver. Conception is the capital town.

VERATRUM, WHITE HELLEBORE; a genus of the monoecia order, belonging to the polygamia claſs of plants. There are four ſpecies.

The root of the *album*, or white hellebore, promotes violent ſneezing, and is mixed in ointments, to cure the itch. It is never now given inwardly. Boerhaave very juſtly obſerves, that it is a medicine much fitter for horſes than men. It is adminiſtered as a ſternutatory, with great ſucceſs, in apoplexies and lethargic complaints.

VERB, in grammar. See GRAMMAR.

VERBASCUM, MULLEIN; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are 12 ſpecies, of which the moſt remarkable are, 1. The thapſus or great mullein, with downy leaves running along the ſtem, and yellow bloſſoms, terminating in a long ſpike. It is a native of Britain, growing commonly on dry banks of ditches. Externally uſed it is an emollient, and its leaves are by ſome reckoned a ſpecific for the piles. It is ſaid to intoxicate fiſh ſo that they may be taken with the hand. In Norway it is given to cows that are conſumptive. The down ſerves for tinder. Neither cows, goats, ſheep, horſes, nor ſwine, willingly eat of it. 2. The nigrum, or black mullein, having a ſtem beſet with hairs that are beautifully branched; the bloſſoms yellow, with purple tips. This is alſo a native of Britain, growing under hedges, and by road-ſides. It is a beautiful plant, and the flowers are grateful to bees: ſwine eat it; ſheep are not fond of it; cows, horſes, and goats, refuſe it.

VERBENA, VERVAIN; a genus of the monogynia order, belonging to the diandria claſs of plants. There are 18 ſpecies; of which the moſt remarkable is the officinalis, or common vervain, growing on the road-ſides near towns and villages. The leaves have many jagged clefts, the bloſſoms are pale blue. It manifeſts a ſlight degree of aſtringency, and was formerly much in vogue as a deobſtruent; but is now diſregarded. Mr Millar ſays that it is never found above a quarter of a mile from a houſe; whence the common people in England call it *Simpler's joy*, becauſe wherever it is found, it is a certain ſign of a houſe being near. Sheep eat it; cows, horſes, and goats, refuſe it.

VERCELLÆ, (anc. geog.); a town of the Libici, in the Tranſpadana, on the right or weſt ſide of the river Seſſites, near the Campi Raudii, where Marius gave a ſignal defeat to the Cimbri, (Plutarch). Now *Vercelli* in Piedmont, ſituated on the river Seſia. E. Long. 8° 20′, Lat. 45° 15′.

VERD (Cape), a promontory on the weſt coaſt of Africa, 40 miles north-weſt of the mouth of the river Gambia. W. Long. 17. 49. N. Lat. 15. 0.

VERD, the iſlands of Cape de Verd, are ſeated on the Atlantic Ocean, about 400 miles weſt of the Cape. They are between the 13th and 19th degree of latitude; and the principal are ten in number, lying in a ſemi-circle. Their names are, *St Antony, St Vincent, St Lucia, St Nicholas, the Iſle of Sal. Bona Viſta, Mayo, St Jago, Fuego, and Brava.*

VERDEN, a conſiderable town of Germany, in the circle of Weſtphalia, and capital of a duchy of the ſame name, ſubject to the elector of Hanover. It is ſeated on the river Aller near the Weſer, in W. Long. 9. 10. N. Lat. 53. 30.

VERDUN, a town of France, in Lorrain, and capital of Verdunois, with a biſhop's ſee. There are ſeveral abbeys, collegiate and pariſh churches; but the principal ſtructures are the biſhop's palace and the town-houſe. They make large quantities of ſweetmeats here, which are exported to ſeveral places. E. Long. 5. 24. N. Lat. 49. 0.

VERDIGRISE, a kind of ruſt of copper, much uſed by painters as a green colour. It is chiefly manufactured at Montpellier; the vines of Languedoc being very convenient for this purpoſe.

The following proceſs for making verdigriſe is deſcribed by Mr Monet of the royal ſociety of Montpellier, and is publiſhed among the memoirs of the academy for the years 1750 and 1753.

Vine-ſtalks well dried in the ſun are ſteeped during eight days in ſtrong wine, and afterwards drained. They are then put into earthen-pots, and upon them wine is poured. The pots are carefully covered. The wine undergoes the acetous fermentation, which in ſummer is finiſhed in ſeven or eight days; but requires a longer time in winter, although this operation is always performed in cellars. When the fermentation is ſufficiently advanced, which may be known by obſerving the inner ſurface of the lids of the pots, which during the progreſs of the fermentation is continually wetted by the moiſture of the riſing vapours, the ſtalks are then to be taken out of the pots. Theſe ſtalks are by this method impregnated with all the acid of the wine, and the remaining liquor is but a very weak vinegar. The ſtalks are to be drained during ſome time in baſkets, and layers of them are to be put into earthen-pots with plate of Swediſh copper, ſo diſpoſed that each plate ſhall reſt upon and be covered with layers of ſtalks. The pots are to be covered with lids; and the copper is thus left expoſed to the action of the vinegar, during three or four days or more, in which time the plates become covered with verdigriſe. The plates are then to be taken out of the pots, and left in the cellar three or four days; at the end of which time they are to be moiſtened with water, or with the weak vinegar above-mentioned, and left to dry. When this moiſtening and drying of the plates has been thrice repeated, the verdigriſe will be found to have conſiderably increaſed in quantity; and it may then be ſcraped off for ſale.

A ſolution or eroſion of copper, and conſequently a verdigriſe, may be prepared by employing ordinary vinegar inſtead of wine, as is directed in the above proceſs. But it would not have the unctuoſity of ordinary verdigriſe, which quality is neceſſary in painting. Good verdigriſe muſt be prepared by means of a vinous acid, or ſolvent, half acid and half ſpirituous. Accordingly, the ſucceſs of the operation depends chiefly on the degree of fermentation to which the wine employed has been carried: for this fermentation muſt not have been ſo far advanced that no ſenſibly vinous or ſpirituous parts remained in the liquor.

Verdigriſe taken internally is a very violent emetic, and is reckoned among the poiſons, though it is certainly the mildeſt of that pernicious tribe. It ſeems to act leſs as a corroſive than as a violent aſtringent, which renders it ſo diſagreeable to the ſtomach that it is almoſt inſtantly evacuated by vomit.—In very ſmall doſes it has been given as an emetic, and in this intention it operates moſt powerfully and ſpeedily. Many pernicious conſequences have been attributed to the gradual introduction of ſmall quantities of verdigriſe or copper into the human body: but it is much to be doubted whether this would certainly be accounted the cauſe of them; ſince copper, either by itſelf or diſſolved either in acid or alkali, when it does not prove emetic, always acts as a tonic.

VERDICT, (*Vere dictum*), is the anſwer of the jury given to the court concerning the matter of fact, in any caſe civil or criminal, committed by the court to their trial and examination. See LAW, N° clxxxvi. 51.

In the law of England, a verdict is either *privy* or *public*. A privy verdict is either when the judge hath left or adjourned the court: and the jury, being agreed in order to be delivered from their confinement, obtain liberty to give their verdict privily to the judge out of court: which privy verdict is of no force, unleſs afterwards affirmed by a public verdict given openly in court; wherein the jury may, if they pleaſe, vary from their privy verdict. So that the privy verdict is indeed a mere nullity; and yet it is a dangerous practice, allowing time for the parties to tamper with the jury, and therefore very ſeldom indulged. But the only effectual and legal verdict is the public verdict; in which they openly declare to have found the iſſue for the plaintiff, or for the defendant; and if for the plaintiff, they aſſeſs the damages alſo ſuſtained by the plaintiff, in conſequence of the injury upon which the action is brought.

Sometimes, if there ariſes in the caſe any difficult matter of law, the jury, for the ſake of better information, and to avoid the danger of having their verdict attainted, will find a ſpecial verdict; which is grounded on the ſtatute Weſtm. 2. 13 Edw. I. c. 30. § 2. And herein they ſtate the naked facts, as they find them to be proved, and pray the advice of the court thereon; concluding conditionally, that if upon the whole matter the court ſhall be of opinion that the plaintiff had cauſe of action, they then find for the plaintiff; if otherwiſe, then for the defendent. This is entered at length on the record, and afterwards argued and determined in the court at Weſtminſter, from whence the iſſue came to be tried.

Another method of finding a ſpecies of ſpecial verdict, is when the jury find a verdict generally for the plaintiff, but ſubject neverthele ſs to the opinion of the judge or the court above, on a ſpecial caſe ſtated by the counſel on both ſides with regard to a matter of law: which has this advantage over a ſpecial verdict, that it is attended with much leſs expence, and obtains a much ſpeedier deciſion; the *poſtea* being ſtayed in the hands of the officer of *niſi prius* till the queſtion is determined, and the verdict is then entered for the plaintiff or defendant as the caſe may happen. But as nothing appears upon the record but the general verdict, the parties are precluded hereby from the benefit of a writ of error, if diſſatisfied with the judgment of the court or judge upon the point of law. Which makes it a thing to be wiſhed, that a method could be deviſed of either leſſening the expence of ſpecial verdicts, or elſe of entering the caſe at length upon the *poſtea*. But in both theſe inſtances the jury may, if they think proper, take upon themſelves to determine, at their own hazard, the complicated queſtion of fact and law; and, without either ſpecial verdict or ſpecial caſe, may find a verdict abſolutely either for the plaintiff or defendent.

In criminal caſes, the jury deliver in their verdict with the ſame forms as in civil cauſes: only they cannot, in a criminal caſe which touches life or member, give a privy verdict. But an open verdict may be either general, guilty, or not guilty; or ſpecial, ſetting forth all the circumſtances of the caſe, and praying the judgment of the court, whether, for inſtance, on the facts ſtated, it be murder, manſlaughter, or no crime at all. This is where they doubt the matter of law, and therefore chooſe to leave it to the determination of the court; though they have an unqueſtionable right of determining upon all the circumſtances, and finding a general verdict, if they think proper ſo to hazard a breach of their oaths; and, if their verdict be notoriouſly wrong, they may be puniſhed and the verdict ſet aſide by attaint at the ſuit of the king; but not at the ſuit of the priſoner. But the practice, heretofore in uſe, of finding, impriſoning, or otherwiſe puniſhing jurors, merely at the diſcretion of the court, for finding their verdict contrary to the direction of the judge, was arbitrary, unconſtitutional, and illegal; and is treated as ſuch by Sir Thomas Smith 200 years ago; who accounted "ſuch doings to be very violent, tyrannical, and contrary to the liberty and cuſtom of the realm of England." For, as Sir Matthew Hale well obſerves, it would be a moſt unhappy caſe for the judge himſelf, if the priſoner's fate depended upon his directions:—unhappy alſo for the priſoner; for if the judge's opinion muſt rule the verdict, the trial by jury would be uſeleſs. Yet in many inſtances, where, contrary to evidence, the jury have found the priſoner guilty, their verdict hath been mercifully ſet aſide, and a new trial granted by the court of king's bench; for in ſuch caſe, as hath been ſaid, it cannot be ſet right by attaint. But there hath yet been no inſtance of granting a new trial, where the priſoner was acquitted upon the firſt.

VERDITER, or **VERDATER**, a kind of mineral ſubſtance, ſometimes uſed by the painters, &c. for a blue; but more uſually mixed with a yellow for a green colour. See CHEMIRTRY, n° 201.

VERE (Sir Francis), a renowned Engliſh general, was the ſecond ſon of Geffrey de Vere, a branch of the ancient family of that name, earls of Oxford, and was born in the year 1554. Concerning his education we are uninformed. About the age of 31 he embarked with the troops ſent by queen Elizabeth, under the command of the earl of Leiceſter, to the aſſiſtance of the ſtates of Holland; in which ſervice his courage and military genius became immediately conſpicuous: but his gallant behaviour in the defence of Berghen-op-Zoom, in the year 1588, when beſieged by the prince of Parma, eſtabliſhed his reputation. After the ſiege was raiſed, he received the honour of knighthood from lord Willoughby, who ſucceeded the earl of Leiceſter in the command. He continued in the ſervice of the ſtates till about the year 1595; during which time, namely, in 1593, he was elected member of parliament for Leominſter in Herefordſhire. The famous expedition againſt Cadiz being reſolved upon, Sir Francis Vere was called home, and appointed to a principal command under the earl of Eſſex. The ſucceſs of this enterpriſe is univerſally known. In 1597 we find him again in Holland, preſent at the battle of Turnhout, of which he has given a particular deſcription in his commentaries. In the ſame year he embarked, with the earl of Eſſex, in the expedition to the Azores; and at his return was appointed governor of the Briel in Holland, with the command of the Engliſh troops in the ſervice of the ſtates. In 1600 he was one of the three generals at the battle of Newport, and had the honour of having the victory univerſally aſcribed to his conduct and reſolution. The ſtates of Holland, then at war with Spain, marched their army with an intention to beſiege Newport in Flanders. The commanders were, count Erneſt of Naſſau, count Somes, and Sir Francis Vere. The Spaniards marched to intercept them, and this battle enſued. Sir Francis was ſhot firſt through the leg, and then through the ſame thigh; notwithſtanding which, he rallied the flying army, and led them on to victory. The Spaniards loſt 120 enſigns, and moſt of their foot were ſlain. Queen Elizabeth on this occaſion declared him the *worthieſt captain of her time*. See *Letters of the Sidney family*, vol. ii. p. 104.—But the laſt and moſt glorious atchievement of his life was his gallant defence of Oſtend, with about 1600 men againſt an army of 12,000, from July 1601 until March 1602, when he reſigned the government, and returned to Holland. An account of this memorable ſiege, which laſted above three years, to the deſtruction of the beſt troops of Holland, Spain, France, England, Scotland, and Italy, the reader may ſee in *Vere's Commentaries*, with the Continuation at the end. Queen Elizabeth died in the year 1603: the peaceful James acceded to the throne; and Sir Francis Vere, with all the heroes of his time, ſheathed his ſword. He died in 1608, in the 54th year of his age; and was buried in St Joh's chapel in Weſtminſter abbey, where a ſplendid monument was erected to his memory. He married the daughter of ——— Dent, a citizen of London, by whom he had three ſons and two daughters, none of which ſurvived him. He will ever be remembered by poſterity as one of our greateſt heroes of our moſt heroic age.—The work above-mentioned is intitled, "The commentaries of Sir Francis Vere, being diverſe pieces of ſervice wherein he had command; written by himſelf in way of commentary." Cambridge 1657, folio. It is elegantly printed, and adorned with prints of Sir Francis, Sir Horace Vere, Sir John Ogle, maps, and plans of battles, &c.

VERGE, (*Virgata*), in law, ſignifies the compaſs of the king's court, which bounds the juriſdiction of the lord ſteward of the houſehold; and which is thought to have been 12 miles round.

The term *verge* is alſo uſed for a ſtick or rod, whereby one is admitted tenant to a copyhold eſtate, by holding it in his hand, and ſwearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's bench, and common-pleas, whoſe buſineſs it is to carry white wands before the judges.

There are alſo vergers of cathedrals, who carry a rod tipped with ſilver before the biſhop, dean, &c.

VERGIL (Polydore). See VIRGIL.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from ſweet ones, whilſt yet acid and unripe. Its chief uſe is in ſauces, ragouts, &c, tho' it is alſo an ingredient in ſome medicinal compoſitions, and is uſed by the wax-chandlers to purify their wax.

VERMEYEN (John Cornelius), a Dutch hiſtorian, and portrait-painter. He attended the emperor Charles V. and drew his encampments, ſieges, and battles, on the ſpot, from which deſigns the famous tapeſtries at the Eſcurial at Madrid were made. He died in 1559.

VERMICELLI, or VERMICHELLY, a compoſition of flour, cheeſe, yolks of eggs, ſugar, and ſaffron, reduced to a paſte, and formed into long ſlender pieces like worms, by forcing it with a piſton thro' a number of little holes.

It was firſt brought from Italy, where it is in great vogue: it is chiefly uſed in ſoups and pottages, to provoke venery, &c.

VERMICULAR, an epithet given to any thing that bears a relation or reſemblance to worms.

VERMIFORMIS, in anatomy, a term applied to various parts in the human body, bearing ſome reſemblance to worms.

VERMILION, a very bright and beautiful red colour, compoſed of quickſilver and ſulphur, in great eſteem among the ancients under the name of *minium;* but what goes by the name of minium amongſt us, is a preparation of lead, known alſo by the name of *red-lead.* See CHEMISTRY, n° 474.

VERMIN, a collective name, including all kinds of little animals or inſects, which are hurtful or troubleſome to mankind, beaſts, or fruits, &c. as worms, lice, fleas, caterpillars, ants, flies, &c.

VERNACULAR, a word applied to ſomething that is peculiar to any one country.

VERNAL, ſomething belonging to the ſpring-ſeaſon.

VERONA, a city of Italy, capital of the Veroneſe in the territory of Venice, ſituated near the mountains on the river Adige, in E. Long. 11. 15. N. Lat. 45. 20. It is ſeven miles in compaſs; and has been ſo fortified by the Venetians, that it is now looked upon as impregnable.

VERONESE, a territory of Italy, in the republic of Venice, bounded on the north by the Trentino, on the eaſt by the Vicentino and Paduano, on the ſouth by the Mantuano, and on the weſt by the Breſciano. It is about 35 miles in length, and 27 in breadth; and is one of the moſt fertile countries in Italy, abounding in corn, wine, fruits, and cattle.

VERONESE. See CAGLIARI.

VERONICA, MALE SPEEDWELL; a genus of the monogynia order, belonging to the diandria claſs of plants. There are a great number of ſpecies, of which the moſt remarkable are, 1. The officinalis, common male ſpeedwell, or fluellin; a native of Britain, growing on heaths and barren grounds. The bloſſoms are blue, the leaves elliptical, ſerrated, and hairy. The leaves have a ſmall degree of aſtringency, and are ſomewhat bitter. An infuſion of them is recommended by Hoffman as a ſubſtitute for tea; but is more aſtringent and leſs grateful. The herb was formerly eſteemed in medicine for various diſorders, but is now almoſt totally diſuſed. Cows, ſheep, goats, and horſes, eat it; ſwine refuſe it. 2. The beccabringa, or common brook-lime, found in ditches and rivulets. The leaves are mild and ſucculent, and are eaten in ſalads alongſt with other early ſpringing plants. Cows, goats, and horſes, eat it; ſwine refuſe it.

VERROCHIO (Andrea), a Florentine, born in 1432. He was well ſkilled in mathematics, muſic, architecture, ſculpture, and painting; and was the firſt who diſcovered the art of moulding off the features of the face in plaſter of Paris. He died in 1488.

VERSAILLES, a town ſituated four leagues from Paris to the ſouth-weſt. Here Lewis XIV. built a moſt magnificent palace, and adorned it with noble gardens: it ſtands on a riſing ground, in the middle of a valley ſurrounded with hills, having, on the ſide towards Paris, a fine avenue leading to it through the town, which it divides into the Old and New. To give a particular account of this palace would exceed our limits; ſuffice it to ſay, that it conſiſts of ſeveral courts embelliſhed (both within and without) in the moſt ſumptuous manner. The grove here is exceeding beautiful, and the water-works very grand. The menagerie conſiſts of ſeven courts, and contains a vaſt number of rare animals. In the palace, all the parts in the inſide, that are not hung with tapeſtries, are lined with marble; and the nearer you come to the king's apartments, the more coſtly is the marble, and the finer the ſculpture and painting. It would require volumes to deſcribe the various paintings and antique ſtatues with which all the apartments abound. The chapel is an exquiſite piece of architecture, ſculpture, and painting. Of all the apartments, the king's bedchamber is the moſt magnificent; the bed, which is of crimſon velvet, embroidered with gold, ſtanding in a kind of alcove, where are two figures of Fame repreſented ſitting. The canal in the garden, by which the river Eure is conveyed to it, is a very noble one: the orangery or green-houſe is accounted a fine piece of architecture, and indeed a maſter-piece of its kind; the parterre before it alſo is very beautiful, being adorned with a great number of orange and lemon trees, myrtles, laurels, &c. The labyrinth or maze is a fine grove, ſo called, becauſe its ſeveral walks are ſo interwoven with each other, that it would be a difficult matter for a perſon to find his way out of it without a guide: in ſhort, the garden, for ſtatues, canals, groves, grottos, fountains, and every thing that can render it delightful, is ſuperior to any thing of the kind in Europe. The royal cabinet contains the choiceſt medals, coins, paintings, &c. that Italy could afford. The ſtables, for proportion, conveniency, beauty, and architecture, far exceed many royal palaces. In the ſame park ſtands the fine palace of Trianon; the outſide of which conſiſts wholly of variegated marble, of exquiſite workmanſhip. The gardens

dens are large, and abound in ſtatues and water-works. E. Long. 2. 12. N. Lat. 48. 48.

VERSE, in poetry, a line conſiſting of a number of long and ſhort ſyllables, which run with an agreeable cadence.

Verse is alſo uſed for a part of a chapter, ſection, &c.

VERSIFICATION, the art or manner of making verſe; alſo the tune and cadence of verſe. See Poetry, Part III.

VERSION, a tranſlation of ſome book or writing out of one language into another.

VERT, in heraldry, the term for a green colour. It is called *vert* in the blazon of the coats of all under the degree of nobles: but in coats of nobility it is called *emerald;* and in thoſe of kings, *venus*. In engraving it is expreſſed by diagonals, or lines drawn athwart from right to left, from the dexter chief corner to the ſiniſter baſe.

VERTEBRÆ, in anatomy. See there, n° 29—33.

VERTEX, in anatomy, denotes the crown of the head. Hence vertex is alſo uſed figuratively for the top of other things: thus we ſay, the vertex of a cone, pyramid, &c.

Vertex, is alſo uſed in aſtronomy for the point of the heaven directly over our heads, properly called the *zenith*.

VERTICILLATÆ, the name of a claſs in Ray's and Boerhaave's Methods, conſiſting of herbaceous vegetables, having four naked ſeeds, and the flowers placed in whorls round the ſtalk. The term is ſynonimous to the labiati, or lip-flowers of Tournefort; and is exemplified in mint, thyme, and ſavory.

Verticillatæ is alſo the name of the 42d order in Linnæus's Fragments of a Natural Method, conſiſting of plants which anſwer the above deſcription.

VERTICILLUS, a mode of flowering, in which the flowers are produced in rings at each joint of the ſtem, with very ſhort foot-ſtalks. The term is exemplified in mint, hore-hound, and the other plants of the natural order deſcribed above.

VERTICITY, is that property of the loadſtone whereby it turns or directs itſelf to one particular point.

VERTIGO, in medicine. See there, n° 182.

VERUMONTANUM, in anatomy. See there, n° 371, m.

VERVAIN, in botany. See Verbena.

VERTOT d'Auboef (René Aubert de), a celebrated hiſtorian, was deſcended from a noble and ancient family in Normandy, and born in 1655. At 16 years of age he became a Franciſcan friar; afterwards he entered into the order of the Premonſtratenſes, in which he had ſeveral benefices; and at length was a ſecular eccleſiaſtic. He became ſecretary to the ducheſs of Orleans, member of the Academy of Inſcriptions, and hiſtoriographer of Malta. He died at Paris in 1735. His principal works are, 1. The Hiſtory of the Revolutions of Sweden. 2. The Revolutions of Portugal. 3. The Revolutions of the Romans. 4 The Hiſtory of Malta. Theſe works are written in elegant French, and tranſlated into moſt of the languages of Europe.

VERTUE (George), an eminent engraver, was born in London in the year 1684, where he was put apprentice to an engraver of arms; but his genius and ſpirit prompting him to appear in a higher ſphere, he applied himſelf with great aſſiduity to learn the art of drawing, in which he became a good proficient. He afterwards commenced engraver; and though greatly reſtrained by the native modeſty of his temper, made a conſiderable figure in that buſineſs, particularly in engraving of portraits, in which he carried the art to greater perfection than any Engliſh engraver had done before him, and for the greateſt part of his life had no equal in this kingdom. Sir Godfrey Kneller was his firſt patron; and he was afterwards encouraged by lord Somers, the earl of Wincheſter, the lord Coleraine, the lord Oxford, &c. and the late prince of Wales. His works are numerous. They are generally faithfully copied, and highly finiſhed; and though they are far from equalling the works of ſome of our preſent engravers, they are not deſtitute of merit. Vertue was an antiquarian; and has redeemed from obſcurity many valuable remains of antiquity. He died in 1756, and was buried in the cloiſters of Weſtminſter abbey. He was a very amiable man in private life; and was much eſteemed by his friends for his piety, modeſty, ſimplicity, and candour.

VERULAM. See Bacon.

VESALIUS (Andreas), a celebrated phyſician and anatomiſt, was born at Bruſſels about the year 1512. He ſtudied phyſic at Paris under James Sylvius; but applied himſelf chiefly to anatomy, which was then very little known, diſſections being eſteemed unlawful and impious: and it appears from his work *De humana corporis fabrica*, that he perfected himſelf in this uſeful knowledge very early. About the year 1537, the republic of Venice made him profeſſor in the univerſity of Padua, where he taught anatomy for ſeven years; Charles V. called him to be his phyſician, as he was alſo to Philip II. king of Spain. Veſalius was now at the height of his glory, when all of a ſudden he formed the deſign of taking a journey to Paleſtine; concerning which journey we are told the following ſtory. A young Spaniſh nobleman he attended being believed to be dead, Veſalius obtained leave to open him to explore the true cauſe of his illneſs; but when he opened the breaſt, he perceived ſymptoms of life, and ſaw the heart beat. The parents, not ſatisfied with proſecuting him for murder, accuſed him of impiety to the inquiſition, in hopes that tribunal would puniſh him with greater rigour: but the king interpoſing, ſaved him on condition of his making a pilgrimage to the Holy Land. He was ſhipwrecked on his return, and thrown upon the iſland of Zante, where he periſhed, in 1564. He was the author of ſeveral works, the principal of which is *De humani corporis fabrica*.

VESICATORIUM, a Blister; an application of an acrid nature made to any part of the body, in order to draw a flux of humours to that part, and thus elevate the ſcarf-ſkin into a bliſter.

VESPA, the wasp; a genus of inſects belonging to the order of hymenoptera. The mouth conſiſts of two jaws without any proboſcis; the ſuperior wings are plaited; the eyes are lunar; and there is a ſharp ſting in the tail. There are 28 ſpecies.

The crabro, or large waſp, makes its neſt in the trunks of hollow trees, and in the timber work of lofts. Its cakes or combs are compoſed of a ſubſtance like unto coarſe paper, or ruſty parchment.

It is very voracious, devouring other inſects, and even bees.

Of theſe inſects, ſome live in ſociety, others are ſolitary. A diſtinguiſhing character of this genus of flies is, their bodies being ſmooth and apparently without hairs. Their upper wings, when at reſt, are folded in two, the whole length of them. At the riſe of each of of theſe wings is ſituated a ſcaly part, which performs the office of a ſpring to hinder the upper wing from riſing too high, in the flapping of their wings; a caution very important to thoſe carnivorous inſects, who purſue their prey on full ſtretch of wing.

The common domeſtic or ſubterraneous waſps, raiſe buildings, live in aſſociations, feed on plunder, and commit great outrages on our wall-fruit. This numerous commonwealth is founded by a ſingle female impregnated during the autumn, and that has weathered out the ſeverity of the winter. It digs a hole in a dry ſoil, contrives itſelf a ſinuous inlet, or elſe it takes up with the dwelling place of a mole, where it haſtily builds a few cells and depoſits its eggs. Within the ſpace of 20 days, they have gone through the different ſtates of larvæ, chryſalids, and turned to waſps. Nature all-wiſe provides for every thing. The mule-waſps, or that are of no ſex, are the only ones that labour at laying the foundation of the republic. The firſt eggs that are hatched prove to be neuter-waſps. No ſooner are they come into exiſtence, but they fall to work, enlarge the hole, and go about upon wood, lattice-work, and window ſaſhes, in ſearch of materials for building. With their teeth they cut, hack, and tear off ſmall fibres of wood, which they moiſten with a liquor they diſgorge, and then convey them to the work-ſhop. Other labourers are in waiting for them, who with thoſe materials ſet about the conſtruction of the waſp-neſt, an edifice outwardly compoſed of ſheets of paper, which not being in contact with each other, dampneſs cannot penetrate to the inſide. This latter part conſiſts of 12 or 15 ſtories, and between each runs a colonade formed by the faſtenings which connect the cakes one to the other. Every ſtory is as it were a market-place, where the citizens may take their walks. Their cells are hexagonal, and form the cradle in which the mother continues to lay eggs of neuter-waſps to the number of 15,000 or 16,000; after which it depoſits 300 eggs of females, and as many of males. The elder brothers, or firſt-hatched inſects, take amazing care of thoſe born after them, by proportioning their food to the delicacy of their ſtomach. Firſt, it conſiſts of the juice of fruits and meats; afterwards it is the carcaſes of inſects. The caterers provide for the labourers. Each one takes his own portion; there is no diſpute, no fighting. The republic grows daily more numerous, living in profound peace. Every individual, as ſoon as he has acquired ſufficient ſtrength, flies away to the fields. They then become a gang of banditti; they pillage our wall-trees, break into our fruit before its maturity, dart with the fierceneſs of hawks upon our bees, cut their throats to poſſeſs themſelves of their honey, plunder and lay waſte their commonwealth, riot on the fruits of their labour, and oblige them to remove. During the period of plenty, the waſps bring all the booty to the neſt, and ſhare it amongſt them. There is nothing then goes forwards but feaſting, rioting, and good fellowſhip; but concord cannot be laſting among robbers. Towards the month of October, proviſions begin to run ſhort; when this lively, this amicable young brood is fired with a kind of rage, and the neſt is now nothing but a ſcene of horror. The neuters and males tear from their cradles the eggs, the larvæ, the chryſalids, and the new-born inſects, without ſhowing mercy to any. They next fight againſt one another; tho' their duels ſeldom proceed to death as thoſe do of the bees. The males alone are deſtitute of ſtings. The hopes of the ſtate, the ſolicitude for poſterity, the love of their native place, no longer exiſt; the whole commonwealth is overturned to the very foundation. Froſts and rains throw the citizens into a ſtate of languor. They almoſt all periſh; luckily for us and our bees. Some few females eſcape the diſaſters of inteſtine war, and the ſeverity of winter, which in the enſuing ſpring become founders of new republics. One robber is ſometimes uſeful in bringing another to puniſhment. Some butchers hang up before their ſhop a calf's liver, or any other tender meat. The waſps come in queſt of this delicate food; and, fond of enjoying it to themſelves, they purſue the blue-bottle flies from whoſe eggs are produced the maggots that ſpoil meat; and this is the only advantage we can reap from waſps.

Aërial waſps are the ſmalleſt ſpecies of them; nor is their ſociety numerous. Their hiſtory, as well as their manners, are the ſame as thoſe of the common waſp; but their buildings are on a different conſtruction. Their neſt is faſtened to the branch of a tree with a kind of band; and is in bigneſs from the ſize of an orange down to that of an egg. Wood reduced to paper is the material part of it; which if it were of a ruddy colour, might be taken for a large opening roſe. It is covered over with a varniſh impenetrable by water. One of thoſe neſts was neither mollified nor impaired by that element.

VESPASIAN, the 10th emperor of Rome; remarkable for his clemency and other virtues. See Rome, n° 332—339.

VESPERS, in the church of Rome, denote the afternoon ſervice; anſwering in ſome meaſure to the evening prayers of the church of England.

VESPERTILIO, the Bat; a genus of quadrupeds, belonging to the order of primates. All the teeth are erect, pointed, near each other; and the firſt four are equal. The fore-feet have the toes connected by a membrane expanded into a kind of wings, by which the creature is enabled to fly. There are many ſpecies; of which the moſt remarkable are,

1. The vampyrus, vampire, or Ternate bat, with large canine teeth; four cutting teeth above, the ſame below; ſharp black noſe; large naked ears; the tongue is pointed, terminated by ſharp aculeated papillæ; talons very crooked, ſtrong, and compreſſed ſidewiſe; no tail: the membrane divided behind quite to the rump: head of a dark ferruginous colour; on the neck, ſhoulders, and under-ſide, of a much lighter and brighter red; on the back the hair ſhorter, duſky, and ſmooth: the membranes of the wings duſky. They vary in colour; ſome being entirely of a reddiſh brown, others duſky.

Theſe monſters inhabit Guinea, Madagaſcar, and all the iſlands from thence to the remoteſt in the Indian Ocean. They fly in flocks, and perfectly obſcure the air with their numbers; they begin their flight from one neighbouring iſland to another immediately on ſunſet, and return in clouds from the time it is light till ſun-riſe. They live on fruits; and are ſo fond of the juice of the palm-tree, that they will intoxicate themſelves with it till they drop on the ground. It is moſt likely, from the ſize of their teeth, they are carnivorous. Mr Edwards relates, that they will dip into the ſea for fiſh. They ſwarm like bees; hanging by one another from the trees in great cluſters. The Indians eat them, and declare the fleſh to be very good: they grow exceſſively fat at certain times of the year. The French who live in the Iſle de Bourbon, boil them in their bouillon, to give it a reliſh. The negroes have them in abhorrence. Many are of an enormous ſize: Beckman meaſured one, whoſe extent from tip to tip of the wings was five feet four inches; and Dampier another, which extended further than he could reach with out-ſtretched arms. Their bodies are from the ſize of a pullet to that of a dove: their cry is dreadful, their ſmell rank, their bite, reſiſtance, and fierceneſs great, when taken.

The ancients had ſome knowledge of theſe animals. Herodotus mentions certain winged wild beaſts like bats, that moleſted the Arabs who collected the caſſia, to ſuch a degree, that they were obliged to cover their faces, all but their eyes, with ſkins. It is very probable, as M. de Buffon remarks, it was from ſuch relations that poets formed their fictions of Harpies.

Linnæus gives this ſpecies the title of *vampyre;* conjecturing it to be the kind which draws blood from people in their ſleep. M. de Buffon denies it; aſcribing that faculty only to a ſpecies found in South America. But there is reaſon to imagine that this thirſt after blood is not confined to the bats of one continent, nor to one ſpecies: for Bontius and Nieuhoff informs us, that the bats of Java ſeldom fail attacking perſons who lie with their feet uncovered, whenever they can get acceſs; and Gumilla, after mentioning a greater and leſſer ſpecies found on the banks of the Oronoque, declares them to be equally greedy after human blood. Perſons thus attacked have been known to be near paſſing from a ſound ſleep into eternity. The bat is ſo dexterous a bleeder, as to inſinuate its aculeated tongue into a vein without being perceived, and then ſuck the blood till it is ſatiated; all the while fanning with its wings, and agitating the air in that hot climate in ſo pleaſing a manner, as to fling the ſufferer into a ſtill ſounder ſleep. It is therefore very unſafe to reſt either in the open air, or to leave open any entrance to theſe dangerous animals: but they do not confine themſelves to human blood; for M. Condamine ſays, that in certain parts of America they have deſtroyed all the great cattle introduced there by the miſſionaries.

2. The ſpectrum, or ſpectre, with a long noſe; large teeth; long, broad, and upright ears; at the end of the noſe a long conic erect membrane, bending at the end, and flexible: hair on the body cinereous, and pretty long: wings full of ramified fibres: the membrane extends from hind leg to hind leg; no tail; but from the rump extend three tendons, terminating at the edge of the membrane. By Seba's figure the extent of the wings are two feet two inches; from the end of the noſe to the rump, ſeven iuches and an half.

Inhabits South America; lives in the palm-trees; grows very fat; called *vampyre* by M. de Buffon, who ſuppoſes it to be the ſpecies that ſucks human blood: but neither Piſo, nor any other writer who mentions the fact, gives the leaſt deſcription of the kind.

3. The Peruvian bat hath a head like a pug-dog; large ſtraight-pointed ears; two canine teeth, and two ſmall cutting teeth between each, in each jaw: the tail is incloſed in the membrane which joins to each hind-leg, and is alſo ſupported by two long cartilaginous ligaments involved in the membrane: colour of the fur, iron grey: body equal to that of a middle-ſized rat: extent of wings two feet five inches.

4. The noctule hath the noſe ſlightly bilobated; ears ſmall and rounded; on the chin a minute verruca; hair reddiſh aſh-colour: length of the rump two inches eight-tenths; tail one inch ſeven-tenths; extent of wings 13 inches. Inhabits Great Britain and France; flies high in ſearch of food, not ſkimming near the gronnd. A gentleman informed Mr Pennant of the following fact relating to thoſe animals, which he was witneſs to: That he ſaw taken under the eaves of Queen's College, Cambridge, in one night, 185; the ſecond night, 63; the third night, 2; and that each that was meaſured had 15 inches extent of wings.

Bats appear abroad in this country early in the ſpring; ſometimes they are tempted by a warm day to ſally out in the winter. They fly in the evenings, and live on moths and other nocturnal inſects. They fly by jerks, not with the regular motion of birds, for which the ancients miſtook them. They frequent glades and ſhady places: will go into larders, and gnaw any meat they find. They bring two young at a time, which they ſuckle at their breaſt. They retire at the end of ſummer into caves, the eaves of houſes, and into ruined buildings, in vaſt multitudes, where they generally remain torpid, ſuſpended by the hind-legs, enveloped in their wings. They are the prey of owls. Their voice is weak. Ovid takes notice both of that and the origin of the Latin name:

> *Minimam pro corpore vocem*
> *Emittunt; peraguntque leves ſtridore querelas.*
> *Tectaque, non ſylvas eelebrant; lucemque peroſæ*
> *Nocte volant: ſeroque trahunt a veſpcre nomen.*

VESSEL, a general name given to the different ſorts of ſhips which are navigated on the ocean, or in canals and rivers. It is, however, more particularly applied to thoſe of the ſmaller kind, furniſhed with one or two maſts. See Ship; and Plate CCLXIV. and CCLXV.

VESTA, in pagan worſhip, the ſame with Cybele. See Cybele.

Vesta the *Younger*, in pagan worſhip, the goddeſs of Fire, was the daughter of Saturn and Cybele, and the ſiſter of Ceres. She was ſo much in love with chaſtity, that on Jupiter's aſcending the throne and offering to grant whatever ſhe aſked, ſhe only deſired the preſervation of her virginity, which ſhe obtained.—Veſta was not repreſented in her temple by any image.

VESTALIA, in Roman antiquity, a feſtival celebrated in honour of the goddeſs Veſta, on the 5th of the ides of June; that is, on the ninth of the month.

VESTALS, among the ancient Romans, were prieſteſſes of the goddeſs Veſta, and had the perpetual fire committed to their charge: they were at firſt only four in number, but afterwards increaſed to ſix; and it does not appear that their number ever exceeded ſix, among whom was one ſuperior to the reſt, and called *veſtalis maxima*.

The veſtals were choſen from ſix to ten years of age, and obliged to ſtrict continency for 30 years; the firſt 10 of which were employed in learning the ceremonies of religion, the next 10 in the performance of them, and the 10 laſt in teaching them to the younger veſtals.

The habit of the veſtals conſiſted of an head-dreſs, called *infula*, which ſat cloſe to the head, and from whence hung certain laces called *vitta*; a kind of ſurplice made of white linen, and over it a purple mantle with a long train to it.

VESTIBLE, in architecture, a kind of entrance into a large building; being an open place before the hall, or at the bottom of the ſtair-caſe.

VESTRY, a place adjoining to a church, where the veſtments of the miniſter are kept; and alſo a meeting at ſuch place, conſiſting of the miniſter, church-wardens, and chief men of moſt pariſhes, who make a pariſh veſtry or meeting. By cuſtom there are ſelect veſtries, being a certain number of perſons choſen to have the government of the pariſh, make rates, and take the accounts of church-wardens, &c.

VESUVIUS, a famous burning mountain ſituated ſix miles eaſt from the city of Naples in Italy.

One ſide of this volcano is well cultivated and fertile, producing great plenty of vines; but the ſouth and weſt ſides are entirely covered with cinders and aſhes; while from the top a ſulphureous ſmoke, and ſometimes moſt violent flames, &c. as in other volcanoes. From the foot of the mountain to the top is about three Italian miles, but the perpendicular height is only 3700 feet. The aſcent on theſe ſides, by reaſon of the ſteepneſs of the mount, is very difficult and tedious; but there are ſome peaſants who live about the mountain, and for a ſmall conſideration aſſiſt travellers in clambering up. They wear leathern belts, of which the ſtrangers take hold in order to render their aſcent more eaſy. The mountain has two tops, one of which only is properly called *Veſuvius*: the other goes by the name of *Somme*; and Sir William Hamilton is of opinion that it is the latter which the ancients called Veſuvius.

The firſt remarkable eruption of Veſuvius happened in the year 79, in the reign of the emperor Titus, when the cities of Pompeii and Herculaneum were entirely buried by the ſtones and aſhes thrown out. Incredible miſchief alſo was done to the neighbouring country, and numbers of people loſt their lives, among whom was Pliny the Elder, whoſe curioſity having induced him to approach too near, he was ſuffocated by the noxious ſteams. This eruption appears to have been very violent; but though it is the firſt on record, it is the opinion of the beſt judges, that it was by no means the firſt which had happened. Since that time, however, they have been much more frequent, and we have accounts of 29 different eruptions. Of theſe a very remarkable one happened in 1767; of which ſome particulars are related under the article ÆTNA, for the ſake of illuſtrating the hiſtory of that mountain. But by far the moſt remarkable which is recorded either of Veſuvius or any other mountain, happened in the year 1779, and is particularly related by Sir William Hamilton in the Philſophical Tranſactions for 1780; to which we beg leave to refer the reader, as the detail would be here improper after the full account given of volcanic phenomena under the article above-mentioned. See alſo VOLCANO.

VETCH, in botany. See VICIA.

VETERAN, among the ancient Romans, an appellation given to a *ſoldier* grown old in the ſervice, or who had made a certain number of compaigns.

VEXILLUM, in botany; the upper petal of a pea-bloom, or butterfly-ſhaped flower, which is generally larger than any of the others.

VIALES, in mythology, a name given among the Romans to the gods who had the care and guard of the roads and high-ways.

VIATICUM, in Roman antiquity, an appellation given in common to all officers or any of the magiſtrates; as *lictors*, *accenſi*, *ſcribes*, *criers*.

VIBEX, is ſometimes uſed, by phyſicians, for a black and blue ſpot in the ſkin occaſioned by an afflux or extravaſation of blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, as a pendulum,

VIBURNUM, in botany, a genus of the trigynia order, belonging to the pentandria claſs of plants. There are nine ſpecies, of which the moſt remarkable are, 1. The lantana, common viburnum, wayfaring, or pliant mealy tree, riſes with a woody ſtem, branching twenty feet high, having very pliant ſhoots covered with a lightiſh-brown bark; large heart-ſhaped, veined, ſerrated leaves, white and hoary underneath; and the branches terminated by umbels of white flowers, ſucceeded by bunches of red berries. It grows naturally in England in hedges, &c. 2. The opulus, or gelder-roſe; conſiſting of two varieties, one with flat-flowers, the other globular. The former grows eighteen or twenty feet high, branching oppoſite, of an irregular growth, and covered with a whitiſh bark; large lobated or three-lobed leaves on glanduloſe foot-ſtalks, and large flat umbels of white flowers at the ends of the branches, ſucceeded by red berries. Grows naturally in England in marſhy places. The latter grows fifteen or eighteen feet high, branching like the other, garniſhed with large lobated or three-lobed leaves, on glandular foot-ſtalks; and large globular umbels of white flowers at the ends of the branches, in great abundance. This tree when in bloom exhibits a ſingularly fine appearance: the flowers, though ſmall, are collected numerouſly into large globular umbels round like a ball; hence, it is ſometimes called *ſnowball-trees*. 3. The tinus, common lauruſtinus, or evergreen viburnum; grows eight or ten feet high or more, branching numerouſly from the bottom upwards, aſſuming a cloſe buſhy growth, with the branches ſomewhat hairy and glandulous; very cloſely garniſhed with oval, wholly entire leaves, of a ſtrong green colour, placed in pairs oppoſite; and whitiſh and red flowers, collected numerouſly in large umbellate cluſters all over the plant, at the ſides and ends of the branches, from January until March or April, exhibiting a moſt beautiful appearance. There are a great many varieties; narrow-leaved—broad-leaved—ſhining-leaved—hairy-leaved—white-ſtriped leaved—yellow-ſtriped leaved; all of which are of ſhrubby, buſhy growth, cloſely garniſhed with leaves all the year, and producing a great profuſion of umbellate flowers in winter and ſpring. All the different ſpecies of viburnum, both deciduous and evergren kinds, being of the tree kind, are woody and durable in root, ſtem, and branches. They may all be propagated by layers; and are of ſuch hardy temperature, as to grow freely in the open ground all the year, in ſhrubberies, and other hardy plantations.

VICAR, a perſon appointed as deputy to another, to perform his functions in his abſence, and under his authority.

Vicar, in the canon-law, denotes a prieſt of a pariſh, the predial tithes whereof are impropriated or appropriated; that is, belong either to a chapter, religious houſe, &c. or to a layman who receives them, and only allows the vicar the ſmall tithes, or a convenient ſalary. See the article Parson *and Vicar*.

VICE, in ethics, is ordinarily defined an elective habit, denoting either an exceſs or defect from the juſt medium wherein virtue is placed.

Vice, in ſmithery and other arts converſant in metals, a machine or inſtrument ſerving to hold faſt any thing they are at work upon, whether it is to be beat, filed, or rivetted.

Vice is alſo uſed in the compoſition of divers words to denote the relation of ſomething that comes inſtead or in the place of another; as vice-admiral, vice-chancellor, &c. are officers who take place in the abſence of admirals, &c.

VICEROY, a governor of a kingdom, who commands in the name and inſtead of a king, with full and ſovereign authority. See King.

VICIA, the tare or vetch; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are 18 ſpecies, the moſt remarkable of which is the ſativa or common tare. This is ſo well known, that no deſcription needs be given. It is known to be an excellent fodder for horſes. In ſome parts of England the crop is ploughed in to anſwer the purpoſes of manure to the land. Pigeons are very fond of the ſeeds; and in ſome parts of Sweden, &c. they enter into the compoſition of bread, either alone, or mixed with the flour of rye.—A decoction of them in water is ſometimes given by the common people in England to expel the ſmall-pox and meaſles.

VICISSITUDE, the regular ſucceſſion of one thing after another; as the viciſſitude of day and night, of the ſeaſons, &c.

VICTIM, denotes a bloody ſacrifice offered to ſome deity, of a living creature, as a man or beaſt, which is ſlain to appeaſe his wrath, or obtain ſome favour.

VICTOR (Sextus Aurelius), a Roman hiſtorian, who flouriſhed under the emperors Conſtantius and Julian: as we learn from many paſſages in his own writings, and alſo from Ammianus Marcellinus. This hiſtorian relates, that Conſtantius made him conſul, and honoured him with a brazen ſtatue, on account of his excellent qualifications; although, as he owns of himſelf, he was born in an obſcure village, and of poor and illiterate parents. It is commonly believed that he was an African: it is certain, that he dwells much upon the praiſes of that country, which he calls the glory of the earth; *decus terrarum.* Two books of his are extant in the hiſtorical way: one *De viris illuſtribus urbis Romæ;* the other, *De Cæſaribus;* to which is perfixed *Libellus de origine gentis Romanæ.* The whole makes an abridged hiſtory of Rome, from its foundation down to the reign of Julian incluſive.

VICTORY, the overthrow or defeat of an enemy in war or combat.

Victory, in pagan worſhip, is repreſented by Heſiod as the daughter of Styx and Pallas; and Varro calls her the *daughter of Heaven and Earth.* The Romans erected a temple to her, where they prayed to the gods to give ſucceſs to their arms. They painted her in the form of a woman, clad in cloth of gold. In ſome medals, ſhe is repreſented with wings flying through the air, holding a laurel crown in one hand and a palm in the other; but in other medals, ſhe is ſeen ſtanding upon a globe, with the ſame crown and branch of palm.

VIDA (Marcus Hieronymus), biſhop of Alva, in Mountferrat, and one of the moſt excellent Latin poets that have appeared ſince the Auguſtan age, was born at Cremona in 1470. Having diſtinguiſhed himſelf by his learning, and taſte for literature, he was made biſhop of Alva in 1552. After continuing two years with pope Clement VII. at Rome, he went to reſide upon his ſee; where, for 30 years, he performed all the offices of a good biſhop and a good man; and though he was mild, gentle, and full of goodneſs, he was ſo far from wanting ſpirit, that when the city of Alba was beſieged by the Gauls, he uſed all poſſible means to prevent its being given up, by ſtrenuouſly exhorting the people, and, when proviſions were ſcarce, by ſupplying them at his own expence. His poetics, and poem on the ſilk-worm, paſs for his maſterpiece; his poem on the game of cheſs is alſo greatly admired. He alſo wrote hymns, bucolics, eclogues, and a poem entitled *Chriſtiados* in ſix books; all which are in Latin, and have gained him a great reputation. His works in proſe conſiſt of dialogues, ſynodical conſtitutions, letters, and other pieces. He died in 1566, ſoon after his being made biſhop of Cremona.

VIENNA, a large and celebrated city of Germany, in the circle of Auſtria, and capital of the Hungarian dominions. It ſtands on the ſouth ſide of the Danube, 40 miles weſt of Preſburg, 40 eaſt of Lintz, 100 north-weſt of Buda, 180 ſouth-weſt of Cracow, 450 north of Rome, 560 eaſt of Rotterdam, 500 from Paris, 600 from London, and 570 weſt of Conſtantinople. The Turks call it *Beez*, the natives *Wien*, and the Poles *Wieden*, The ancient Vindobena ſtood in the neighbourhood. The Danube is here pretty wide, forming ſeveral beautiful iſlands well ſtocked with woods. The country to the eaſt and north is level; but to the weſt and ſouth there is a range of mountains, clothed with trees and vines. It ſeems to have been a conſiderable place in the time of the Romans: for it was the ſtation of their Claſſis Iſtrica, or navy on the Danube; and here the emperor Marcus Aurelius is ſaid to have died. In 1192 it was enlarged, beautified, and walled round, with the ranſom-money which the marquis of Auſtria obliged Rich. I. of England to pay when he made him priſoner in his return from the Holy Land, becauſe he took down the Auſtrian banner at Joppa, and threw it into the houſe of office. The city itſelf is of no great extent, Vienna.

containing, beſides churches and cloiſters which have generally extenſive gardens and walks, about 1200 houſes from four to ſeven ſtories high, 80 ſtreets, and 15 principal ſquares. There are many magnificent palaces in it; and in the burghers houſes the ſecond ſtory is allotted for the reſidence of the imperial court officers. It is well fortified after the modern way; and, including the ſuburbs, may be about a quarter as big as London and Weſtminſter. It is very populous, having always great numbers of ſtrangers in it, of moſt European nations, in their proper habits, and may contain generally about 180,000 ſouls. The ſtreets are narrow and dirty; and the air would be very unwholeſome, were it not for the high winds which blow here moſt part of the year: whence the proverb, *Vienna vel ventoſa, vel venenoſa.* In moſt of the ſquares are beautiful fountains and magnificent monuments, erected by the emperors. The metropolitan church of St Stephen is a large magnificent Gothic building, with a tower 460 Auſtrian feet high, and a bell upwards of 10 feet in height and 32 in circumference. The bowels of the archducal family at their deaths are depoſited in a vault of this church; but their hearts in the cloiſter church of the bare-footed Auguſtines, which is the imperial abbey-church, and their bodies in that of the capuchin-cloiſter. The archbiſhop's revenue is near 30,000 imperial florins *per* annum. Among the cloiſters, of which there are a great number here, both in the city and ſuburbs, one of the principal is the Schotten, or Scottiſh Benedictine abbey, whoſe abbot is mitred, and to whoſe juriſdiction the populous ſuburb of St Ulrich, together with the Neubau, is ſubject. This abbey was founded for the Scots, in honour of their countryman St Colman, who was formerly reckoned the patron of Auſtria. At the entrance of St Stephen there is a ſtone placed in the wall, and held in great veneration by the Papiſts, being ſuppoſed to be one of thoſe with which St Stephen was ſtoned to death. It looks like a pebble, and is worn very ſmooth, in conſequence of the ſuperſtition of the people, who are continually touching it out of devotion. From the ſpire of the church is a moſt noble proſpect of the city and adjacent country, and of the Danube, almoſt to Preſburgh in Hungary. In the tower there is a caſe of wooden hammers, with which they call the people to church from Good-Friday to Eaſter-Sunday, becauſe they will not ſuffer the bells to ring out during the time that our Saviour is ſuppoſed to have lain in the grave. Here are many hoſpitals; one in particular called the *Burgher-ſpital*, in which near 3000 perſons are maintained. The imperial palace is a mean old building, conſiſting of two courts; the inner for the imperial family; and the outer, which is the largeſt, for lodging the courtiers and guards. The imperial cabinet of coins and medals is the largeſt and grandeſt in Europe; and the imperial library equals, if not exceeds, that of the Vatican, and the royal library at Paris, being ſuppoſed to contain near 100,000 volumes. Among other curious manuſcripts is one of Livy, above 1000 years old; a Greek manuſcript of Dioſcorides, above 1100; a Greek manuſcript of the book of Geneſis above 1300, containing many curious draughts and repreſentations in miniature or water-colours; Luther's Bible, with a great many notes in his own hand-writing; a Greek manuſcript of the New Teſtament, above 1500 years old, in gold letters on purple. Here is a noble univerſity, endowed with large revenues and privileges; and divided into four claſſes, having each of them peculiar rules and immunities; namely, the Auſtrian claſs for the ſtudents of Auſtria, Italy, and other countries beyond the Alps; that of the Rhine, for the weſtern parts of the empire, France, Spain, and the Netherlands; that of the Hungarians, for Hungary, Bohemia, with other countries, which ſpeak Sclavonic, and ſome parts of Germany, with Great Britain and Ireland. The principal, or chancellor, with the other maſters of the univerſity, have the power of life and death over the ſcholars: but the eſtabliſhments for painting, ſculpture, and the other fine arts, are on a much better footing here than thoſe for the ſciences, eſpecially in reſpect to philoſophy and divinity, which are little better than a heap of ſcholaſtic chimeras. However, in the year 1752, an imperial ordinance was iſſued, with a view to improve the method of teaching. Vienna is divided into four quarters, one of which is called the *Schotten*, that is, the Scots quarter. One of the gates alſo is called the *Scots gate*, in remembrance of ſome noble exploit performed there by the troops of that nation. The miniſters of the Proteſtant crowned heads have chapels here, as in other Roman Catholic countries; and ſome Proteſtants held offices, both civil and military, under the late emperor Charles VI. The ſuburbs are much larger than the city itſelf. To ride round the line which incloſes them, at an ordinary pace, would take up about four hours. The largeſt of them is called *Leopold-ſtadt*, from the emperor Leopold. In that of Rouſſau, is the grand palace of Lichtenſtein. In that of Wieden, is the new imperial favourita, or ſummer-palace. In that called *Rennweg*, is the cloiſter of the female Salerians or Engliſh nuns, with the grand palaces of the late prince Eugene of Savoy, and of the prince of Schwarzenberg. In that called *Landſtraſze*, is a fine cloiſter of hermits of the order of St Auguſtine, who wear white ermine. The city, by means of the Danube, is well ſupplied with proviſions, and every thing elſe uſeful, neceſſary, or agreeable. As it is the ſeat of the court, and the ſupreme colleges and tribunals, there is a prodigious reſort to it, eſpecially of the nobleſſe, from all the hereditary countries, and others, particularly thoſe of the empire. The grandeur of this court exceeds that of moſt others. All or moſt of the officers of ſtate and of the houſehold, of the horſe and foot guards, and above 100 gentlemen of the bed-chamber, who wear golden keys at their breaſts, are either princes, counts, or barons; but the etiquette, that is, ancient forms and uſages which are rigidly obſerved, though univerſolly exclaimed againſt, gives it an air of conſtraint, that is no where elſe to be ſeen. Days of Gala, i. e. feſtivals and holidays, are very welcome to both the court and city. They are of three ſorts, the court-gala, the grand-gala, and little-gala. The firſt are the birth-days, name-days, &c. of the emperor and empreſs. The ſecond, thoſe of ſome miniſter, which are kept in the city. And the third, when any piece of good fortune happens to a family of rank and diſtinction.

Vienna, Vigil.

VIGIL, in church-hiſtory, is the eve or next day before any ſolemn feaſt; becauſe then Chriſtians were wont to watch, faſt, and pray, in their churches.

Vigils *of Plants*, a term under which botaniſts comprehend the preciſe time of the day in which the flowers of different plants open, expand, and ſhut.

As all plants do not flower in the ſame ſeaſon, or month; in like manner, thoſe which flower the ſame day, in the ſame place, do not open and ſhut preciſely at the ſame hour. Some open in the morning, as the lip flowers, and compound flowers with flat ſpreading petals; others at noon, as the mallows; and a third ſet in the evening, or after ſun-ſet, as ſome geraniums and opuntias: the hour of ſhutting is equally determined. Of thoſe which open in the morning, ſome ſhut ſoon after, while others remain expanded till night.

The hours of opening, like the time of flowering, ſeem to vary, according to the ſpecies of the plant, the temperature of the climate, and that of the ſeaſon. Flowers, whoſe extreme delicacy would be hurt by the ſtrong impreſſions of an ardent ſun, do not open till night; thoſe which require a moderate degree of heat to elevate their juices, in other words, whoſe juices do not riſe but in the morning or evening, do not expand till then; whilſt thoſe which need a more lively heat for the ſame purpoſe, expand at noon, when the ſun is in his meridian ſtrength. Hence it is, that the heat of the air being greater betwixt the tropics than elſewhere, plants which are tranſported from thoſe climates into the cold or temperate climates of Europe, expand their flowers much later than in their native ſoil. Thus, a flower which opens in ſummer at ſix o'clock in the morning at Senegal, will not open at the ſame ſeaſon in France and England till eight or nine, nor in Sweden till ten; that which opens at ten at Senegal, does not open in France and England till noon; and, in Sweden, the plant does not flower, or, at leaſt, loſes its petals, and frequently bears no fruit: laſtly, a plant which opens its flowers, in Senegal, at noon, or at one or two hours after noon, bears neither flowers nor fruit in France, England, and Sweden. The ſame thing happens to moſt plants of temperate countries, when removed to Senegal, or other ſultry climes.

Linnæus diſtinguiſhes by the general name of *ſolar (flores ſolares)* all thoſe flowers which obſerve a determinate time in opening and ſhutting. Theſe flowers are again divided, from certain circumſtances, into three ſpecies, or kinds:

Equinoctial flowers *(flores æquinoctiales)* are ſuch as open and ſhut at all ſeaſons, at a certain fixed or determinate hour.

Tropical flowers *(flores tropici)* are ſuch whoſe hour of opening is not fixed at all ſeaſons, but accelerated or retarded according as the length of the day is encreaſed or diminiſhed.

Meteorous flowers *(flores meteorici)* are ſuch whoſe hour of expanſion depends upon the dry or humid ſtate of the air, and the greater or leſs preſſure of the atmoſphere. Of this kind is the Siberian ſow-thiſtle, which ſhuts at night if the enſuing day is to be clear and ſerene, and opens if it is to be cloudy and rainy. In like manner the African marigold, which in dry ſerene weather opens at ſix or ſeven in the morning, and ſhuts at four o'clock in the afternoon, is a ſure indication that rain will fall during the courſe of the day, when it continues ſhut after ſeven.

VIGNOLA (James Barozzio de), a learned architect of the 16th century, was born at Vignola a ſmall town in the marquiſate of that name, and became eſteemed at Rome and in France for his taſte and ſkill in the art of building and caſting ſtatues. He compoſed a book on the five orders of architecture, which is eſteemed; and died at Rome in 1573, aged 66.

VIGO, a ſea-port town of Spain, in Galicia, with an old caſtle and a fort. It is ſeated in a fertile country by the ſea-ſide. It was rendered famous by a ſea-fight between the confederate fleet commanded by Sir Geo. Rook, and a ſquadron of French men of war, while the duke of Ormond with a body of land-forces drove the Spaniards from the caſtles which defended the harbour. Admiral Hopſon having with infinite danger, broke thro' the boom, made acroſs the mouth of the harbour, the Engliſh took four galleons and five large men of war, and the Dutch five galleons and one man of war. Four galleons, with 14 men of war, were deſtroyed, with abundance of plate and other rich effects. W. Long. 8. 21. N. Lat. 42. 3.

VILLA franca, the name of ſeveral towns; one in Piedmont, three miles eaſt of Nice; another of Catalonia, 18 miles weſt of Barcelona; a third, the capital of St Michael, one of the Azores; and a fourth, a town of Eſtremadura in Spain, 57 miles ſouth-eaſt of Salamanca.

VILLAGE, an aſſemblage of houſes inhabited chiefly by peaſants and farmers, and having no market, whereby it is diſtinguiſhed from a town. The word is French, formed of *vil*, or *vilis*, "low, mean, contemptible:" or rather, from the Latin *villa*, a country-houſe or farm.

VILLAIN, or Villein, in our ancient cuſtoms, denotes a man of ſervile or baſe condition, viz. a bondman or ſervant.

VILLARS (Lewis Hector, duke de) marſhal of France, grandee of Spain, &c. and a very brave general in the 18th nentury, was the ſon of Peter marquis de Villars, of a noble and ancient family. He was at firſt aid-de-camp to marſhal de Bellefons, his couſin; and diſtinguiſhed himſelf in ſeveral ſieges and battles till the year 1702, when having obtained the victory at Fredlinghem from the prince of Baden, he was made marſhal of France. The marſhal de Villars took the fort of Kell the year following, and gained the battle of Hochſtet. In 1707 he forced the lines of Stolhoffen, and raiſed large contributions from the enemy: but in 1709, he, in conjunction with marſhal Bouflers, was entirely defeated by the duke of Marlborough, at the battle of Malplaquet, when marſhal Villars was wounded at the beginning of the action. In 1712, he gained much glory by forcing the intrenchments at Denain on the Scheld; which was followed by the taking of Marchiennes, Douay, Bouchain, Landau, Friburg, &c. and by the peace concluded at Raſtat between the emperor and France in 1714. The marſhal de Villars, who had been plenipotentiary at the treaty of Raſtat, was made preſident of the council of war in 1715, then counſellor of the regency, and miniſter of ſtate. In 1733, he was nominated to command in Italy under the king of Sardinia, and the French king declared him marſhal-general of his camps and armies; a title which had not been granted to any one ſince the marſhal Turenne, who appears to have been the firſt who was ever honoured with it. The marſhal de Villars made himſelf maſter of Piſighitona, Milan, Novara, and Tortona, But having opened the following campaign, he fell ſick, and died at Turin, in 1734, aged 82. The Memoirs of M. de Villars have been publiſhed in Holland, the firſt volume of which was written by himſelf.

Blackſt. Comment.

VILLENAGE, in law. The folk-land or eſtates held in villenage, was a ſpecies of tenure neither ſtrictly feodal, Norman, or Saxon; but mixed, and compounded of them all; and which alſo, on account of the heriots that uſually attend it, may ſeem to have ſomewhat Daniſh in its compoſition. Under the Saxon government there were, as Sir William Temple ſpeaks, a ſort of people in a condition of downright ſervitude, uſed and employed in the moſt ſervile works, and belonging, both they, their children, and effects, to the lord of the ſoil, like the reſt of the cattle or ſtock upon it. Theſe ſeem to have been thoſe who held what was called the *folkland*, from which they were removeable at the lord's pleaſure. On the arrival of the Normans here, it ſeems not improbable, that they, who were ſtrangers to any other than a feodal ſtate, might give ſome ſparks of enfranchiſement to ſuch wretched perſons as fell to their ſhare, by admitting them, as well as others, to the oath of fealty; which conferred a right of protection, and raiſed the tenant to a kind of eſtate ſuperior to downright ſlavery, but inferior to every other condition. This they called *villenage*, and the tenants *villeins*, either from the word *vilis*, or elſe, as Sir Edward Coke tells us, from *villa;* becauſe they lived chiefly in villages, and were employed in ruſtic works of the moſt ſordid kind: like the Spartan *helotes*, to whom alone the culture of the lands was conſigned; their rugged maſters, like our northern anceſtors, eſteeming war the only honourable employment of mankind.

Theſe villeins, belonging principally to lords of manors, were either villeins *regardant*, that is, annexed to the manor or land: or elſe they were *in groſs*, or at large; that is, annexed to the perſon of the lord, and transferable by deed from one owner to another. They could not leave their lord without his permiſſion; but, if they ran away, or were purloined from him, might be claimed and recovered by action, like beaſts or other chattels. They held indeed ſmall portions of land by way of ſuſtaining themſelves and families; but it was at the mere will of the lord, who might diſpoſſeſs them whenever he pleaſed; and it was upon villein ſervices, that is, to carry out dung, to hedge and ditch the lord's demeſnes, and any other the meaneſt offices: and their ſervices were not only baſe, but uncertain both as to their time and quantity.

A villein could acquire no property either in lands or goods: but, if he purchaſed either, the lord might enter upon them, ouſt the villein, and ſeize them to his own uſe; unleſs he contrived to diſpoſe of them again before the lord had ſeiſed them, for the lord had then loſt his opportunity.

In many places alſo a fine was payable to the lord, if the villein preſumed to marry his daughter to any one without leave from the lord: and, by the common law, the lord might alſo bring an action againſt the huſband for damages in thus purloining his property. For the children of villeins were alſo in the ſame ſtate of bondage with their parents; whence they were called in Latin, *nativi*, which gave riſe to the female appellation of a villein, who was called a *neiſe*. In caſe of a marriage between a freeman and a neiſe, or a villein and a freewoman, the iſſue followed the condition of the father, being free if he was free, and villein if he was villein; contrary to the maxim of the civil law, that *partus ſequitur ventrem.* But no baſtard could be born a villein, becauſe by another maxim of our law he is *nullius filius;* and as he can *gain* nothing by inheritance, it were hard that he ſhould *loſe* his natural freedom by it. The law, however, protected the perſons of villeins, as the king's ſubjects, againſt atrocious injuries of the lord: for he might not kill or maim his villein; though he might beat him with impunity, ſince the villein had no action or remedy at law againſt his lord, but in caſe of the murder of his anceſtor or the maim of his own perſon. Neifs indeed had alſo an appeal of rape, in caſe the lord had violated them by force.

Villeins might be enfranchiſed by manumiſſion. In proceſs of time they gained conſiderable ground on their lords; and in particular ſtrengthened the tenure of their eſtates to that degree, that they came to have in them an intereſt in many places full as good, in others better than their lords. For the good-nature and benevolence of many lords of manors having, time out of mind, permitted their villeins and their children to enjoy their poſſeſſions without interruption, in a regular courſe of deſcent, the common law, of which cuſtom is the life, now gave them title to preſcribe againſt their lords; and, on performance of the ſame ſervices, to hold their lands, in ſpite of any determination of the lord's will. For, though in general they are ſtill ſaid to hold their eſtates at the will of the lord, yet it is ſuch a will as is agreeable to the cuſtom of the manor; which cuſtoms are preſerved and evidenced by the rolls of the ſeveral courts-baron in which they are entered, or kept on foot by the conſtant immemorial uſage of the ſeveral manors in which the lands lie. And, as ſuch tenants had nothing to ſhow for their eſtates but theſe cuſtoms, and admiſſions in purſuance of them, entered on thoſe rolls, or the copies of ſuch entries witneſſed by the ſteward, they now began to be called *tenants by copy of court-roll*, and their tenure itſelf a *copyhold*.

Privileged VILLENAGE, a ſpecies of tenure otherwiſe called *villein-ſocage*. See TENURE.

Ancient demeſne conſiſts of thoſe lands or manors which, though now perhaps granted out to private ſubjects, were actually in the hands of the crown in the time of Edward the confeſſor, or William the conqueror; and ſo appear to have been by the great ſurvey in the exchequer called *domeſday book*. The tenants of theſe lands, under the crown, were not all of the ſame order or degree. Some of them, as Britton teſtifies, continued for a long time pure and abſolute villeins, dependent on the will of the lord: and common copyholders in only a few points. Others were in great meaſure enfranchiſed by the royal favour: being only bound in reſpect of their lands to perform ſome of the better ſort of villein-ſervices; but thoſe determinate and certain; as, to plough the king's land for ſo many days, to ſupply his court with ſuch a quantity of proviſions, and the like; all of which are now changed into pecuniary rents: and in conſideration hereof they had many immunities and privileges granted to them; as, to try the right of their property in a peculiar court of their own, called a *court of ancient demeſne*, by a peculiar proceſs denominated a writ of right cloſe: not to pay toll or taxes; not to contribute to the expences of knights of the ſhire; not to be put on juries, and the like.

Theſe tenants therefore, though their tenure be abſolutely copyhold, yet have an intereſt equivalent to a freehold: for, though their ſervices were of a baſe and villenous original, yet the tenants were eſteemed in all other reſpects to be highly privileged villeins; and eſpecially for that their ſervices were fixed and determinate, and that they could not be compelled (like pure villeins) to relinquiſh thoſe tenements at the lord's will, or to hold them againſt their own: *et ideo*, ſays Bracton, *dicuntur liberi*.

Lands holding by this tenure are therefore a ſpecies of copyhold, and as ſuch preſerved and exempted from the operation of the ſtatute of Charles II. Yet they differ from common copyholds, principally in the privileges before-mentioned: as alſo they differ from freeholders by one eſpecial mark and tincture of villenage, noted by Bracton, and remaining to this day; viz. that they cannot be conveyed from man to man by the general common law conveyances of feoffment, and the reſt; but muſt paſs by ſurrender to the lord or his ſteward, in the manner of common copyholds: yet with this difference, that, in the ſurrenders of theſe lands in ancient demeſne, it is not uſed to ſay, "to hold at the will of the lord," in their copies; but only, "to hold according to the cuſtom of the manor."

VILLI, among botaniſts, a kind of down like ſhort hair, with which ſome trees abound.

VILLIERS (George duke of Buckingham), an ingenious and witty nobleman, whoſe mingled character rendered him at once the ornament and diſgrace, the envy and ridicule, of the court he lived in, was ſon to that famous ſtateſman and favourite of king Charles I. who loſt his life by the hands of Lieutenant Felton. He was born in 1627, the year before the fatal cataſtrophe of his father's death. The early parts of his education he received from various domeſtic tutors, after which he was ſent to the univerſity of Cambridge. Having here completed a courſe of ſtudies, he, with his brother Lord Francis, went abroad under the care of one Mr Ayleſbury.—Upon his return, which was not till after the breaking out of the civil wars, the king being at Oxford, his grace repaired thither, was preſented to his majeſty, and entered of Chriſt-church college. Upon the decline of the king's cauſe, he attended prince Charles into Scotland, and was with him at the battle of Worceſter in 1661; after which, making his eſcape beyond ſea, he again joined him, and was ſoon after, as a reward for this attachment, made knight of the garter.

Deſirous, however, of retrieving his affairs, he came privately to England; and in 1657 married Mary, the daughter and ſole heireſs of Thomas lord Fairfax, through whoſe intereſt he recovered the greateſt part of the eſtate he had loſt, and the aſſurance of ſucceeding to an accumulation of wealth in the right of his wife.

We do not find, however, that this ſtep loſt him the royal favour; for after the reſtoration, at which time he is ſaid to have poſſeſſed an eſtate of L.20,000 *per annum*. he was made one of the lords of the bedchamber, called to the privy-council, and appointed lord lieutenant of Yorkſhire and maſter of the horſe. All theſe high poſts, however, he loſt again in the year 1666. For having been refuſed the poſt of preſident of the north, he became diſaffected to the king; and it was diſcovered that he had carried on a ſecret correſpondence by letters and other tranſactions with one Dr Heydon, tending to raiſe mutinies among his majeſty's forces, particularly in the navy, to ſtir up ſedition among the people, and even to engage perſons in a conſpiracy for the ſeizing the tower of London. Matters were ripe for execution; and an inſurrection, at the head of which the duke was openly to have appeared, was on the very eve of breaking out, when it was diſcovered by means of ſome agents whom Heydon had employed to carry letters to the duke. The detection of this affair ſo exaſperated the king, who knew Buckingham to be capable of the blackeſt deſigns, that he immediately ordered him to be ſeized; but the duke finding means, having defended his houſe for ſome time by force, to make his eſcape, his majeſty ſtruck him out of all his commiſſions, and iſſued a proclamation requiring his ſurrender by a certain day.

This ſtorm, however, did not long hang over his head; for, on his making an humble ſubmiſſion, king Charles, who was far from being of an implacable temper, took him again into favour, and the very next year reſtored him both to the privy-council and bed-chamber. But the duke's diſpoſition for intrigue and machination could not long lie idle; for having conceived a reſentment againſt the duke of Ormond for having acted with ſome ſeverity againſt him in regard to the laſt-mentioned affair, he, in 1670, was ſuppoſed to be concerned in an attempt made on that nobleman's life by the ſame Blood who afterwards endeavoured to ſteal the crown. Their deſign was to have conveyed the duke to Tyburn, and there to have hanged him; and ſo far did they proceed towards the putting it in execution, that Blood and his ſon had actually forced the duke out of his coach in St James's ſtreet, and carried him away beyond Devonſhire houſe, Piccadilly, before he was reſcued from them. See BLOOD.

It does not appear, however, that this tranſaction hurt the duke's intereſt at court; for in 1671 he was inſtalled chancellor of the univerſity of Cambridge, and ſent ambaſſador to France. Here he was very nobly entertained by Lewis XIV. and preſented by that monarch at his departure with a ſword and belt ſet with jewels, to the value of 40,000 piſtoles; and the next year he was employed in the ſecond embaſſy to that king at Utrecht. However, in June 1674, he reſigned the chancellorſhip of Cambridge, and about the ſame time became a zealous partizan and favourer of the Nonconformiſts. On the 16th of February 1676, his grace, with the earls of Saliſbury and Shafteſbury and Lord Warton, were committed to the tower by order of the houſe of lords, for a contempt in refuſing to retract the purport of a ſpeech which the duke had made concerning a diſſolution of the parliament. This confinement did not laſt long, Villoſe, Vinca.

yet we find no material tranſaction of this nobleman's life recorded after it, till the time of his death, which happened in 1687. Wood tells us that died at his houſe in Yorkſhire; but Mr Pope, who muſt certainly have had very good information, and it is to be imagined would not have dared to advance an injurious falſhood of a perſon of his rank, has, in his epiſtle to Lord Bathurſt, given us a moſt affecting account of the death of this ill-ſtarred nobleman, whom, after having been maſter of near L. 50,000 *per annum*, he deſcribes as reduced to the deepeſt diſtreſs by his vice and extravagance, and breathing his laſt moments in a mean apartment at an inn.

As to his perſonal character, it is impoſſible to ſay any thing in its vindication; for though his ſevereſt enemies ackowledge him to have poſſeſſed great vivacity and a quickneſs of parts peculiarly adapted to the purpoſes of ridicule, yet his warmeſt advocates have never attributed to him a ſingle virtue. His generoſity was profuſeneſs, his wit malevolence, the gratification of his paſſions his ſole aim through life, his very talents caprice, and even his gallantry the mere love of pleaſure. But it is impoſſible to draw his character with equal beauty, or with more juſtice than in that given of him by Dryden, in his Abſalom and Achitophel, under the name of *Zimri*, to which the reader is referred.

As a writer, however, he ſtands in a quite different point of view. There we ſee the wit, and forget the libertine.—His poems, which indeed are not very numerous, are capital in their kind; but what will immortalize his memory while language ſhall be underſtood, or true wit reliſhed, is his celebrated comedy of The Rehearſal.

VILLOSE, or Villous, ſomething abounding with villi or fibres like ſhort hair; ſuch is one of the coats of the ſtomach.

VINCA, periwinkle; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are four ſpecies, three of which are commonly cultivated in our gardens, *viz.* 1. The minor, or ſmaller periwinkle, hath ſlender, ligneous, trailing, green ſtalks, branching and running conſiderably along the ground, emitting roots at the joints; garniſhed with oval, ſpear-ſhaped, thick, ſmooth, ſhining-green leaves, in pairs oppoſite; and flowers growing ſingly on proper peduncles at the ſides of the branches, of different colours in the varieties.

2. The major, or large green periwinkle, riſes with ſhrubby, ſomewhat erect, green ſtalks, a foot or two high, with tops inclining to the ground; large, oval, ſhining-green leaves, in pairs oppoſite; and large blue flowers ſingly on foot-ſtalks at the axillas of the branches. There is a variety with white flowers.—Both the ſpecies are perennial in root, ſtem, and branches, with leaves in perpetual verdure, and begin flowering in the ſpring, about March and April; the flowers moderately large, each being of one ſalver-ſhaped petal, ſpreading at the brim, and cut into five parts; generally continue flowering in ſucceſſion ſeveral months, and even ſometimes in winter, in mild ſeaſons, eſpecially the vinca major.

3. The roſea, or roſe periwinkle of Madagaſcar, riſes with an upright, ſhrubby, ſmooth, branching ſtem, a yard or more high; having a browniſh bark; oblong-oval, ſmooth, firm leaves, placed oppoſite; and large beautiful, roſe-like, crimſon, and pale-red flowers, ſingly and in pairs at the ſides of the branches, being large, ſpreading above, and divided into five ſegments; appearing very ornamentally from the ſpring till winter, ſucceeded by ripe ſeeds in the autumn.

The two former kinds may be propagated by layers, cuttings, and ſuckers; and will thrive any where: but the laſt being tender, muſt be conſtantly kept in a ſtove.

Vincent.

St VINCENT, one of the Caribbee iſlands, which received its name from being diſcovered on the 22d of January, the feaſt of that Saint. It lies from 13° to 13° 20′ of north latitude, and in longitude 59° 40′ weſt from London. At the diſtance of between 5 and 6 leagues ſouth-weſt from St Lucia, 23 ſouth-weſt from Martinico, 36, or, as ſome compute, 40 ſouth of Dominica, 20 weſt-by-ſouth from Barbadoes, and 17 or 18 north-eaſt from Grenada. Being thus ſituated directly to the leeward of Barbadoes, it may in a few hours be reached from thence; and is at the ſame time ſo ſeated as to cover and connect the ſmall iſlands that lie between it and Grenada. It ſtretches in length from ſouth to north about 25 miles, and is about 13 in breadth; in circumference between 60 and 70. In point of ſize therefore it differs but little from Barbadoes. The climate is very warm; at leaſt in the judgment of Europeans. The country is in general hilly, in ſome places mountainous; but interſperſed with a variety of pleaſant valleys, and ſome luxuriant plains, the ſoil being every where very fertile, and the high grounds are at leaſt in general eaſy of aſcent. Few iſlands of its extent are ſo well watered: for ſeveral rivers run down from the mountains, and ſmaller ſtreams from almoſt every hill; there are likewiſe ſeveral fine ſprings at a little diſtance from the ſea. The inhabitants raiſe all kinds of ground proviſions in plenty, and with little trouble. The rivers ſupply them with a variety of fiſh; and the ſame may be ſaid of the ſea that waſhes their coaſts. They have abundance of excellent fruits, and very fine timber fit for almoſt every uſe; and with which they formerly ſupplied their neighbours.

The French, though they did not venture to raiſe ſugars, had ſeveral ſpacious plantations at the mouths and on the ſides of the rivers, planted with cacao trees, coffee, indigo, and fine tobacco. There are ſeveral commodious bays on the north-weſt and ſouth-weſt ſides; and at the ſouthern extremity there is the deep ſpacious ſandy bay, formerly ſtyled the *Bay of St Antonio*, but now *Kingſton Bay*, where large ſhips may ride commodiouſly: and there is ſaid to be good anchoring ground round the whole iſland. It remained, for a long ſpace of time after it was diſcovered by the Europeans, the head-quarters and general rendezvous of the Caribs and Caraibs, who from thence made expeditions to the continent, and were alſo ſometimes very troubleſome to the adjacent iſlands. Beſides theſe there are another race of people generally, though very improperly, ſtyled *Black Caribs*, but who are in reality negroes deſcended, as is generally believed, from ſome who eſcaped out of a Guinea ſhip wrecked upon the coaſt, and gradually augmented by ſuch as from time to time fled thither from Barbadoes. Theſe nations were often at war; but when their quarrels were compoſed,

poſed, they had a ſtrength ſufficient to prevent ſtrangers from ſetling by force.

The French, about half a century ago, at the requeſt of the Caribs, made a deſcent from Martinico, and attacked the negroes, but were repulſed with loſs; and found it their intereſt to conciliate a friendſhip with both nations by means of preſents, and furniſhing them with arms and ammunition, which procured them the means of making thoſe plantations that have been before-mentioned. At the treaty of Paris this iſland was given up to Britain, but has ſince been taken by the French. In 1770 its exports were, cotton, 284 bags, at 10l. *per* bag, 2840l. Coffee, 4818 hundred weight one quarter, ſix pound, at 3l. 5s. *per* hundred weight, 15,659l. 9s. 8¼. Cacao, 1000 hogſheads and one barrel, at 25l *per* hogſhead, and 12l. *per* barrel, 25,012l. Rum, 346 hogſheads, at 10l. *per* hogſhead, 3460l. Sugar, 2866 hogſheads, at 17l. 10s. *per* hogſhead, 50,155l. In all to Great Britain, 97,126l. 9s. 8¼d. To North America, 13,375l. Total 110,501l. 9s. 8¼d.

VINCENT (Nathaniel), an eminent diſſenting miniſter, received his education at Chriſt Church in Oxford. He became a member of that univerſity at 11 years of age, and when he was about 18 he took the degree of maſter of arts. He ſoon became a very famous preacher and writer; but refuſing to comply with the act of uniformity, was not only one of the moſt aſſiduous, but one of the moſt unfortunate, of his nonconforming brethren. He was ſeveral times impriſoned, and heavily fined, for holding conventicles; and was once ſentenced to ſuffer three years impriſonment, and then baniſhment, in purſuance of an act made in the 25th of Elizabeth; but his counſel finding a flaw in the indictment, the ſentence was never carried into execution. He diſtinguiſhed himſelf by preaching amidſt the ruins after the fire of London, where multitudes aſſembled to hear him, many of whoſe conſciences were awakened by that dreadful calamity. He was the author of many ſermons, and other practical pieces of divinity; and died in 1679.

Thomas Vincent, his brother, a man of a ſimilar character, exerted himſelf on the ſame occaſion, as he did alſo in the time of the peſtilence, when he conſtantly preached in London, and viſited the ſick, but eſcaped the diſtemper himſelf. He was the author of "God's terrible Voice to the City by Fire and Plague, 8vo;" and publiſhed another of the like kind, occaſioned by an eruption of Mount Ætna, intitled *Fire and Brimſtone*, 1. From heaven, in the burning of Sodom and Gomorrah formerly; 2. From earth, in the burning of Mount Ætna lately; 3. From hell, in the burning of the wicked eternally. He wrote ſeveral other works.

VINCI (Leonardo da), an illuſtrious Italian painter, deſcended from a noble Tuſcan family, was born in the caſtle of Vinci near Florence in 1445. He was placed under Andrea Verochia, a celebrated painter in that city; but ſoon ſurpaſſed him and all his predeceſſors ſo much, as to be reputed the maſter of the third or golden age of modern painting. But his ſtudies were far from terminating here; no man's genius was more univerſal: he applied himſelf to arts, to literature, and to the accompliſhments of the body; and he excelled in every thing he attempted. Lewis Sforza duke of Milan, prevailed on him to be director of the academy for architecture he had juſt eſtabliſhed; where Leonardo ſoon baniſhed all the Gothic faſhions, and reduced every thing to the happy ſimplicity of the Greek and Roman ſtyle. By the duke's order he conſtructed the famous aqueduct that ſupplies the city of Milan with water: this canal goes by the name of *Morteſana*, being above 200 miles in length; and conducts the water of the river Adda quite to the walls of the city. In 1479, he was deſired to conſtruct ſome new device for the entertainment of Lewis XII. of France, who was then to make his entrance into Milan. Leonardo accordingly made a very curious automaton in the form of a lion, which marched out to meet the king, reared up on its hinder legs before him, and opening its breaſt, diſplayed an eſcutcheon with fleur de lys quartered on it. The diſorders of Lombardy, with the misfortunes of his patrons the Sforzi, obliging Leonardo to quit Milan, he retired to Florence, where he flouriſhed under the Medici: here he raiſed the envy of Michael Angelo, who was his cotemporary; and Raphael, from the ſtudy of his works, acquired his beſt manner of deſigning. At length, on the invitation of Frances I. he removed to France when above 70 years of age; where the journey and change of climate threw him into his laſt ſickneſs: he languiſhed for ſome months at Fontainbleau, where the king came frequently to ſee him; and one day riſing up in his bed to acknowledge the honour done him, he fainted, and Francis ſupporting him, Leonardo died in his arms. His death happened in 1520. Some of his paintings are to be ſeen in England and other countries, but the greateſt part of them are in Florence and France. He compoſed a great number of diſcourſes on curious ſubjects; but none of them have been publiſhed but his treatiſe on the Art of Painting.

VINE, in botany. See VITIS.

VINEGAR, ACETUM, an agreeable acid and penetrating liquor, prepared from wine, cyder, beer, and others liquors; of conſiderable uſe, both as a medicine and a ſauce. The word is French, *vinaigre;* formed from *vin,* "wine;" and *aigre,* "ſour." See ACETUM and WINE.

Wine and other vinous liquors are ſaid to gain a grateful ſharpneſs, *i. e.* to become vinegar, by having their ſalts extracted by inſolation or other means, and their ſulphurs weakened or depreſſed.

Others aſcribe the converſion of vinous liquors into vinegar, to the grinding or ſharpening of the longitudinal particles thereof; by which means they become more ſharp and pungent.

The method of making vinegar has long been kept a ſecret among the people of that profeſſion; who, it is ſaid, oblige themſelves to each other by an oath not to reveal it: but notwithſtanding this, the Philoſophical Tranſactions, and ſome other late writings, furniſh us with approved accounts thereof.

Method of making Cyder VINEGAR.—The cyder (the meaneſt of which will ſerve the purpoſe) is firſt to be drawn off fine into another veſſel, and a quantity of the muſt of apples to be added: the whole is ſet in the ſun, if there be conveniency for it; and at a week or nine days end it may be drawn off. See CYDER.

Method of making Beer VINEGAR.—Take a middling ſort of beer, indifferently well hopped; into which, when it has worked well and grown fine, put ſome rape, or huſks of grapes, uſually brought home for that purpoſe: maſh them together in a tub; then letting the rape ſettle, draw off the liquid part, put it into a caſk, and ſet it in the ſun as hot as may be; the bung being only covered with a tile, or ſlate-ſtone: and in about 30 or 40 days it will become a good vinegar, and may paſs in uſe as well as that made of wine, if it be refined, and kept from turning muſty.

Or thus:—To every gallon of ſpring-water add three pounds of Malaga raiſins; which put into an earthen jar, and place them where they may have the hotteſt ſun from May till Michaelmas; then preſſing all well, tun the liquor up in a very ſtrong iron-hooped veſſel, to prevent its burſting: it will appear very thick and muddy when newly preſſed; but will refine in the veſſel, and be as clear as wine.—Thus let it remain untouched for three months before it is drawn off, and it will prove excellent vinegar.

To make Wine VINEGAR.—Any ſort of vinous liquor being mixed with its own fæces, flowers, or ferment, and its tartar firſt reduced to powder; or elſe with the acid and auſtere ſtalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar; and the whole being kept frequently ſtirring in a veſſel which has formerly held vinegar, or ſet in a warm place full of the ſteams of the ſame, will begin to ferment anew, conceive heat, grow ſour by degrees, and ſoon after turn into vinegar.

The remote ſubjects of acetous fermentation are the ſame with thoſe of vinous; but the immediate ſubjects of it, are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is abſolutely impoſſible to make vinegar of muſt, the crude juice of grapes, and other ripe fruits, without the previous aſſiſtance of vinous fermentation.

The proper ferments for this operation, whereby vinegar is prepared, are, 1. The fæces of all acid wines. 2. The lees of vinegar. 3. Pulverized tartar, eſpecially that of Rheniſh wine, or the cream or cryſtals thereof. 4. Vinegar itſelf. 5. A wooden veſſel well drenched with vinegar, or one that has long been employed to contain it. 6. Wine that has often been mixed with its own fæces. 7. The twigs of vines, and the ſtalks of grapes, currants, cherries, or other vegetables of an acid auſtere taſte. 8. Bakers leaven, after it is turned acid. 9. All manner of ferments, compounded of thoſe already mentioned.

Vinegar is no production of nature, but a creature of art: for verjuice, the juices of citrons, lemons, and the like native acids, are improperly ſaid to be *natural vinegars;* becauſe, when diſtilled, they afford nothing but vapid water: whereas it is not the property of vinegar to yield an acid ſpirit by diſtillation.

Method of making VINEGAR *in France.*—The French uſe a method of making vinegar different from that above deſcribed.—They take two very large oaken veſſels, the larger the better, open at the top; in each whereof they place a wooden grate, within a foot of the bottom; upon theſe grates they firſt lay twigs or cuttings of vines, and afterwards the ſtalks of the branches, without the grapes themſelves, or their ſtones, till the whole pile reaches within a foot of the brim of the veſſels; then they fill one of theſe veſſels with wine to the very top, and half fill the other; and with liquor drawn out of the full veſſel, fill up that which was only half full before; daily repeating the ſame operation, and pouring the liquor back from one veſſel to the other; ſo that each of them is full and half-full by turns.

When this proceſs has been continued for two or three days, a degree of heat will ariſe in the veſſel which is then but half full, and increaſe for ſeveral days ſucceſſively, without any appearance of the like in the veſſel which happens to be full during thoſe days, the liquor whereof will ſtill remain cool: and as ſoon as the heat ceaſes in the veſſel that is half full, the vinegar is prepared: which, in the ſummer, happens on the 14th or 15th day from the beginning; but in the winter, the fermentation proceeds much ſlower, ſo that they are obliged to forward it by artificial warmth or the uſe of ſtoves.

When the weather is exceeding hot, the liquor ought to be poured off from the full veſſel into the other twice a-day; otherwiſe the liquor would be over-heated, and the fermentation prove too ſtrong: whence the ſpirituous parts would fly away, and leave a vapid wine inſtead of vinegar behind.

The full veſſel is always to be left open at the top; but the mouth of the other muſt be cloſed with a cover of wood, in order the better to keep down and fix the ſpirit in the body of the liquor; for otherwiſe it might eaſily fly off in the heat of fermentation. The veſſel that is only half full ſeems to grow hot rather than the other, becauſe it contains a much greater quantity of the vine-twigs and ſtalks, than that in proportion to the liquor; above which the pile riſing to a conſiderable height, conceives heat the more, and ſo conveys it to the wine below.

VINEGAR *Concentrated.* See CHEMISTRY, n° 287.

VINEGAR, (*Salt of.*) See CHEMISTRY, n° 288.

Eels in VINEGAR. See ANIMALCULE, n° 8.

VINEYARD, a plantation of vines. The beſt ſituation of a vineyard is on the declivity of a hill facing the ſouth.

VIO (Thomas de). See CAJETAN.

VIOL, a muſical inſtrument of the ſame form with the violin, and, like that, ſtruck with a bow.

VIOLA, the VIOLET; a genus of the monogynia order, belonging to the ſyngeneſia claſs of plants. There are many ſpecies. The odorata, odoriferous, or common ſweet-ſcented March violet, with the flowers of different colours in the varieties, appearing in March. The flowers impart a fine ſweet odour, and are uſed in medicine. It grows naturally in woods, and under hedges, &c. in moſt parts of Europe; but has been a long reſident of gardens as a flowery plant, and for its uſe in medicine.

2. The tricolor, or three-coloured violet, commonly called *heart's-eaſe*, or *panſey*, aſſumes a buſhy, tufted growth; and at the axillas of the branches are numerous variegated, three-coloured flowers, yellow, purple, and white, appearing in conſtant ſucceſſion all ſummer and autumn. It grows naturally in cultivated places in the north of England, &c.

This elegant little plant merits culture in every garden, for the beauty and great variety of its three-coloured flowers; and it will ſucceed any where in the open borders, or other compartments, diſpoſed in patches towards the front; either by ſowing the ſeed at once to remain, or by putting in young plants previouſly raiſed in a ſeed-bed: they will begin flowering early in ſummer, and will continue ſhooting and flowering in ſucceſſion till winter; and even during part of that ſeaſon in mild weather.

The common violet is propagated by parting the roots, ſometimes by ſeed.

VIOLATION, the act of violating, that is, forcing a woman, or committing a rape upon her.—This term is alſo uſed in a moral ſenſe, for a breach or infringement of a law, ordinance, or the like.

VIOLET, in botany. See VIOLA.

VIOLET-*Crab*, in zoology. See CANCER.

VIOLIN, or FIDDLE, a muſical inſtrument mounted with four ſtrings or guts, and ſtruck or played with a bow. The ſtyle and ſound of the violin is the gayeſt and moſt ſprightly of all other inſtruments; and hence it is of all others the fitteſt for dancing. Yet there are ways of touching it, which render it grave, ſoft, languiſhing, and fit for church or chamber muſic.—It generally makes the treble, or higheſt parts in concerts. Its harmony is from fifth to fifth. Its play is compoſed of baſs, counter-tenor, tenor, and treble; to which may be added, a fifth part: each part has four fifths, which riſe to a greater ſeventeenth.

VIOLONCELLO, of the Italians, is properly our fifth violin; which is a little baſs violin half the ſize of the common baſs violin, and the ſtrings bigger and longer in proportion: conſequently its ſound is an octave lower than our baſs violin; which has a noble effect in concerts.

VIPER, in zoology. See COLUBER.

VIRAGO, a woman of extraordinary ſtature and courage; and who, with the female ſex, has the mien and air of a man, and performs the actions and exerciſes of men.

VIRGIL, or PUBLIUS VIRGILIUS MARO, the moſt excellent of all the Latin poets, was the ſon of a potter of Andes, near Mantua, where he was born, 70 years B. C. He ſtudied firſt at Mantua; then at Cremona, Milan, and Naples; whence going to Rome, he acquired the eſteem of the greateſt wits and moſt illuſtrious perſons of his time; and among others, of the emperor Auguſtus, Mæcenas, and Pollio. He was well ſkilled not only in polite literature and poetry, but alſo in philoſophy, the mathematics, geography, medicine, and natural hiſtory. Though one of the greateſt geniuſes of his age, and the admiration of the Romans, he always preſerved a ſingular modeſty, and lived chaſte at a time when the manners of the people were extremely corrupt. He carried Latin poetry to ſuch an high perfection, that he was juſtly eſteemed the prince of Latin poets. He firſt turned himſelf to paſtoral; and being captivated with the beauty and ſweetneſs of Theocritus, was ambitious to introduce this new ſpecies of poetry among the Romans. His firſt performance in this way is ſuppoſed to have been written U. C. 709, the year before the death of Julius Cæſar, when the poet was in his 25th year: it is intitled *Alexis*. Poſſibly *Palæmon* was his ſecond: it is a cloſe imitation of the fourth and fifth Idylls of Theocritus. Mr Warton places *Silenus* next; which is ſaid to have been publicly recited on the ſtage by Cytheris, a celebrated comedian. Virgil's fifth eclogue is compoſed in alluſion to the death and deification of Cæſar. The battle of Philippi in 712 having put an end to the Roman liberty, the veteran ſoldiers began to murmur for their pay; and Auguſtus, to reward them, diſtributed among them the lands of Mantua and Cremona. Virgil was involved in this common calamity; and applied to Varus and Pollio, who warmly recommended him to Auguſtus, and procured for him his patrimony again. Full of gratitude to Auguſtus, he compoſed the *Tityrus*, in which he introduces two ſhepherds: one of them complaining of the diſtraction of the times, and of the havoc the ſoldiers made among the Mantuan farmers; the other rejoicing for the recovery of his eſtate, and promiſing to honour as a God the perſon who reſtored it to him. But our poet's joy was not of long continuance; for we are told, that when he returned to take poſſeſſion of his farm, he was violently aſſaulted by the intruder, and would certainly have been killed by him if he had not eſcaped by ſwimming haſtily over the Mincio. Upon this unexpected diſappointment, he returned to Rome to renew his petition; and during his journey ſeems to have compoſed his ninth eclogue. The celebrated eclogue, intitled *Pollio*, was compoſed U. C. 714, upon the following occaſion. The conſul Pollio on the part of Antony, and Mæcenas on the part of Cæſar, had made up the differences between them; by agreeing, that Octavia, half-ſiſter to Cæſar, ſhould be given in marriage to Antony. This agreement cauſed an univerſal joy; and Virgil, in his eclogue, teſtified his. Octavia was with child by her late huſband Marcellus at the time of this marriage; and whereas the Sybilline oracles had foretold, that a child was to be born about this time, who ſhould rule the world, and eſtabliſh perpetual peace, the poet ingeniouſly ſuppoſes the child in Octavia's womb to be the glorious infant, under whoſe reign mankind was to be happy, the golden age to return from heaven, and fraud and violence to be no more. In this celebrated poem, the author with great delicacy at the ſame time pays his court to both the chiefs, to his patron Pollio, to Octavia, and to the unborn infant. In 715, Pollio was ſent againſt the Parthini, a people of Illyricum; and during this expedition, Virgil addreſſed to him a beautiful eclogue, called *Pharmaceutria*. His tenth and laſt eclogue was addreſſed to Gallus. Theſe were our poet's firſt productions; and we have been the more circumſtantial in our account of ſome of them, as many particulars of his life are intimately connected with them.

Being in his 34th year, he retired to Naples, and laid the plan of his inimitable Georgics; which he undertook at the intreaties of Mæcenas, to whom he dedicated them: not to rival and excel Heſiod, as he had lately done Theocritus, but on a noble political motive, and to promote the welfare of his country. Great was the deſolation occaſioned by the civil wars: Italy was almoſt depopulated; the lands were uncultivated and unſtocked; a famine and inſurrection enſued; and Auguſtus himſelf hardly eſcaped being ſtoned by the people, who attributed this calamity to his ambition. His wiſe and able miniſter therefore reſolved, if poſſible, to revive the decayed ſpirit of huſbandry; to introduce a taſte for agriculture, even among the great; and could not think of a better method to effect this, than to recommend it by the inſinuating charms of poetry. Virgil fully anſwered the expectations of his polite patron, by

Virgil.

by his Georgics. They are divided into four books. Corn and ploughing are the ſubject of the firſt, vines of the ſecond, cattle of the third, and bees of the fourth.

He is ſuppoſed to have been in his 45th year when he began to write the Æneid; the deſign of which is thus explained by Mr Spence in his Polymetis. Auguſtus being freed from his rival Antony, the government of the Roman empire was to be wholly in him; and though he choſe to be called their father, he was, in every thing but the name, their king. But the monarchical form of government muſt naturally diſpleaſe the Romans; and therefore Virgil, like a good courtier, ſeems to have laid the plan of his poem to reconcile them to it. He takes advantage of their religious turn, and of ſome old prophecies that muſt have been very flattering to the Roman people, as promiſing them the empire of the whole world. He weaves this in with the moſt probable account of their origin; that of their being deſcended from the Trojans. He ſhows, that Æneas was called into their country by the expreſs order of the gods; that there was an uninterrupted ſucceſſion of kings from him to Romulus; that Julius Cæſar was of the royal race, and that Auguſtus was his ſole heir. The reſult of all this was, that the promiſes made to the Roman people in and through this race, terminating in Auguſtus, the Romans, if they would obey the gods, and be maſters of the world, were to yield obedience to the new eſtabliſhment under that prince. Auguſtus was eager to peruſe this poem before it was finiſhed; and intreated him by letters to communicate it. Macrobius has preſerved to us part of one of Virgil's anſwers to the emperor, in which the the poet excuſes himſelf: who, however, at length complied, and read himſelf the fixth book to the emperor; when Octavia, who had juſt loſt her ſon Marcellus, the darling of Rome, and adopted ſon of Auguſtus, made one of the audience. Virgil had artfully inſerted that beautiful lamentation for the death of young Marcellus, beginning with—*O nate, ingentem luctum ne quære tuorum*—but ſuppreſſed his name, till he came to the line—*Tu Marcellus eris*: upon hearing which, Octavia could bear no more, but fainted away; overcome with ſurpriſe and ſorrow. When ſhe recovered, ſhe made the poet a preſent of ten ſeſterces for every line, which amounted in the whole to above 2000l.

The Æneid being brought to a concluſion, but not to the perfection our author intended to give it, he reſolved to travel into Greece to correct and poliſh it at leiſure. It was probably on this occaſion that Horace addreſſed that affectionate ode to him, *Sic te Divæ potens Cypri, &c.* Auguſtus returning victorious from the eaſt, met with Virgil at Athens, who thought himſelf obliged to attend the emperor to Italy: but the poet was ſuddenly ſeized with a fatal diſtemper, which being increaſed by the agitation of the veſſel, put an end to his life as ſoon as he landed at Brunduſium, in his 52d year. He had ordered in his will, that the Æneid ſhould be burnt as an unfiniſhed poem; but Auguſtus forbad it, and had it delivered to Varius and Tucca, with the ſtricted charge to make no additions, but only to publiſh it correctly. He died with ſuch ſteadineſs and tranquillity, as to be able to dictate his own epitaph in the following words:

Mantua me genuit: Calabri rapuere, tenet nunc
Parthenope: cecini Paſcua, Rura, Duces.

Virgil, Vigin.

His bones were carried to Naples, according to his earneſt requeſt; and a monument was erected at a ſmall diſtance from the city.

Virgil was of a ſwarthy complexion, tall, of a ſickly conſtitution, and afflicted with frequent head achs and ſpitting of blood. He was ſo very baſhful, that he often ran into the ſhops to prevent being gazed at in the ſtreets; yet was ſo honoured by the Roman people, that once coming into the theatre, the whole audience roſe up out of reſpect to him. He was of a thoughtful and melancholy temper; he ſpoke little, and loved retirement and contemplation. His fortune was affluent; he had a fine houſe and well-furniſhed library near Mæcenas's gardens, on the Eſquiline mount at Rome, and alſo a delightful villa in Sicily. He was ſo benevolent and inoffenſive, that moſt of his cotemporary poets, though they envied each other, agreed in loving and eſteeming him. He reviſed his verſes with prodigious ſeverity; and uſed to compare himſelf to a ſhe-bear, which licked her cubs into ſhape.

The beſt edition of Virgil's works are thoſe of Moſvicius, with the notes of Servius, printed at Lewarden in 1717, 2 vols, 4to; and that of Burman, at Amſterdam, 1746, in 4 vols 4to. There are ſeveral Engliſh tranſlations, which are well known.

Virgil (Polydore), an Engliſh hiſtorian, born at Urbino in Italy, was ſent in the beginning of the 16th century, by pope Alexander VI. as ſub-collector of the Papal tax, called *Peter-pence*, in this kingdom. He had not been long in England before he obtained preferment in the church; for in 1503 he was preſented to the rectory of Church-Langton in the archdeaconry of Leiceſter. In 1507, he was collated to the prebend of Scamleſby in the church of Lincoln; and in the ſame year was made archdeacon of Wells, and prebendary of Hereford. In 1513, he reſigned his prebend of Lincoln, and was collated to that of Oxgate, in St Paul's, London. We are told, that on his preferment to the archdeaconry of Wells, he reſigned the office of ſub-collector to the pope, and determined to ſpend the remainder of his life in England, the Hiſtory of which kingdom he began in the year 1505, at the command of Henry VII. That work coſt him 12 years labour. In 1526, he finiſhed his treatiſe on Prodigies. Polydore continued in England during the whole reign of Henry VIII. and part of that of Edward VI. whence it is concluded that he was a moderate Papiſt. In 1550, being now an old man, he requeſted leave to reviſit his native country. He was accordingly diſmiſſed with a preſent of 300 crowns, together with the privilege of holding his preferments to the end of his life. He died at Urbino in the year 1555. As an hiſtorian, he is accuſed by ſome as a malignant ſlanderer of the Engliſh nation; yet Jovius remarks, that the French and Scotch accuſe him of having flattered that nation too much: ſee his *Elog.* cap. 135. p. 179. Beſides the above, he wrote, 1. *De rerum inventoribus*; of which an Engliſh tranſlation was publiſhed by Langley in 1663. It was alſo tranſlated into French and Spaniſh. 2. *De prodigiis et ſortibus.* 3. *Epiſcoporum Angliæ catalogus.* Manuſcript. 4. *De vita perfecta.* Baſil, 1546, 1553, 8vo. 5. *Epiſtolæ eruditæ*; and ſome other works.

VIRGIN, a female who has had no carnal commerce with man.

Virgin is alſo figuratively applied to ſeveral things that retain their abſolute purity, and have never been made uſe of.

VIRGINIA, late one of the Britiſh colonies, now one of the United States of North America; bounded on the ſouth by Carolina, on the north-eaſt by the river Patowmack which divides it from Maryland, on the eaſt by the Atlantic Ocean, and on the weſt by the Apalachian mountains; extending about 240 miles in length, and 200 in breadth.

The air and ſeaſons here depend very much upon the wind, as to heat and cold, dryneſs and moiſture. The north and north-weſt winds are piercing cold, and clear, or elſe ſtormy; the ſouth-eaſt and ſouth, hazy and ſultry hot. In winter they have a fine clear air, and dry, which renders it very pleaſant. Their froſts are ſhort; but ſometimes ſo very ſharp, that rivers three miles broad will be frozen over. Snow falls ſometimes in pretty large quantities, but rarely lies above a day or two. Their ſpring is about a month earlier than in England; in April they have frequent rains; in May and June the heat increaſes; and the ſummer is much like our's, being mitigated with gentle breezes that riſe about nine o'clock, and decreaſe and increaſe as the ſun riſes or falls. In July and Auguſt theſe breezes ceaſe, and the air becomes ſultry and hot: in September the weather generally changes ſuddenly, and heavy rains fall, and then the inhabitants are generally very ſickly. It is to be obſerved, however, that here, and in all the other ſtates, as the cultivation and population of them advances, the air grows better, to which the cutting down of the woods greatly contributes.

As to the face of the country in Virginia, it is generally low and flat towards the ſea-coaſt, and for 100 miles up the country; ſo that there is hardly a hill or ſtone to be ſeen, except here and there ſome rocks of iron ore, and ſome banks of a kind of petrified oyſter-ſhells. The whole country, before it was planted, was one continued foreſt, interſperſed with marſhes, which in the Weſt Indies they call *ſwamps*. No country now produces greater quantities of excellent tobacco; and the ſoil is generally ſo ſandy and ſhallow, that after they have cleared a freſh piece of ground out of the woods, it will not bear tobacco after two or three years, unleſs cow-penned and well dunged.

The foreſts here yield oaks, poplars, pines, cedars, cypreſſes, ſweet myrtles, cheſnuts, hickery, live oak, walnut, dog-wood, alder, hazel, chinkapins, locuſt-trees, ſaſſafras, elm, aſh, beech, with a great variety of ſweet gums and incenſe, which diſtil from ſeveral trees; pitch, tar, roſin, turpentine, plank-timber, maſts, and yards. Virginia yields alſo rice, hemp, Indian corn, plenty of paſture, with coal, quarries of ſtone, and lead and iron ore.

Of ſpontaneous flowers there are a great variety here, particularly the fineſt crown-imperial in the world, and the cardinal-flower ſo much extolled for its ſcarlet colour; almoſt the whole year round the plains and valleys are adorned with flowers of one kind or another. In this country alſo is found the tulip bearing laurel-tree, which has the pleaſanteſt ſmell in the world, and keeps ſeeds and bloſſoms ſeveral months together.

Silk-graſs grows ſpontaneous in many places; the fibres of which are as fine as flax, and much ſtronger than hemp. Their trees are much loftier than our's, and no underwood or buſhes grow beneath; ſo that people travel with eaſe through the foreſts on horſeback, and never want a fine ſhade to defend them from the ſummer heats.

Among other animals in Virginia are elks, but not common; red deer in great plenty; muſk rats, racoons, beavers, and wolves. As for reptiles, they have lizards, with ſeveral kinds of ſnakes, particularly the rattle-ſnake. Of birds, they have ſeveral ſorts of eagles, hawks, and owls, mocking-birds, and humming-birds.

Beſides the animals that are natives of the country, moſt of the quadrupeds of Europe have been introduced here; ſuch as horſes, cows, ſheep, and hogs, which are prodigiouſly multiplied, great numbers running wild in their foreſts, beſides what they have tame in their plantations. In February, March, April, and May, ſhoals of herrings come up into their very brooks; ſome of the ſize of ours, but for the moſt part much larger. They have great quantities in ſummer of thoſe deſtructive worms that eat into the bottoms of ſhips, wherever they find the coat of pitch, tar, or lime, worn off the timber; theſe worms have a kind of horn or ſcrew in their head, with which they force a paſſage through any wood to which they ſtick.

Four great rivers, namely James River, York River, Rappahannock, and Patowmack, which riſe in the Apalachian mountains, run through this province, or along its borders, from the north-weſt to the ſouth-eaſt, and fall into the bay of Cheſapeak. James River is generally about two miles over, and navigable at leaſt 80. York and Rappahannock are not ſo large; but Potowmack is navigable for near 200 miles, being generally ſeven miles broad, and in ſome places nine. The great bay of Cheſapeak runs up through Virginia and Maryland, almoſt due north, 300 miles and upwards, being navigable moſt part of the way for large ſhips. The two promontories that form the mouth of the bay, are called *Cape Charles* and *Cape Henry*.

VIRGINITY, the teſt or criterion of a virgin; or that which entitles her to the denomination. See Hymen.

VIRGO, in aſtronomy, one of the ſigns or conſtellations of the zodiac. See Astronomy, n° 110.

VIRILE, ſomething that belongs, or is peculiar, to a man, or the male ſex.

VIRTUAL, or Potential; ſomething that has a power or virtue of acting or doing. The term is chiefly underſtood of ſomething that acts by a ſecret inviſible cauſe, in oppoſition to actual and ſenſible.

VIRTUE, a term uſed in various ſignifications. In the general it denotes power, or perfection of any thing, whether natural or ſupernatural, animate or inanimate, eſſential or acceſſory. But, in its more proper or reſtrained ſenſe, virtue ſignifies a habit, which improves and perfects the poſſeſſor and his actions. See Morals, n° 27, 28, 72, 73, &c. and Metaphysics, n° 119—137.

VIRTUOSO, an Italian term lately introduced into the Engliſh, ſignifying a man of curioſity and learning, or one who loves and promotes the arts and ſciences. But among us the term ſeems to be appropriated to thoſe who apply themſelves to ſome curious and quaint, rather than immediately uſeful art, or ſtudy; as antiquaries, collectors of rarities of any kind, microſcopical obſervers, &c.

VIRULENT, a term applied to any thing that yields a virus; that is, a contagious or malignant pus.

VISCERA, in anatomy, a term ſignifying the ſame with entrails; including the heart, liver, lungs, ſpleen, inteſtines, and other inward parts of the body.

VISCIDITY, or VISCOSITY, the quality of ſomething that is viſcid or viſcous; that is glutinous, and ſticky like bird-lime, which the Latins call by the name of *viſcus*.

VISCOUNT (*Vice Comes*), was anciently an officer under an earl, to whom, during his attendance at court, he acted as deputy to look after the affairs of the country. But the name was afterwards made uſe of as an arbitrary title of honour, without any ſhadow of office pertaining to it, by Henry VI.; when, in the 18th year of his reign, he created John Beaumont a peer, by the name of *viſcount Beaumont;* which was the firſt inſtance of the kind.

A viſcount is created by patent as an earl is; his title is *Right Honourable;* his mantle is two doublings and a half, of plain fur; and his coronet has only a row of pearls cloſe to the circle.

VISIBLE, ſomething that is an object of ſight or viſion; or ſomething whereby the eye is affected ſo as to produce this ſenſation.

VISIER, an officer or dignitary in the Ottoman empire, whereof there are two kinds; one called by the Turks *Viſier-azem,* that is, "grand viſier," is the prime miniſter of ſtate in the whole empire. He commands the army in chief, and preſides in the divan or great council. Next to him are ſix other ſubordinate viſiers, called *viſiers of the bench;* who officiate as his counſellors or aſſeſſors in the divan.

VISION, in optics, the art of ſeeing or perceiving external objects by means of the organ of ſight, the eye. See ANATOMY, n° 406, and *Index* ſubjoined to OPTICS.

VISTULA, or WEISEL, a large river of Poland, which taking its riſe in the mountains ſouth of Sileſia, viſits Cracow, Warſaw, &c. and continuing its courſe northward, falls into the Baltic ſea below Dantzic.

VISUAL, in general, ſomething belonging to viſion.

VITAL, in phyſiology, an appellation given to whatever miniſters principally to the conſtituting or maintaining life in the bodies of animals: thus the heart, lungs, and brain, are called *vital parts;* and the operations of theſe parts by which the life of animals is maintained are called *vital functions*.

VITELLUS, the yolk of an egg. See EGG and YOLK.

VITIS, the VINE; a genus of the angioſpermia order, belonging to the didynamia claſs of plants. There are ſeven ſpecies, and a great many varieties, the enumeration of all which would be too tedious to inſert here. Mr Millar enumerates the following, which are eaſily propagated and ripen well in this country. 1. The July grape, called by the French *Morillon noir hatif,* is a ſmall, round, black berry, growing looſe on the bunches. The juice is ſugary; but has little flavour, and has no merit but that of ripening early. It ripens the beginning of Auguſt. 2. The black ſweet-water, is a ſmall roundiſh berry, growing cloſe in the bunches, which are ſhort. The ſkin is thin, the juice very ſweet, and the birds and flies are very apt to devour them if they are not guarded. It ripens ſoon after the other. 3. The white ſweet-water, is a large round berry when in perfection; but theſe are very different in ſize on the ſame bunch; ſome of them will be of a large ſize, and others extremely ſmall, for which reaſon it is not much eſteemed. The juice is ſugary, but not vinous. This ripens about the ſame time with the former. 4. The Chaſſelas blanc, or royal Muſcadine, as it is called by ſome, is an excellent grape; the bunches are generally large, and at the upper part divided with two ſmaller ſide bunches or ſhoulders. The berries are round; and, when perfectly ripe, turn of an amber colour. The juice is rich and vinous: it ripens in September; but, if carefuly preſerved, they will hang very late, and become excellent. 5. The Chaſſelas muſque, or *le cour grape,* as it is here called, by ſome called the *Frankindal,* is an excellent grape, and generally ripens well in England, if it has a good aſpected wall. The berries are very like thoſe of the former in ſhape, ſize, and colour; but are fleſhy, and have a little muſky flavour. It ripens at the ſame time with the former. 6. The black cluſter, or *Munier* grape, as it is called by the French, from the hoary down of the leaves in ſummer, is a good fruit, and ripens well here. The bunches are ſhort, the berries are oval, and are very cloſe to each other; ſo that many of thoſe which grow on the inſide continue green when the outer are perfectly ripe. It ripens in September, and is by ſome called the *Burgundy* grape. 7. The auverna, or true Burgundy grape, ſometimes called *black morillon,* is an indifferent fruit for the table; but is eſteemed one of the beſt ſorts for making wine. The berries of this are oval, and hang looſer on the bunches than thoſe of the cluſter grape; ſo ripen equally, which gives it the preference. 8. The Corinth, or as it is vulgarly called the *currant grape,* is a ſmall roundiſh berry, generally without ſtones, of a deep black colour, and much cluſtered on the bunches, which are ſhort; it has a ſugary juice, and ripens in September, but will not laſt long. 9. The red Chaſſelas, is very like the white in ſize and ſhape; but is of a dark red colour: it is a very good grape; but ripens later than the white, and is pretty rare in England. 10. The white muſcadine, is ſomething like the chaſſelas; but the berries are ſmaller, and hang looſer on the bunches, which are longer, but not ſo thick as thoſe of the chaſſelas. The juice is ſweet, but not ſo rich as the chaſſelas. 11. The black frontinac, or muſcat noir, is a round berry of good ſize; they grow looſe on the bunches, yet do not ripen equally. The bunches are ſhort; the berries, when fully ripe, are very black; and are covered with a meal or flue, like the black plums. The juice of this is very rich and vinous. It ripens in the end of September, or the beginning of October. 12. The red frontinac, or muſcat rouge, is an excellent grape when fully ripe; but unleſs the ſeaſon proves very warm, they rarely ripen without artificial heat in England. The bunches of this ſort are longer than thoſe of the former: the berries are large and round: when they are fully ripe, they are of a brick colour; but before, they are gray, with a few dark ſtripes: and this is frequently taken for a different kind, and is commonly called *griſley frontinac;* but I am convinced it is the ſame grape. The juice of this has the moſt vinous flavour of all the ſorts, and is greatly eſteemed in France. 13. The white frontinac, has larger bunches than either of the former: the berries are round, and are ſo cloſely cluſtered on the bunches, that unleſs they are carefully thinned early in the ſeaſon, when the berries are very ſmall, the ſun and air will be excluded from many of them, ſo that they will not ripen, and the moiſture will be detained in the autumn, which will cauſe them to rot. The juice of this is excellent; and, if the fruit is perfectly ripe, is inferior to none. The French call it *muſcat blanc.* 14. The Alexandrian frontinac, or muſcat d'Alexandire, is by ſome called *muſcat of Jeruſalem.* The berries of this are oval, and hang looſe on the bunches; theſe are long, and are not ſhouldered. There are two ſorts, one with white and the other with red berries; their juice is very rich and vinous, but they ſeldom ripen in England without artificial heat. 15 The red and black Hamburgh, by ſome called the *Warner grape,* from the perſon who brought it into England, Theſe have middle-ſized berries inclining to an oval ſhape. The bunches are large; and their juice, when ripe, is ſugary, with a vinous flavour. This ripens in October. 16. The St Peter's grape has a large oval berry, of a deep black colour when ripe. The bunches are very large, and make a fine appearance at the table; but the juice is not rich, and it ripens late in the year, The leaves of this ſort are much more divided than thoſe of the other ſorts, approaching to thoſe of the parſley-leaved grape, ſo it may be diſtinguiſhed before the fruit is ripe.

All the ſorts of grapes are propagated either from layers or cuttings, the former of which is greatly practiſed in England, but the latter is much preferable.

In chooſing the cuttings, you ſhould always take ſuch ſhoots as are ſtrong and well ripened of the laſt year's growth; theſe ſhould be cut from the old vine, juſt below the place where they were produced, taking a knot, or piece of the two-years wood to each, which ſhould be pruned ſmooth; then you ſhould cut off the upper part of the ſhoots, ſo as to leave the cutting about ſixteen inches long. When the piece or knot of old wood is cut at both ends, near the young ſhoot, the cutting will reſemble a little mallet; from whence Columella gives the title of *malleolus* to to the vine-cuttings. In making the cuttings after this manner, there can be but one taken from each ſhoot; whereas moſt perſons cut them into lengths of about a foot, and plant them all: which is very wrong, for various reaſons too tedious to mention.

When the cuttings are thus prepared, if they are not then planted, they ſhould be placed with their lower part in the ground in a dry ſoil, laying ſome litter upon their upper parts to prevent them from drying: in this ſituation they may remain till the beginning of April, (which is the beſt time for planting them); when you ſhould take them out, and waſh them from the filth they have contracted; and if you find them very dry, you ſhould let them ſtand with their lower parts in the water ſix or eight hours, which will diſtend their veſſels, and diſpoſe them for taking root. Then the ground being before prepared where the plants are deſigned to remain (whether againſt walls or for ſtandards, (for they ſhould not be removed again), the cuttings ſhould be planted. But in preparing the ground, you ſhould conſider the nature of the ſoil; which if ſtrong, and inclinable to wet, is by no means proper for grapes: therefore, where it ſo happens, you ſhould open a trench where the cuttings are to be planted, which ſhould be filled with lime rubbiſh, the better to drain off the moiſture: then raiſe the borders with freſh light earth about two feet thick, ſo that it may be at leaſt a foot above the level of the ground: then you ſhould open the holes at about ſix feet diſtance from each other, putting one good ſtrong cutting into each hole, which ſhould be laid a little ſloping, that their tops may incline to the wall; but it moſt be put in ſo deep, as that the uppermoſt eye may be level with the ſurface of the ground; for when any part of the cutting is left above ground, moſt of the buds attempt to ſhoot, ſo that the ſtrength of the cuttings is divided to nouriſh ſo many ſhoots, which muſt conſequently be weaker than if only one of them grew; whereas, on the contrary, by burying the whole cutting in the ground, the ſap is all employed on one ſingle ſhoot, which conſequently will be much ſtronger; beſides, the ſun and air are apt to dry that part of the cutting which remains above ground, and ſo often prevents their buds from ſhooting.

Then having placed the cutting into the ground, you ſhould fill up the hole gently, preſſing down the earth with your foot cloſe about it, and raiſe a little hill juſt upon the top of the cutting, to cover the upper eye quite over, which will prevent it from drying. This being done, there is nothing more neceſſary but to keep the ground clear from weeds until the cuttings begin to ſhoot; at which time you ſhould look over them carefully, to rub off any ſmall ſhoots, if ſuch are produced, faſtening the firſt main ſhoot to the wall, which ſhould be conſtantly trained up, as it is extended in length, to prevent its breaking or hanging down. You muſt continue to look over theſe once in about three weeks during the ſummer ſeaſon, conſtantly rubbing off all lateral ſhoots which are produced; and be ſure to keep the ground conſtantly clear from weeds, which, if ſuffered to grow, will exhauſt the goodneſs of the ſoil and ſtarve the cuttings. The Michaelmas following, if your cuttings have produced ſtrong ſhoots, you ſhould prune them down to two eyes. In the ſpring, after the cold weather is paſt, you muſt gently dig up the borders to looſe the earth; but you muſt be very careful, in doing this, not to injure the roots of your vines: you ſhould alſo raiſe the earth up to the ſtems of the plants, ſo as to cover the old wood, but not ſo deep as to cover either of the eyes of the laſt year's wood. After this they will require no farther care until they begin to ſhoot; when you ſhould look over them carefully, to rub off all weak dangling ſhoots, leaving no more than the two ſhoots, which are produced from the two eyes of the laſt year's wood, which ſhould be faſtened to the wall. And ſo from this, until the vine have done ſhooting, you ſhould look them over once in three weeks or a month, to rub off all lateral ſhoots as they are produced, and to faſten the main ſhoots to the wall as they are extended in length; which muſt not be ſhortened before the middle or latter end of July, when it will be proper to nip off their tops, which will ſtrengthen the lower eyes; and during the ſummer ſeaſon you muſt conſtantly keep the ground clear from weeds: nor ſhould you permit any ſort of plants to grow near the vines, which would not only rob them of nouriſhment, but ſhade the lower parts of the ſhoots, and thereby prevent their ripening; which will not only cauſe their wood to be ſpongy and luxuriant, but render it leſs fruitful.

As ſoon as the leaves begin to drop in autumn, you ſhould prune theſe young vines again, leaving three buds to each of the ſhoots, provided they are ſtrong: otherwiſe it is better to ſhorten them down to two eyes if they are good; for it is a very wrong practice to leave much wood upon young vines, or to leave their ſhoots too long, which greatly weakens the roots: then you ſhould faſten them to the wall, ſpreading them out horizontal each way, that there may be room to train the new ſhoots the following ſummer, and in the ſpring the borders muſt be digged as before.

The uſes of the fruit of the vine for making wine, &c. are well known. However, the number of vines cultivated in this country is by no means ſufficient to ſupply the conſumpt. The plant was introduced by the Romans, and appears formerly to have been very common. From the name of vineyard yet adhering to the ruinous ſites of our caſtles and monaſteries, there ſeem to have been few in the country but what had a vineyard belonging to them. The county of Glouceſter is particularly commended by Malmeſbury in the twelfth century, as excelling all the reſt of the kingdom in the number and goodneſs of its vineyards. In the earlier periods of our hiſtory, the iſle of Ely was expreſsly denominated the Iſle of Vines by the Normans. Vineyards are frequently noticed in the deſcriptive accounts of doomeſday. And thoſe of England are even mentioned by Bede, as early as the commencement of the eighth century.

That the Romans were the original introducers of the plant, we need no other teſtimony than the Britiſh appellations of it. Being brought by them into Gaul, it was denominated the *vigne* by the natives. And, being carried by them into Britain, it was ſimilarly called by the inhabitants the *guin-uydhen*, the *guin-bren*, the *guin-ien*, or *fion-ras*, as it is ſtill denominated in the Welſh, Corniſh, Armorican, and Iriſh dialects. Theſe appellations, like the Gaelic, do not directly ſignify the vine, and only ſpeak of it characteriſtically as the wine-tree. And, as they ſhow the Romans to have been the firſt planters of it in both kingdoms; ſo this little peculiarity pretty plainly intimates the natives of both to have been acquainted with the liquor, ſome time before they cultivated the tree. Such would naturally be the caſe of both. Such appears to have been actually the caſe with the Gauls. And the Caledonian Britons, who were ſtrangers to the plant, were converſant with its produce before the middle of the third century.

The former was not brought into Britain in the firſt, but was introduced before the cloſe of the third. And, confined as it would for ages be within the pale of the Roman government, it was tranſplanted into Ireland before the beginning of the eighth. But the grape, or, as with an agreeable ſimplicity it was called by the Britons, the *corne of the tree*, the *wine-grane*, and the *apple of the vine*, was not, as it now is, merely raiſed for the uſes of the table. All the arts of the vigneron would naturally be introduced with the plant. They were carried with it into Gaul. And, that they came together into Britain, the good knowledge which the Caledonians appear to have had of the liquor is a preſumptive evidence, and the Britiſh appellation of the wine-tree for the vine ſeems a ſtrong argument. But doomſday exhibits to us a particular proof made in England, during the period preceding the conqueſt. And, after it, the biſhop of Ely appears to have received at leaſt three or four tuns of wine annually, as tythe, from the produce of the vineyards in his dioceſe; and to have made frequent reſervations in his leaſes of a certain quantity of wine for rent. A plot of land in London, which now forms Eaſt-Smithfield and ſome adjoining ſtreets, was with-held from the religious houſe within Aldgate by four ſucceſſive conſtables of the Tower, in the reigns of Rufus, Henry, and Stephen, and made by them into a vineyard to their great emolument and profit. In the old accounts of rectorial and vicarial revenues, and in the old regiſters of eccleſiaſtical ſuits concerning them, the tithe of wine is an article that frequently occurs in Kent, Surry, and other counties. And the wines of Glouceſterſhire, within a century after the conqueſt, were little inferior to the French in ſweetneſs. The beautiful region of Gaul, which had not a ſingle vine in the days of Cæſar, had numbers ſo early as the time of Strabo. The ſouth of it was particularly ſtocked with them; and they had even extended themſelves into the interior parts of the country: But the grapes of the latter did not ripen kindly. And France was even famous for its vineyards in the reign of Veſpaſian, and even exported its wines into Italy. The whole province of Narbonne was then covered with vines: and the wine-merchants of the country were remarkable for all the knaviſh dexterity of our modern brewers, tinging it with ſmoke, colouring it (as was ſuſpected) with herbs and noxious dies, and even adulterating the taſte and appearance with aloes. And, as our firſt vines would be tranſplanted from Gaul, ſo were in all probability thoſe of the Allobroges in Franche Compte. Theſe were peculiarly fitted for cold countries. They ripened even in the froſts of the advancing winter. And they were of the ſame colour, and ſeem to have been of the ſame ſpecies, as the black Muſcadines of the preſent day, which have lately been tried in the iſland, I think, and found to be fitteſt for the climate. Theſe were pretty certainly brought into Britain a little after vines had been carried over all the kingdoms of Gaul, and about the middle of the third century; when the numerous plantations had gradually ſpread over the face of the latter, and muſt naturally have continued their progreſs into the former.

The Romans, even nearly to the days of Lucullus, were very ſeldom able to regale themſelves with wine. Very little was then raiſed in the compaſs of Italy. And the foreign wines were ſo dear, that they were rarely produced at an entertainment; and, when they were, each gueſt was indulged only with a ſingle draught. But in the ſeventh century of Rome, as their conqueſts augmented the degree of their wealth, and enlarged the ſphere of their luxury, wines became the object of particular attention. Many vaults were conſtructed, and good ſtocks of liquor repoſited in them. And this naturally gave encouragement to the wines of the country. The Falernian roſe immediately into great repute; and a variety of others, that of Florence among the reſt, ſucceeded it about the cloſe of the century. And the more weſterly parts of the European continent were, at once, ſubjected to the arms and enriched with the vines of Italy.

But the ſcarcity of the native, and dearneſs of the foreign wines in that country, ſeveral ages before the conqueſt of Lancaſhire, had called out the ſpirit of invention, and occaſioned the making of factitious wines. Theſe were ſtill continued by the Romans, and naturally taught to the Britons. And they were made of almoſt all the products of the orchard and garden, the pear, the apple, mulberry, ſervis, and roſe. Two of them, therefore, were thoſe agreeable liquors which we ſtill denominate *cyder* and *perry*. The latter would be called *pyrum* by the Romans, and is therefore called *perry* or *pear-water* by us. And the former aſſumed among the Romans the appellation of *ſicera*, which was colloquially pronounced by them *ſidera*, as the ſame pronunciation of it among the preſent Italians ſhows; and retains therefore the denomination of *cider* among ourſelves.

VITREOUS HUMOUR *of the Eye*. See ANATOMY, n° 406, p.

VITRIFICATION, in chemiſtry, the converſion of a body into glaſs by means of fire. See GLASS.

VITRIOL, a compound imperfect ſalt, formed by the union of certain metals with the ſulphureous acid. It is of three colours, white, blue, and green. See CHEMISTRY, n° 110. 142. 157.

VITRIOLATED, among chemiſts, ſomething impregnated, or ſuppoſed to be ſo, with vitriol or its acid.

VITRIOLIC, an appellation given to whatever abounds with, or partakes of the nature of, vitriol: thus ſuch foſſil bodies as contain vitriol are called *vitriolic minerals*, or *ores of vitriol*.

VITRUVIUS POLLIO (Marcus), a very celebrated Roman architect, was, according to the common opinion, born at Verona, and lived in the reign of Auguſtus, to whom he dedicated his excellent treatiſe on architecture, divided into ten books. William Philander's edition of this celebrated work is eſteemed. Claudius Perrault has given an excellent tranſlation of it in French, with learned notes. There are alſo ſeveral Engliſh tranſlations of Vitruvius.

VITUS's DANCE. See MEDICINE, n° 391, and p. 4870.

VIVERRA, the WEASEL; a genus of quadrupeds belonging to the order of feræ. They have ſix fore-teeth, the intermediate ones being ſhorter, and more than three grinders, and the claws are exſerted. The ſpecies are,

1. The ichneumon, with the tail tapering to a point, and the toes diſtant from each other; inhabits Egypt, Barbary, India and its iſlands. It is there a moſt uſeful animal; being an inveterate enemy to the ſerpents and other noxious reptiles which infeſt the torrid zone: it attacks without dread that moſt fatal of ſerpents the Naja, or Cobra de Capello; and ſhould it receive a wound in the combat, inſtantly retires, and is ſaid to obtain an antidote from a certain herb; after which it returns to the attack, and ſeldom fails of victory: it is a great deſtroyer of the eggs of crocodiles, which it digs out of the ſand; and even kills multitudes of the young of thoſe terrible reptiles: it was not therefore without reaſon, that the ancient Egyptians ranked the ichneumon among their deities. This animal is at preſent domeſticated and kept in houſes in India and in Egypt, for it is more uſeful than a cat, in deſtroying rats and mice; and grows very tame. It is very active; ſprings with great agility on its prey; will glide along the ground like a ſerpent, and ſeem as if without feet. It ſits up like a ſquirrel, and eats with its fore-feet, catching any thing that is flung to it. It is a great enemy to poultry; and will feign itſelf dead, till they come within reach: loves fiſh; draws its prey, after ſucking the blood, to its hole. Its excrements are very fetid; when it ſleeps, it brings its head and tail under its belly, appearing like a round ball, with two legs ſticking out. Rumphius obſerves how ſkilfully it ſeizes the ſerpents by the throat, ſo as to avoid receiving an injury; and Lucan beautifully deſcribes the ſame addreſs of this animal, in conquering the Egyptian aſp.

Aſpidas ut Pharias *cauda ſolertior hoſtis*
Ludit, et iratas incerta provocat umbra:
Obliquanſque caput vanas ſerpentis in auras
Effuſæ toto comprendit guttura morſu
Letiferam citra ſaniem: tunc irrita peſtis
Exprimitur, fauceſque fluunt pereunte veneno.

2. The yzquiepatl, or ſtifling weeſel, has a ſhort ſlender noſe; ſhort ears and legs; black body, full of hair; the tail long, of a black and white colour; length from noſe to tail, about eighteen inches. It inhabits Mexico, and perhaps other parts of America. This and ſome other ſpecies are remarkable for the peſtiferous, ſuffocating, and moſt fetid vapour, they emit from behind, when attacked, purſued, or frightened: it is their only means of defence. Some turn their tail to their enemy, and keep them at a diſtance by a frequent crepitus; and others ejaculate their urine, tainted with the horrid effluvia, to the diſtance of eighteen feet. The purſuers are ſtopped with the terrible ſtench. Should any of this liquor fall into the eyes, it almoſt occaſions blindneſs: if on the cloaths, the ſmell will remain for ſeveral days, in ſpite of all waſhing; they muſt even be buried in freſh ſoil, in order to be ſweetened. Dogs that are not true bred, run back as ſoon as they perceive the ſmell: thoſe that have been uſed to it, will kill the animal; but are often obliged to relieve themſelves by thruſting their noſes into the ground. There is no bearing the company of a dog that has killed one, for ſeveral days. Profeſſor Kalm was one night in great danger of being ſuffocated by one that was purſued into a houſe where he ſlept; and it affected the cattle ſo, that they bellowed through pain. Another, which was killed by a maid-ſervant in a cellar, ſo affected her with its ſtench, that ſhe lay ill for ſeveral days; all the proviſions that were in the place were ſo tainted, that the owner was obliged to throw them away. Notwithſtanding this, the fleſh is reckoned good meat, and not unlike that of a pig; but it muſt be ſkinned as ſoon as killed, and the bladder taken carefully out. The Virginian ſpecies is capable of being tamed, and will follow its maſter like a dog: it never emits its vapour, except terrified. It breeds in hollow trees, or holes under ground, or in

clefts of rocks; climbs trees with great agility; kills poultry; eats eggs, and deſtroys young birds.

Another ſpecies reſembling this, inhabits Peru and other parts of South America; its peſtilential vapour overcomes even the panther of America, and ſtupifies that formidable enemy.

3. The zibetha, or civet-cat, has ſhort rounded ears; the back and ſides cinereous, tinged with yellow, marked with large duſky ſpots diſpoſed in rows; the hair coarſe; that on the top of the body longeſt, ſtanding up like a mane; the tail ſometimes wholly black; ſometimes ſpotted near the baſe; length, from noſe to tail, about two feet three inches; the tail fourteen inches; the body pretty thick. It inhabits India, the Philippine iſles, Guinea, Ethiopia, and Madagaſcar. The famous drug muſk, or civet, is produced from an overture between the privities and the anus, in both ſexes, ſecreted from certain glands. The perſons who keep them procure the muſk by ſcraping the inſide of this bag twice a week with an iron ſpatula, and get about a dram each time: but it is ſeldom ſold pure; being generally mixed with ſuet or oil, to make it more weighty. The males yield the moſt; eſpecially when they are previouſly irritated, They are fed, when young, with pap made of millet, with a little fleſh or fiſh; when old, with raw fleſh, In a wild ſtate, they prey on fowl. Theſe animals ſeem not to be known to the ancients: it is probable the drug was brought without their knowing its origin; for it is certain the the fine gentlemen in Rome uſe perfume.

VIVES, in farriery. See there, § x.

VIVIPAROUS, in natural hiſtory, an epithet applied to ſuch animals as bring forth their young alive and perfect; in contradiſtinction to them that lay eggs, which are called *oviparous* animals.

UKRAINE, a large country of Europe, bounded on the north by Poland and Muſcovy, on the eaſt by Muſcovy, on the ſouth by Tartary, and on the weſt by Moldavia. This province is one continued plain, interſperſed with ſeveral fine rivers and agreeable foreſts. It is exceedingly fertile, and produces all the neceſſaries of life. The rivers ſwarm with all ſorts of fiſh, and game is alſo very plenty. There are no brick buildings, all the houſes being of wood after the Ruſſian manner. It belongs to the Poles and Muſcovites; but theſe laſt poſſeſs the greateſt part. The people that now inhabit it are called *Coſſacks*.

ULCER, in ſurgery. See there, § iv. p. 8409.

ULCER, farriery. See there, § xxvi.

ULEX, FURZE, GORSE, or WHINS; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are two ſpecies; of which the moſt remarkable is the Europæus, or common furze. This is ſo well known as to need no deſcription. It is frequently cut to make faggots for heating ovens, which it does very ſoon, burning rapidly and with a great degree of heat. The aſhes yield an alkaline ſalt. For its uſes as a fence, and food for horſes, ſee AGRICULTURE, n° 46. and FENCE.

ULIETEA, one of the Society iſlands. This iſland is about 21 leagues in circuit. Its productions are plantains, cocoa-nuts, yams, hogs, and fowl; the two latter of which are ſcarce. The ſoil on the top of one of the hills was found to be a kind of ſtone marle; on the ſides were found ſome ſcattered flints, and a few ſmall pieces of a cavernous or ſpongy ſtone lava, of a whitiſh colour, which ſeemed to contain ſome remains of iron, ſo that it may poſſibly be here lodged in the mountains in a great quantity. Nothing was ſeen on this iſland to diſtinguiſh either its inhabitants, or their manners, from the other neighbouring iſlands. The firſt Europeans who landed on this ſhore, were Mr Banks and Dr Solander; they were received by the natives in the moſt courteous manner, reports concerning them having been their harbingers from O-Taheitee. Every body ſeemed to fear and reſpect them, placing in them at the ſame time the utmoſt confidence; behaving, as if conſcious, that their viſitors poſſeſſed the power of doing them miſchief without a diſpoſition to make uſe of it.

ULIGINOUS, in agriculture, an appellation given to a moiſt, mooriſh, and fenny ſoil.

ULLAGE, in gauging, is ſo much of a caſk or other veſſel as it wants of being full.

ULM, a free and imperial city of Germany, in the circle of Swabia, ſeated on the river Iller. It is a pretty large place, defended by fortifications; and the inhabitants are proteſtants. Here the archives of the circle are depoſited, and it carries on a very great trade. The elector of Bavaria became maſter of it, in 1702, by a ſtratagem; but, in 1604, the French being vanquiſhed at the battle of Hochſtet, the Bavarians ſurrendered it by capitulation. The Roman Catholics have but two churches, all the reſt belonging to the Proteſtants. E. Long. 10. 5. N. Lat. 48. 30.

ULMUS, the ELM; a genus of the digynia order, belonging to the pentandria claſs of plants. There are ſix ſpecies; of which the moſt remarkable are, 1. The campeſtris, or common rough broad-leaved witch elm, is very common in the north-weſt counties of England, where it is generally believed to grow naturally in the woods; this grows to a very large ſize. The back of the young branches is ſmooth and very tough, but that of the old trees cracks and is rough. The leaves are rough, and are doubly ſawed on their edges. Their baſe is unequal, ſtanding on ſhort foot-ſtalks. The flowers come out in March upon ſlender twigs in cluſters, of a deep red colour; and are ſucceeded by oval bordered capſules, containing one roundiſh compreſſed ſeed, which ripens in May. The wood of this tree is very good for all the purpoſes of any kind of elm, and the trees grow to a very large ſize; but as the leaves do not come out till late in the ſpring, there are few perſons who plant theſe trees for ornament. 2. The ſcaber, or witch-hazel, grows naturally in ſome of the northern counties in England, where it has its name from the reſemblance of the young ſhoots and leaves to thoſe of hazel. This grows to a tree of great magnitude. The bark of the young ſhoots is very ſmooth and tough; it is of a yellowiſh brown colour, with ſpots of white. The flowers grow in cluſters toward the end of the twigs; they have long leafy empalements, of a green colour, appearing in the ſpring before their leaves, and the ſeeds ripen the latter end of May. The wood of this tree is not ſo good for uſe as that of the firſt ſort. Formerly, when long bows were in uſe, many of them were made of the boughs of this tree. 3. The ſativa, improperly called *Engliſh elm*, is not a native of England, and is only found in plantations where the young trees were procured from the neighbourhood of London. Where this tree grows naturally, is not eaſy to determine; ſome perſons have ſuppoſed it was brought from Germany. As this tree is well known, it requires no deſcription. The flowers are of a purpliſh red colour, and generally appear the beginning of March, but Mr Miller ſays he could never obſerve any ſeed from this ſort. 4. The glaber, or ſmooth-leaved witch-elm, is very common in ſeveral parts of Hertfordſhire, Eſſex, and other north-eaſt counties of England; this grows to a large tree, and is much eſteemed. The branches ſpread out like thoſe of the firſt ſort. The leaves are ſharply ſawed on their edges; they are ſmoother than moſt of the other ſorts: they do not appear till the middle or latter end of May, ſo the trees are ſeldom planted for ornament. 5. The minor, or upright elm, is found growing in hedge-rows in ſeveral parts of England. The branches of this ſort have a ſmooth grayiſh bark, and grow erect. The leaves are narrow, and more pointed than thoſe of the Engliſh elm, and are ſmoother; they are later in coming out in the ſpring than thoſe, but continue longer in autumn; this has been by ſome called the *Iriſh elm.*

All the ſorts of elm may be either propagated by layers or ſuckers taken from the roots of the old trees, the latter of which is generally practiſed by the nurſery-gardeners: but as theſe are often cut up with indifferent roots, they often miſcarry, and render the ſucceſs doubtful; whereas thoſe which are propagated by layers are in no hazard, and always make better roots and come on faſter than the other, and do not ſend out ſuckers from their roots in ſuch plenty, for which reaſon this method ſhould be more univerſally practiſed.

ULSTER, the moſt northerly province of Ireland. In Latin it is called *Ultonia,* in Iriſh *Cui Guilly;* and gives the title of *earl* to the dukes of York of the royal family. It is bounded by the Atlantic Ocean on the weſt, St George's channel and the Iriſh Sea on the eaſt, the Deucaledonian Ocean on the north, and on the ſouth and ſouth-weſt the provinces of Leinſter and Connaught. Its greateſt length is near 120 miles, its breadth about 100; and its circumference, including the windings and turnings, 460; containing 9 counties, 58 market-towns and boroughs, 1 archbiſhopric, 6 biſhoprics, and 214 pariſhes. Ulſter abounds in lakes and rivers, which ſupply it with variety of fine fiſh, eſpecially ſalmon, beſides what it has from the ſea, with which a great part of it is bounded. The ſouthern parts of it are rich, fertile, well cultivated, and incloſed; but the greater part of the northern is open and mountainous. The towns of this province are in general the neateſt and beſt built of any in Ireland, as well as the farm-houſes; which in moſt parts of the kingdom are conſtructed of no better materials than clay and ſtraw. The inhabitants of Ulſter are alſo more like the Engliſh in their manner and dialect, than thoſe of the other three provinces: for as it includes within itſelf the whole, or by far the greater part of the linen manufactory, the beſt branch of trade in the kingdom, they have conſequently the greateſt intercourſe with England. An Engliſhman in ſome parts of it, indeed, will imagine himſelf, from the ſimilarity of their language and manners, in his own country. This province had anciently petty kings of its own. It was firſt ſubjected to the Engliſh in the reign of Henry II. by John Courcy, the firſt who bore the title of *earl of Ulſter;* but it afterwards threw off the yoke, and was never entirely reduced till the reign of James I. when great numbers of Scots by his encouragement went and ſettled in it. Of theſe, moſt of the preſent inhabitants are the deſcendants. This province was the firſt and principal ſcene of the bloody maſſacre in 1741. The counties contained in it are, Donnegal, Londonderry, Antrim, Tyrone, Fermanagh, Cavan, Monaghan, Armagh, and Down.

ULTERIOR, in geography, is applied to ſome part of a county or province, which, with regard to the reſt of that country, is ſituated on the farther ſide of the river, mountain, or other boundary, which ſeparates the two countries.

ULTRAMARINE, a beautiful blue colour uſed by the painters, prepared from the lapis lazuli by calcination.

ULTRAJECTUM. See TRAJECTUM *Rheni.*

ULTRAMONTANE, ſomething beyond the mountains. The term is principally applied in relation to France and Italy, which are ſeparated by the Alps.

ULVA, LAVER, or *Turkey Feather;* a genus of the order of algæ, belonging to the cryptogamia claſs of plants. It conſiſts merely of a foliaceous ſubſtance formed into long cylindrical tubes. There are 10 ſpecies; of which the moſt remarkable are, 1. The umbilicalis, navel laver, in Scotland called *ſloke* or *ſlake,* is frequent on ſea-rocks, and ſometimes on low ſhores, growing ſingle. It is a wide membranaceous leaf, of a dark, dull, purple colour, expanded flat; for the moſt part in a circular form, variouſly ſinuated on the edges; often perforated on the ſurface, and generally fixed to the rocks by a central root. The ſubſtance of it is ſmooth and ſhining, and a little tough, but not difficult to be torn. The breadth is from three inches to a foot. It often varies into a riband-like form. The inhabitants of the Weſtern iſles gather it in the month of March; and after pounding and ſtewing it with a little water, eat it with pepper, vinegar, and butter. Others ſtew it with leeks or onions. In England it is generally pickled with ſalt, and preſerved in jars; and when brought to table is ſtewed, and eaten with oil and lemon-juice.

ULUG BEIG, a Perſian prince and learned aſtronomer, was deſcended from the famous Tamerlane, and reigned at Samarcand about 40 years; after which he was murdered by his own ſon, in 1449. His catalogue of the fixed ſtars, rectified for the year 1434, was publiſhed at Oxford by Mr Hyde, in 1665, with learned notes. Mr Hudſon printed in his Engliſh Geography Ulug Beig's Tables of the longitude and latitude of places; and Mr Greaves publiſhed, in Latin, his Aſtronomical Epochas, at London, in 1650.

ULYSSES, king of Ithaca, the ſon of Laertius, and father of Telemachus, and one of thoſe heroes who contributed moſt to the taking of Troy. After the deſtruction of that city, he wandered for 10 years; and at laſt returned to Ithaca, where, with the aſſiſtance of Telemachus, he killed Antinous and other princes who intended to marry his wife Penelope and ſeize his dominions. He at length reſigned the government of the kingdom to his ſon Telemachus; and was killed by Telegonus, his ſon by Circe, who did not know him. This hero is the ſubject of the Odyſſey.

UMBELLA, an UMBEL, in botany; a ſpecies of receptacle: or rather a mode of flowering, in which a number of ſlender foot-ſtalks proceed from the ſame centre, and riſe to an equal height, ſo as to form an even, and generally round ſurface at top. The term differs from *corymbus*, another mode of flowering, in that there is a common part, the point, to wit, from which iſſue all the foot-ſtalks; and in that the foot-ſtalks are of an equal length, whereas in a corymbus the foot-ſtalks proceed from different points, and though they altogether form an even ſurface at top, as in the umbel, yet is each lower foot-ſtalk of greater length than that immediately above it.

UMBELLATÆ, the name of a claſs in Ray's and Tournefort's methods, conſiſting of plants whoſe flowers grow in umbels, with five petals that are often unequal, and two naked ſeeds that are joined at top and ſeparated below.

The ſame plants conſtitute the 45th order of Linnæus's Fragments of a Natural Method. See BOTANY, p. 1315.

UMBELLIFEROUS PLANTS, are ſuch as have their tops branched and ſpread out like an umbrella.

UMBILICAL, among anatomiſts, ſomething relating to the umbilicus or navel.

UMPIRE, a third perſon choſen to decide a controverſy left to arbitration.

UNCIA, in general, a Latin term denoting the twelfth part of any thing; particularly the twelfth part of a pound, called in Engliſh an *ounce;* or the twelfth part of a foot, called an *inch*.

UNCTION, the act of anointing or rubbing with oil or other fatty matter.

UNCTION, in matters of religion, is uſed for the character conferred on ſacred things, by anointing them with oil. Unctions were very frequent among the Hebrews. They anointed both their kings and high-prieſts at the ceremony of their inauguration. They alſo anointed the ſacred veſſels of the tabernacle and temple, to ſanctify and conſecrate them to the ſervice of God. The unction of kings is ſuppoſed to be a ceremony introduced very late among the Chriſtian princes. It is ſaid, that none of the emperors were ever anointed before Juſtinian, or Juſtin. The emperors of Germany took the practice from thoſe of the eaſtern empire: king Pepin of France was the firſt who received the unction. In the ancient Chriſtian church, unction always accompanied the ceremonies of baptiſm and confirmation. Extreme unction, or the anointing perſons in the article of death, was alſo practiſed by the ancient Chriſtians, in compliance with the precept of St James, chap. v. 14 and 15 verſes; and this extreme unction the Romiſh church has advanced to the dignity of a ſacrament. It is adminiſtered to none but ſuch as are afflicted with ſome mortal diſeaſe, or are in a decrepit age. It is refuſed to impenitent perſons, as alſo to criminals. The parts to be anointed are the eyes, the ears, the noſtrils, the mouth, the hands, the feet, and the reins. The laity are anointed in the palms of the hands, but prieſts on the back of it; becauſe the palms of their hands have been already conſecrated by ordination. The parts above-mentioned are anointed in the form of a croſs. The prieſt begins anointing the ſick perſon's eyes, ſaying, "May God, by his holy anointing, pardon you the ſins you have committed by the eyes." In like manner he proceeds to the other parts, varying the words according to the parts he anoints.

UNDECAGON, is a regular polygon, of 11 ſides.

UNDECEMVIR, a magiſtrate among the ancient Athenians, who had ten other colleagues or aſſociates joined with him in the ſame commiſſion. The functions of the undecemviri at Athens were much the ſame as thoſe of the *prevots de marechauſſe* in France. They took care of the apprehending of criminals; ſecured them in the hands of juſtice; and when they were condemned, took them again into cuſtody, that the ſentence might be executed on them. They were choſen by the tribes, each tribe naming its own; and as the number of the tribes after Calliſthenes was but ten, which made ten members, a ſcribe or notary was added, which made the number eleven.

UNDERSTANDING, is defined by the Peripatetics, to be a faculty of the reaſonable ſoul, converſant about intelligible things, conſidered as intelligible. They alſo make it twofold, *viz.* active and paſſive. Active underſtanding, they hold that faculty of the ſoul by which the ſpecies and images of intelligible things are framed, on occaſion of the preſence of phantaſms or appearances thereof. For maintaining the intellect to be material, they hold it impoſſible it ſhould be diſpoſed to think by any diſproportionable phantaſms of mere body, and therefore that it is obliged to frame other proportionate ſpecies of itſelf, and hence its denomination *active*. Paſſive underſtanding, is that which, receiving the ſpecies framed by the active underſtanding, breaks forth into actual knowledge.

The moderns ſet aſide the Peripatetic notion of an active underſtanding. The Carteſians define the underſtanding to be that faculty whereby the mind converſing with, and as it were intent on, itſelf, evidently knows what is true in any thing not exceeding its capacity. The Corpuſcular Philoſophers define the underſtanding to be a faculty expreſſive of things which ſtrike on the external ſenſes, either by their images or their effects, and ſo enter the mind. Their great doctrine is, *Nihil eſſe in intellectu quod non prius fuerit in ſenſu;* and to this doctrine Mr Locke, and moſt of the lateſt Engliſh philoſophers, ſubſcribe.

Between the Carteſians and Corpuſcularians there is this farther difference, that the latter make the judgment to belong to the underſtanding, but the former to the will. Hence, according to the moſt approved opinions of the Corpuſcularians, the underſtanding has two offices, *viz.* perception and judgment; according to the Carteſians, it has only one, *viz.* perception. See METAPHYSICS and LOGIC.

UNDERWALD, a canton of Swiſſerland, and the ſixth in rank. It is bounded on the north by the canton of Lucern and by the Lake of the Four Cantons, on the eaſt by the high mountains which ſeparate it from the canton of Bern, and on the weſt by the Canton of Bern. It is divided into two great valleys, which are ſeparated by a chain of mountains covered with foreſts. The religion of this canton is the Roman Catholic.

UNDERWOOD, is coppice, or any wood that is not accounted timber.

UNDULATION, in phyſics, a kind of tremulous motion or vibration obſervable in a liquid whereby it alternately riſes and falls like the waves of the ſea.

UNGUENT, in medicine and ſurgery, a topical remedy or compoſition, chiefly uſed in the dreſſing of wounds or bliſters.

UNICORN, an animal famous among the ancients, and thought to be the ſame with the rhinoceros. See RHINOCEROS.

UNICORN-*Fiſh*. See MONODON.

UNIFORM, denotes a thing to be ſimilar, or conſiſtent either with another thing, or with itſelf, in reſpect of figure, ſtructure, proportion or the like; in which ſenſe it ſtands oppoſed to difform.

UNIFORMITY, a ſimilitude or reſemblance between the parts of a whole.

UNIFORMITY *and Variety*. In things of nature's workmanſhip, whether we regard their internal or external ſtructure, beauty and deſign are equally conſpicuous. We ſhall begin with the outſide of nature, as what firſt preſents itſelf.

The figure of an organic body is generally regular. The trunk of a tree, its branches, and their ramifications, are nearly round, and form a ſeries regularly decreaſing from the trunk to the ſmalleſt fibre: uniformity is no where more remarkable than in the leaves, which, in the ſame ſpecies, have all the ſame colour, ſize, and ſhape; the ſeeds and fruits are all regular figures, approaching for the moſt part to the globular form. Hence a plant, eſpecially of the larger kind, with its trunk, branches, foliage, and fruit, is a charming object.

In an animal, the trunk, which is much larger than the other parts, occupies a chief place. Its ſhape, like that of the ſtem of plants, is nearly round; a figure which of all is the moſt agreeable. Its two ſides are preciſely ſimilar: ſeveral of the under parts go off in pairs; and the two individuals of each pair are accurately uniform. The ſingle parts are placed in the middle; the limbs, bearing a certain proportion to the trunk, ſerve to ſupport it, and to give it a proper elevation; upon one extremity are diſpoſed the neck and head, in the direction of the trunk: the head being the chief part, poſſeſſes with great propriety the chief place. Hence the beauty of the whole figure is the reſult of many equal and proportional parts orderly diſpoſed; and the ſmalleſt variation in number, equality, proportion, or order, never fails to produce a perception of deformity.

Nature in no particular ſeems more profuſe of ornament, than in the beautiful colouring of her works. The flowers of plants, the furs of beaſts, and the feathers of birds, vie with each other in the beauty of their colours, which in luſtre as well as in harmony are beyond the power of imitation. Of all natural appearances, the colouring of the human face is the moſt exquiſite; it is the ſtrongeſt inſtance of the ineffable art of nature, in adapting and proportioning its colours to the magnitude, figure, and poſition of the parts. In a word, colour ſeems to live in nature only, and to languiſh under the fineſt touches of art.

When we examine the internal ſtructure of a plant or animal, a wonderful ſubtlety of mechaniſm is diſplayed. Man, in his mechanical operations, is confined to the ſurface of bodies; but the operations of nature are exerted through the whole ſubſtance, ſo as to reach even the elementary parts. Thus the body of an animal and that of a plant are compoſed of certain great veſſels; theſe of ſmaller; and theſe again of ſtill ſmaller, without end, as far as we can diſcover. This power of diffuſing mechaniſm through the moſt intimate parts is peculiar to nature; and diſtinguiſhes her operations moſt remarkably from every work of art. Such texture, continued from the groſſer parts to the moſt minute, preſerves all along the ſtricteſt regularity: the fibres of plants are a bundle of cylindric canals, lying in the ſame direction, and parallel or nearly parallel to each other: in ſome inſtances, a moſt accurate arrangement of parts is diſcovered, as in onions; formed of concentric coats, one within another to the very centre. An animal body is ſtill more admirable in the diſpoſition of its internal parts, and in their order and ſymmetry; there is not a bone, a muſcle, a blood-veſſel, a nerve, that hath not one correſponding to it on the oppoſite ſide; and the ſame order is carried through the moſt minute parts. The lungs are compoſed of two parts, which are diſpoſed upon the ſides of the thorax; and the kidneys, in a lower ſituation, have a poſition not leſs orderly. As to the parts that are ſingle, the heart is advantageouſly ſituated near the middle: the liver, ſtomach, and ſpleen, are diſpoſed in the upper region of the abdomen, about the ſame height; the bladder is placed in the middle of the body, as well as the inteſtinal canal, which fills the whole cavity with its convolutions.

The mechanical power of nature, not confined to ſmall bodies, reacheth equally thoſe of the greateſt ſize; witneſs the bodies that compoſe the ſolar ſyſtem, which, however large, are weighed, meaſured, and ſubjected to certain laws, with the utmoſt accuracy. Their places round the ſun, with their diſtances, are determined by a preciſe rule, correſponding to their quantity of matter. The ſuperior dignity of the central body, in reſpect of its bulk and lucid appearance, is ſuited to the place it occupies. The globular figure of theſe bodies, is not only in itſelf beautiful, but is above all others fitted for regular motion. Each planet revolves about its own axis in a given time; and each moves round the ſun, in an orbit nearly circular, and in a time proportioned to its diſtance. Their velocities, directed by an eſtabliſhed law, are perpetually changing by regular accelerations and retardations. In fine, the great variety of regular appearances, joined with the beauty of the ſyſtem itſelf, cannot fail to produce the higheſt delight in every one who is ſenſible of deſign, power, or beauty.

Nature hath a wonderful power of connecting ſyſtems with each other, and of propagating that connection through all her works. Thus the conſtituent parts of a plant, the roots, the ſtem, the branches, the leaves, the fruit, are really different ſyſtems, united by a mutual dependence on each other: in an animal, the lymphatic and lacteal ducts, the blood-veſſels and nerves, the muſcles and glands, the bones and cartilages, the membranes and bowels, with the other organs, form diſtinct ſyſtems, which are united into one whole. There are at the ſame time other connections leſs intimate. Every plant is joined to the earth by its roots;

roots; it requires rain and dews to furniſh it with juices; and it requires heat to preſerve theſe juices in fluidity and motion. Every animal by its gravity is connected with the earth; with the element in which it breathes; and with the ſun, by deriving from it cheriſhing and enlivening heat. The earth furniſheth aliment to plants, theſe to animals, and theſe again to other animals, in a long train of dependence. That the earth is part of a greater ſyſtem, comprehending many bodies mutually attracting each other, and gravitating all toward one common centre, is now thoroughly explored. Such a regular and uniform ſeries of connections, propagated through ſo great a number of beings, and through ſuch wide ſpaces, is wonderful; and our wonder muſt increaſe, when we obſerve theſe connections propagated from the minuteſt atoms to bodies of the moſt enormous ſize, and ſo widely diffuſed as that we can neither perceive their beginning nor their end. That theſe connections are not confined within our own planetary ſyſtem, is certain; they are diffuſed over ſpaces ſtill more remote, where new bodies and ſyſtems riſe without end. All ſpace is filled with the works of God, which are conducted by one plan, to anſwer unerringly one great end.

But the moſt wonderful connection of all, though not the moſt conſpicuous, is that of our internal frame with the works of nature: man is obviouſly fitted for contemplating theſe works, becauſe in this contemplation he has great delight. The works of nature are remarkable in their uniformity not leſs than in their variety; and the mind of man is fitted to receive pleaſure equally from both. Uniformity and variety are interwoven in the works of nature with ſurpriſing art. Variety, however great, is never without ſome degree of uniformity; nor the greateſt uniformity without ſome degree of variety. There is great variety in the ſame plant, by the different appearances of its ſtem, branches, leaves, bloſſoms, fruit, ſize, and colour; and yet when we trace that variety through different plants, eſpecially of the ſame kind, there is diſcovered a ſurpriſing uniformity. Again, where nature ſeems to have intended the moſt exact uniformity, as among individuals of the ſame kind, there ſtill appears a diverſity, which ſerves readily to diſtinguiſh one individual from another. It is indeed admirable, that the human viſage, in which uniformity is ſo prevalent, ſhould yet be ſo marked, as to leave no room among millions for miſtaking one perſon for another; theſe marks, though clearly perceived, are generally ſo delicate, that words cannot be found to deſcribe them. A correſpondence ſo perfect between the human mind and the works of nature is extremely remarkable. The oppoſition between variety and uniformity is ſo great, that one would not readily imagine they could both be reliſhed by the ſame palate; at leaſt not in the ſame object, nor at the ſame time: it is however true, that the pleaſures they afford being happily adjuſted to each other, and readily mixing in intimate union, are frequently produced by the ſame individual object. Nay, further, in the objects that touch us the moſt, uniformity and variety are conſtantly combined; witneſs natural objects, where this combination is always found in perfection. Hence it is, that natural objects readily form themſelves into groups, and are agreeable in whatever manner combined: a wood with its trees, ſhrubs, and herbs, is agreeable; the muſic of birds, the lowing of cattle, and the murmuring of a brook, are in conjunction delightful; though they ſtrike the ear without modulation or harmony. In ſhort, nothing can be more happily accommodated to the inward conſtitution of man, than that mixture of uniformity with variety which the eye diſcovers in natural objects; and accordingly the mind is never more highly gratified than in contemplating a natural landſcape.

UNIFORMITY *and Variety*, conſidered with relation to the fine arts.—In general, in every work of art, it muſt be agreeable to find that degree of variety which correſponds to the natural courſe of our perceptions; and that an exceſs in variety or in uniformity muſt be diſagreeable, by varying that natural courſe. For that reaſon, works of art admit more or leſs variety according to the nature of the ſubject. In a picture of an intereſting event, that ſtrongly attaches the ſpectator to a ſingle object, the mind reliſheth not a multiplicity of figures nor of ornaments: a picture, again, repreſenting a gay ſubject, admits great variety of figures and ornaments; becauſe theſe are agreeable to the mind in a cheerful tone. The ſame obſervation is applicable to poetry and to muſic.

It muſt be at the ſame time remarked, that one can bear a greater variety of natural objects than of objects in a picture; and a greater variety in a picture, than in a deſcription. A real object preſented to view, makes an impreſſion more readily than when repreſented in colours, and much more readily than when repreſented in words. Hence it is, that the profuſe variety of objects in ſome natural landſcapes neither breed confuſion nor fatigue; and for the ſame reaſon, there is place for greater variety of ornament in a picture than in a poem. A picture however, like a building, ought to be ſo ſimple as to be comprehended in one view. Whether every one of Le Brun's pictures of Alexander's hiſtory will ſtand the teſt, is ſubmitted to judges.

From theſe general obſervations we proceed to particulars. In works expoſed continually to public view, variety ought to be ſtudied. It is a rule, accordingly, in ſculpture, to contraſt the different limbs of a ſtatue, in order to give it all the variety poſſible. Though the cone in a ſingle view be more beautiful than the pyramid, yet a pyramidal ſteeple, becauſe of its variety, is juſtly preferred. For the ſame reaſon, the oval is preferred before the circle; and painters, in copying buildings or any regular work, give an air of variety by repreſenting the ſubject in an angular view; we are pleaſed with the variety, without loſing ſight of the regularity. In a landſcape repreſenting animals, thoſe eſpecially of the ſame kind, contraſt ought to prevail: to draw one ſleeping, another awake; one ſitting, another in motion; one moving toward the ſpectator, another from him, is the life of ſuch a performance.

In every ſort of writing intended for amuſement, variety is neceſſary in proportion to the length of the work. Want of variety is ſenſibly felt in Davila's hiſtory of the Civil Wars of France: the events are indeed important and various; but the reader languiſhes by a tireſome monotony of character, every perſon engaged being figured a conſummate politician, governed by intereſt only. It is hard to ſay, whether Ovid diſguſts more by too great variety, or too great uniformity.

mity. His ſtories are all of the ſame kind, concluding invariably with the transformation of one being into another; and ſo far he is tireſome by exceſs in uniformity. He is not leſs fatiguing by exceſs in variety, hurrying his reader inceſſantly from ſtory to ſtory. Arioſto is ſtill more fatiguing than Ovid, by exceeding the juſt bounds of variety. Not ſatisfied, like Ovid, with a ſucceſſion in his ſtories, he diſtracts the reader, by jumbling together a multitude of them without any connection. Nor is the Orlando Furioſo leſs tireſome by its uniformity than the Metamorphoſes, though in a different manner. After a ſtory is brought to a criſis, the reader, intent on the cataſtrophe, is ſuddenly ſnatched away to a new ſtory, which makes no impreſſion ſo long as the mind is occupied with the former. This tantalizing method, from which the author never once ſwerves during the courſe of a long work, beſide its uniformity, hath another bad effect; it prevents that ſympathy which is raiſed by an intereſting event when the reader meets with no interruption.

It may ſurpriſe ſome readers to find variety treated as only contributing to make a train of perceptions pleaſant, when it is commonly held to be a neceſſary ingredient in beauty of whatever kind; according to the definition, "That beauty conſiſts in uniformity amid variety." But this definition, however applicable to one or other ſpecies, is far from being juſt with reſpect to beauty in general. Variety contributes no ſhare to the beauty of a moral action, nor of a mathematical theorem; and numberleſs are the beautiful objects of ſight that have little or no variety in them: a globe, the moſt uniform of all figures, is of all the moſt beautiful; and a ſquare, though more beautiful than a trapezium, hath leſs variety in its conſtituent parts. The foregoing definition, which at beſt is but obſcurely expreſſed, is only applicable to a number of objects in a group or in ſucceſſion; among which, indeed, a due mixture of uniformity and variety is always agreeable; provided the particular objects ſeparately conſidered, be in any degree beautiful; for uniformity amid variety among ugly objects affords no pleaſure. This circumſtance is totally omitted in the definition; and indeed to have mentioned it, would at the very firſt glance have ſhown the definition to be imperfect: for to define beauty as ariſing from beautiful objects blended together in a due proportion of uniformity and variety, would be too groſs to paſs current; as nothing can be more groſs, than to employ in a definition the very term that is to be explained.

UNION, a junction, coalition, or aſſemblage of two or more different things in one.

Union, or *The Union*, by way of eminence, is more particularly uſed to expreſs the act by which the two ſeparate kingdoms of England and Scotland were incorporated into one, under the title of *The kingdom of Great Britain*. This union, in vain attempted by king James I. was at length effected in the year 1707, 6 Annæ; when twenty-five articles were agreed to by the parliament of both nations, the purport of the moſt conſiderable being as follow:

1. That on the firſt of May 1707, and for ever after, the kingdoms of England and Scotland ſhall be united into one kingdom, by the name of *Great Britain*.

2. The ſucceſſion to the monarchy of Great Britain ſhall be the ſame as was before ſettled with regard to that of England.

3. The united kingdom ſhall be repreſented by one parliament.

4. There ſhall be a communication of all rights and privileges between the ſubjects of both kingdoms, except where it is otherwiſe agreed.

9. When England raiſes 2,000,000l. by a land tax, Scotland ſhall raiſe 48,000l.

16, 17. The ſtandards of the coin, of weights, and of meaſures, ſhall be reduced to thoſe of England, throughout the united kingdoms.

18. The laws relating to trade, cuſtoms, and the exciſe, ſhall be the ſame in Scotland as in England. But all the other laws of Scotland ſhall remain in force; but alterable by the parliament of Great Britain. Yet with this caution, that laws relating to public policy are alterable at the diſcretion of the parliament; laws relating to private right are not to be altered but for the evident utility of the people of Scotland.

22. Sixteen peers are to be choſen to repreſent the peerage of Scotland in parliament, and 45 members to ſit in the houſe of commons.

23. The 16 peers of Scotland ſhall have all privileges of parliament; and all peers of Scotland ſhall be peers of Great Britain, and rank next after thoſe of the ſame degree at the time of the union, and ſhall have all privileges of peers, except ſitting in the houſe of lords and voting on the trial of a peer.

Theſe are the principal of the 25 articles of union, which are ratified and confirmed by ſtatute 5 Ann. c. 8. in which ſtatute there are alſo two acts of parliament recited; the one of Scotland, whereby the church of Scotland, and alſo the four univerſities of that kingdom, are eſtabliſhed for ever, and all ſucceeding ſovereigns are to take an oath inviolably to maintain the ſame; the other of England, 5 Annæ, c. 6. whereby the acts of uniformity of 13 Eliz. and 13 Car. II. (except as the ſame had been altered by parliament at that time) and all other acts then in force for the preſervation of the church of England, are declared perpetual; and it is ſtipulated, that every ſubſequent king and queen ſhall take an oath inviolably to maintain the ſame within England, Ireland, Wales, and the town of Berwick upon Tweed. And it is enacted, that theſe two acts "ſhall for ever be obſerved as fundamental and eſſential conditions of the union."

Upon theſe articles and act of union, it is to be obſerved, 1. That the two kingdoms are now ſo inſeparably united, that nothing can ever diſunite them; except the mutual conſent of both, or the ſucceſsful reſiſtance of either, upon apprehending an infringement of thoſe points which, when they were ſeparate and independent nations, it was mutually ſtipulated ſhould be "fundamental and eſſential conditions of the union." 2. That whatever elſe may be deemed "fundamental and eſſential conditions," the preſervation of the two churches, of England and Scotland, in the ſame ſtate that they were in at the time of the union, and the maintenance of the acts of uniformity which eſtabliſh the liturgy, are expreſsly declared ſo to be. 3. That therefore any alteration in the conſtitution of either of thoſe churches, or in the liturgy of the church of England, (unleſs with the conſent of the reſpective churches, collectively or repreſentatively given) would be an infringement of theſe "fundamental and eſſential conditions," and greatly endanger the union. 4. That the municipal laws of Scotland are ordained to be ſtill obſerved in that part of the iſland, unleſs altered by parliament; and as the parliament has not yet thought proper, except in a few inſtances, to alter them, they ſtill (with regard to the particulars unaltered) continue in full force.

UNISON, in muſic. See Interval.

UNIT, or Unity, in arithmetic, the number one; or one ſingle individual part of diſcrete quantity.

1 Batavians in high eſteem under the Romans.

2 Fall under the dominion of Spain.

UNITED provinces, or United *Netherlands*, otherwiſe called the *Republic of Holland*, conſiſt of the ſeven provinces of Holland, Zealand, Frieſland, Groningen, Overyſſel, Zulphen, and Utrecht. They are bounded on the weſt by the German Ocean; on the eaſt by the circle of Weſtphalia; and on the ſouth by Flanders, Brabant, and the duchy of Cleves. They compoſe the greateſt part of the ancient Batavia, whoſe inhabitants were formerly ſo much renowned for their valour. Under the Romans, they were exempt from impoſts and taxes, in conſequence of bearing the honourable title of *allies of the Republic*. On the decline of the Roman empire they fell under the power of the Turks; but on the decline of the houſe of Charlemagne, the great lords and officers of the crown taking advantage of the weakneſs of the princes, rendered their governments hereditary in their families. The United Provinces, and indeed the whole of the Netherlands, now experienced frequent revolutions; being ſometimes united into a monarchy, ſometimes governed by independent petty ſovereigns. The hiſtory of theſe times affords only an account of wars of the different provinces with each other, which at laſt terminated in nothing, and which for that reaſon we paſs over in ſilence. The Netherlands came into the poſſeſſion of the houſe of Auſtria by the marriage of Mary of Burgundy with the emperor Maximilian: but on that prince's reſigning the Imperial crown, in hopes of being made a pope, the 17 provinces of the Netherlands devolved of right on Don John of Spain; but he, and his ſucceſſor Philip le Beau, dying in a ſhort time after, they, in 1505, fell under the dominion of Charles V. at that time a minor.

3 Flouriſhing ſtate of the provinces at that time.

At this period the ſeven provinces, which now compoſed the Republic of Holland, enjoyed a kind of independence; but the policy and warlike diſpoſition of Charles ſoon reduced them to obedience. When he reſigned the ſceptre to his ſon Philip, the Low Countries were in a moſt flouriſhing condition. In this ſmall tract of country were reckoned no fewer than 350 large cities incloſed with walls, and 6300 conſiderable towns, all become rich by their application to the arts and to commerce. At the ſame time the love of liberty was very prevalent among the inhabitants, and they were jealous of every invaſion of their rights and privileges. The arbitrary government of Philip was therefore very diſagreeable to his ſubjects in the Low Countries, and the partiality ſhown on all occaſions to the Spaniards ſoon loſt their affections altogether.

4 Perſecution of the Reformed.

5 Court of inquiſition eſtabliſhed.

6 Ducheſs of Parma appointed governeſs.

The extreme ſuperſtition, however, and cruel bigotry, of Philip, proved the greateſt ſource of diſcontent. The doctrines of the reformers had been preached and received with avidity in the Low Countries. A cruel perſecution of the reformed had been commenced by Charles V. inſomuch that he is ſaid to have deſtroyed no fewer than 100,000 perſons on account of religion. This cruelty had no effect except to increaſe the number of heretics; which being obſerved by Mary queen of Hungary, ſiſter to the emperor, ſhe invited him to the Low Countries, that he might perſonally behold the bad effects of his cruelty. On this the emperor granted a toleration, but Philip was altogether inflexible. In order to proceed more effectually againſt the reformed, a court of inquiſition was inſtituted; and under pretence that the three biſhoprics, which at that time comprehended the whole country, were too large, ſeventeen of theſe dignitaries were erected, three with the title of archbiſhops. To afford ſufficient revenues for theſe, it became neceſſary to ſuppreſs ſeveral abbeys, which of itſelf produced great diſcontent. But what gave the finiſhing ſtroke to the whole was Philip's announcing his intention of reſiding conſtantly in Spain; his appointing the ducheſs of Parma, his natural ſiſter, to be regent of the Netherlands; and giving her for a counſellor cardinal Granvele, a bloody perſecutor of the reformed; at the ſame time that the provinces were oppreſſed by the violences of foreign troops, for the payment of whom they were alſo oppreſſed by taxes. Three councils were eſtabliſhed at Bruſſels; one to preſide over the laws and courts of juſtice; a ſecond to direct every thing reſpecting peace or war; and the third to manage the revenues: but ſtill the ducheſs of Parma was ordered to conſult Granvele in every matter, and make him at all times her chief confidant.

7 Univerſal diſcontent.

8 Extreme bigotry of Philip.

The ducheſs took upon her the government of the Low Countries in the year 1560; and was no ſooner arrived at Bruſſels, than complaints poured in from all quarters againſt the inquiſition, cardinal Granvele, and the new biſhoprics. The ducheſs endeavoured to allay the ferment by fair words, but in vain. At the head of the malcontents were the prince of Orange, count Egmont, and count Horn, who ſtrenuouſly inſiſted on calling an aſſembly of the States-general, and laying before them the grievances by which the country was oppreſſed. The event was, that, in 1564, the cardinal was obliged to reſign his dignity; which yet did not produce any good effect, as he was ſucceeded by two of his creatures Barlaimont and Viglius, who trod exactly in his footſteps. They puſhed on the inquiſition to freſh executions; ſtigmatized the principal nobility as heretics; and on all occaſions ſhowed ſuch violent and intolerable zeal for the Catholic religion, that one of Philip's miniſters repreſented to him the danger there was of a total revolt of the provinces unleſs the rigours of perſecution were ſomewhat relaxed. But Philip no ſooner received this intelligence, than he replied, "that he had rather be without ſubjects, than be a king of heretics." Agreeable to this reply, all the obnoxious decrees were enforced with double rigour; upon which the ſtate of affairs became ſo alarming, that it was thought neceſſary to ſend count Egmont into Spain, in order to have a perſonal interview with the king on the ſubject. Philip, accuſtomed to deceit, gave a ſmooth anſwer, abated the rigour of his decrees, and ordered the governante ſometimes to conſult with the prince of Orange.

9 A general aſſociation againſt the inquiſition.

Thus tranquillity was for a time reſtored; but in the year 1566, it being diſcovered that a ſcheme for the total extirpation of the Proteſtants had been concerted by the queen-mother of France, her ſon Charles IX. and Iſabella queen of Spain, in a conference at Bayonne, matters became worſe than ever. That the information received concerning this deteſtable combination was true, very ſoon appeared from Philip's diſclaiming all the favourable interpretations which had been put upon his anſwer to count Egmont, and from his ordering the inquiſition to proceed with more fury than ever. The conſequence of this was, a general aſſociation againſt this abominable tribunal, which was ſubſcribed by all orders and degrees of men, Roman Catholics as well as Proteſtants. The confederates, headed by Henry de Brodenrode, a deſcendent of the ancient earls of Holland, waited on the ducheſs of Parma, in ſuch a formidable body, that ſhe was obliged to diſmiſs them with an abſolute promiſe that their demands ſhould be granted. Theſe demands were, that the inquiſition ſhould be aboliſhed, and the edicts againſt liberty of conſcience recalled; and for this ſhe immediately interpoſed all her intereſt with Philip. Sir William Temple alleges, that Philip, in conſequence of the governante's remonſtrances, granted all that was deſired, but too late. All other hiſtorians, however, agree that he was inflexible, and that the ducheſs could procure no better conditions than that heretics ſhould from that time forward be hanged inſtead of being burned. Even this appeared a conceſſion unworthy of the king; the royal name was therefore forbid to be uſed.

10 The people break out into acts of rebellion.

11 New oath of allegiance required.

12 Prince of Orange retires.

13 Ducheſs of Parma reſigns.

Before the confederates proceeded to extremities, they ſent deputies to Madrid; but, according to ſome authors, they were refuſed admittance into the king's preſence. It appears, however, that they had found means of repreſenting the true ſtate of affairs to the king, and of informing him that the diſturbances proceeded from the deteſtation in which the inquiſition was every where held in the Low Countries. Their repreſentations produced no other effect than an equivocal promiſe, which was evidently never intended to be kept. The governante received orders to proceed againſt heretics with the utmoſt ſeverity; upon which the people broke out into acts of open rebellion. In ſeveral towns of Flanders the churches were deſtroyed, images pulled down, and all thoſe acts of violence committed which are the uſual operations of a lawleſs mob. The principal inhabitants, however, ſtill remained quiet, and even did all in their power to reſtrain the violence of the commonalty; ſo that, had Philip made any kind of reaſonable conceſſion, the public tranquillity might have been reſtored. Inſtead of this, however, a new oath of allegiance was adminiſtered by the governante, and all perſons were obliged to ſwear that they would regard as traitors and enemies to their country all whom the king ſhould think proper to proſcribe. This extraordinary proceeding was followed by the moſt cruel perſecution that can be imagined; at the ſame time that the duke of Alva was ſent into the Netherlands with an army of 10,000 veteran troops, to put the laſt hand to the miſery of the people, and fully to eſtabliſh the deſpotiſm of the court. Counts Egmont and Horn took the abovementioned oath; but the prince of Orange could by no means be induced to it, and therefore retired into Germany, along with counts Broderode and Hoogſtrete. Their example was followed by great numbers of all ranks and conditions; and after the arrival of the army commanded by the duke of Alva, ſuch multitudes continued to emigrate, that the ducheſs of Parma informed the king, that within a few days, 100,000 families had left his dominions; that in a ſhort time the country muſt be depopulated, in which caſe there would be no occaſion for a governante: ſhe therefore begged leave to reſign before ſhe ſhould have the mortification and diſgrace of being left alone in the Netherlands.

14 Is ſucceeded by the duke of Alva.

15 Prince of Orange invited by the people to return.

Philip immediately complied with the requeſt of the princeſs, and the duke of Alva was appointed to ſucceed her in the government. It may eaſily be imagined that the miſeries of the people would now become intolerable. The king was a proud and mercileſs tyrant, ſet at too great a diſtance from his ſubjects to be thoroughly ſenſible of their calamities, and totally deſtitute of compaſſion had he known them ever ſo well. The new governor was of the ſame diſpoſition; and the army he commanded was fierce, rapacious, and cruel, deſiring nothing more ardently than to enrich themſelves at the expence of the inhabitants. The whole country was filled with blood and horror; counts Egmont and Horn were ignominiouſly executed, and the eſtate of the prince of Orange was confiſcated. Theſe laſt proceedings drove the people into deſpair, and they invited the prince to return, in order to take upon him the defence of the country from ſuch inſufferable tyranny and oppreſſion.

16 Hoſtilities commence, to the diſadvantage of the prince.

All this time the prince of Orange, and his brother Lewis of Naſſau, had been labouring to form alliances for the defence of the liberties of his country. He had repreſented matters in ſuch a light to the emperor Maximilian, that his Imperial majeſty ſent an ambaſſador to Philip exhorting him to treat his ſubjects in the Netherlands with leſs rigour. This embaſſy was haughtily received; Philip continued his perſecutions, and the Prince of Orange his preparations for entering the Low Countries. His firſt efforts, however, were very unſucceſsful. A detachment of Germans in the ſervice of the prince attempted to penetrate into Brabant, and ſurpriſed Buremond; but were defeated by a detachment from the duke of Alva's army. Another party, conſiſting chiefly of French, attempted to penetrate into Artois by the way of Picardy; but their officers were arreſted by order of Charles IX. Lewis of Naſſau, however, defeated a body of Spaniards, and killed 600 of them on the ſpot; but the vigilance of his enemies prevented him from drawing any advantage of conſequence from his victory.

17 Prince of Naſſau and count Hoogſtrate defeated by the duke of Alva.

The duke of Alva was ſo much chagrined at the defeat ſuſtained by his party, that he inſtantly aſſembled his troops from all quarters. His army then appeared too formidable to be oppoſed, and the prince of Naſſau with count Hoogſtrate retired towards the river Ens. But being hard puſhed by the duke of Alva, and mutinies ariſing among their troops for want of pay, they were ſoon brought to an action, and totally defeated. The infantry were entirely cut in pieces; the cavalry were ſaved, but all the baggage and artillery were taken by the enemy. In the mean time the prince of Orange was haſtening to the relief of his diſtreſſed allies with an army of 28,0000 men; but having the misfortune of being alſo defeated, and count Hoogſtrate killed in the action, his ſoldiers deſerted in ſuch crowds, that he was at laſt obliged to diſband his army and return to Germany.

18
Prince of Orange defeated, and diſbands his army.

This diſaſter happened in the year 1569. The duke of Alva reſolved to make the moſt of his time. He entered Bruſſels in triumph; and let looſe his vengeance againſt all who had in the leaſt aſſiſted, or been ſuppoſed to aſſiſt, the prince of Orange. All the priſoners taken in the laſt campaign were put to death: and, not content with this barbarity, the cruel governor projected nothing leſs than the total extirpation of the reformed religion, by the deſtruction of every one who profeſſed it; and of rendering himſelf deſpotic, by erecting citadels in all the conſiderable towns which were to be garriſoned by his ſoldiers. He began with Amſterdam, in which be laid the foundations of a ſtrong citadel. The people complained of it as an infringement of their rights, but the duke was deaf to their complaints. At Antwerp he cauſed his ſtatue to be erected; and here he was figured treading on the necks of two ſmaller ſtatues, which repreſented the two eſtates of the Low Countries. This piece of inſolent vanity exaſperated the people to a great degree; and they were ſtill farther provoked by a demand of the hundredth part of every man's eſtate to be paid immediately for the ſupport of the army, beſides the tenth of all the merchandize, and the twentieth of all immoveables, to be annually levied as a ſtanding revenue. The provinces remonſtrated, and refuſed to ſubmit to ſuch intolerable exactions: the governor was inflexible; and being incenſed at their reſiſtance, he ſent the regiment of Lombardy to live at free quarters in the province of Utrecht.

19
Cruelty of the duke of Alva.

20
His intolerant principles and exactions.

In this ſituation of affairs, the prince of Orange was adviſed by admiral Coligni to fit out a ſquadron of privateers to cruiſe upon the Spaniards, intercept the ſupplies of money ſent to the Netherlands, and thus raiſe a fund for the maintenance of an army. This meaſure was immediately executed, and numbers of the Spaniſh merchantmen were taken; but as no method was taken to ſave the profits, the deſigns of the prince of Orange were at firſt but little forwarded. The ſhoal of privateers went by the general name of *gueux*, or *ſea-beggars*; and in a little time commenced pirates, to the no ſmall detriment of their own country as well as the enemy.

21
Privateers fitted out to cruiſe on the Spaniards.

All this time the prince of Orange was employed in laying plans for the deliverance of his diſtreſſed country; but, in 1501, the duke of Alva, growing impatient, ordered the edict concerning the new taxes to be publiſhed at Bruſſels. The city was inſtantly filled with confuſion; the ſoldiers ſeized on the goods of the inhabitants by force; tradeſmen ſhut up their ſhops; and the peaſants refuſed to bring proviſions to the market. The ſtates offered to pay a ſubſidy of 2,000,000 of florins annually in lieu of the intended tax; but their offer was rejected. The drum beat to arms, and orders were iſſued to hang all who refuſed to comply. The ſoldiers were preparing to obey, when news arrived of the ſurrender of Briel in the iſland of Voorn, at the entrance of the Meuſe, to the Gueux. Lumey, who commanded the Orange ſquadron, made a deſcent on the iſland from 40 ſhips, deſtroyed the churches, broke the images, and executed the prieſts, but offered no violence to the other inhabitants.

22
Duke of Alva attempts in vain to eſtabliſh his new taxes at Bruſſels.

23
Briel taken by the Orange party.

However unimportant the conqueſt of ſo inconſiderable a place might appear, it alarmed the duke of Alva, and produced the moſt extravagant rejoicings in Bruſſels. The duke regarding it as the harbinger of further oppoſition, dropped his taxes and executions for the preſent, and diligently applied himſelf to ſuppreſs the growing ſpirit of rebellion. He withdrew the garriſon from Bruſſels, and detached it under the command of Maximilian Hermin Boſſu, againſt the Gueux. This officer, endeavouring to force Briel, was defeated by the Orange faction, and forced to retire with loſs to the iſland of Beyerland. Trifling as this victory might ſeem, it ſerved to animate the depreſſed ſpirits of the enemies to the government. The prince of Orange, ſenſible of the advantage of poſſeſſing this iſland, exhorted the nobility of his party to fortify and garriſon it; his orders were obeyed, by which means he ſoon became maſter of Delfshaben, a town ſituated on the oppoſite banks of the Meuſe. It appeared in Boſſu's retreat, how unpopular the duke of Alva was in every part of the country. Dordrecht ſhut its gates againſt him. Rotterdam refuſed to admit his troops; but Boſſu obtaining permiſſion that they ſhould paſs through in ſeparate ſmall diviſions, ſeized the gates, and began a general maſſacre of the inhabitants. Four hundred ſouls periſhed by the ſword, the town was pillaged, the women were raviſhed, and every poſſible act of barbarity and inhumanity committed. Retribution was ſoon made by the enemy. Alva had detached Oſſorio d'Angulo with a body of forces to ſecure Fluſhing, a conſiderable port in Zealand, and to erect a citadel. The inhabitants denied Oſſorio admittance, ſhut their gates, and ſeized Pacaneo, a famous engineer, who had come to meaſure the ground where the citadel was to be erected. Apprehending that attempts would be made to force them to ſubmiſſion, they petitioned Lumey, admiral of the Gueux, for aſſiſtance; and he furniſhed them with 200 men, under the command of Captain Treſlong. On the arrival of this reinforcement, the Spaniſh engineer was hanged, and an unſucceſsful attempt made to ſurpriſe Middleburg, the capital of the iſland of Walcheren. Not diſpirited by this diſappointment, the Zealanders aſſiduouſly proſecuted their cruizes upon the Spaniards, and obtained as much wealth as purchaſed a large ſtore of arms and ammunition at Antwerp. Joined by great numbers of Engliſh and Scotch adventurers, they ventured to attack the duke of Medina Celi, ſent with a ſtrong ſquadron to ſucceed the duke of Alva in the government of the Netherlands. The duke was completely defeated, a great number of his ſhips were taken, and a booty amounting to near 1,000,000 livres was carried off by the Zealanders.

24
Duke of Alva deſiſts from enforcing his taxes.

25
A party of his forces defeated by the Gueux.

26
The Gueux take Delfshaben.

27
Inhabitants of Rotterdam maſſacred by the Spaniards.

28
Duke de Medina Cœli entirely defeated by the Zealanders at ſea.

The duke of Alva now ordered a ſquadron of ſhips to be equipped at Amſterdam to bridle the inſolence of Lumey and the Zealanders, while he buſied himſelf in raiſing an army to oppoſe the prince of Orange and Lewis de Naſſau, who were making great preparations in Germany and France. To augment the army in the field, he had draughted moſt of the garriſons. By this means the prince's friends gained poſceſſion of North Holland; and Lewis de Naſſau was projecting a ſcheme to ſurpriſe Mons, with the inhabitants of which he held a ſecret correſpondence.

30 Moſt of the towns in Holland declare againſt the Spaniards.

The deſign ſucceeded, which emboldened moſt of the cities and towns in Holland to declare againſt the government. The count de Bergues gained over ſeveral cities in Overyſſel, Guelderland, and Friſeland. In a word, the revolt became ſo general, that the duke of Alva ſoon found he could not long reſiſt the torrent. He now, when too late, publiſhed an edict to appeaſe the people, ſetting forth, that he would conſent to remit the moſt oppreſſive taxes, if the ſtates could ſuggeſt any other means of raiſing the neceſſary ſupplies.

31 Proceedings of the States-general in favour of the prince of Orange.

He convoked the ſtates-general to meet at the Hague, but his orders were now diſregarded; and the ſtates, in contempt of his authority, aſſembled at Dordrecht, inviting deputies from the prince of Orange, the nobility, and the towns that had declared againſt the governor. Here money was raiſed to enable the prince of Orange to begin his march. His forces amounted to 15,000 foot and 7000 horſe. He had promiſed to advance three months pay; and was enabled to perform his engagements, by the liberality and public ſpirit of the ſtates-general and the cities. Several regulations reſpecting the future ſupport and government of the army were made on this occaſion, and their proportions of the public expence aſſigned to the ſeveral provinces and cities. It was further reſolved, that nothing of importance ſhould be tranſacted without the privity and conſent of the prince of Orange; and that the prince, on his part, ſhould not negociate a peace with the king or his lieutenants, contrary to the ſentiments of the ſtates. In a word, the prince ſhowed the addreſs with which he could manage and direct the people. Without the name of ſovereign of the provinces under his government, he poſſeſſed the authority. He preſided at all military operations by ſea and land; made and diſpoſed of offices at pleaſure; aſſembled the ſtates; and publiſhed all ordonnances and regulations, relative to the preſent ſtate of affairs, without controul. However, he conducted matters with the utmoſt delicacy, and uſed his power with great moderation, to avoid giving offence to the free ſpirit of the Hollanders. The Popiſh religion was baniſhed the churches, and perſons of that perſuaſion were, with great caution, admitted into public employments. Not only the king's revenue and church-tythes were appropiated to the public ſervice, but the eſtates of thoſe who remained firm in their loyalty. In ſhort, the moſt vigorous meaſures were taken for reſiſting the tyranny of Spain; and thoſe perſons who had refuſed the tythes to the government, voluntarily ſubſcribed their all to ſupport a party formed in defence of liberty.

32 His ſucceſſes.

While the ſtates-general were employed in ways and means to maintain an army, the prince of Orange advanced to Ruremonde, which he took by aſſault, on the refuſal of the city to ſupply him with neceſſaries. From thence he marched to Brabant, and raiſed heavy contributions. He took Mechlin, Oudenarde, and Dendermonde; and could not reſtrain the exceſſes of the ſoldiers, who pillaged the churches, maſſacred the prieſts, and committed other barbarities. Next he approached to Mons, beſieged by the duke of Alva, with deſign, if poſſible, to engage him to give battle. The duke baffled all his endeavours to force him, and carried Mons by capitulation. The whole Spaniſh dominion, however, lately ſo inſolent and exulting, was ready to expire in the Netherlands, had it not been revived by the maſſacre of the Proteſtants in Paris.

While the fate of Mons was depending, the ſtates of Holland met at Haarlem, to deliberate on the defence of the province and the proſecution of the war. Amſterdam was in the enemy's hands, which greatly obſtructed all their meaſures. It was therefore determined to beſiege it; and the enterprize was committed to Lumey, chief of the Gueux. After putting the ſtates to conſiderable expence, the project miſcarried through Lumey's miſconduct. Water was his element, but his vanity led him to diſplay his abilities as a land-officer. He made regular approaches, and was foiled in every attempt.

33 Is obliged to retire.

The reduction of Mons, and the depreſſion of ſpirits conſequent on the maſſacre at Paris, obliged the prince of Orange to retire to Holland, and encouraged Alva to inveſt Dendermonde, Oudenarde, and Mechlin. The latter, being in no condition to reſiſt, opened its gates; but the Spaniſh ſoldiers choſe to ſcale the walls, to gave an air of aſſault to the enterpriſe, and countenance to the horrid barbarities intended.

34 Succeſs and cruelty of the duke of Alva.

Proteſtants and Catholics were maſſacred without diſtinction. The town was pillaged, and the booty eſtimated at 400,000 florins. All the other towns were evacuated by the garriſons, and loaded with heavy impoſitions by Alva. As to the prince, he had now removed the ſeat of war into the province of Holland. Only this province and Zealand remained firm to their engagements; the reſt, overwhelmed with conſternation, capitulated on the beſt terms they could procure from the government. However, the country being ſtrong by its nature and ſituation among the waters, and more ſo by a fierce, rough, and ſturdy people, proud of their ancient fame, and the moſt implacable enemies of Spaniſh tyranny, it was determined to make the moſt vigorous reſiſtance. Frederic de Toledo was diſpatched by Alva to begin the operations in Holland. He had already reduced Zutphen and Guelderland; and, fluſhed with ſucceſs, appeared before Waerden, which he ſummoned to admit a garriſon. The burghers replied, that they were intruſted by the king with the defence of the place, and could not received a military force without violence to their priviledges and engagements. They ſoon had reaſon to repent their firmneſs: the town was taken by ſurpriſe; and all the burghers, aſſembled in the great church to take the oaths of fidelity to the king, were wantonly butchered. Infants, old men, women, and the ſick, were all put to the ſword, without pity or remorſe; and of all the barbarities hitherto committed, this was the moſt horrible. It was imagined that the terror inſpired by ſuch inſtances of ſeverity, would reduce the people to obedience, and ſhake the obſtinacy of the other towns. The contrary effects were produced; rage and deſpair took poſſeſſion of every breaſt, and all determined to ſuffer the laſt extremities rather than ſubmit to ſo cruel a tyranny.

Having finiſhed this tragedy, Frederic went to Amſterdam, to deliberate with the officers of the army about the ſiege of Haarlem. Here it was determined, before they proceeded to extremities, that the city of Amſterdam ſhould write to the magiſtrates, exhorting them, in the moſt pathetic terms, to ſubmit, rather than incur the puniſhment inflicted on Waerden. The council of Haarlem met to take this letter into conſideration. Some were for ſoliciting an immediate reinforcement from the prince of Orange; and others, who apprehended the prince was too weak to afford the neceſſary relief, were for making the beſt terms poſſible with the king. Thoſe of the latter opinion were the magiſtrates. Accordingly, without conſulting the burghers, deputies were diſpatched to Frederic to ſtipulate conditions. In their abſence, Ripperda, a gentleman of Friſeland, ſtrongly attached to the prince of Orange and the cauſe of liberty, aſſembled the chief burghers; and ſo animated them againſt the Spaniards, that they reſolved to ſtand a ſiege, and ſuffer all the horrors of war, rather than ſubmit.

35 Haerlem beſieged.

They ſent to the prince of Orange to acquaint him with their determination, and to implore aſſiſtance. Four companies of Germans were detached to reinforce the garriſon of Haarlem; and the deputies, on their return, were ſeized as traitors to their country, ſent to the prince of Orange, and by his order beheaded. Frederic was preparing to compel the burghers to ſubmiſſion. On the 19th of December, he inveſted the town, after carrying Sparendem fort by aſſault, with great loſs and ſlaughter of his ſoldiers. A variety of errors were committed in the attack, in the defence, and manner of ſuccouring Haarlem. The aſſailants and defendants had equally ſhown themſeves ignorant of the art of war, and implacable in their reſentment. The prince of Orange uſed every expedient to relieve to town; but all his attempts were fruſtrated by untoward accidents, and the vigilance of the Spaniards.

36 And taken.

At laſt, quite ſpent with fatigue, deſpairing of relief, weakened by loſſes, and totally exhauſted of proviſions and ammunition, the burghers of Haarlem ſurrendered upon more favourable terms than they could well expect. A few only of the moſt obſtinate were executed; the reſt were pardoned on taking an oath of fidelity, and paying an acknowledgment of 15.000 florins.

During the ſiege of Haarlem, the Zealanders were performing glorious achievements by ſea, and gaining victories over the Spaniſh naval armaments.

37 Succeſſes of the Zealanders by ſea.

All the efforts of the governor of Antwerp could not prevent their carrying off a great number of ſhips out of the harbour. To revenge the inſult, and relieve Middleburg and Rammekins blocked up by the Zealanders, he equipped a ſquadron, and gave battle to Wertz, the Zealand admiral, but was defeated. After repairing and augmenting his fleet, he again ſet ſail with ſixty large veſſels, encountered a ſquadron of Zealanders much inferior in ſtrength, and met with his former fortune. Moſt of his ſhips were ſunk or taken; but he found means to puſh into Middleburg, with the broken remains of his ſquadron, to the great joy of the garriſon, now reduced by the ſcarcity of proviſions to the laſt extremity. D'Avila's diſgrace did not end here; for, on his return to Antwerp, he was a third time attacked and defeated, with conſiderable loſs, by Wertz, who thus repaired the diſappointment of an unſucceſsful attempt made on Tolen.

Soon after the reduction of Haarlem, Alva, perceiving that his ſeverity anſwered no other purpoſe than irritating the people more againſt the Spaniſh government, publiſhed a proclamation, couched in the moſt ſoothing terms: but the people were not diſpoſed to confide in promiſes ſo often violated, nor to throw themſelves on the clemency of a prince and governor, who had ſhown themſelves inflexible, implacable, perfidious, and inhuman. They now expected the worſt that could happen, and bid defiance to fortune.

38 The Spaniards repulſed before Alcmar.

The Spaniards were preparing to inveſt Alcmar, and the Hollanders put every means in practice to reſiſt them. Eight months pay was due to the garriſon, who began to mutiny; but contributions were raiſed, which ſilenced their clamours. Frederic of Toledo, with 16,000 men, ſat down before a town fortified by no regular works, and defended only by 300 burghers, and 800 ſoldiers, in extreme want of proviſions, and without the proſpect of relief. Sonoi, the governor, deſpairing of being able to ſuſtain a ſiege, wrote to the prince of Orange, that a place deſtitute of troops, proviſions, ammunition, money, and every neceſſary, ought to be evacuated, and the few ſoldiers in garriſon, and the burghers, ſaved from falling into the hands of the enemy. But the prince of Orange ſo animated them by a letter, that, to a man, the townſmen, governor, and ſoldiers, determined to ſacrifice their lives, and ſpill the laſt drop of their blood in the breach. Perſeverance had made the Zealanders maſters of Rammekins, contrary to all hope and probability; the ſame virtue, the prince obſerved, might ſave Alcmar, a town of the utmoſt conſequence to the cauſe of liberty. What particularly inſpired the defendants with courage, was the prince's good fortune in ſurpriſing Gertrudenburg. Frederic puſhed the ſiege with great vigour. He ordered the inhabitants of Haarlem to work in the trenches, and ſuſtain the firſt fire of their friends and countrymen. On the 18th of September, a battery of 20 pieces of heavy cannon began to play; a breach was ſoon effected; the aſſault was given, and repulſed with vigour, though ſuſtained by the bulk of the Spaniſh army. From a Spaniſh officer taken, the garriſon were informed, that Alva had given orders to retire, in caſe he failed in the third aſſault; but if he ſucceeded, to put all to the ſword. Their courage was whetted by this account, and preparations were cheerfully made for withſtanding the utmoſt efforts. Frederic was foiled in every attempt; the aſſailants were driven from the breach with prodigious ſlaughter; the Spaniſh ſoldiers refuſed to mount the walls; in a word, the ſiege was raiſed, and the town relieved, to the exceeding joy of the prince of Orange, and great mortification of Alva.

This advantage was attended with another of leſs importance, but which equally ſerved to inſpirit the Hollanders.

39 They are defeated at ſea.

The duke of Alva's grand fleet, equipped with great labour and expence, was defeated by the Zealanders. Though the action did not prove deciſive, it greatly chagrined the duke, as Boſſu, one of his beſt officers, was taken priſoner, and his fleet afterwards dreaded to look the enemy in the face. The year, and the government of Alva, concluded with a meeting of the ſtates of thoſe provinces ſubject to Spain. Here they deliberated on the means of continuing the war; read, and diſregarded a remonſtrance ſent by the prince of Orange, complaining of the violence of the duke, demanding the free exerciſe of their religion for his party, reſtitution of the rights and privileges of the provinces, and that the foreign troops ſhould be withdrawn. On the 2d of December, the Duke of Alva quitted the Low Countries, with his ſon Frederic of Toledo; and Don Lewis de Requeſnes, appointed to ſucceed him, began his government with pulling down the inſulting ſtatue of his predeceſſor, erected at Antwerp; a popular act, that would have produced happy conſequences, had not the court of Spain been infatuated with notions of deſpotiſm and blind ſuperſtition.

40 Duke of Alva reſigns.

Notwithſtanding this ſucceſs, the affairs of the States were yet in a moſt precarious ſituation; and their ability to ſupport themſelves appeared in the higheſt degree problematical. The new governor Requeſnes had orders to puſh the war with vigour, and his antagoniſts prepared for the moſt obſtinate reſiſtance. The firſt advantages appeared on the ſide of the prince of Orange, by the ſurrender of Middleburg. But this was ſoon balanced by the defeat and death of prince Lewis of Naſſau. The Spaniards, however, were prevented from purſuing the advantage they had gained, by a mutiny among their troops.

41 Mutiny in the Spaniſh army.

This mutiny took place on a regular and well-concerted plan. The ſoldiers depoſed all their officers, appointed new ones, and eſtabliſhed a ſort of community, veſting one of their number with the chief authority. The diſtreſſes of the Spaniards on account of this tumult were likewiſe augmented by a victory gained by the Zealanders at ſea; when 40 of the Spaniſh ſhips were almoſt all taken or deſtroyed. Philip then perceiving that numberleſs difficulties would attend the reduction of the provinces by force, publiſhed an act of grace; but in ſuch a limited manner, that it was unanimouſly rejected. Requeſnes then determining to cloſe the campaign with ſome remarkable exploit, laid ſiege to Leyden. The city was reduced to the utmoſt diſtreſs for want of proviſions; the whole country was laid under water; and they could receive no relief except what was obtained by boats forcing themſelves through the enemy to the city. In ſhort, they were reduced to the brink of deſtruction, when a violent ſouthweſt wind drove the inundation againſt the works of the beſiegers with ſuch violence, that they were obliged to relinquiſh the enterprize for fear of being entirely ſwallowed up. In their retreat they were attacked by the garriſon, and 500 of them deſtroyed. This diſappointment ſo provoked the Spaniſh ſoldiery, that they depoſed Valdes the commander whom they had choſen for themſelves, and proclaimed their old one: a ſecond mutiny enſued, and they marched in a tumultuous manner to Utrecht. Here, however, they met with a very unfavourable reception. Barlaimont the governor declared them rebels and traitors to their king; and gave free liberty to every one to maſſacre them wherever they could be found. The mutineers attempted to ſet fire to the gates; but being repulſed, and their leader ſlain, they capitulated, were received into favour, and ſent into winter quarters.

The year 1575 commenced with ſome negociations for peace; but theſe proving ineffectual, though the emperor interpoſed his mediation as far as poſſible, the war was renewed with redoubled fury. Fortune now declared in favour of the Spaniards; and the States were reduced to ſuch deſpair, that they began ſeriouſly to think of making an offer of the provinces to ſome Proteſtant power who might be able to defend them againſt the tyranny of the Spaniards.

42 The States offer the ſovereignty to queen Elizabeth, &c.

This offer was made to queen Eliſzabeth of England; but ſhe declined it, for political reaſons. A negociation was even ſet on foot for this purpoſe with France, in favour of the duke of Anjou; but it ended in nothing beſides the advantage of eſtabliſhing a mart at Calais for the diſpoſal of the prizes made by the Gueux. Philip, however, notwithſtanding his power, had the utmoſt difficulty in ſupporting the expence of the war.

43 Philip diſtreſſed in his finances.

He had already borrowed more than 40,000,000 crowns from the Spaniſh and Genoeſe merchants, and the intereſt ſtill unpaid now amounted to as much as the capital. The war had beſides coſt a greater ſum ſent in ſpecie from Spain and the Indies, which, with the immenſe loſſes occaſioned by the ſtagnation of trade in the Netherlands, had quite exhauſted the treaſury. Large arrears were due to the troops; they were every day mutinying, and ſome broke out into actual rebellion. To remedy theſe evils, Requeſnes demanded a ſupply of the provinces; and they anſwered him, by requiring reſtitution of their privileges, and diſmiſſion of the Spaniſh troops. Flanders, in particular, paid the deſired ſubſidy, by balancing it againſt half the damages the province ſuſtained from the miſconduct of the governors, and the wars wantonly and unneceſſarily excited. While this affair was in agitation, Requeſnes died of an ardent fever; the council of ſtate aſſumed the adminiſtration, and the prince of Orange took the opportunity of the confuſion that enſued to lay the firſt foundation of the Pacification of Ghent, by which his affairs were conſiderably retrieved, and the greateſt blow given to the court of Spain ſhe had yet ſuſtained.

44 Confuſion in the Spaniſh affairs.

All now was anarchy in the Low Countries. The garriſon of Ziriczee mutinied for want of pay; and to appeaſe them, the council of ſtate ſent 100,000 livres, which the Walloon regiments under Madragon ſeized upon, after expelling the Spaniſh ſoldiers, wounding and murdering their officers. This did not unite the Spaniſh mutineers among themſelves: they turned out the few remaining officers, and made new appointments. Joining with the garriſon of Lillo, they marched, to the number of 2000 men, towards the capital; committed horrible outrages; overwhelmed the inhabitants of Bruſſels with conſternation; and, upon the 26th of July, ſeized upon Aloſt, confined the principal burghers, and hanged up a king's officer. The moſt favourable conditions were offered by the council of ſtate, in order to appeaſe the tumult, and proviſions were ſent to the mutineers. This created ſuſpicion in the inhabitants of Bruſſels, that the mutiny was excited by the connivance of the council, with a view of ruining the provinces, without incurring the reſentment and odium conſequent on any appearance of legal oppreſſion. They arreſted the council, declared the Spaniards rebels, and took meaſures in concert with the other cities and provinces for expelling foreigners out of the Netherlands. A confederacy to this purpoſe was formed between the provinces of Hainault, Artois, and Flanders, to which all the reſt except Luxemburgh acceded; and Don John of Auſtria, who had entered the Low Countries in quality of governor and ſucceſſor to Requeſnes, was obliged to live in obſcurity in Luxemburgh, until the ſtorm ſhould ſubſide.

The prince of Orange was all this while profiting by theſe commotions. He had long laboured to have the States-General convoked; and he now ſaw them not only aſſembled, but preparing to make head againſt the Spaniards, by a ſtrange viciſſitude of fortune, ariſing from accidents which all his penetration and ſagacity could not foreſee. United in councils againſt the common enemy, every meaſure was taken for reducing the citadels of Ghent, Antwerp, and Maeſtricht, the chief places in the hands of the Spaniards, and what muſt principally contribute to their expulſion. Ghent citadel was taken on the 27th of November, by the aſſiſtance of a ſtrong reinforcement of troops and artillery ſent by the prince of Orange. At Antwerp the ſtates of Brabant were leſs ſucceſsful. The citadel was vigorouſly attacked; but the mutineers at Aloſt entering the citadel to aſſiſt their countrymen, a ſally was made, the beſiegers were driven from their trenches, great part of the town was conſumed by fire, and the reſt pillaged for three days with every kind of inſolence and brutality, at a time when Antwerp was the moſt flouriſhing and populous city in the Netherlands, and indeed among the moſt wealthy in Europe. It is affirmed that the treaſure carried off amounted to four millions, beſides an infinity of rich merchandiſe. This terrible calamity united Papiſts and Proteſtants without diſtinction in a confederacy, and co-operated with the meaſures of the prince of Orange to form the Pacification of Ghent: which was a confederacy of all the provinces to expel foreign ſoldiers; to reſtore the ancient form of government; to refer matters of religion to the ſeveral ſtates of the provinces; for ever to unite the other 15 provinces in the ſame common intereſt with Holland, Zealand, and the prince of Orange; to renew the commerce and amity between them; to aſſemble the ſtates in the manner practiſed under the houſe of Burgundy and Charles V.; to ſuſpend all the rigorous edicts of the duke of Alva on the ſubject of religion, until the States General ſhould take the matter into conſideration; to releaſe all the natives made priſoners, mutually, without ranſom; and to reſtore all things upon the ſame footing as before the war, and the tyrannical government of the duke of Alva.

45
Antwerp taken and pillaged.

46
Pacification of Ghent.

The States-General began with ſoliciting aid from the queen of England. Their ambaſſador had a gracious reception; and Elizabeth advanced them 20,000l. ſterling, on condition that the French ſhould not be invited into the Netherlands, that they would accept of reaſonable terms of accommodation if offered, and that the loan ſhould be repaid the enſuing year. Next a ceſſation of hoſtilities was agreed upon with Don John, upon his aſſurances that every reaſonable requeſt of the provinces ſhould be granted. On the 27th of December, deputies were ſent with propoſals to Don John to diſband the foreign troops: but he deſired to know what ſecurity the ſtates would give for their allegiance after the departure of the Spaniſh forces; and remonſtrated againſt the unreaſonableneſs of diſarming the king, while his rebellious ſubjects were in arms, and ready to ſeize the firſt opportunity of deſerting their obedience. He likewiſe demanded ſecurity with reſpect to religion; and inſiſted ſo warmly on this head, that it was obvious he had no inclination to part with the Spaniſh army before the provinces of Zealand and Holland embraced the Catholic religion. After much altercation, neceſſity at length obliged Don John to grant all that was required, to confirm the Pacification of Ghent, and diſmiſs the Spaniſh army. He had the king's authority for his proceedings; the treaty was proclaimed at Bruſſels and Antwerp on the 17th of February; and Don John immediately acknowledged governor, and the king's lieutenant of the Netherlands.

47
The States receive aſſiſtance from queen Elizabeth.

48
Don John accedes to Pacification of Ghent.

It muſt be obſerved, however, that when this edict was ſigned, the provinces of Holland and Zealand, by the advice of the prince of Orange, made the following objections, viz. that the States-general had not eſtabliſhed the right of aſſembling this ſovereign tribunal in the perſons originally inveſted with that power by the conſtitution; that in ſome particular inſtances they had ſuffered an infraction of their privileges; that the Spaniſh troops were allowed to carry off the immenſe wealth they had acquired in the Netherlands, and by the deſtruction of the city of Antwerp in particular; that no ſtipulation was made in favour of thoſe diſpoſſeſſed of their eſtates, &c. For theſe reaſons the States and the prince refuſed to ſign the edict, though they conſented to all the articles that did not contradict thoſe ſpecified. This raiſed a contention, by which the public peace was ſoon broken. Don John was ſtrenuous in recommending violent meaſures againſt the prince and his party. To this purpoſe he wrote a letter in cypher to the king; but this letter fell into the hands of Henry IV. of France, who tranſmitted it to the prince of Orange. Eſcovedo, ſecretary to Don John, was next ſent into Spain with a meſſage to the ſame purpoſe; but the governor becoming impatient for his return, left the country himſelf, under pretence of complimenting Margaret queen of Navarre on her journey to Spaw. In this expedition he ſeized on the citadel of Namur: but attempted to juſtify his conduct to the States, by repreſenting, that he was under a neceſſity of retiring to a place of ſafety, while he ſaw the flames of war and rebellion ready to break out all around him; and concluded with deſiring the States to diſarm the burghers of Bruſſels, who were cloſely attached to the prince of Orange. This letter was anſwered by an invitation from the States to return; promiſing at the ſame time, that they would to the utmoſt of their power bring to puniſhment all thoſe who ſhould form any deſigns againſt him. This, however, was not only refuſed, but the whole tenor of his conduct afterwards ſhewed, that he was reſolved to commence hoſtilities, and that he was encouraged to do ſo by Philip. The event was, that Don John was depoſed from his dignity, the archduke Matthias was appointed governor-general, and preparations were made for a new and vigorous war. The Spaniſh troops were ordered to aſſemble in Naples and Milan; levies were made in Burgundy and Luxemburgh; and a reſolution was taken of ſupporting Don John with the whole power of the Spaniſh monarchy. To oppoſe this formidable power, the States, in 1578, entered into a new treaty with the queen of England; by which that princeſs agreed to advance them 100,000 l. Sterling, and to aſſiſt the provinces with 5000 foot and 1000 horſe; on condition that the loan ſhould be repaid with intereſt in eight

49
Objections made to the Pacification by the provinces of Holland and Zealand.

50
Hoſtilities recommenced.

51
Don John depoſed.

52
New treaty with queen Elizabeth.

eight months; that certain towns ſhould be ceded to her in ſecurity; and that the States ſhould defray the expence of tranſporting their troops, and take them into pay, while they acted in their ſervice. Elizabeth, however, afterwards departed from theſe conditions, under pretence that the French would ſuſpect her having ſome deſigns on the Netherlands, and would for that reaſon unite their forces with thoſe of Spain againſt her. Inſtead of the Engliſh troops, ſhe now propoſed to ſend John Caſimir, count Palatine, with 3000 foot and 3000 horſe; refuſing at the ſame time to pay the money ſtipulated, until the States had conſented to this alteration.

Before this treaty was concluded, Don John was joined by an army of 16,000 foot and 2000 horſe, all choſen veterans, commanded by Alexander Parneſe, duke of Parma, the beſt officer in the Spaniſh ſervice. Being thus ſuperior to the prince of Orange, the Spaniards gained ſeveral advantages; which, however, were more than balanced by the loſs of the city of Amſterdam.

53
Amſterdam concludes a treaty with the prince of Orange.

This place had been cloſely blocked up for ſeveral months by ſea and land, and at laſt concluded a treaty with the friends of the prince of Orange, by which it was ſtipulated, that the Proteſtants ſhould hold their religious meetings without the walls, and have a burying-place within; that the garriſon ſhould be diſbanded, and 600 men, commanded by the burghers, levied for the defence of the city; that all perſons baniſhed on account of religion ſhould be recalled; that Amſterdam ſhould enjoy all its ancient privileges, and that all vacancies in public employments ſhould be filled without diſtinction of party or connection. This capitulation, however, was ſoon after broken; the Catholic magiſtrates were driven out of the city, attended by the prieſts and Popiſh clergy of every denomination; the images were pulled down, and only the reformed clergy ſuffered to preach publicly. Some ineffectual negociations next took place; after which the States, ſenſible that the misfortunes and loſſes in the winter aroſe from the irreſolution of the provincial ſtates, veſted the archduke, the council of ſtate, and the prince of Orange, with a power of levying what number of troops they ſhould think neceſſary, and diſpoſing of them as they thought proper, without referring to the ſtates in every particular: they only recommended that they would proportion the expences to the revenue, which at that time amounted to 600,000 livres.

54
Revolution in Guelderland.

About this time a revolution, greatly beneficial to the common cauſe, was effected in Guelderland; John of Naſſau, brother to the prince of Orange, had been appointed governor of this province. Upon entering on the adminiſtration, he perceived that the whole conduct of affairs was in the hands of perſons ſtrongly affected to king Philip and the Catholic religion; moſt of the cities profeſſed Popery; and the count, who had ſworn to the pacification of Ghent, was reſtrained from attempting any change in religion. The face of affairs, however, took a ſudden turn; John acquired great popularity, and ſoon diſcovered that foreigners were the leading perſons. By his artifice and policy he ſtimulated the people againſt them; they were deprived of their ſeats in the provincial ſtates, and turned out of their offices in the government of the cities. Thus Naſſau obtained the chief direction, and was able to co-operate with the meaſures planned by his brother.

55
And in Groningen.

Another revolution happened in Groningen, of which the ſieur de Billy was governor. Billy was by birth a Portugueſe, by religion a Catholic, and conſequently a dependent on the court of Spain: he refuſed to accede to the union of the provinces, and the States-general found it neceſſary to ſend to him Francis Martin Stella, with propoſals for ſigning the pacification of Ghent. Billy ſuſpecting that the deputy's real deſign was to excite a revolt in the province, put him to the torture to extort confeſſion; after having firſt wounded him with his own hand. The deputy bore the moſt excruciating tortures with firmneſs; and having a ſurgeon to dreſs his wound to enable him to undergo a ſecond trial, he communicated ſomething in the Greek language, which the ſurgeon ſoon made public: in conſequence, the mob aſſembled, reſcued Stella, declared for the pacification of Ghent, and obliged Billy to quit his government. The change of councils in theſe two provinces was of the utmoſt ſervice to the confederacy; and would have enabled the province to have encountered the whole power of Spain, had not their affairs been diſtracted by diſſentions among themſelves.

At laſt the prince of Orange, perceiving that little confidence was to be placed in the unanimity of provinces rent by faction, different in religion, and divided by ambition, political maxims, and private intereſt, formed the ſcheme of more cloſely uniting the provinces of which he was governor, and cementing them with thoſe more contiguous, in which the Proteſtant intereſt prevailed. Such an alliance was ſubject to fewer difficulties than attended the more general one of uniting all the provinces; it was in fact the only meaſure that could be propoſed with ſafety, and it was proſecuted with that alacrity and addreſs for which William was deſervedly celebrated.

56
Union of Utrecht.

On the 23d of January 1579, deputies from the provinces of Holland, Zealand, Utrecht, Frieſland, Groningen, Overyſſel, and Guelderland, met at Utrecht, and ſigned the alliance ever ſince known by the name of the *Union of Utrecht*, the baſis of that commonwealth ſo renowned by the appellation of the *United Provinces*. This treaty of alliance was founded upon the infraction of the pacification of Ghent ſolemnly acceded to by Philip, and the late invaſion of certain towns in Guelderland. It was not hereby intended to divide the ſeven provinces from the other ten, or to renounce the pacification of Ghent; its object was to preſerve the liberty ſtipulated in that pacification, by more vigorous operations, and united councils. The chief articles of this union are the following.

The ſeven provinces ſhall unite themſelves in intereſt as one province, never to be ſeparated or divided by teſtament, donation, exchange, ſale, or agreement; reſerving to each particular province and city all its privileges, rights, cuſtoms, and ſtatutes. In all diſputes ariſing between either of the provinces, the reſt ſhall interpoſe only as mediators. They ſhall aſſiſt each other with life and fortune againſt every foreign attempt upon any particular province, whether to eſtabliſh ſovereignty, the Catholic religion, arbitrary meaſures, or whatever elſe may appear inconſiſtent with the liberties of the provinces and the intention of the alliance. All frontier towns belonging to the United Provinces, ſhall, if old, be fortified at the expence of the provinces; if new, at the joint expence of the union. The public impoſts and duties ſhall be farmed for three months to the higheſt bidder, and employed with the king's taxes in the public ſervice. No province, city, or member of the union, ſhall contract an alliance with any foreign prince or power, without the concurrence of all the other members. Foreign powers ſhall be admitted into the alliance, only by conſent of all the contracting parties. As to religion, the provinces of Holland and Zealand ſhall act in that particular as they think adviſeable; the reſt ſhall adhere to the purport of the edict publiſhed by the archduke Matthias, which preſcribed that no man ſhould be oppreſſed on the account of conſcience. All the inhabitants, from the age of 18 to 60, ſhall be trained and diſciplined to war. Peace and war ſhall be declared by the unanimous voice of all the provinces, other matters that concern the internal policy ſhall be regulated by a majority. The ſtates ſhall be held in the uſual conſtitutional manner, and coinage ſhall be deferred to future determination. Finally, the parties agree, that the interpretation of theſe articles ſhall remain in the States-general; but in caſe of their failing to decide, in the ſtadtholder.

This alliance was ſo univerſally approved, that in a ſhort time the cities of Ghent, Nimeguen, Arnheim, Leewarden, Venlo, Ypres, Antwerp, Breda, Bruges, with ſeveral other towns, beſides a great number of noblemen and perſons of diſtinction, embraced and ſigned the union. Thus the foundation of a commonwealth was laid, but in a fluctuating and uncertain ſtate of affairs, when men were actuated by different paſſions, views, and intereſts; intimidated by the great ſtrength of the Spaniſh monarchy, and ſupported chiefly by a zealous adherence to liberty, and firm reſolution to periſh in defence of freedom. The firſt coin ſtruck after this alliance is expreſſive of the ſituation of the infant republic. Here was repreſented a ſhip labouring amidſt the waves, unaſſiſted by ſails or oars, with this motto, *Incertum quo fata ferant.*

57 Firſt coin ſtruck by the republic of Holland.

It was expected, that the important object of this alliance would have attracted the attention of the Walloons, and indeed of all the Catholic inhabitants of the Netherlands: it in fact did ſo, but in a different manner from what was imagined. The Walloons not only refuſed to accede to the union, but they made the ſtrongeſt remonſtrances to the States-general upon the danger, impropriety, and illegality of ſuch a confederacy. It appears from Strada and Bentivoglio, that the duke of Parma was at the bottom of their intrigues. He ſtimulated and prompted their meaſures, inſpiring them with a jealouſy of the Proteſtant deſigns on the Catholic religion. In the end, he contracted an alliance with them; and thereby confirmed by his own example the legality and neceſſity of the union of of Utrecht. Immediately they began levying an army; but ſtill kept up appearances with the confederated provinces, though it was obvious that hoſtilities muſt ſoon commence. To prevent the effuſion of blood, the emperor, as mediator, ſet on foot another negociation; but Philip would allow no reaſonable terms of accommodation, and give no ſecurity for liberty of religion. Inſtead of granting equitable conditions, he laboured to detach the prince of Orange from the union; made him extraordinary propoſals; offered to reſtore him to all his eſtates, indemnify his loſſes, raiſe him to the height of power, and give him the firſt place in his eſteem and favour. But William was too wiſe to rely on the promiſes of a king, who had ſhown himſelf perfidious. He determined to ſhare the fate of the United Provinces, to fulfil his engagements, and the hope conceived of his conduct.

58 Intrigues of the duke of Parma.

In the mean time great diſorders aroſe in Ghent. The inhabitants, finding that the Walloons refuſed all propoſals of agreement, began afreſh their violences againſt the Catholics. Their example was followed by Oudenarde and Dendermonde; and to ſuch exceſs did they puſh their zeal, that the preſence of the prince of Orange was neceſſary to reſtore the tranquillity of Ghent in particular. On the prince's arrival, he found every thing in confuſion; the convents and churches pillaged by the ſoldiers, the houſes and effects of the Catholic prieſts ſold at public markets. But he ſoon put a ſtop to thoſe arbitrary and iniquitous proceedings, and the Catholics were reſtored to the full poſſeſſion of their eſtates: an inſtance of juſtice which, however, could not procure William the confidence of the Catholic faction; who eſteemed the man, while they deteſted the heretic. An attempt was made by the Walloons to ſurpriſe the city; but it was fruſtrated by the prince's vigilance and prudence.

59 His ſucceſſes.

While the prince of Orange was buſied in conciliating factions, forming alliances, and ſtrengthening the union, the duke of Parma was taking meaſures to diſconcert his projects, and reduce the provinces to the king's obedience. He diſpatched Gonzaga and Mondragon with 8000 men to lay ſiege to Marſien. The town was taken by aſſault; the governor hanged; and 45 of the chief inhabitants were tortured to death, for having valiantly defended themſelves, and faithfully diſcharged their duty. It is ſaid the duke of Parma diſavowed this bloody proceeding, ſo inconſiſtent with the character of a hero. After ſome farther inconſiderable advantages obtained in the neighbourhood of Ruremonde, the king's army inſulted Antwerp, where the archduke and the prince of Orange then reſided. The ſtates army was intrenched near Borgerhout, a poſt attacked without ſucceſs by the duke of Parma, after a briſk ſkirmiſhing of two hours between the armies. La Noue, however, the general of the ſtates army, not chooſing to expoſe himſelf to continual alarms from the enemy's cavalry, retired under the cannon of Antwerp.

60 Maeſtricht taken, and the inhabitants maſſacred.

On La Noue's retreat, the duke of Parma inveſted Maeſtricht. The ſiege began on the 8th of March, and continued without remiſſion to the 29th of June. This defence was deemed very extraordinary, as the fortifications were in bad order, the garriſon ſlender, and the place but poorly provided with the neceſſaries of a ſiege. One Sebaſtian Tappin, an engineer by profeſſion, a Proteſtant, and a brave and alert ſoldier, by his indefatigable vigilance raiſed continual obſtructions to the duke's approaches. The garriſon had ſuſtained frequent aſſaults, and made divers bloody ſallies, by which they were ſo much fatigued, that during a parley the town was ſurpriſed, and a great many ſoldiers were put to the ſword; but Tappin was ſaved by favour of the duke of Parma, who gave ſtrict orders that he ſhould have quarter. For three days Maeſtricht was a ſcene of the utmoſt deſolation and horror, the Spaniſh

61 Diſtreſſed ſituation of the republic.

niſh ſoldiers committing every exceſs and enormity, in deſpite of all the endeavours of the general to reſtrain their licentiouſneſs, and maintain diſcipline. With ſuch diligence did the duke apply himſelf to this ſiege, that unable to ſupport the fatigue, he was ſeized with a fever, which had near proved fatal. His ſituation inſpired the enemy with freſh courage. They ventured to appear in the field; reduced Aloſt, and ſome other places of little conſequence; but could not prevent the loſs of Menin taken by aſſault, though it was ſoon after retaken by the prince of Orange. In Brabant the ſtates likewiſe obtained ſome advantages, though of too unimportant a nature to merit attention. The truth is, all the United Provinces were in a deplorable ſituation; and their trifling ſucceſſes were owing entirely to accident, or the duke of Parma's illneſs. Several provinces contributed nothing to the common cauſe; others furniſhed but a ſmall proportion of the taxes agreed upon at the union. The army had large arrears due, and lived at diſcretion; in a manner more oppreſſive to the people than taxes to the amount of their regular pay. The people clamoured againſt the ſtates; they threw the blame on the officers for relaxing in the point of diſcipline; and the officers recriminated, alleging, that the fault was in the ſtates, who failed in performing their engagements to the army. All was in confuſion; but as no perſon would acknowledge his error, there appeared little hopes of amendment. In a word, nothing beſides the ſame diſtreſs in the Spaniſh army could have prevented the duke of Parma from reducing the revolted provinces to accept any terms he ſhould think fit to preſcribe. He was equally in want of money; and his late treaty with the Walloons required that he ſhould diſmiſs all his foreign troops in the ſpace of ſix weeks after the publication of the treaty. His ſituation indeed was ſo deplorable, that he requeſted leave to reſign his command, and retire with the foreign ſoldiers to Italy; but the court of Spain had too much confidence in his ability to entruſt ſo important a charge to another. In this ſtate of affairs the animoſity of the parties remained, without the power of ſhowing their reſentment. The ſtates were reſolute, but unable to defend their liberties. Philip was determined, but too weak to be deſpotic; and both were obliged to content themſelves with publiſhing bitter remonſtrances againſt each other.

62 Duke of Anjou ch ſen ſovereign.

At laſt the prince of Orange renewed the treaty with the duke of Anjou. The queen of England was again offered the ſovereignty, but ſhe declined it for political reaſons. The duke of Anjou was, however, oppoſed by a great number of the Reformed, on account of the ſhare his mother had in the horrid maſſacre of the Proteſtants at Paris. All arguments to remove their prejudices were in vain. Anjou was a Roman Catholic, and that alone was ſufficient to render him deteſtable. The prince of Orange urged the neceſſity of receiving the prince. Theologians and civilians allowed that it was lawful to have recourſe in extremity to a Papiſt, but the people continued obſtinate. This determined the prince of Orange to have recourſe to the States general, to whom he ſent a long remonſtrance, pointing out the cauſes why the confederacy did not produce the intended effect; and exhorting them to re-conſider the affair reſpecting the duke of Anjou. In conſequence, the States-general referred the prince's remonſtrances to the provincial ſtates and cities; and after long deliberations, and warm debates, it was at length determined, in 1380, to call in the duke of Anjou, as the only reſource in ſo great a calamity. Accordingly the year began with a ſolemn treaty, whereby the United Provinces renounced their allegiance to Philip, and acknowledged Francis Hercules de Valois, duke of Alençon and Anjou, for their ſovereign. The treaty conſiſted of 27 articles, of which this we have mentioned was the chief. Deputies were ſent to the duke of Anjou, to explain the articles, and congratulate him on his acceſſion. As to the archduke Mathias, finding himſelf unſupported by the emperor, the empire, and the numerous friends whom he expected would have joined him on his elevation, he expreſſed no reſentment at the conduct of the provinces, which with great moderation he attributed to neceſſity. He only demanded to know their intention with reſpect to his own perſon; and the ſtates made their apology, by repreſenting the ſituation of their affairs, aſſuring him of their eſteem, permitting him to reſide in the Netherlands as long as he thought convenient, and highly applauding the prudence and equity of his conduct during his adminiſtration. As to the provinces of Holland and Zealand, they were left wholly in the hands of the prince of Orange, whoſe power as ſtadtholder was in no reſpect limited by the duke's ſovereignty. After all, Grotius affirms, that the duke's authority was merely nominal, that the real power devolved on the prince of Orange, whoſe name, however, was uſed in all public acts only in a ſubaltern capacity. It was apparent indeed to the French, that William concealed ambitious views under the cloak of patriotiſm; but it was not convenient to diſcover their ſentiments.

63 Prince o Orange ſcribed.

When the king of Spain was informed of this open defection of the Provinces, he attributed the whole to the prince of Orange, and proceeded directly to proſcribe him; he confiſcated his eſtate, upbraided him with ingratitude, and ſtained his character with ignominy. He even promiſed a reward of 25,000 crowns to whoever ſhould bring him the prince of Orange dead or alive; the ſame to his heirs, in caſe the perſon periſhed in the enterpriſe; and he declared all thoſe proſcribed, their eſtates confiſcated, their honours and dignities aboliſhed, who adhered to William a month after the publication of this edict.

The prince of Orange did not ſilently paſs over this proſcription. He employed one Villiers, a Frenchman, to refute the edict: his anſwer was well received, and is recorded by hiſtorians as a proof of the ſpirit, the equity, the prudence, and the moderation of the prince. However, when it was propoſed to the ſtates for their opinion, with a requeſt they would publiſh it in their own name, they declined it; aſſigning for a reaſon, that it contained ſome facts too little known to be credited, and perhaps too much acrimony and reſentment againſt a prince whoſe power they ſtill dreaded. With theſe recriminations ended the tranſactions of the year.

64 The publi clude lip fr the reig

The following year the ſtates, after long deliberations at the Hague, publiſhed an edict, excluding king Philip from any ſovereignty, right, or authority over the Netherlands. This writing appeared on the 26th of July, 1581, under the title of *The Abdication of Philip king of Spain.* It was extremely well drawn up;

ſtated in the ſtrongeſt manner the mutual privileges of the king and people; proved that the allegiance of the latter was voided by the breach of contract on the ſide of the former; enumerated the oppreſſive and tyrannical acts of his government; ſet aſide his authority for the moſt cogent reaſons; forbid money to be coined in his name; and took every other ſtep towards independence. It was in vain for Philip to remonſtrate: he knew the ſtates were to be convinced only by the ſword; to this therefore he appealed. The duke of Parma blocked up Cambray ſo cloſely, that the garriſon was reduced to the extremity of living upon horſes, dogs, and cats; though they ſtill refuſed to capitulate, in hopes of being ſuccoured. At length the duke of Anjou aſſembled a body of 10,000 foot and 4000 horſe, and approached Cambray. The viſcount de Turenne and count Voulandois, undertook to force themſelves with a body of men into the town, but they were ſurrounded and taken priſoners by the Spaniards. This diſappointment did not diſcourage the duke of Anjou: he ſtill preſſed forward with intention to attack the the Spaniſh lines; but the duke of Parma, not caring to hazard a battle, deſerted his works, and retired to Bouchain. As ſoon as the duke of Anjou entered the city, he took an oath to govern it agreeable to its ancient laws, and to preſerve the citizens in the full poſſeſſion of all its liberties. He was now preſſed by the ſtates and the prince of Orange to march directly into Flanders: he endeavoured to comply; but his army, compoſed chiefly of volunteers, was ſo weakened by deſertion, that the deſign was laid aſide.

65 ambray lieved by duke of Anjou.

It was about this time that the duke of Anjou reſumed the notion of addreſſing Elizabeth queen of England. Not deterred by the ill ſucceſs of his former negociation, he determined upon a voyage to England; an excurſion which proved equally unſucceſsful to himſelf and unfortunate to the United Provinces, as during his abſence the duke of Parma made himſelf maſter of Tournay, which concluded the tranſactions of this campaign. He was magnificently entertained, led into a perſuaſion that all would ſucceed according to his wiſh, and at length tired out with tedious expectation. In his abſence, St Guilan was reduced by the prince of Eſpinoi. This general directed his march towards Dunkirk, with intention to join the French forces. The duke of Parma, who had notice of his motion, repaired to ſeize the opportunity of inveſting Tournay. He began his approaches, and was vigorouſly received by that garriſon, inſpirited by the courage of the princeſs Maria d'Eſpinoi, niece of the count Horn ſo cruelly beheaded by the duke d'Alva. The town was ſtormed in breach by the duke of Parma, who ſupported the aſſailants in perſon, received a wound, and had the mortification to ſee his Spaniards thrown headlong from the walls. The duke of Anjou repeatedly promiſed ſuccours; but either forgot, or could not perform his engagements: the latter indeed is the moſt probable; as he was certainly a dupe to the ſuperior policy of Elizabeth, who had not yet declared openly in favour of the ſtates. In the end, deſpairing of relief, harraſſed with perpetual watching, and weakened by loſſes, the garriſon capitulated on the 29th of November. The conditions were honourable; and the princeſs d'Eſpinoi was treated with particular marks of diſtinction by the duke of Parma, who highly eſteemed the heroic qualities of this amazon. This advantage was ſucceeded by another, obtained by the Spaniſh general Verdugo, over the confederate army in Frieſland, commanded by general Norris and William Lewis of Naſſau, a young prince of great expectation. It appears from the Spaniſh account, that Norris was attacked in a defile, where he could not draw out his troops in battalia; and that he was put in confuſion, and defeated with great loſs. On the other hand, the Dutch writers allege, that he attacked the enemy; but being inferior to them in cavalry, retreated in good order, with ſcarce any loſs.

66 ucceſſes of e Spa- iards.

67 Duke of Anjou makes his public entry.

The year 1582 began with a ſpectacle very unuſual in the Netherlands, the public entry of a ſovereign elected by the people. The duke of Anjou ſetting ſail from England on the 8th day of February, arrived on the 10th at Fluſhing, where he was received by the princes of Orange and d'Eſpinoi. Next day they ſet out for Antwerp with a magnificent retinue, and went up the Scheld attended by 50 barges. His reception at Antwerp was ſplendid beyond any thing ever ſeen in the provinces; they even exceeded the preparations made for Philip himſelf on his being appointed to the government in the Netherlands by Charles V. his father. A theatre was erected before the walls of the citadel, in which was placed a chair of ſtate, covered with cloth of gold. There the duke was ſeated, and the conditions were read to him, upon which he was received as duke of Brabant. When he had ſworn to obſerve the articles, he was cloathed with the ducal robe, and his head adorned with the ducal coronet by the prince of Orange; who ſaid, "I will pin it in ſuch a manner that it will not be eaſily ſhaken:" an expreſſion which at that time was taken for a happy omen, though it ſoon proved fallacious.

While the ſtates of Brabant were employed in feſtivity and mirth, a Biſcayan merchant, named *Gaſper Anaſtra*, had contrived a project to redeem his ſhattered fortune by the death of the prince of Orange. He corrupted one of his domeſtics, by the promiſe of half the reward, to ſtrike the blow. The aſſaſſin entered the citadel; and as the prince was paſſing after dinner into another room, diſcharged a piſtol, and dangerouſly wounded him behind the ear. The prince was ſtunned with the force of the ball, and before he recovered the aſſaſſin was killed by his attendants; which prevented for a time the abſolute diſcovery of the plot, though it afterwards appeared from circumſtances. It was traced that he had confeſſed the ſecret to a Dominican named *Antonio Tunmermon*, receiving from the wicked prieſt abſolution, and a promiſe of eternal reward. Tunmermon was hanged, drawn, and quartered, his limbs being fixed upon the walls of Antwerp. But though for this time the prince eſcaped the danger, he was in 1584 aſſaſſinated at Delft, by one Balthazar Gerrard or Guion, a perſon who had before ſerved his highneſs with fidelity and zeal. He was at that very time employed by the prince to carry letters into France, and had received money to bear his expences, with which he purchaſed piſtols to murder his benefactor. At the criminal's examination, it appeared that he had long meditated this bloody action, and was confirmed in his reſolution by the Jeſuits and Catholic prieſts; he even affirmed on the rack, that the duke of Parma was privy to the deſign, who promiſed

68 Prince of Orange aſſaſſinated.

he ſhould have the reward: upon the whole, Gerrard ſeems to have been an enthuſiaſt, and his crime the reſult rather of inſanity, than of any concerted ſcheme, or malicious intention. His puniſhment, however, regarded only the action: it was cruel beyond meaſure, ſhocking to humanity, and a ſtriking inſtance of the vehement party-ſpirit of the times; not of the juſtice of the judges, or the attachment of the people to the prince of Orange.

69
Prince Maurice choſen ſtadtholder.

70
Succeſs of the Spaniards.

† See *England*, nº 243.

71
Duke of Parma obliged to move towards France.

The United Provinces were now in a moſt deplorable ſituation. The duke of Anjou had been totally unable to reſiſt the duke of Parma, in conſequence of which many towns had been taken; and in other reſpects the ſtates had ſuſtained immenſe loſſes. The duke of Anjou, chagrined and diſappointed, had retired to France, where he died. But above all, the loſs of the prince of Orange ſeemed to give the finiſhing ſtroke to the affairs of the ſtates; and confuſion and anarchy now reigned in their councils. The provinces of Zealand and Holland alone endeavoured to repair the loſs, and ſhow their gratitude to William by electing his ſon Maurice their ſtadtholder and captain-general by ſea and land. Maurice was at that time only 18 years of age; but appeared in every reſpect worthy of the high dignity which had been conferred upon him. The firſt ſtep taken by the confederates was a ſolemn renewal of the treaty of Utrecht; after which the moſt vigorous preparations were made for the defence of the country. But before any thing of conſequence could be done, the duke of Parma had reduced Liſkenſhouk, Dendermonde, Vilvorde, Ghent, and Antwerp; which ſtruck the ſtates with ſuch terror, that they again offered the ſovereignty to queen Elizabeth. This was once more refuſed; though that princeſs engaged, by a new treaty, to aſſiſt the States both with men and money. An army was accordingly ſent into the Netherlands under the command of the earl of Leiceſter: but it does not appear that this was of any eſſential ſervice to the cauſe; for the conduct of that general was ſo exceedingly improper, that he was not only baffled in every military enterprize, but drew upon himſelf a general odium. It is very probable indeed that the States could not long have ſupported themſelves in ſuch circumſtances, had not Philip raſhly engaged in a war with England, with whoſe naval power he could ſcarce be enabled to cope by any ſuperiority in numbers whatever. The defeat of the Spaniſh armada in 1588 †, gave ſuch a blow to the power of that nation, as totally diſabled them from carrying on the war in the Netherlands. Inſtead of ſending the proper aſſiſtance to the duke of Parma, that general received orders to haſten to the aid of the duke of Mayence, who had been defeated by Henry IV. The duke was obliged to comply with this order, though he was ſenſible the loſs of the United Provinces muſt be the conſequence. Prince Maurice now carried every thing before him; and by the end of the year 1591, the Dutch ſaw their frontiers extended, the whole country ſecured by rivers and covered by fortified towns, with the greateſt probability of driving the Spaniards out of Frieſeland in another campaign.

72
A truce
twelve ye
conclude
with Spa

The remainder of the hiſtory of this war is only a detail of the Spaniſh loſſes and miſfortunes, which now enſued. Their affairs were at laſt totally ruined by a deciſive victory gained by prince Maurice, in the year 1600, over the archduke Albert, who had been appointed the Spaniſh governor of the Netherlands. King Philip II. died in 1598, leaving the affairs of his kingdom in the moſt diſtreſſed ſituation; notwithſtanding which, his ſucceſſor Philip III. was too haughty to conſent to peace, or allow that the States were free, though he was plainly unable to keep them in ſubjection. At laſt, in 1606, the courts of Madrid and Bruſſels began to think of peace in good earneſt. In 1607 a ſuſpenſion of hoſtilities took place, and in 1609 a treaty was concluded. In the firſt article of the treaty, the archduke, in his own and the king of Spain's name, acknowledged the United Provinces, and renounced all claim to ſovereignty over them, but in ſuch general terms as would admit of altercation. In the ſecond, a truce for 12 years, by ſea and land, through all the dominions of both parties, was concluded. By the third article, the parties were to remain in poſſeſſion of what they now held, without ceſſion or exchange. In the fourth, a general amneſty was ſtipulated, and full freedom of trade by ſea and land to each others dominions granted. This neceſſarily implied a ceſſation of hoſtilities in the Indies; however, great debates afterwards aroſe upon this account. Spain obſerving the rapid progreſs of the Hollanders in the India trade, apprehended they would ſoon become too powerful in that quarter; and the Dutch were willing to maintain the advantage of their ſuperiority. Both, for this reaſon, diſputed the article; yet it could not be ſet aſide without deſtroying the whole treaty, and the fruits of all their laboured conferences. The fifth article regulated the imports, and the duties to be paid by the ſubjects of the archduke and the States, trading to each others dominions, which were to be on the ſame footing with thoſe of other nations. The archduke uſed his utmoſt endeavours to have the duties at Lillo, on the Scheld, aboliſhed, and the commerce of Antwerp reſtored to its former grandeur; but this was ſo diametrically oppoſite to the intereſt of the Hollanders, that it was impoſſible it ſhould ever take place. The ſixth and ſeventh articles likewiſe regarded commercial affairs. But it would be unneceſſary to dwell on particulars. Sufficient is it, that the truce was mutually beneficial, Spain being no longer in condition to ſupport the war, and the Hollanders having obtained the end of all their deſperate reſiſtance and invincible perſeverance in the cauſe of liberty. Philip of Naſſau, by the truce, entered into poſſeſſion of all his paternal eſtates in the Spaniſh Netherlands and Burgundy; while the States rewarded the faithful ſervices of Maurice with a penſion of 25,000 florins, to be paid annually out of the public treaſury, beſides an appointment of 60,000 francs as governor-general. Penſions were likewiſe ſettled on the other princes of the houſe of Naſſau: all were gratified in a manner that demonſtrated the high ſenſe the republic had of their merit, though they might poſſibly be diſappointed in their great deſign of raiſing prince Maurice to the ſovereign authority.

73
War r
newed

No ſooner were the Dutch freed from this extreme danger, and felt the bleſſings of liberty, than diſſentions among themſelves took place. The diſputes betwixt the Arminians and Calviniſts produced violent diſturbances, which frequently ended in the perſecution of the former. In 1621 war was renewed with Spain;

United Provinces.

74 Spaniſh flota taken.

75 Peace concluded.

Spain; and it may be remarked, that during the whole courſe of it, the ſubjects of the republic traded to the Spaniſh ports, as if there had been an entire friendſhip ſubſiſting between the two nations. It was no uncommon practice with them to ſupply towns with proviſion that were beſieged by their own armies; and to furniſh the enemy with ammunition and other neceſſaries, without which they could not carry on the war. Their motive and apology for this conduct was, that thus they kept in their own hands the profits by which other nations would be enriched. By ſteadily purſuing this line of conduct, making as many prizes as they could by force, and at the ſame time making as much profit of their enemies as could be obtained by a lucrative trade, it is no wonder that the republic ſhould flouriſh, and rival in wealth the greateſt nations of Europe. In 1628 the Spaniards met with a dreadful blow by the capture of their flota from Mexico. This was the greateſt prize the Hollanders had ever met with; being valued at no leſs than 15,000,000 livres. From this time the Spaniards were every where defeated and baffled in almoſt every enterprize they undertook; nevertheleſs, they carried on the war, with an obſtinacy hardly to be matched, for 20 years longer. At laſt, in 1648, a treaty was concluded, by which his Catholic Majeſty renounced all right and ſovereignty over the Lords the States-general of the United Provinces, who were henceforth declared a free and independent republic, and that both ſides ſhould remain in the unmoleſted poſſeſſion of what they held ſeverally at the ſigning of the treaty.

76 Flouriſhing ſtate of the republic.

77 Cauſe of the war with France

From this time to the year 1670 we meet with nothing very remarkable in the hiſtory of the United Provinces. By invariably purſuing the maxims of prudence, induſtry, and frugality, the republic had attained the higheſt pitch of grandeur. Amſterdam was become the emporium of Europe, and the richeſt city in the univerſe. Holland alone contained 3,000,000 of ſouls, and all the other provinces were proportionably populous. The States diſpatched miniſters and conſuls to China, Siam, and Bengal, to the Great Mogul, the king of Perſia, the khan of Tartary, the grand Signior, the czar of Muſcovy, and the princes of Africa. They were conſidered as an important weight in the ſcale of Europe, and no treaty was concluded without their ambaſſadors. The triple alliance with England and Sweden, into which they had entered, gave Lewis ſuſpicion that they propoſed to ſet bounds to his ambition, and clip thoſe bold pinions which had ſo ſwiftly conveyed his conqueſts over the Low Countries. Van Beuningen's inſolence, in comparing himſelf to Joſhua ſtopping the courſe of the ſun, which was the French king's device, highly diſguſted his Majeſty; who was ſhocked at the preſumption and pride of a republic juſt ſtarted out of obſcurity, and gained, in the ſpace of a century, from the ocean. But what was ſtill more alarming to Lewis, was the probability that the Dutch would ruin the manufactures of France, and his new eſtabliſhed commerce of the Indies. His jealouſy diſcovered itſelf in divers inſtances; and the penſioner De Witt, who at that time had the leading of affairs, his brother, and his party, did all in their power to remove theſe prejudices; but the unhappy differences which then prevailed in the United Provinces fruſtrated all their endeavours.

United Provinces.

78 Treaty between the kings of France and England.

Lewis now ſought every opportunity of breaking with the Dutch; leſs perhaps from any dread of their power, or ability to injure him, than with a view to enlarge his dominions by the entire conqueſt of the Low Countries. He knew that the whole ſtrength of the republic conſiſted in her marine; that her frontier was weak, her provinces divided, and the chief power in the hands of men inveterately ſet againſt the family of Orange, the ancient captains of the republic. His firſt attempt was to diſſolve the triple alliance, and diſengage from it Charles II. king of England. In this buſineſs the ducheſs of Orleans was employed: ſhe went to England under pretence of viſiting the king her brother; and her negociation was ſucceſsful. In the mean time Lewis poſſeſſed himſelf of Lorrain, under pretence that duke Charles was forming alliances in the empire againſt France.

The following year was ſpent in negociations with the emperor, Spain, and Sweden, with the electors of Cologne and Brandenburg, with the biſhop of Munſter, and other ſpiritual and German princes. The deſign of Lewis was to prevent their acceding to the triple alliance; from which he had already weaned one power, the moſt conſiderable of the whole. The biſhop of Munſter beheld with uneaſineſs the growing power of the United Provinces: he pretended that they had made ſeveral attempts upon the counties of Stirum, Culemberg, Bentheim, and Eaſt Frieſland; that they had ſeized on Ravenſtein on the Meuſe, and ſeveral other places belonging to his biſhopric. In his own defence he concluded a treaty with France, and prevailed on the elector of Cologne to follow his example. By ſigning a treaty with theſe two princes, the king opened a way to Holland by the Meuſe and the Rhine; he eſtabliſhed by this means places of arms and magazines in a country diſtant from his own dominions, and ſecured a retreat in caſe his enterprize proved abortive. With reſpect to the emperor, every artifice was uſed to keep him neutral; and indeed his own inclinations co-operated but little in favour of the Dutch, whom he regarded as ſubjects revolted from the princes of his family, and in poſſeſſion of ſeveral places belonging to the empire. In Sweden, Lewis's negociations were equally ſucceſsful; for here he prevailed ſo far with Charles XI. as to obtain a ſtipulation, that if the emperor, or any of the princes of the empire, joined their forces to the Dutch, a Swediſh army ſhould march into the very heart of Germany and join the French, in order to force thoſe princes to obſerve the treaty of Weſtphalia.

79 Brandenburg aſſiſts the republic

Of all the Germanic body, the elector of Brandenburg alone intereſted himſelf for the ſafety of the States-general. The peace of Weſtphalia had prevented this enterpriſing prince from extending his dominions in Germany, and retaking Pomerania from the Swedes. He had long aſpired at the ſtadtholderſhip of Holland; and though that office had been for ſix years ſuppreſſed, yet he flattered himſelf, that in caſe of a war he might obtain it, perpetuate it in his family, and in time reduce Holland by dint of force, intrigue, and ſtratagem. With this view, he rejected the propoſals of ſeveral princes of the empire, and even thoſe of France, endeavouring by every poſſible method to inſinuate himſelf into the friendſhip and confidence of the States. In the end he concluded a treaty with them, whereby it was ſtipulated that he ſhould aſſiſt the republic with 25,000 men. Beverning, the Dutch ambaſſador at Madrid, diſconcerted all the ſchemes of France at that court, and engaged the queen of Spain to furniſh money and troops for the defence of the United Provinces. Thus was the face of Europe wholly changed. France and England, who had contributed largely to the raiſing and aggrandizing the republic, were now incited to deſtroy her; while Spain, which for an age had been endeavouring to ſuppreſs her, was arming for her ſupport. Pierre de Groot, the Dutch miniſter at the Hague, was employed to penetrate into Lewis's deſigns; he gave his conſtituents notice that he foreſaw a terrible ſtorm ready to fall upon them, which they might nevertheleſs break by ſeaſonable ſubmiſſions and proper acknowledgments. Upon this the States wrote to the king, endeavouring to appeaſe his wrath; but finding him inexorable, they prepared for receiving him, and provided for the ſecurity of their provinces. But the long peace the republic had enjoyed deſtroyed her ſtanding forces, and little confidence could be repoſed in her new levied ſoldiers.

81
Hoſtilities commenced

As ſoon as matters were ripe for execution, Lewis ordered an army of 100,000 men to file off towards the Rhine. Before the opening of the campaign, and previous to his declaration of war, he divided his army into four columns; commanding one in perſon, with the marſhal Turenne under him. Another was led by the prince of Condé, aſſiſted by the marſhals Humieres and Bellefonds; the third was headed by Crequi; and the fourth marched to Weſtphalia under the conduct of the duke of Luxemburgh, to join the biſhop of Munſter. As the marſhals Crequi, Bellefonds, and Humieres, refuſed to receive orders from Turenne, they were baniſhed; but after ſix months exile, were recalled, at the inſtance of the whole body of marſhals in France, upon their making proper ſubmiſſions.

Such an army drawing towards their frontiers could not but terrify the Dutch, now torn with civil factions. The partiſans of the Orange family were for aboliſhing the perpetual edict, and raiſing William III. to the dignity enjoyed by his predeceſſors; but the De Witt faction oppoſed him violently, though they could not prevent the young prince from being choſen captain-general and high admiral. Many perſons hoped that William's new dignity would incline his uncle Char. II. to return to the triple alliance: but that hope was fruſtrated by the conduct of his Majeſty; who, in conjunction with the moſt Chriſtian king, declared war againſt the States-general on the 7th day of April. A month after, the elector of Cologne and biſhop of Munſter followed the example of the two kings. The Dutch put themſelves in the beſt poſture of defence that circumſtances would admit. Maeſtricht was ſtrongly garriſoned; the prince of Orange had aſſembled an army of 25,000 men, with which he advanced to the banks of the Iſſel, and the Dutch fleet cruiſed off the mouth of the Thames to prevent the junction of the naval forces of England and France, which amounted to 150 ſhips. All Europe watched the firſt motions of two powerful kings, ſeconded by the beſt generals of the age.

His moſt Chriſtian Majeſty joined his army at Charleroy. It was compoſed of 23 companies of *gens d'arms*, life-guards, muſqueteers, and light-horſe, two regiments of the French and Swiſs guards, 14 regiments of foreign infantry, and 60 regiments of light horſe or dragoons, compriſing in all an army of 110,000 fighting men, under the command of marſhal Turenne as captain-general. Holland could only be attacked by the Rhine or the Meuſe; and the generals and miniſters differed by which of theſe inlets they were to make the firſt impreſſions. At laſt, after ſeveral deliberations, it was determined to make both attacks at the ſame time, in order the more to diſconcert their councils. It is probable that Turenne always oppoſed the ſiege of Maeſtricht; for we find him immediately after the ſurrender of Maſeick ſtrongly diſſuading the king from that enterprize, in oppoſition to the ſentiments of the prince of Condé. At laſt he prevailed; and it was reſolved in council to advance towards the Rhine, and beſiege at the ſame time the towns of Rhinberg, Veſſel, Orſoi, and Burick. Theſe places were all well fortified, and deemed the keys of Holland; however, the Dutch did not appear diſturbed at their being inveſted, as they were only under the protection, and did not immediately belong to, the United Provinces. They were beſides in hopes, that any attempts upon the territory of Cleves would haſten the preparations of the elector of Brandenburg, and even rouſe the emperor unto a ſenſe of the danger he was in from the vaſt deſigns of Lewis. Nothing could oppoſe armies ſo well appointed, led by generals ſo ſkilful and ſo experienced. The four towns ſurrendered within a few days of each other; and Rhinberg, that held out longeſt, opened its gates on the 7th of June. A few days after, the town and fort of Rhees, and the town of Emerick, ſurrendered; upon which the king reſolved to paſs the Rhine by a ford, over which the cavalry were to ſwim. This bold enterprize was projected and conducted by Condé; who, in the face of two regiments of foot, and ſeveral ſquadrons of horſe, under general Wartz, intrenched on the oppoſite ſide, effected the paſſage, in the ſame order, and with as much regularity, as if he had marched his troops on dry land. The enemy made a ſtout reſiſtance; but were driven from their poſt, after having killed the duke de Longueville on the ſpot, and wounded the prince of Condé, which diſabled him for ſome time from attending the ſervice, and obliged him to reſign the command of his army to Turenne.

It is almoſt incredible with what rapidity towns and fortreſſes yielded to the fortune of his Majeſty's arms. The reduction of Betau, the moſt fruitful country of the United Provinces, and the ſurrender of Tolhus fort, obliged the prince of Orange to abandon the Iſſel, leſt he ſhould be attacked in the rear, and to retire to the very heart of the country, as far as Rhenen, in the province of Utrecht. By this means the town of Arnheim, the forts of Knotſembourgh, Voorn, St André, and Shenck, this laſt the ſtrongeſt in the Netherlands, (having coſt the great Henry Frederic prince of Orange, a ſeven months ſiege), with a variety of other forts and towns, ſurrendered as ſoon as ſummoned; and at laſt Nimeguen, a town ſtrong from the nature of the works and fortifications, and garriſoned by 8000 fighting men, including the inhabitants, was inveſted. After the citizens had for eight days exhibited ſignal proofs of courage

rage in defence of their liberties, they were forced to yield to the ſuperior ſkill of Turenne.

In the mean time the biſhop of Munſter and elector of Cologne, having joined that body of troops under the command of the duke of Luxembourg, the united army entered the province of Overyſſel, and by dint of cruelty, and terror which the duke ſpread, reduced the towns as ſoon as he appeared before them. Animated by that implcable rage that conſtantly attends religious wars, the two prelates obliged the duke to exert a ſeverity, by no means ſuited to his nature, againſt heretics and the rebellious ſubjects of the houſe of Auſtria. Next the king's forces penetrated into the province of Utrecht, where their conqueſts went on with the ſame rapidity, and put the capital of the province in the utmoſt danger. To retard its fate, the Dutch could imagine no other expedient than opening their ſluices, and overflowing the country. The other towns followed the example of Utrecht; and Holland, Brabant, and Dutch Flanders, was one vaſt lake, the towns riſing like iſlands in the midſt of the waters. Farther to ſtem the torrent of Lewis's conqueſts, the people were perſuaded the only barrier was to lodge the ſupreme power in the hands of the prince of Orange. They accordingly obliged the ſtates of Holland and Weſt-Frieſland to unite the dignity of ſtadtholder to thoſe of captain-general and high admiral, with which the prince was already inveſted. They likewiſe ſent remonſtrances ſo pathetic to the king of England, that Charles, moved with the ſituation of the republic, and jealous of the deſigns of Lewis, diſpatched the duke of Buckingham and earl of Arlington into Holland, to quiet the fears of the Dutch, and inſiſt upon the king's penetrating no farther into Holland. In caſe of Lewis's refuſal, Charles declared he would break the alliance; as he perceived, that, inſtead of ſecuring Zealand to the Engliſh, agreeable to the treaty, the deſigns of France were to unite the whole republic to their own monarchy. His moſt Chriſtian majeſty had in fact no great regard to the menaces of his ally: but as perſiſting obſtinately to advance into a country which the inundation rendered impaſſable, might terminate in the ruin of all his ſchemes, he ſeemed, out of compliment to the king of England, to liſten to terms of accommodation; which, after all his victories, could not fail of proving advantageous. In the ſpace of three months he had conquered the provinces of Guelderland, Overyſſel, and Utrecht, taken about 50 towns and forts, and made 24.000 priſoners. Condé and Turenne adviſed his Majeſty to ſend the priſoners to work upon the canal of Languedoc, and to leave all the places that were not eſſential to the preſervation of his conqueſts; the miniſter Louvois was of a different opinion, and his ſentiments determined the king. The priſoners were releaſed for a trifling ranſom, and the king's army totally reduced and exhauſted by the continual drains made to garriſon the conquered places.

82
The Dutch obliged to overflow their country.

83
Unſucceſsful negociation

A negociation was ſet on foot at Boxtel, near Boiſle-duc, whither the king, attended by the Engliſh ambaſſadors and the Dutch deputies, repaired: but the terms required of the republic were ſo hard, that they were rejected with diſdain by the Dutch; who, animated by their ſtadtholder, reſolved to wait a change of fortune in the midſt of the waters. They uſed every expedient to rouſe the princes of Germany in their defence; and ſo ſucceſsfully, that the elector of Brandenburg, the neareſt and moſt intereſted prince, prepared to take the field. The undaunted courage, the vigilance, and public ſpirit of the prince of Orange, gained him the intire confidence and affection of the republic; and excited their reſentment againſt the two brothers De Witts, his implacable enemies, whom they accuſed of receiving penſions from Lewis. The ſuggeſtion was falſe; but poſſibly their love of liberty, and jealouſy of the houſe of Orange, had carried thoſe two great politicians too far in their pacific meaſures and complaiſance to the power of the French monarch. The penſionary was attacked in the ſtreet by the populace; but by his perſonal bravery broke through the crowd, and ſaved his life, though covered with wounds. Soon after the ſedition broke out afreſh, and the partiſans of the houſe of Orange again ſtirred up the animoſity of the republic againſt the De Witts. Several crimes were laid to the penſioner's charge, but he cleared himſelf. Suborned witneſſes accuſed his brother of an attempt to poiſon the prince of Orange. Cornelius was impriſoned, and treated with great barbarity. While he was under the torture, he ſung that ode of Horace, *Juſtum et tenacem propoſiti virum.* His brother took him out of priſon after ſentence of baniſhment was pronounced; the tumult roſe high, and both the De Witts were cruelly torn in pieces in the ſtreets. William of Orange ſeemed touched at this terrible ſacrifice; he made the penſionary's eulogium, and ordered the murderers to be proſecuted; however, the clemency he ſhowed them, the advanrages he obtained by the maſſacre, and the animoſity he bore the De Witts, convinced all men that he countenanced the murder.

84
The De Witts cruelly murdered.

William of Orange in the mean time daily ingratiated himſelf more. He gave up his whole fortune for the ſafety of the ſtate; and exerted himſelf with ſuch prudence and ability, that all Europe began to unite againſt the two kings by the month of July. Every prince in Germany was in motion to ſuccour the Dutch. The emperor, the king of Denmark, the elector of Brandenburg, the duke of Brunſwic Lunenburg, the landgrave of Heſſe, immediately ordered their troops to join; ſeveral of the other princes were preparing to take the field. All were jealous, England began to waver, and there was not a power in Europe upon whom Lewis XIV. could heartily rely. The army of Brandenburg commanded by the elector in perſon, and the forces of the empire under the famous Montecuculi, joined near Heidelſheim, and compoſed a body of 40,000 mmen. Turenne, now appointed generaliſſimo of the king's army on his Majeſty's return to Paris, marched to oppoſe the enemy's paſſing the Rhine. For three whole months were the elector and Montecuculi employed in abortive attempts to effect a paſſage at Mentz, Coblintz, Straſburgh, and other places. This anſwered the purpoſe of making a powerful diverſion in favour of the Dutch, though they could not accompliſh their deſign of joining the prince of Orange. After repeated diſappointments, the imperial army directed its march to Weſtphalia; and Turenne followed, in order to keep the biſhop of Munſter ſteady to his engagements. For half the campaign, he, with a body of 16,000 men, baffled every ſtratagem of the elector and Montecuculi, the latter the moſt renowned

general

85
Exploits of Turenne.

general of the empire, at the head of an army near triple his ſtrength. He obliged them to go into winter-quarters, in a country haraſſed and exhauſted; and confirmed the biſhop of Munſter in the alliance of France, at the very time he was on terms with the emperor. He obliged the elector of Brandenburg, who took the chief command during Montecuculi's illneſs, to abandon the ſiege of Werlc; took Unna, Kamen, Altena, Berkembaum, and ſeveral other towns and fortreſſes. By continuing his operations, he forced the elector out of his winter-quarters again into the field, chaſed him from poſt to poſt, until he obliged him to quit Weſtphalia, repaſs the Weſer, and retire with precipitation into the biſhopric of Hildeſheim. After taking poſſeſſion of all the elector's towns in Weſtphalia, he purſued him into the biſhopric of Hildeſheim; and at length, by mere dint of ſuperior genius, forced him to ſeek ſhelter in his hereditary dominions. All this was effected after Louvois had appointed the marſhal's army quarters in Alſace and Lorrain, amidſt the rigours of a ſevere winter, oppoſed by a ſuperior enemy, by the artifices of Louvois, and ſeconded only by his own prudence, and the affections of his troops, which he maintained in defiance of all the difficulties, hardſhips, and dangers, they encountered. It was indeed ſuppoſed, that Montecuculi was prevented from giving Turenne battle by the remonſtrances of prince Lobkowitz, the emperor's ambaſſador, influenced by the gold of Lewis. Certain indeed it is, that Montecuculi's illneſs aroſe from his chagrin at ſeeing all his projects fruſtrated by the unſteady dilatory conduct of the court of Vienna. Lewis's negociations diſturbed Europe no leſs than his arms. His tools and creatures ſwarmed in every court. Leopold could not be prevented from declaring in favour of Holland; but his miniſters were bought off from ſeconding the emperor's intentions. The whole Engliſh nation exclaimed againſt the alliance of their king with France; but Charles ſtood in need of French gold to ſupply his extravagance and profligacy. The elector of Bavaria had indeed been compelled by Lewis to retire to his capital; but it was by dint of intrigue that he was forced from his alliance with Holland, and conſtrained to ſign a peace with France.

While Turenne was thus employed on the Rhine, Condé having recovered of his wounds, returned to the command of the army in Holland. He beſieged and took Maeſtricht in 13 days. Having repaired the fortifications, he propoſed making himſelf maſter of ſeveral other towns; but the inundations every-where ſtopped his courſe. All his attempts to draw off the waters were in vain; and he was forced to content himſelf with preſerving, without pretending to extend, the king's conqueſts.

Whatever glory the king might have acquired by land, certain it is that the conduct of his admirals deſerved equal praiſe with that of his generals. In little more than 12 months the French were taught the art of naval war. Before, they fought ſhip to ſhip; but underſtood nothing of thoſe evolutions by which whole fleets imitate the movements of armies. The duke of York, afterwards James II. invented the method of giving all orders at ſea by means of ſignals: this and every other part of the art the French borrowed from the Engliſh; and became ſo apt ſcholars, that they ventured to give battle to the Hollanders, the great rivals of the Engliſh on that element. Their fleet, amounting to 40 ſail, beſides fire-ſhips, joined to the Engliſh, gave battle three different times to the Dutch. De Ruyter gained additional glory in theſe engagements; and D'Eſtrees, the French admiral, gained the eſteem of De Ruyter.

86
Fortune declares againſt the French.

In the mean time Spain declares in favour of the Dutch; and prevails upon the emperor to act more heartily in the cauſe of Holland, and defence of the liberties of Europe. The prince of Orange was reinforced by 10,000 Spaniards, ſent to him by the governor of the Low Countries. Philip had concluded a treaty with the States at the Hague, whereby he declared war againſt France, engaged the emperor to make a powerful diverſion on the Rhine, ſtipulated not to accept of peace before the Dutch had retrieved all their loſſes, and obtained from them a promiſe to liſten to no terms of accommodation before his Catholic majeſty was reinſtated in all his poſſeſſions in the Low Countries, previous to the peace of the Pyrenees. Montecuculi was ordered to advance with 30,000 men to Franconia; and Turenne, joining the troops of Cologne and Munſter, paſſed the Main, and took poſt in the electorate of Mentz. The prince of Orange receiving no impediment from Condé, who was forced on account of the inundations to repaſs the Meuſe, thought this a proper time for action, as the enemy had no conſiderable forces in the heart of the United Provinces. He ordered ſome troops to file off ſecretly to Amſterdam and Muyden; lined with infantry the intrenchments which ſecured the paſſage to Holland; and to deceive the duke of Luxemburgh, who commanded in Utrecht, ſent ſome forces by ſea to attack Bowmel. The duke, not penetrating the prince's deſign, came to ſuccour the place; and William finding his ſtratagem ſucceed, marched to Naerden, and with 25,000 men inveſted and took the place before the duke could provide for its ſecurity. Upon this ſucceſs, the Dutch took courage, fortune inclined in their favour, and in a ſhort time all the horrors of war were removed from the interior parts of the United Provinces to the Spaniſh Netherlands. Neither the experience nor conſummate addreſs of Turenne, the genius of Vauban, or the indefatigable vigilance of Louvois, could repair the error committed in ruining the army to garriſon the conquered towns. Even Condé's fire ſeemed extinguiſhed in the waters with which the Dutch had drowned their country. Inſtead of penetrating farther, he was obliged to retreat. Turenne could not prevent the junction of Montecuculi and the prince of Orange, nor the loſs of Bonne. This junction, and the declaration of Spain, obliged the armies of France to abandon the three provinces with ſtill more rapidity than they had conquered them. The triumphal arch at St Denis was hardly erected as a monument of Lewis's victories, before the fruits of thoſe victories were relinquiſhed. In a word, the parliament of England would no longer ſuffer Charles to be the mercenary tool of France; the late ill ſucceſs cooled the elector of Cologne and biſhop of Munſter in their friendſhip; and Lewis, forſaken by all his allies, found himſelf under the neceſſity of maintaining ſingly a war againſt the empire, Spain, and the United Provinces.

From that time the United Provinces have been diſtinguiſhed among the European nations as a very conſiderable maritime and commercial power. Their connection with Britain by the revolution in 1688, when William III. ſtadtholder of Holland became king of this iſland, brought on a much cloſer connection between the two nations than had ever taken place before.

87 State of the republic to the preſent time.

By means of this connection William formed a plan of humbling his great adverſary Lewis XIV. who had ſo lately brought his country to the verge of ruin. For this purpoſe he renewed the war in 1689, and commanded the army in perſon. However, he was overmatched by the abilities of Luxemburg the French general; who oppoſed him, and obliged him to conclude a peace in 1697. His enmity to the French king, however, was not yet extinguiſhed. The remaining part of his life he employed in forming a moſt powerful confederacy againſt that monarch; and ſo much was he wrapped up in this project, that even in his dying moments it ſeemed to prevail over every other conſideration *. His meaſures, however, were adopted by his ſucceſſor Queen Anne; and the French monarchy had nearly ſunk under the united efforts of the forces of Britain, Holland, and Germany, headed by the experienced generals Marlborough and Eugene. But at laſt the whole plan was diſconcerted by a revolution in the Britiſh miniſtry; the Dutch were diſappointed in the moment of their expectations, and obliged to conſent to the peace of Utrecht, which left them expoſed to the attempts of France as much as ever. A barrier compoſed of a great number of fortified towns was indeed granted them; but barriers of this kind are a ſlender defence againſt the modern improvements in war. In the war of 1739, theſe towns were taken one after another by Marſhal Saxe, who thus revenged the exploits of the duke of Marlborough; while the Dutch and Britiſh army commanded by the late duke of Cumberland, were driven from place to place, without being able to make one ſucceſsful effort from the beginning of the war to the end of it. See BRITAIN, n° 342—423.

It is probable that the bad ſucceſs of this war cooled the affections of the Dutch towards Britain ſo much, that ever ſince they have acted rather as concealed enemies than friends. In the war of 1755, their attachment to France was evident; and in the laſt, it proceeded to ſuch an height, as to oblige the Britiſh miniſtry to declare war againſt them. The iſſue of this war is ſtill freſh in our memories. A ſingle naval engagement was the only event of conſequence that took place, and ſhowed that both were formidable antagoniſts to each other. The republic ſtill poſſeſſes dominions of great conſequence in the Eaſt Indies, with ſome portion of South America, and by conſtant application to commerce may perhaps be reckoned the richeſt nation in Europe.

88 Climate, &c. of the United Provinces.

The ſeven United Provinces being in great part ſurrounded by the ſea, lying low, and abounding in marſhes, have a damp and unwholeſome air. Rains and fogs are frequent; and the gout, ſcurvy, rheumatiſm, and agues, very common, and difficult of cure. The effects of human induſtry here are wonderful in the dykes and dams erected for defending the country againſt the inundations of the ſea, and in ditches, canals, mills, and ſluices, for draining the marſhes. The quantity of grain produced is not ſufficient for home conſumption; but the paſtures in the marſhes are ſo rich, that they can ſpare a great deal of butter and cheeſe for exportation. They have alſo a good breed of ſheep, whoſe wool is highly valued. There is turf, madder, tobacco, ſome fruit, and iron; but all the pit-coal and timber uſed in this country, and indeed moſt of the neceſſaries of life, are imported. All the provinces either lie upon, or communicate with, the North-ſea, by means of that called the *Zuyder*, or *Sourh-ſea;* which was formed partly by the Rhine's right branch, then increaſed by the Vecht, which has now another outlet, overflowing the low ſwampy grounds through which it paſſed; and partly by the ſea's breaking in, in the 13th century, and overflowing a large tract of ground contiguous to that before laid under water by the Rhine. The principal rivers are the Rhine, the Meuſe, the Scheld, and the Vecht. The firſt is divided into ſeveral branches, one of which joins the Old Iſſel, and after that falls into the Zuyder-ſea; another named the *Leck*, at the village of Krimpen, mingles with the Meuſe; a third, called the *Crooked Rhine*, is branched out at Leyden into canals, of which one runs into the lake of Haarlem, and another loſes itſelf in the ſand hills between Catwyk on the Rhine, and Catwyk on the ſea; and a fourth, called the *Waal*, falls into the Meuſe over againſt Workum. The Meuſe, after dividing itſelf into two branches, and again uniting theſe, falls into the North-ſea, below Rotterdam. The Scheld below Antwerp divides itſelf into two branches, called the *Weſtern* and *Eaſtern Scheld;* the firſt ſeparating Flanders from Zealand; and the other, running north by Bergen-op-Zoom, and afterwards eaſt, between the iſlands of Beveland and Schowen, falls into the ſea a little below. The Vecht runs from eaſt to weſt through the province of Overyſſel, and falls into the Zuyder-ſea. There are many ſmaller rivers that join theſe, and a vaſt number of canals; yet there are few good harbours in the provinces. The beſt are thoſe of Rotterdam, Helvoetſluys, and Fluſhing. As to the harbour of Amſterdam, it is indeed one of the largeſt and ſafeſt in Europe; but there is a bar at the entrance of it, over which large veſſels cannot paſs without being lightened or unloaded. There are no mountains in theſe provinces; and the only lake, properly ſo called, is that of Haarlem. The provinces are extremely well cultivated, and very populous; eſpecially that of Holland, which, in this reſpect, perhaps has not its equal in the univerſe. The towns are very agreeable, being kept clean, and having canals in the middle of the ſtreets, planted with trees. The number of inhabitants is computed at about 200,000. The animals here are much the ſame as in England; but their horſes and horned cattle are of a larger ſize. Storks build and hatch on their chimnies; but, being birds of paſſage, they leave the country about the middle of Auguſt, with their young, and return the February following. It is ſaid there are ſome wild boars and wolves here; and that neither oyſters nor herrings are to be found upon the coaſt: but of other fiſh, they have the ſeveral ſorts, both in their ſeas and rivers, that we have in Britain.

89 Religion.

The eſtabliſhed religion here is the Preſbyterian, or Calviniſm: none but Preſbyterians are admitted into any office or poſt in the government, excepting the army; yet all religions and ſects are tolerated, and have their reſpective meetings or aſſemblies for public worſhip, among which the Papiſts and Jews are very numerous. There are five univerſities in the provinces, viz. thoſe of Utrecht, Leyden, Franeker, Groningen, and Harderwic; but the three laſt are inconſiderable. The diſſenters in England often ſend their children to theſe univerſities for education. Before the Reformation there was an archbiſhop at Utrecht, who had for his ſuffragans the biſhop of Deventer, Groningen, Middleburg, Haarlem, and Lewarden. The language here is a dialect of the German, but French is much ſpoken by the better ſort.

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* See Britain, n° 339, 340

90 Commerce, &c. With regard to the commerce of this country, their Eaſt-India company have had the monopoly of the fine ſpices for more than 100 years, and is the moſt opulent and powerful of any in the world. Though the country itſelf produces very few things, yet almoſt all the products and commodities of the globe may be found here, nearly as cheap as in the countries where they are made or produced. A vaſt variety of manufactures are carried on in the provinces, and with extraordinary ſkill and diligence; and a great number of hands are employed, and much wealth acquired, by the herring, cod, and whale fiſheries. No nation has hitherto equalled them in the curing of herrings; thoſe cured at Glaſgow, in Scotland, are thought to come neareſt to them. About 150 ſail are annually employed in the whale fiſhery, and about 200 in the herring, The profits of the latter, in a good year, after all deductions, are thought to amount to 200,000 Holland guilders. The principal manufactures here are thoſe of linen, paper, and earthen ware of all ſorts. Ship-building alſo employs vaſt numbers of hands. The trade of this country, however, upon the whole, is ſaid to be upon the decline; owing partly to a decline of their ancient parſimony and induſtry; but chiefly to the improvement of manufactures, trade, and navigation, in other countries.

91 Conſtitution. Moſt of the towns in the ſeveral provinces are little republics, whoſe deputies, with the nobility, compoſe the ſtates thereof; and the deputies of the provinces, in like manner, compoſe the ſtates-general. Every town or province may ſend as many deputies as they pleaſe to the aſſemblies of the provincial ſtates, or ſtates-general; but thoſe of each town or province have but one voice, and preſide by turns. No reſolution taken by the ſtates-general is of any force, till it is confirmed by the ſeveral provinces. The legiſlative power in the towns is veſted in the ſenates; and the executive in the burgomaſters, ſyndics, &c. The ſtates of the provinces are ſtyled, Noble and Mighty Lords; but thoſe of Holland, Noble and Moſt Mighty Lords: and the ſtates-general, High and Mighty Lords, or the Lords the States-general of the United Netherlands, or their High Mightneſſes. Beſides the ſtates-general, there is alſo a council of ſtate, conſiſting of deputies from the ſeveral provinces, making twelve in all; of which Holland ſends three; Gelderland, Zealand, and Utrecht, two a-piece; and Frieſland, Groningen, and Overyſſel, one. In this council every deputy preſides a week by turns, and the ſtadtholder has a deciſive voice when the votes happen to be equal. The principal affairs that come under their deliberation, are thoſe relating to the army and finances. The ſtadtholder is alſo preſident of the ſtates in every province, but has no ſeat in the ſtates-general. One diſſenting voice in the provincial ſtates prevents their coming to any reſolution. From the death of William III. prince of Orange and king of England, there had been no ſtadtholder, at leaſt for the provinces of Holland, Zealand, and Weſt-Frieſland; but theſe alſo, in 1747, upon the French breaking into Dutch Flanders, made choice of William-Charles-Henry-Friſo, prince of Orange. The ſtadtholderſhip was at the ſame time made hereditary to his heirs male and female, provided the latter did not marry the ſon of a king, or a Papiſt. The ſtadtholder's powers and prerogatives are very conſiderable: in particular, he ſeems directly, or by his influence, to have the nomination of the magiſtrates, deputies, and moſt of the officers civil and military. In ſhort, though he has not the title, he has more real power and authority than many kings; for beſides the influence and revenue he derives from the ſtadtholderſhip, he has ſeveral principalities and large eſtates of his own.

With reſpect to the adminiſtration of juſtice in this country, every province has its tribunal, to which, except in crimina lcaſes, appeals lie from the petty and country courts; and it is ſaid, that juſtice is nowhere diſtributed with more impartiality.

92 Taxes. The taxes in theſe provinces are ſo many, and ſo heavy, eſpecially in Holland, that it is not without reaſon aſſerted, that the only thing that has eſcaped taxation there is the air they breathe. The ordinary revenues of the republic are computed at between two and three millions ſterling annually. Out of 100 guilders, the province of Holland contributes 58; and conſequently above one half of the whole public expences. For the encouragement of trade, the duties on goods and merchandiſe are ſaid to be exceeding low.

93 Forces by ſea and land. With reſpect to their land-forces in time of peace, they ſeldom exceed 40,000, and very often fall ſhort of that number. They employ a great many foreigners in their ſervice; and in time of war, hire whole regiments of Germans. The chief command of the army is veſted in the ſtadtholder, under whom is the field-marſhal general. In 1756 the expences of the army amounted only to 9,765,004 guilders. No nation in the world can ſo quickly fit out a formidable fleet than the Dutch; having always vaſt quantities of timber prepared for building of ſhips, and ſuch numbers of ſhip-carpenters and mariners: however, in times of peace, they uſually have no more than 30 in commiſſion, for the protection of their trade in the Mediterranean, and to convey the homeward-bound Indiamen, &c. Their navy is under the direction of the five admiralty colleges, who, to defray the charges thereof, levy the duties on exports and imports.

94 Character. As to the character of the Dutch, the boors or huſbandmen are induſtrious enough, but heavy, and ſlow of underſtanding. The ſeamen are a plain, blunt, but rough, ſurly, and ill-mannered ſort of people. Their tradeſmen are ſomething ſharper, and make uſe of all their ſkill to take advantage of thoſe they deal with. Every claſs of men are extremely frugal. All appetites and paſſions run lower and cooler here than in other countries, avarice excepted. Quarrels are very

rare; revenge is ſeldom heard of; and jealouſy ſcarcely ever known. It is very uncommon for any of them to be really in love, or even to pretend to it; nor do the women ſeem to care whether they are or not. People converſe pretty much upon a level here; nor is it eaſy to diſtinguiſh the man from the maſter, or the maid from the miſtreſs, ſuch liberties do they allow their ſervants, or rather are obliged to allow them; for they may not be ſtruck or corrected by them, but the diſpute muſt be left to the magiſtrate. The Dutch are tall and ſtrong-built; but both men and women have the groſſeſt ſhapes that are to be met with any where. Their garb, except among the officers of the army and ſome few others, is exceeding plain, and the faſhions change as ſeldom as in Spain. The men are addicted to drinking; which ſome think neceſſary in this foggy air, both for their health and the improvement of their underſtandings. Among their diverſions, that of ſkating in winter is one of the chief. It is amazing to ſee the crowds in a hard froſt upon the ice, and their their great dexterity in ſkaiting; both men and women darting along with inconceivable velocity. The Dutch are remarkable for their cleanlineſs: nothing can exceed the neatneſs of their houſes, towns, and villages. Many of them have diſtinguiſhed themſelves by their learning, and ſome even by their wit and ingenuity; witneſs Eraſmus, Grotius, &c. The Dutch excel alſo in painting and engraving; and ſome of them have been no contemptible ſtatuaries.

UNITY, in poetry. There are three unities to be obſerved, *viz.* the unity of action, that of time, and that of place. In the epic poem, the great, and almoſt the only, unity, is that of the action. Some regard indeed ought to be had to that of time; for that of place there is no room. The unity of character is not reckoned among the unities. See POETRY, chap. ii. 24, &c.

UNIVERSAL, ſomething that is common to many things; or it is one thing belonging to many or all things.

UNIVERSE, a collective name, ſignifying the whole world; or the aſſemblage of heaven and earth, with all things therein. See ASTRONOMY and GEOGRAPHY.

UNIVERSITY, a collective term applied to an aſſemblage of ſeveral colleges eſtabliſhed in a city, wherein are profeſſors in the ſeveral ſciences, appointed to teach them to ſtudents, and where degrees or certificates of ſtudy in the divers faculties are taken up.

In each univerſity four faculties are uſually taught, theology, medicine, law, and the arts and ſciences.

They are called *univerſities*, or *univerſal ſchools*, by reaſon the four faculties are ſuppoſed to take in the whole compaſs of ſtudy.

Univerſities had their firſt riſe in the XIIth and XIIIth centuries. Thoſe of Paris and Bologna pretend to be the firſt that were ſet on foot; but they were on a different footing from the univerſities among us.

The univerſities of Oxford and Cambridge ſeem entitled to the greateſt antiquity of any in the world; and Baliol and Merton colleges in Oxford, and St Peter's in Cambridge, all made colleges in the XIIIth century, may be ſaid to be the firſt regular endowments of this kind in Europe.

The univerſities of Scotland are four, *viz.* thoſe of St Andrews, Aberdeen, Edinburgh, and Glaſgow. See EDINBURGH, &c.

UNIVERSITY-*Courts*, in England. The two univerſities enjoy the ſole juriſdiction, in excluſion of the king's courts, over all civil actions and ſuits whatſoever, where a ſcholar or privileged perſon is one of the parties; excepting in ſuch caſes where the right of freehold is concerned. And then by the univerſity charter they are at liberty to try and determine, either according to the common law of the land, or according to their own local cuſtoms, at their diſcretion; which has generally led them to carry on their proceſs in a courſe much conformed to the civil law.

This privilege, ſo far as it relates to civil cauſes, is exerciſed at Oxford in the chancellor's court; the judge of which is the vice-chancellor, his deputy, or aſſeſſor. From his ſentence an appeal lies to delegates appointed by the congregation; from thence to other delegates of the houſe of convocation; and if they all three concur in the ſame ſentence, it is final, at leaſt by the ſtatutes of the univerſity, according to the rule of the civil law. But if there be any diſcordance or variation in any of the three ſentences, an appeal lies in the laſt reſort to judges delegates appointed by the crown under the great ſeal in chancery.

As to the juriſdiction of the univerſity-courts in criminal matters, the chancellor's court at Oxford, and probably alſo that of Cambridge, hath authority to try all offences or miſdemeanors under the degree of treaſon, felony, or mayhem; and the trial of treaſon, felony, and mayhem, by a particular charter, is committed to the univerſity juriſdiction in another court, namely, the court of the lord high ſteward of the univerſity.

The proceſs of the trial is this. The high ſteward iſſues one precept to the ſheriff of the county, who thereupon returns a panel of 18 freeholders; and another precept to the bedells of the univerſity, who thereupon return a panel of 18 matriculated laymen, *laicos privilegio univerſitatis gaudentes:* and by a jury formed *de medietate*, half of freeholders and half matriculated perſons, is the indictment to be tried; and that in the guildhall of the city of Oxford. And if execution be neceſſary to be awarded in conſequence of finding the party guilty, the ſheriff of the county muſt execute the univerſity proceſs; to which he is annually bound by an oath.

VOCABULARY, in grammar, denotes the collection of the words of a language, with their ſignifications, otherwiſe called a *dictionary*, *lexicon*, or *nomenclature*. See DICTIONARY.

A vocabulary is properly a leſſer kind of dictionary, which does not enter ſo minutely into the origin and different acceptations of words.

VOCAL, ſomething that relates to the voice or ſpeech: thus vocal muſic is that ſet to words, eſpecially verſes, and to be performed by the voice; in contradiſtinction to inſtrumental muſic, compoſed only for inſtruments, without ſinging.

VOCATIVE, in grammar, the fifth ſtate or caſe of nouns See GRAMMAR.

VOETIUS (Giſbert), an eminent divine of the 16th century, was profeſſor of divinity and the Oriental tongues at Utrecht, where he was alſo miniſter. He aſſiſted at the ſynod of Dort; and died in 1676, aged 87. He wrote a great number of works; and was the declared enemy of Des Cartes and his philoſophy. His followers are called *Voetians*.

Voetius had two ſons, *Daniel* and *Paul*, who alſo wrote ſeveral works. *John Voetius*, the ſon of Paul, was doctor and profeſſor of law at Herborn: he wrote a commentary on the Pandects, which is eſteemed, and other works on law.

VOICE, a ſound produced in the throat and mouth of an animal, by an apparatus of inſtruments for that purpoſe.

Voices are either articulate or inarticulate. Articulate voices are thoſe whereof ſeveral conſpire together to form ſome aſſemblage or little ſyſtem of ſounds: ſuch are the voices expreſſing the letters of an alphabet, numbers of which joined together form words. Inarticulate voices are ſuch as are not organized, or aſſembled into words; ſuch is the barking of dogs, the braying of aſſes, the hiſſing of ſerpents, the ſinging of birds, &c.

The formation of the human voice, with all the varieties thereof obſerved in ſpeech, muſic, &c. makes a very curious article of inquiry; and the apparatus and organiſm of the parts adminiſtering thereto, is ſomething exceedingly ſurpriſing. Thoſe parts are the trachea or wind-pipe, through which the air paſſes and repaſſes into the lungs; the larynx, which is a ſhort cylindric canal at the head of the trachea; and the glottis, which is a little oval cleft or chink left between two ſemicircular membranes ſtretched horizontally withinſide the larynx; which membranes, though capable of joining cloſe together, do generally leave an interval, either greater or leſs, between them, called the *glottis*. A particular deſcription of each part may be ſeen in ANATOMY, Part IV.

VOICE, in grammar, a circumſtance in verbs, whereby they come to be conſidered as either active or paſſive; *i. e.* either expreſſing an action impreſſed on another ſubject, as, *I beat*; or receiving it from another, as, *I am beaten*. See GRAMMAR.

VOICE, in matters of election, denotes a vote or ſuffrage.

VOICE, in oratory. See DECLAMATION; READING, n° xii.; and ORATORY, n° 129, 131.

VOLANT, in heraldry, is when a bird, in a coat of arms, is drawn flying, or having its wings ſpread out.

VOLATILE, in phyſics, is commonly uſed to denote a mixed body, whoſe integrant parts are eaſily diſſipated by fire or heat; but is more properly uſed for bodies whoſe elements or firſt component parts are eaſily ſeparated from each other, and diſperſed in air.

VOLATILE *Alkali*, a name given to one of the primary or elementary ſalts, the baſis of all thoſe which go by the name of *ammoniacs*. It is produced chiefly from animal-ſubſtances, eſpecially urine, either by diſtillation with a ſtrong heat, or by putrefaction. In its pure ſtate it is a tranſparent elaſtic fluid like common air, but lighter in a conſiderable proportion; and in this ſtate Dr Prieſtley has given it the appellation of *alkaline air*. It unites very readily with fixed air, and with all kinds of acids, forming with them various neutral ſalts according to their different natures. It unites alſo with water, which will imbibe one third of its weight of alkaline air. The mixture then is a cauſtic volatile ſpirit, the ſtrongeſt that can be made, which unites with acids without any efferveſcence. If fixed air is added, the ſpirit then contains volatile ſalt, and is ſaid to be mild; though in fact it is now partly changed into a neutral ſaline mixture along with a quantity of cauſtic ſpirit. If a true cauſtic ſpirit is expoſed to the air, part of the alkali will fly off; but part is alſo neutralized by the fixed air which it attracts from the atmoſphere. The ſalt formed by an union of fixed air with volatile alkali is the moſt volatile of all the ammoniacal ſalts, and may be made perfectly neutral, though it is eaſily ſuper-ſaturated with alkaline air, and is then extremely pungent. In this ſtate it is called *volatile ſalt*, and is uſed in ſmelling-bottles; but the ſuperfluous quantity of alkaline air ſoon flies off, and the ſalt remains neutral as before. Alkaline air in large quantities is fatal to animals, though in a ſmall proportion it is a medicine of great efficacy in caſes of fainting. It is very cauſtic; diſſolves oils, and renders them ſoluble in water; prevents putrefaction; and is inflammable, but burns without any exploſion. For the chemical properties of the volatile alkali, ſee CHEMISTRY, n° 319, *& ſeq.*

VOLATILISATION, the art of rendering fixed bodies volatile, or of reſolving them by fire into a fine ſubtle vapour or ſpirit which eaſily diſſipates and flies away. All bodies, even the moſt fixed, as gold, may be volatilized, either of themſelves, or with the admixture of ſome volatile ſubſtance or ſpirit, by diſtillation or ſublimation.

VOLCANO, or VULCANO, a name given to ſeveral parts of the earth whence flames, ſmoke, ſtones, cinders, &c. are ſometimes thrown out with aſtoniſhing violence and in prodigious quantity. The name is borrowed from VULCAN the Heathen god of fire, who was fabled by the poets to have his work-ſhop under Mount Ætna, where he, with the aſſiſtance of the Cyclops his ſervants, forged thunderbolts for Jupiter.

1 Derivation of the name.

2 General account of the ſituation and form of volcanoes.

The greater part of the known volcanoes are ſituated under high mountains, which they perforate by means of their internal heat, and throw out ſuch immenſe quantities of melted and burning hot matter, ſeemingly from the bowels of the mountain, that it is wonderful how it continues to ſupport itſelf, and is not at once precipitated into the huge caverns which muſt be occaſioned by the diſgorging ſuch immenſe quantities of matter. The very ſummit of volcanoes indeed does from time to time fall into the abyſs below; but this is ſoon repaired again by the quantity of ſtones, cinders, and aſhes, thrown out of the volcano, which form a conical mount, hollow like a funnel in the inſide, and having an hole in the middle which leads directly down to the abyſs whence the fire proceeds. This conical mount is ſupported all the way down by the ſtones and other matter heaped up on each ſide of the ſpiracle or chimney through which the fire of the volcano paſſes. But in proceſs of time the vehemence of the heat, or its long continued action, wears away thoſe ſupports, and the top again falls in, and ſoon after is renewed as before. But though the ſummit of volcanoes thus very often falls in, we ſeldom or never hear of a burning mountain falling down from the foundation. On the contrary, Ætna, though it has continued to burn from time immemorial, is ſtill a very high mountain. Veſuvius alſo continues much of the ſame height as ever, though its ſummit, and even great part of the mountain itſelf, has been known to fall in. However, it muſt be remarked, that though volcanoes are generally ſeated under high mountains, this is not alway the caſe. In the Mediterranean, a burning iſland aroſe in the beginning of the preſent century, upon which there was no eminence of any conſiderable height. In the iſland of Tanna, in the South Sea, alſo, Mr Forſter mentions a volcano whoſe height was much leſs than that of many hills in the neighbourhood.

3
Times of their eruption uncertain.

Though volcanoes generally emit a hot ſulphureous and ſuffocating ſteam, yet they by no means caſt forth flames at all times with violence. This happens only at uncertain intervals of ſometimes more than a century together. Nay, ſometimes even the emiſſion of the abovementioned kind of ſteam ceaſes, the crater or chimney of the volcano is covered over with earth and vegetables, and it is forgot that ever any eruption took place. This appears to have been the caſe with Veſuvius before the time of Pliny; for at that time nobody ſeems to have apprehended the leaſt danger; though it is now pretty certainly determined that many eruptions had happened before this time. The ſigns of an approaching eruption are enumerated under the article ÆTNA ſo fully, that little remains to be added here. It would ſeem however, from the accounts of Sir William Hamilton and Mr Brydone, that neither the volcanoes of Ætna, Veſuvius, nor Stromboli, are ever in a ſtate of perfect quietneſs. Smoke continually iſſues from them, and exploſions and other noiſes are heard within them. Mr Brydone particularly mentions a ſmall mountain on the ſide of Ætna, which diſturbed him in the night-time with frequent exploſions like the noiſe of heavy cannon fired at a diſtance, though the mountain was then as quiet as it is almoſt ever known. Mr Hamilton mentions it as a common remark at Naples, that Veſuvius *grumbles in bad weather*; which he explains by ſuppoſing that the ſea forces itſelf into ſome of the caverns under the mountain, and which are at all times of a glowing heat, whence ariſe thoſe exploſions and ſtrange kinds of ſounds above-mentioned: but we can ſcarce ſuppoſe this to be peculiar to Veſuvius; nor is there any certainty of a communication between that mountain and the ſea. Mr Raſpe indeed ſuppoſes the ſea-water to be neceſſary for the accenſion of volcanoes; but of this he brings no proof. It is certain indeed that many of them are below the bottom of the ſea; but it ſeems moſt probable that the water has not acceſs, or but in ſmall quantity, to the place whence the fire orginates. Mr Forſter, from more certain obſervation, concludes, that volcanoes are exaſperated by the falling of rain. This he took particular notice of in the volcano in the iſland of Tanna, and ſuſpects that rain excites the exploſions by increaſing the fermentation of the mineral ſubſtances within the mountain.

4
Veſuvius moſt noiſy in bad weather.

5
Conjectures concerning the accenſion of volcanoes.

6
Prodigious force of volcanoes.

The force with which a volcano explodes ſeems to be the greateſt hitherto known in nature. So great indeed is this force, that we muſt of neceſſity ſuppoſe the reſiſtance of the air to be exceedingly leſſened before the projected materials. Under the article GUNNERY, it is ſhown how great this reſiſtance is, and what an effect it has upon globes of ſolid iron. Upon irregular maſſes of rock, then, and much more upon ſtreams of liquid lava, the reſiſtance muſt be ſuch as to ſtop their motion almoſt as ſoon as it began. Nevertheleſs, in the great eruption of Veſuvius in 1779, Sir William Hamilton informs us, that a ſtream of lava of an immenſe magnitude was projected to the height of at leaſt 10,000 feet above the top of the mountain; and if to this we add the depth of the ſource whence this lava was derived, the force by which it was impelled muſt exceed our imagination. Indeed, let us ſuppoſe the cauſe to be what we will, had the air exerted its reſiſting power upon this lava as it does on a cannon-ball, the force neceſſary to have carried it to that amazing height muſt have daſhed the ſtream in pieces at its firſt emiſſion from the mouth of the volcano. Either the extreme heat of the lava, therefore, or ſome other cauſe muſt contribute to keep off this reſiſtance, without which we cannot ſuppoſe that it could have reached to ſuch an height, much leſs could the lighter materials, aſhes, cinders, &c. have ariſen to an height ſufficient to carry them to the diſtance of 100 miles from the mountain, which we are aſſured was the caſe at that time.

7
Fermentation of pyrites ſuppoſed to be the cauſe of volcanoes.

There are no phenomena in nature whoſe cauſe ſeems more difficult to be explained than volcanoes. The fermentation of pyrites, of ſulphur and iron, the exploſions of nitre, of aqueous ſteam violently heated, or of air pent up and greatly rarefied, have all been thought of to explain them, but with very little ſucceſs. Dr Woodward and others have recourſe to a central fire which they ſuppoſe to exiſt in the bowels of the earth, and ſuppoſe that volcanoes are ſo many ſpiracles or chimneys to prevent it from deſtroying the whole world.

8
Inſufficiency of ſuch conjectures.

It muſt, however, be very evident, that the immenſe force which we obſerve in volcanoes cannot by any means be accounted for from any ſuch principles. It is impoſſible that beds of pyrites can be ſo totally inexhauſtible as to remain for thouſands of years under, or nearly under, the ſame part of the ſurface of the earth. And as to nitre, it is never found in a foſſile ſtate, nor indeed can we conceive that ſuch quantities of nitre can exiſt under any one part of the ſurface as would be ſufficient for a ſingle exploſion: beſides, nitre does not explode inſtantaneouſly, unleſs it is thoroughly mixed with ſulphur and charcoal in order to convert it into gun-powder; an operation which cannot take place in the bowels of the earth. As little can we ſuppoſe thoſe eruptions owing to the expanſion of aqueous ſteam; for though this will in ſome caſes explode with great violence, yet in others it ſeems to be in a manner totally deprived of that power. With melted lead, copper, or ſalts, it explodes with the utmoſt fury, even when water in a very ſmall quantity is thrown upon the ſurface of ſuch ſubſtances; yet on the ſurface of melted glaſs, which is much hotter than any of them, water will not explode, but evaporates quietly, ſeemingly kept at ſome diſtance from the ſurface of the glaſs by the violent emiſſion of ſteam from its under part. Nay, with this violent heat, it does not even appear to boil; but gradually leſſens in its dimenſions, until at laſt it quite diſappears. Indeed, if we ſuppoſe water intimately mixed and diſperſed in ſmall quantities through the ſubſtance of melted glaſs or any ſimiliar ſubſtance, no doubt a very violent exploſion will take place; but in this caſe the matter, inſtead of being thrown up in a full ſtream, would be ſcattered all around in an immenſe number of ſmall drops. Indeed we cannot conceive how any ſuch intimate mixture could take place; for if we ſuppoſe any large collections of water to exiſt under ground at the ſame time that a lava is by ſome unknown means melted in ſuch a manner as to come in contact with it, either the water muſt fall upon the lava, or the lava into the water. If the water falls upon the lava, no exploſion will take place, as has been already ſhown; and if the lava falls into the water, the liquid muſt no doubt be heated boiling hot, and the ſteam diſſipated with thoſe noiſy exploſions mentioned under the article Ætna, when a lava of that mountain ran into the ſea. On this ſuppoſition, however, the lava could never be projected above the mountain; much leſs can we ſuppoſe that ſolid rocks ſhould be moved from their places, and thrown to great diſtances, as experience ſhows them to be. In the eruption of Veſuvius in 1779, Sir William Hamilton meaſured one which was 108 feet in circumference and 17 feet high, and which was thrown to the diſtance of more than 1300 feet from the crater of the volcano. If we ſuppoſe this ſtone to have been only twice as heavy as water, it muſt have weighed conſiderably more than 700 tons; and the projectile power employed to throw this to ſuch a diſtance muſt have exceeded any thing we can conceive, almoſt, of the force of gun-powder itſelf.

9
Difficulties in aſcertaining the true cauſe.

10
Fire of volcanoes originally kindled by the electric fluid.

Indeed, when we conſider the immenſe power exerted by volcanoes, we can ſcarce find any thing in nature to which it can be aſcribed. What only ſeems to reſemble it is the exploſions of inflammable air in mines, and of which an account is given under the article Damps. But as it is impoſſible to account for the continual generation of this air, which we know muſt be deſtroyed by every exploſion, we cannot have recourſe to this agent; nor, though electricity ſeems to be very much concerned in volcanoes, are we acquainted with any laws according to which that fluid acts, by which a ſucceſſion of violent exploſions could be occaſioned. The primary conſideration, however, in attempting to account for the phenomena of volcanoes, is the means by which the fire is originally kindled, becauſe upon this, ſome-how or other, all the reſt of the phenomena depend. This, from what has been already obſerved, cannot be occaſioned by fermentations of metalline, mineral, or ſaline ſubſtances, which in time would wear out; but muſt depend on ſome inexhauſtible cauſe. The only inexhauſtible ſource of fire which we are acquainted with is the electric fluid, by means of whch every degree of heat, even to that which vitrifies gold and platina, may be excited. From the many articles in this work, where the nature of the electric fluid has been conſidered, it muſt appear very probable that it is no other than the light of the ſun himſelf abſorbed by the earth, pervading every part of it, receiving new motions, and becoming ſubject to new laws, in conſequence of this abſorption, as if it were different fluid. As the ſun perpetually ſends down an immenſe quantity, great part of which is ſtill abſorbed, it is impoſſible that ſuch an abſorption can take place without an emiſſion of an equal quantity ſomewhere or other. The outlets to this fluid are innumerable; but by various cauſes many of theſe may occaſionally be ſtopped. In this caſe it is plain, that the fluid muſt move with greater velocity through thoſe which remain open. But it has been ſhown, under the article Electricity, n° 79. and Heat, n° 9. that the violent motion of the electric fluid through any ſubſtance is heat; that when this fluid converges to a centre, or diverges from one, heat always takes place in the central point, and that more or leſs violent according to the quantity of fluid which thus converges or diverges. If then, from any cauſe, the electric matter diffuſed through a very large portion of the earth ſhould converge towards one particular ſpot on the ſurface, then that ſpot would undoubtedly be heated, or perhaps ſet on fire; and if a ſufficient quantity of electric matter ſhould conſtantly be directed in this manner, we muſt eaſily ſee that the heat would be continual. Hence may be underſtood the origin of *ſolfataras*, or ſpots of earth which have a continual heat in them, and of hot ſprings. But if this violent flux of electric matter ſhould by any means be interrupted and renewed at uncertain intervals, we ſee, in that caſe, the heat muſt occaſionally increaſe and decreaſe, without any cauſe viſible to thoſe who dwelt near the ſpots above-mentioned. In volcanoes, however, it is probable that the flux of electric matter alway continues to a very conſiderable degree, but occaſionally is increaſed in ſuch a manner as to melt down the earth, ſtones, and mineral ſubſtances through which it paſſes into the ſemivitrified compound called *lava*. We cannot indeed, as yet particularly know the cauſes by which this electrical flux is at all times occaſioned. In general, we are certain, that whatever has a tendency to ſolicit the matter to the ſurface, will increaſe the violence of an eruption; and whatever can increaſe it after it has begun, will alſo contribute to bring it on originally. This will happen when the preſſure of the atmoſphere directly over the mountain is leſſened; when a cloud paſſes over it whoſe electricity is oppoſite to that of the mountain itſelf, or which, by acting as a conductor, may facilitate the eſcape of the confined electric matter; or it will readily happen if by any means the ſurface of the mountain and of the earth round it is rendered a better conductor than uſual. But above all, the ſtate of electricity in the neighbouring earth and air muſt contribute towards the bringing on an eruption, or increaſing one which is already begun. Under the article Earthquake, n° 29. it has been ſhown, that when there is a perfect equality between the electricity of the earth and of the atmoſphere, there is then great danger of a concuſſion, becauſe the electric matter can neither get into the atmoſphere from the earth, or into the earth from the atmoſphere. It muſt therefore ſtagnate altogether, and be ready to burſt out on all ſides, when the preſſure upon it becomes ſufficiently ſtrong. In ſuch circumſtances, if there happens to be a volcano in the neighbourhood, it is probable that it will be ſet on fire, or perhaps a new volcano may be produced on this occaſion.

11
Origin of ſolfataras and hot ſprings.

12
Of the lava of volcanoes.

13
How a flux of electric matter may be determined to one particular ſpot.

14
Why volcanoes are produced or ſet on fire by earthquakes.

15
Facts in confirmation of volcanoes being ſet on fire by electricity.

Theſe cauſes ſeem to be ſufficient for the production of volcanoes, and ſetting them on fire from time to time, as uſually happens with them; though no doubt there may be others much more unknown to us which take place in the bowels of the earth itſelf; but as theſe are entirely concealed from us, we can only gueſs at their exiſtence. But that all the above-mentioned cauſes do contribute towards the eruption of burning mountains experience evinces. Sir William Hamilton mentions it as a common obſervation, that the inward exploſions of Veſuvius increaſe during bad weather, when we know that the preſſure of the atmoſphere is leſſened, and the deſcending vapours ſerve as conductors to the electric fluid. The ſame gentleman informs us, that, on the 7th of Auguſt 1779, as he was obſerving Veſuvius, a collection of thunder-clouds paſſed directly over its ſummit, and mingled with the ſulphureous and mineral clouds of ſmoke, cinders, and aſhes, which were then piled up to an amazing height over its top. "At this moment (ſays he) a fountain of fire was ſhot up to an incredible height, caſting ſo bright a light, that the ſmalleſt objects could be clearly diſtinguiſhed at any place within ſix miles or more of Veſuvius." Thus we ſee that theſe clouds acting either by their conducting power as aqueous vapours, or by an electricity oppoſite to that of the volcano, ſolicited a vaſt diſcharge of the fire as ſoon as they came directly over it. Mr Forſter's obſervation, that the volcano in the iſland of Tanna took fire after rain, has been already mentioned; and the cauſe will now be apparent, namely, that by this means the ſurface of the ground all round was rendered a much better conductor than before, and perhaps ſupplied with a greater quantity of electricity, the paſſage of which to the volcano was now free, in conſequence of which it took fire and burnt violently till this ſupply was again exhauſted. Laſtly, it is well known that ſome countries which were formerly very ſubject to earthquakes, have been freed from theſe deſtructive phenomena by the breaking out of a volcano. In the time of earthquakes alſo, temporary volcanoes are often formed, and the neighbouring ones throw out vaſt quantities of fire. This was particularly obſerved in the great earthquake of 1692, when Catanea was deſtroyed, at which fatal moment a vaſt flame was ſeen to iſſue from mount Ætna. But whether any ſuch appearance was obſerved during the earthquakes of the preſent year (1783), which ſeem not to have been leſs violent than that of 1692, has not yet been authenticated.

16 Incredible quantities of electric matter emitted by volcanoes.

We ſhall only add one remark more in confirmation of the hypotheſis that volcanoes are ſet on fire by electricity, namely, that in a volcanic eruption the quantity of this fluid emitted from the mountain is quite incredible. For a long time together, the ſmoke is ſometimes ſo much electrified as to attract the aſhes which are thrown out along with it almoſt into a ſolid column. The ſtones thrown out, according to Sir William Hamilton, are ſometimes tranſparent, which we can only attribute to an immoderate electricity. Nay, the ſame author informs us, that the vaſt ſtream of lava which iſſued in 1779 to the height of almoſt two miles, was tranſparent alſo. Add to this, that the volcanic ſmoke proves very dreadful by reaſon of the thunder-ſtorms which iſſue from it. In the great exploſion of 1779, which, however, laſted only twenty-five minutes, a cloud of electrified ſmoke was produced which threatened the deſtruction of Naples at ſix miles diſtance from the mountain; and though it was happily driven from thence by the wind, the air continued ſo much electrified, that a Leyden vial armed with a pointed wire ſoon became conſiderably charged by being only held out at a window. At Ottaiano, which was involved in this cloud, inceſſant flaſhes of lightning added greatly to the horror of the ſcene, as well as to the danger of the inhabitants. By another day's eruption the air was filled with meteors reſembling falling ſtars, which give us a yet higher idea of the quantity of electric matter emitted, as theſe indicate a greater degree of electricity than even the moſt violent forked lightning. See LIGHTNING, n° 7.

17 Exploſions and exacerbations of volcanoes accounted for.

Thus we have attempted to explain the original cauſe of volcanoes, the formation of lava, and the reaſon why the volcanic eruptions are not conſtant, but only take place at uncertain intervals. It now remains only to aſſign a reaſon why volcanoes do not burn quietly as any common fire, but, even during the time of an eruption, by fits and intervals. The exploſions indeed are in a manner continued; but Sir William Hamilton obſerves, that the burning mountains are ſubject to what he calls a *criſis at noon and midnight*. The exacerbations alſo are very remarkable, ſo that our author diſtinguiſhes them by the name of *fever-fits*. All theſe phenomena, however, may be ſolved by an attentive conſideration of the principles above laid down. The lava is formed by a great quantity of electric matter violently forcing itſelf through a ſmall ſpot of earth, in conſequence of which that ſpot is melted, and thus becomes a better conductor of electricity than before, whence the force of the electric blaſt towards that place is ſtill augmented. Now, as the earth is compoſed of what we call ſimply *mould*, together with ſtones, and minerals of various kinds, moiſtened with a certain quantity of water, it is not poſſible that a maſs of this kind can be melted without the production of an incredible quantity of ſteam of various kinds. It is not only the aqueous vapour that is here concerned, but almoſt all the different kinds we can imagine. No doubt the ſteam of water alone ſhows, in certain circumſtances, an incredible degree of ſtrength; but of all vapours hitherto known, the aerial ones are the moſt powerful in their effects as well as the quickeſt in their operation. Mr Robins, in his Treatiſe on Gunnery, relates ſome experiments, from which he concluded, that air, heated to an intenſe white heat, was expanded into more than four times its uſual bulk, and conſequently, in ſuch circumſtances, has more than four times its uſual elaſticity. From another experiment he ſhowed, that inflamed gun-powder produces a quantity of permanently elaſtic ſteam equivalent to 244 times the bulk of the gun-powder itſelf. Hence he concludes, that the force of inflamed gun-powder is nearly equal to 1000 times the preſſure of the common atmoſphere. Now, though the air produced by the inflammation of gun-powder is of a different kind from that which we may ſuppoſe to be produced by the melting of a lava, and in much greater quantity in proportion to the bulk of moſt of the materials, yet it does not appear that the elaſticity of the volcanic ſteam is at all inferior, as far as it goes. From Dr Prieſtley's experiments it appears, that the expanſion of the different kinds of air by heat are in the following proportions:

Common air - - -	132
Inflammable - - -	205
Nitrous - - - - -	202
Fixed - - - - -	220
Marine acid - - -	133
Dephlogiſticated - -	221
Phlogiſticated - - -	165

Vitriolic

Vitriolic acid - - - -	237
Fluor acid - - - -	283
Alkaline - - - -	475

In order to form ſome eſtimate of the force of volcanic ſteam, however, it is neceſſary not only that we ſhould know the different elaſticity of the airs which may be ſuppoſed to be extricated, but the proportions which are yielded by different ſubſtances. But here our data are very ſlender. Dr Prieſtley, to whom we muſt in a manner wholly have recourſe, has not made experiments on thoſe ſubſtances which we can moſt reaſonably ſuppoſe to exiſt in the bowels of the earth. From ſome, however, air was diſcharged in the following proportions, with a heat indeterminate indeed, but certainly not greater than that of a volcano.

Wood-aſhes	-	160 times their own quantity
Pitcoal ditto	-	110
Lapis calaminaris	-	306
Manganeſe	-	40
Chalk	- -	1

18 Burning of volcanoes cannot be ſupported by dephlogiſticated air.

All theſe ſubſtances we may with good reaſon ſuppoſe to exiſt in a volcano, or at leaſt ſubſtances equally ready to diſcharge air. Nay, Dr Prieſtley himſelf ſuppoſes as much dephlogiſticated air to be diſcharged from the melted materials of a lava as is ſufficient to continue the burning. But however much he may be in the right with regard to the *quantity* of dephlogiſticated air produced in this manner, he muſt certainly be miſtaken as to the *uſe* of it. It is certain that the burning muſt have commenced before any air could be emitted from the materials, and the cauſe which produced muſt alſo be ſufficient to continue it; not to mention that lava could not be kept melted, nor ſtones red-hot, by blowing air in any quantity upon their ſurfaces.

With regard to the effects of this ſteam, we muſt eaſily ſee, that where the quantity of materials is very large, it muſt be extremely formidable. From the calculations of Dr Prieſtley above-mentioned, it appears, that fixed air let looſe and heated is more powerful than atmoſpheric air, and conſequently more ſo than even the air emitted by gun-powder, which Mr Robins obſerves to have much the ſame elaſticity with common air. It is true, that nitre yields pure dephlogiſticated air, which is ſomewhat more elaſtic than fixed air: but it is inſtantly phlogiſticated by the other ingredients; and Dr Prieſtley found what remains after the accenſion of gun-powder to be more phlogiſticated than common air, and conſequently to have very little more elaſticity, as Mr Robins obſerved. Now, the ſteam of a volcano muſt undoubtedly be compoſed of fixed air, vitriolic acid, ſome marine acid, dephlogiſticated and inflammable air, all blended together at once by the melting of the lava, not to mention a prodigious quantity of aqueous ſteam rarefied and heated to an extreme degree. As all theſe are more powerful than an equal quantity of the vapour of inflamed gun-powder, no wonder that ſuch terrible effects enſue from it. From Dr Prieſtley's calculation, it appears that two ounces of wood-aſhes, if a ſtrong white heat could be ſuddenly applied to them in ſuch a manner as to make them give out all their air at once, would be much more powerful than one ounce of gun-powder; three ounces of pit-coal aſhes would be more powerful than an ounce and an half of gun-powder; ſix ounces of manganeſe would be more than an equivalent to one ounce, and 15 pounds of chalk would be the ſame; though this laſt we may be aſſured would in ſuch circumſtances yield more than 50 times the quantity of air that Dr Prieſtley could obtain from it. Lapis calaminaris would be terrible beyond all meaſure; one ounce of it being nearly equivalent to two of gun-powder. What muſt be the conſequence, then, if thouſands of tons of materials equally prolific in ſuch kinds of air are melted at once?

When all this is attentively conſidered, we will be ſo far from being ſurpriſed at the immenſe power of volcanoes, that it will rather be matter of ſurpriſe that more miſchief is not done by them than what actually happens. This however is prevented by the force being conſtantly directed upwards, and not horizontally along the ſurface of the earth. The firſt conſequence of the production of a lava muſt be a violent tendency of it to expand. The reaſon of this is obvious, *viz.* becauſe the ſteam is diſperſed through every part of it, and therefore ſwells and heaves it up, as we ſee is the caſe with any glutinous fluid when ſet over the fire to boil. As this expanſion is very violently reſiſted by the obſtacles below ground, the overcoming of theſe, which in fact is no leſs than removing and breaking to pieces rocks and huge maſſes of earth, muſt be attended with the moſt tremendous exploſions; and hence we may account for the noiſes below ground before an eruption of a volcano takes place. As the lava is exceſſively tenacious, it will continue to ſwell, and keep the ſteam within itſelf for a long time, though violent blaſts of ſmoke and elaſtic ſteam will now and then get out, as we ſee that puffs of ſmoke will get out from any thick matter boiling over a fire. As theſe blaſts of volcanic ſteam muſt alſo be compoſed partly of the ſmoke of burnt earth, and partly of elaſtic air, they are conſequently of a black colour; and hence the ſign of an approaching eruption is a quantity of black ſmoke now and then ſhooting up to an immenſe height in the air. Along with this black ſmoke, however, a white one will be emitted without intermiſſion. This white ſmoke is compoſed of aqueous vapour, and what comes from the outſide of the lava when thoroughly melted, which is always obſerved to emit a white ſteam. As the lava advances, a prodigious quantity of earth, ſtones, &c. are collected on its upper part, ſo that the blaſts of ſteam cannot get out without breaking through this covering. The earth in the mean time is calcined to aſhes, and the ſtones are made red-hot by the vehement heat of the lava underneath, and by the violent current of electric matter converging towards that point. The volcano therefore begins to throws up red-hot ſtones, cinders, aſhes, and ſcoriæ of the lava itſelf. Theſe falling down into the crater, continually fill it up; and thus confining the ſteam, give conſtant occaſion for freſh exploſions, and the mountain continues to rage with more or leſs violence, according to the quantity of ſteam yielded by the lava, and the degree of reſiſtance it meets with. At laſt, when the lava has reached the ſummit, or meets with a weak place in the mountain, as the ſame tendency to expand ſtill continues, it runs over the top, or burſts out thro' the ſide. Then all the violent exploſions and fury of the volcano ceaſe, becauſe the ſteam gets continual vent by forcing more of the lava out through the opening. But if by any accident the running of the lava happens to be ſtopped, or the vent happens to be too narrow, all the former phenomena return, ſometimes with double violence.

Thus we may in a pretty plauſible manner account for the general phenomena of volcanoes; and if extraordinary phenomena ſometimes occur, we may reaſonably ſuppoſe them to be owing to ſome accidental circumſtance. Thus the vaſt height to which the lava of Veſuvius aſcended in 1779, muſt certainly have been occaſioned by ſome extraordinary preſſure, ſuch as indeed we may well be ſurpriſed how the ſides of the mountain could bear. There are three circumſtances which may reaſonably be ſuppoſed to cauſe the lava ſpring up to a conſiderable height. 1. Its being very ſuddenly formed; for thus all the elaſtic ſteam will be diſcharged in a manner at once, and the tendency to expand will be inconceivably great. 2. The degree of reſiſtance. And, 3. The capability of the materials to produce elaſtic ſteam. All theſe ſeem to have concurred to produce the great exploſion on the 8th of Auguſt 1779. The immenſe quantity of electric fluid which at this time iſſued from the mountain, indicated that the lava had been ſuddenly formed. Immediately before its emiſſion, ſuch a report was heard as ſhook the houſes at Portici, broke the windows, and cracked ſeveral walls; and the fitneſs of the materials at that time in the mountain for producing elaſtic ſteam, appeared from the vaſt quantities of ſmoke which iſſued along with the lava.

29 Uſes of volcanoes.

With regard to the uſes of volcanoes, we may obſerve, that however terrible their eruptions may be, they anſwer very important purpoſes in nature, by giving vent to ſuch quantities of electric matter as might otherwiſe render the earth totally uninhabitable, if not endanger its frame altogether. Sulphur, ſal ammoniac, and various other ſalts, are produced by them; their aſhes fertilize the neighbouring country; and the lavas, tufa, baſaltes, &c. afford materials for building. By their means alſo many iſlands have been thrown up from the bottom of the ſea, and afford new habitations for man.

VOLERY, a great bird-cage, ſo large that the birds have room to fly up and down in it.

VOLITION, the act of willing. See METAPHYSICS.

VOLLEY, a military ſalute, made by diſcharging a great number of fire arms at the ſame time.

VOLONES, in Roman antiquity, ſlaves who in the Punic war voluntarily offered their ſervice to the ſtate, which is the reaſon of the appellation; upon which they were admitted to citizenſhip, as none but freemen could be ſoldiers.

VOLT, in the manege, a round or circular tread; and hence, by the phraſe *to make volts*, is underſtood a gate of two treads, made by a horſe going ſidewiſe round a centre, in ſuch a manner that theſe two treads make parallel tracts; one larger, made by the fore feet, and another ſmaller made by the hind-feet; the croup approaching towards the centre, and the ſhoulders bearing out.

VOLTAIRE (Francis de), one of the moſt celebrated French authors and wits, was born in the year 1694. At twelve years of age, having written ſome verſes that appeared to be ſuperior to what could have been expected at that early period, he was introduced to the celebrated Ninon d'Enclos by the Abbe Chateauneuf, her intimate friend; and that extraordinary woman bequeathed to him the ſum of 2000 livres to buy books; which legacy was punctually paid.

Notwithſtanding his extreme youth, he was admitted to an intimacy with the Abbe Chaulieu, the Marquis de la Fare, the duke of Sully, and the Abbe Courtin; and he has often told us that his father believed him entirely ruined, becauſe he kept company with people of faſhion and made verſes.

At the age of 18, he began the tragedy of Oedipus, in which he propoſed to introduce choruſes after the manner of the ancients. The players were very unwilling to appear in a tragedy, the ſubject of which had been already treated by Corneille, whoſe performance was what is commonly called a *ſtock play*. It was not acted till 1718, and even then not without an order from the court. The young man, who was exceſſively diſſipated, and immerſed in all the pleaſures common at his time of life, was not ſenſible of the riſk he ran, nor did he give himſelf any trouble whether his pieces ſucceeded or not. He indulged himſelf in a thouſand ſallies on the ſtage; and at laſt wantonly laid hold of the train of the chief prieſt, in a ſcene where that pontiff was producing a very tragical effect. Mareſchal Villars's lady, who was in the firſt box, inquired who the young man was that had played that trick, as it ſeemed to be done with a view to ruin the piece; and being told that he was the author, ſhe ſent for him into the box, and the attachment he formed from that time to the mareſchal and his lady continued during their lives.

After having finiſhed his Oedipus, but before it had been performed, he began the Henriade; when, with Monſieur de Caumartin, intendant of the finances at St Ange, having one day read ſeveral cantos of his poem when on a viſit to his intimate friend the young preſident de Maiſons, he was ſo teized with objections, that he loſt patience, and threw his manuſcript into the fire. The preſident Henaut with difficulty reſcued it. "Remember (ſaid M. Henaut to him, in one of his letters), it was I that ſaved the Henriade, and that it coſt me a handſome pair of ruffles." Some years after, ſeveral copies of this poem were handed about while it was only a ſketch; and an edition of it with many chaſms was publiſhed under the title of *The League*. All the poets in Paris, and even many of the learned, fell foul of him. The Henriade was played at the fair; and it was inſinuated to the old biſhop of Frejus, preceptor to the king, that it was indecent, and even criminal, to write in praiſe of admiral Coligny and queen Elizabeth. The cabal had intereſt enough to engage cardinal de Biſſi, then preſident of the aſſembly of the clergy, to paſs a judicial cenſure upon the work; but this ſtrange deſign proved abortive. The young author was filled with equal ſurpriſe and reſentment at theſe intrigues. His diſſipation prevented him from making friends among the literati; and he had not the art of combating his enemies with their own weapons, which is ſaid to be abſolutely neceſſary in Paris, if a man wiſhes to ſucceed in any kind of purſuit.

In 1722, he gave the tragedy of Mariamne. That princeſs was poiſoned by Herod. When ſhe drank the cup, the faction cried out, "The queen drinks;" and the piece was damned. Theſe continual mortifications determined him to print the Henriade in England, as he could neither obtain privilege nor patronage for it in France.

Here king Geo. I. and more particularly the princeſs of Wales, afterwards queen of England, raiſed an immenſe ſubſcription for him. Their liberality laid the foundation of his fortune: for on his return to France in 1728, he put his money into a lottery eſtabliſhed by Mr Desforts, comptroller general of the finances. The adventurers received a rent-charge on the *Hotel-de Ville* for their tickets; and the prizes were paid in ready money: ſo that if a ſociety had taken all the tickets, it would have gained 1,000,000 of livres. He joined with a numerous company of adventurers, and was fortunate.

We are afterwards informed of the bad ſucceſs of his Brutus and Zara; and of the refuſal of the academicians to admit him into their ſociety. About this time he became intimately acquainted with the illuſtrious marchioneſs of Chatellet, with whom he ſtudied the principles of Newton, and the ſyſtems of Leibnitz. They retired to Circy, in Champagne, for ſeveral years; two of which Mr Kœnig, an eminent mathematician, paſſed with them. Mr Voltaire cauſed a gallery to be erected, where they performed all the experiments on light and electricity. When he attempted to publiſh his Elements of the Newtonian Philoſophy, a philoſophy then ſcarce known in France, he could not obtain a privilege from the chancellor Agueſſeau, who was a man of univerſal learning, but being bred a Carteſian, diſcouraged the new diſcoveries as much as he could. Our author's attachment to the principles of Newton and Locke, drew upon him a new crowd of enemies. He wrote to Mr Falkner, to whom he dedicated his Zara. "It is believed that the French love novelty, but it muſt be in cookery and faſhions, for as to new truths they are always proſcribed among us; it is only when they grow old that they are well received."

By way of relaxation from his ſtudies in natural philoſophy, he amuſed himſelf in writing his Maid of Orleans. Although this poem was only comic, yet there is much more fancy in it than in the Henriade; but it was vilely diſgraced by ſome ſhameleſs ſcoundrels, who printed it with horrid lewdneſſes. The only good editions are thoſe of Geneva. Not long afterwards, he became acquainted with the celebrated Rouſſeau at Bruſſels; and they ſoon conceived a ſtrong averſion for each other. Rouſſeau having ſhown his antagoniſt a lyric epiſtle addreſſed to poſterity, met with this repartee: "My friend, this letter will never be delivered according to its direction." Rouſſeau never forgave this piece of raillery.

In the year 1738, he commenced a correſpondence with the king, then hereditary prince-royal, of Pruſſia; and in the year 1740 he went to pay his court at Berlin before the king was prepared for invading Sileſia. Soon after his return from Berlin, he wrote the tragedies of Mahomet and Merope. The tragedy of Merope is the firſt piece, not upon a ſacred ſubject, that ſucceeded without the aid of an amorous paſſion, and which procured our author more honour than he hoped from it. It was played on the 26th of February 1743.

Soon after, we ſee him again taking a journey to the king of Pruſſia, who was always inviting him to Berlin, but could never prevail on him to quit his old friends for any conſiderable time. In his journey he performed a ſingular ſervice to the king his maſter; as we ſee by the letters which paſſed between him and Mr Amelot the miniſter of ſtate.

In the year 1749, after the death of the illuſtrious marchioneſs of Chatellet, whom Mr Voltaire had attended to the court of Staniſlaus, the king of Pruſſia gave him an invitation to come and live with him. It was not till towards the end of the month of Auguſt 1750, after having for ſix months combated the opinions of all his friends, who ſtrongly diſſuaded him from going, that we find him reſolved to quit France, and attach himſelf to his Pruſſian majeſty for the reſt of his life. He could not withſtand the letter which the king of Pruſſia wrote to him on the 23d of Auguſt from the apartments deſtined for his future gueſt in the palace of Berlin: a letter which has been often printed, and is univerſally known.

After this letter, the king of Pruſſia aſked the conſent of the king of France, by his miniſter at that court, which was readily granted. Our author was preſented at Berlin with the order of Merit, the key of chamberlain, and a penſion of 20,000 livres. However, he did not give up his houſe at Paris; and by the account of Mr Delaleu the notary, we find that Mr Voltaire was at the expence of 30,000 livres a-year there. He was attached to the king of Pruſſia by the moſt reſpectful regard, as well as by their conformity of taſte. He has a hundred times ſaid, that monarch was as agreeable in company as he was formidable at the head of an army; and that he had never more pleaſing evening-parties at Paris, than thoſe to which that prince would have conſtantly admitted him. His regard for the king of Pruſſia roſe to a degree of enthuſiaſm. His apartments were under the king's, and he never quitted them but to go to ſupper. The king compoſed works in philoſophy, hiſtory, and poetry, in the upper apartments, while his favourite cultivated the ſame arts and the ſame talents in the lower. They communicated their works to one another. The Pruſſian monarch wrote his Memoirs of the Houſe of Brandenburg at Potzdam; and the French author having carried his materials with him, wrote his Age of Lewis XIV. at the ſame place. Thus did his days glide along in tranquillity, enlivened by ſuch agreeable employments.

This happineſs would have been more laſting, if it had not been for a diſpute on a ſubject in mixed mathematics which aroſe between Maupertuis, who likewiſe lived at that time with the king of Pruſſia, and Kœnig librarian to the princeſs of Orange at the Hague. This diſpute was a continuation of that which for a long time had divided the mathematicians about the living and dead forces. The tempers of the diſputants were ſoured; and Maupertuis, who ruled the academy at Berlin, procured a condemnation of Kœnig's opinion in the year 1752, on the authority of a letter of the late Leibnitz, without being able to produce the original of that letter, which however had been ſeen by Mr Wolf. He went ſtill farther—He wrote to the princeſs of Orange, to beg her to diſmiſs Kœnig from his employment of librarian; and repreſented him to the king of Pruſſia as a man who had been wanting in the reſpect due to his Majeſty. Voltaire, who had paſſed two whole years at Circy with

Kœnig, during which he had contracted an intimacy, thought it was his duty openly to eſpouſe the cauſe of his friend. The quarrel became violent; and Maupertuis having reported that Voltaire had ſpoken diſreſpectfully of the king's literary abilities, the latter returned the key of chamberlain, &c. which, however, the king ſent him back.

Soon after his departure from Berlin, he purchaſed the ſeignory of Ferney in the *pays de Gex*, about a league from Geneva. It was here that he undertook the defence of the celebrated family of Calas; and it was not long before he had a ſecond opportunity of vindicating the innocence of another condemned family of the name of *Sirven*. It is ſomewhat remarkable, that in the year 1774, he had the third time a ſingular opportunity of employing that ſame zeal which he had the good fortune to diſplay in the fatal cataſtrophe of the families of Calas and Sirven.

In this retreat M. Voltaire continued long to enjoy the pleaſures of a rural life, accompanied with the admiration of a vaſt number of wits and philoſophers throughout all Europe. Wearied at length, however, with his ſituation, or yielding to the importunities of friends, he came to Paris about the beginning of the year 1778, where he wrote a new tragedy called *Irene*. By this time his underſtanding ſeems to have been impaired, either through the infirmities of age, or continued intoxication by the flattery of others; and he ridiculouſly ſuffered himſelf to be crowned in public with laurel, in teſtimony of his great poetical merit. He did not long ſurvive this farce: for having over-heated himſelf with receiving viſits, and exhauſted his ſpirits by ſupplying a perpetual fund of converſation, he was firſt ſeized with a ſpitting of blood; and at laſt becoming reſtleſs in the night-time, he was obliged to uſe a ſoporific medicine. Of this he unluckily one night took ſo large a doſe, that he ſlept 36 hours, and expired a very ſhort time after awaking from it.

VOLUME, in matters of literature, a book or writing of a juſt bulk to be bound by itſelf. The name is derived from the Latin *volvere*, "to roll up;" the ancient manner of making up books being in rolls of bark or parchment. See Book.

VOLUNTARY, in muſic, a piece played by a muſician extempore, according to his fancy. This is often uſed before he begins to ſet himſelf to play any particular compoſition, to try the inſtrument, and to lead him into the key of the piece he intends to perform.

VOLUNTEERS, perſons who, of their own accord, either for the ſervice of their prince, or out of the eſteem they have for their general, ſerve in the army without being inliſted, to gain honour and preferment, by expoſing themſelves in the ſervice.

VOLVOX, in natural hiſtory, a genus of inſects belonging to the order of vermes zoophyta. The body is round, gelatinous and deſtitute of limbs. For an account of the beroe, a ſpecies of this genus, ſee the article Animalcula, n° 46.

VOLUTA, in natural hiſtory, a genus of inſects belonging to the order of vermes. The animal is of the ſnail kind, with an unilocular ſpiral ſhell, of which there are 46 ſpecies, diſtinguiſhed by peculiarities in their ſhells.

VOLUTE, in architecture, a kind of ſpiral ſcroll uſed in the Ionic and Compoſite capitals, whereof it makes the principal characteriſtic and ornament.

VOMICA, is commonly taken for a ſuppurated impoſthume, or an abſceſs with a ſuppuration. See Medicine, n° 535.

Nux Vomica, in pharmacy, a flat compreſſed round fruit, of the breadth of a ſhilling, or ſomewhat more, and of about the thickneſs of a crown-piece.

It is the nucleus of a fruit of an Eaſt-Indian tree, the wood of which is the *lignum colubrinum* of the ſhops.

Some have preſcribed ſmall doſes of the nux vomica as a ſpecific againſt a gonorrhœa, and others againſt quartan agues. But we have ſo many good and ſafe medicines for all theſe purpoſes, that there ſeems no occaſion for our having recourſe to ſuch as theſe, which ſhow ſo many ſigns of miſchief.

VOMIT. See Emetic.

VOMITING, a retrograde ſpaſmodic motion of the muſcular fibres of the œſophagus, ſtomach, and inteſtines, attended with ſtrong convulſions of the muſcles of the abdomen and diaphragm, which, when gentle, create a nauſea; when violent, a vomiting.

VOORN, one of the iſlands of Holland, bounded by the river Maes, which divides it from the continent and the iſland of Iſſemunde, on the north; by the ſea called the *Bies-boſch*, on the eaſt; by another branch of the Maes, which divides it from the iſlands of Goree and Overflackee, on the ſouth; and by the German ſea on the weſt; being about 24 miles long, and 5 broad.

VORTEX, in meteorology, a whirlwind, or ſudden, rapid, and violent motion of the air in gyres, or circles.

Vortex is alſo uſed for an eddy or whirlpool; or a body of water, in certain ſeas or rivers, which run rapidly around, forming a ſort of cavity in the middle.

Vortex, in the Carteſian philoſophy, is a ſyſtem or collection of particles of matter moving the ſame way, and round the ſame axis.

Such vortices are the grand machines whereby thoſe philoſophers ſolve moſt of the motions and other phenomena of the heavenly bodies. Accordingly, the doctrine of theſe vortices make a great part of the Carteſian philoſophy.

VOSSIUS (John Gerard), one of the moſt learned and laborious writers of the 17th century, was of a conſiderable family in the Netherlands; and was born in 1577, in the Palatinate, near Heidelberg, at a place where his father, John Voſſius, was miniſter. He became well ſkilled in polite literature, hiſtory, and ſacred and profane antiquities, and was made director of the college of Dort. He was at length made profeſſor of eloquence and chronology at Leyden, from whence he was called in 1633 to Amſterdam, to fill the chair of a profeſſor of hiſtory. He died in 1649. He wrote many learned works, of which a complete edition has been printed at Amſterdam, in 9 vols folio.

Vossius (Iſaac), a man of great parts and learning, the ſon of John Gerard Voſſius, was born at Leyden in 1618. He had no other tutor but his father, and employed his whole life in ſtudying: his merit recommended him to a correſpondence with queen Chriſtina of Sweden; he made ſeveral journeys into Sweden

den by her order, and had the honour to teach her the Greek language. In 1670 he came over to England, where king Charles made him canon of Windſor; tho' he knew his character well enough to ſay, That there was nothing that Voſſius refuſed to believe, excepting the Bible. He appears indeed by his publications, which are neither ſo uſeful nor ſo numerous as his father's, to have been a moſt credulous man, while he afforded many circumſtances to bring his religious faith in queſtion. He died at Windſor caſtle in 1688.

VOTE, the ſuffrage or reſolve of each of the members of an aſſembly, where any affair is to be carried by a majority; but more particularly uſed for the reſolves of the members of either houſe of parliament.

VOTIVE MEDALS, thoſe on which are expreſſed the vows of the people for the emperors or empreſſes. See MEDAL.

VOW, a ſolemn and religious promiſe, or oath. See OATH.

The uſe of vows is found in moſt religions. They make up a conſiderable part of the Pagan worſhip, being made either in conſequence of ſome deliverance, under ſome preſſing neceſſity, or for the ſucceſs of ſome enterpriſe. Among the Jews, all vows were to be voluntary, and made by perſons wholly in their own power; and if ſuch perſon made a vow in any thing lawful and poſſible, he was obliged to fulfil it. If he appointed no particular time for accompliſhing his vow, he was bound to do it inſtantly, leſt by delay he ſhould prove leſs able, or be unwilling, to execute his promiſe. Among the Romaniſts, a perſon is conſtituted a religious by taking three vows; that of poverty, chaſtity, and obedience.

Vows, among the Romans, ſignified ſacrifices, offerings, preſents, and prayers made for the Cæſars and emperors, particularly for their proſperity and the continuance of their empire. Theſe were at firſt made every 5 years, then every 15, and afterwards every 20, and were called *quinquennalia*, *decennalia*, and *vincennalia*.

VOWEL, in grammar, a letter which affords a complete ſound of itſelf, or a letter ſo ſimple as only to need a bare opening of the mouth to make it heard, and to form a diſtinct voice.

The vowels are ſix in number, *viz.* A, E, I, O, U, Y, and are called *vowels*, in contradiſtinction to certain other letters, which, depending on a particular application of ſome part of the mouth, as the teeth, lips, or palate, can make no perfect ſound without an opening of the mouth, that is, without the addition of a vowel, and are therefore called *conſonants*.

VOWEL (John). See HOOKER.

UPHOLSTER, UPHOLSTERER, or *Upholder*, a tradeſman that makes beds, and all ſorts of furniture thereunto belonging, &c.

UPLAND, denotes high ground, or, as ſome call it, *terra firma*, by which it ſtands oppoſed to ſuch as is mooriſh, marſhy, or low.

UPLAND, a province of Sweden, bounded on the north-eaſt by the Baltic Sea, on the ſouth by the ſea of Sudermania, and on the weſt by Weſtmania and Geſtricia, from which it is ſeparated by the river Dela. It is about 70 miles in length and 45 in breadth, and contains mines of iron and lead. Stockholm is the capital.

UPSAL, a rich and conſiderable city of Sweden, in Upland, with a famous univerſity, and an archbiſhop's ſee. The town is pretty large, and as ſtraight as a line; but moſt of the houſes are of wood, covered with birch-bark, with turf on the top. On an eminence, to the ſouth of the town, is a ruined caſtle. Thoſe that view the town from hence would take it to be a garden, whoſe ſtreets repreſent the alleys; and the houſes, which are covered with turf, the graſs-plats. It was formerly the reſidence of the kings, and is now the uſual place where they are crowned. It is ſeated on the river Sala, over which there are two bridges. It is 27 miles north-weſt of Stockholm. E. Lon. 17. 56. N. Lat. 60. 10.

UPUPA, in ornithology, a genus belonging to the order of picæ. The beak is arcuated, convex, and ſomething blunt; the tongue is obtuſe, triangular, entire, and very ſhort; and the feet are fitted for walking. There are two ſpecies; both natives of India. The epops, hoopoe, or dung-bird, is frequently ſeen in Britain. It may be readily diſtinguiſhed from all others that viſit theſe iſlands by its beautiful creſt, which it can erect or depreſs at pleaſure. It is in length 12 inches; in breadth, 19: the bill is black, two inches and a half long, ſlender, and incurvated; the irides are hazel: the creſt conſiſts of a double row of feathers; the higheſt about two inches long; the tips are black, their lower part of a pale orange colour: the neck is of a pale reddiſh brown; the breaſt and belly white; the leſſer coverts of the wings are of a light brown; the back, ſcapulars, and wings, croſſed with broad bars of white and black; the rump is white; the tail conſiſts of only 10 feathers, white marked with black, in form of a creſcent, the horns pointing towards the end of the feathers. The legs are ſhort and black; the exterior toe is cloſely united at the bottom to the middle toe.

According to Linnæus, it takes its name from its note, which has a ſound ſimilar to the word; or it may be derived from the French *huppe*, or "creſted:" it breeds in hollow trees, and lays two aſh-coured eggs; it feeds on inſects, which it picks out of ordure of all kinds: the ancients believed that it made its neſt of human excrement; ſo far is certain, that its hole is exceſſively fetid from the tainted food it brings to its young. The country people in Sweden look on the appearance of this bird as a preſage of war;

———————*Facies armata videtur.*

And formerly the vulgar in our own country eſteemed it a forerunner of ſome calamity. It viſits theſe iſlands frequently; but not at ſtated ſeaſons, neither does it breed with us. It is found in many parts of Europe, in Egypt, and even as remote as Ceylon. The Turks call it *tir chaous*, or the "meſſenger-bird," from the reſemblance its creſt has to the plumes worn by the chaous or Turkiſh couriers.

Ovid ſays that Tereus was changed into this bird:

Vertitur in volucrem, cui ſtant in vertice criſtæ,
Prominet immodicum pro longa cuſpidæ roſtrum:
Nomen epops volucri. Metam. lib. vi. l. 672.

Tereus, through grief and haſte to be reveng'd,
Shares the like fate, and to a bird is chang'd.
Fix'd on his head the creſted plumes appear.
Long is his beak, and ſharpen'd as a ſpear. *Croxall.*

UR (anc. geog.), a citadel of Meſopotamia, ſituate between the Tigris and Niſibis; taken by ſome for Ur of the Chaldees, the reſidence of Abraham. What ſeems to confirm this is, that from Ur to Haran, the other reſidence of the patriarch, the road lies directly for Paleſtine. And it is no objection that Ur is ſaid to be in Meſopotamia; becauſe the parts next the Tigris were occupied by the Chaldeans, as ſeems to be confirmed from Acts vii. 2, 4. It is called *Orche*, in Strabo; *Orchoe*, in Ptolemy.

URANBURG, or **Uraniburg**, a caſtle of Denmark, ſituated on the little iſland of Huen, in the Sound, 16 miles north-eaſt of Copenhagen. Here was the celebrated obſervatory built by that noble Dane Tycho Brahe, and furniſhed with inſtruments for obſerving the courſe and motions of the heavenly bodies.

URANIA, in fabulous hiſtory, one of the nine Muſes, was ſuppoſed to preſide over aſtronomy. She is commonly repreſented in an azure robe, crowned with ſtars, and ſupporting a large globe with both hands.

URANOSCOPUS, in ichthyology, a genus belonging to the order of jugulares. The head is large, rough, and depreſſed, the upper jaw being ſhorter than the under one; there are five dentated rays in the membrane of the gills; and the anus is in the middle of the body. There is but one ſpecies, found in the Mediterranean ſea.

URBINO, a province of Italy, in the pope's territory, bounded by Romania and the gulph of Venice on the north and eaſt, by the marquiſate of Ancona on the ſouth, and by Tuſcany on the weſt, being 70 miles long, and from 20 to 50 broad.

Urbino is alſo the capital of this province.

URCHIN, in zoology. See Echinus.

URETERS, in anatomy. See Anatomy, n° 363.

URETHRA, in anatomy. See Anatomy, n° 371, f.

URIM *and* **Thummim**, among the ancient Hebrews, a certain oracular manner of conſulting God, which was done by the high-prieſt dreſſed in his robes, and having on his pectoral or breaſt-plate.

Various have been the ſentiments of commentators concerning the urim and thummim. Joſephus, and ſeveral others, maintain, that it meant the precious ſtones ſet in the high-prieſt's breaſt-plate, which by extraordinary luſtre made known the will of God to thoſe who conſulted him. Spencer believes that the urim and thummim were two little golden figures ſhut up in the pectoral as in a purſe, which gave reſponſes with an articulate voice. In ſhort, there are as many opinions concerning the urim and thummim as there are particular authors that wrote about them. The ſafeſt opinion, according to Broughton, ſeems to be, that the words *urim* and *thummim* ſignify ſome divine virtue and power annexed to the breaſt-plate of the high-prieſt, by which an oraculous anſwer was obtained from God when he was conſulted by the high-prieſt; and that this was called *urim* and *thummim*, to expreſs the clearneſs and perfection which theſe oracular anſwers always carried with them; for urim ſignifies "light," and thummim "perfection:" theſe anſwers not being imperfect and ambiguous, like the heathen oracles, but clear and evident. The uſe made of the urim and thummim was to conſult God in difficult caſes relating to the whole ſtate of Iſrael; and ſometimes in caſes relating to the king, the ſanhedrim, the general of the army, or ſome other great perſonage.

URINAL, in medicine, a veſſel fit to receive and hold urine, and uſed accordingly for the convenience of ſick perſons. It is uſually of glaſs, and crooked; and ſometimes it is filled with milk, to aſſuage the pain of the gravel.

Urinal, in chemiſtry, is an oblong glaſs veſſel, cloſed for making ſolutions, and ſo called from its reſemblance to the glaſſes in which urine is ſet to ſettle for the inſpection of the phyſician.

URINE, a ſerous and ſaline fluid, of a citron colour, ſeparated from the blood, and carried by the emulgent arteries to the kidneys, from whence it deſcends to the bladder by the ureters, and is from time to time emitted thence by the canal of the urethra. See Anatomy, n° 365. For the analyſis of urine, ſee Chemistry, n° 308.

URN, a kind of vaſe, of a roundiſh form, but biggeſt in the middle, like the common pitchers, now ſeldom uſed but in the way of ornament over chimney-pieces, in buffets, &c. The great uſe of urns among the ancients, was to preſerve the aſhes of the dead after they were burnt; for which reaſon they were called *cineraria*, and *urnæ cinerariæ*, and were placed ſometimes under the tomb-ſtone whereon the epitaph was cut; and ſometimes in vaults in their own houſes. Urns were alſo uſed at their ſacrifices to put liquid things in.

UROGALLUS, in ornithology. See Tetrao.

URSA, in aſtronomy. See Astronomy, n° 206.

URSULINES, in church-hiſtory, an order of nuns, founded originally by St Angela of Breſcia, in the year 1537; and ſo called from St Urſula, to whom they were dedicated. They obſerve the rules of St Auguſtine, and are chiefly noted for taking on them the education and inſtruction of young maids: their monaſteries are a kind of ſchools where young ladies of the beſt families receive their education.

URSUS, the bear; a genus of quadrupeds belonging to the order of feræ. There are ſix fore-teeth in the upper jaw, alternately hollow in the inſide, and ſix in the under jaw, the two lateral ones being lobated. The dog-teeth are ſolitary and conical; the eyes are furniſhed with a nictitating membrane; the noſe is prominent; and there is a crooked bone in the penis. There are five ſpecies, *viz.*

1. The urſus cauda abrupta, has ſtrong, thick, and clumſy limbs; very ſhort tail; large feet; body covered with very long and ſhaggy hair, various in its colour: It inhabits the north parts of Europe and Aſia; the Alps of Switzerland, and Dauphine; Japan and Ceylon; North America and Peru. The brown bears are ſometimes carnivorous, and will deſtroy cattle, and eat carrion; but their general food is roots, fruits, and vegetables: they will rob the fields of peaſe; and when they are ripe, pluck great quantities up, beat the peaſe out of the huſks on ſome hard place, eat them, and carry off the ſtraw: they will alſo, during winter, break into the farmer's yard, and make great havock among his ſtock of oats; they are alſo particularly fond of honey. The bears of America are ſmall and black, and confine themſelves entirely to vegetables: they are remarkably greedy of maiz and potatoes; and will even reject animal-food, though preſſed by hunger: neither of theſe varieties

will attack mankind, unleſs wounded, or when they have their young: they ſtrike with their fore-feet like a cat; ſeldom or never uſe their mouths in fighting, but ſeizing the aſſailant with their paws, and preſſing him againſt their breaſt, almoſt inſtantly ſqueeze him to death. The females after conception retire into the moſt ſecret places; leſt, when they bring forth, the males ſhould devour the young: it is affirmed, that out of the ſeveral hundred bears that are killed in America, during winter, (which is their breeding ſeaſon), ſcarce a female is found among them; ſo impenetrable is their retreat during their pregnancy: they bring two, rarely three, young at a time: the cubs are deformed, but not a ſhapeleſs maſs to be licked into ſhape, as the ancients pretended. The fleſh of a bear in autumn, when they are exceſſively fat, by feeding on acorns, and other maſt, is delicate food; and that of the cubs ſtill finer; but the paws of the old bears are reckoned the moſt exquiſite morſel; the fat white, and very ſweet; the oil excellent for ſtrains and old pains. The latter end of autumn, after they have fattened themſelves to the greateſt degree, the bears withdraw to their dens, where they continue for a great number of days in total inactivity, and abſtinence from food, having no other nouriſhment than what they get by ſucking their feet, where the fat lodges in great abundance; their retreats are either in cliffs of rocks, in the deepeſt receſſes of the thickeſt woods, or in the hollows of ancient trees, which they aſcend and deſcend with ſurpriſing agility: as they lay in no winter-proviſions, they are in a certain ſpace of time forced from their retreats by hunger, and come out extremely lean: multitudes are killed annually in America, for the ſake of their fleſh or ſkins; which laſt makes a conſiderable article of commerce.

2. The polar, or white bear, has a long head and neck; ſhort round ears; great teeth; the hair long, ſoft, and white, tinged in ſome parts with yellow: growing to a vaſt ſize; the ſkins of ſome being 13 feet long.

This animal is confined to the coldeſt part of the globe; it has been found as far as navigators have penetrated northwards, above lat. 80. The frigid climes only ſeem adapted to its nature; for we do not learn from any authority that it is met with farther ſouth than Newfoundland. Its bounds in reſpect to longitude are alſo very limited; being an animal unknown except on the ſhores of Hudſon's Bay, Greenland, and Spitzbergen, on one ſide, and thoſe of Nova Zembla on the other; for ſuch as have appeared in other parts have been brought there involuntarily on floating iſlands of ice; ſo that the intermediate countries of Norway and Iceland are acquainted with them but by accident. We cannot trace them farther eaſt than Nova Zembla; though the frozen ſea, that is continued from thence as far as the land of Tſchukſchi, that lies above Kamtſchatka, is equally ſuited to their nature. The late hiſtories of thoſe countries are ſilent in reſpect to them.

During ſummer, the white bears are either reſident on iſlands of ice, or paſſing from one to another: they ſwim admirably, and can continue that exerciſe ſix or ſeven leagues, and dive with great agility. They bring two young at a time: the affection between the parents and them is ſo ſtrong, that they would die rather than deſert one another. Their winter retreats are under the ſnow, in which they form deep dens, ſupported by pillars of the ſame. They feed on fiſh, ſeals, and the carcaſes of whales, and on human bodies, which they will greedily tear up: they ſeem very fond of human blood; and are ſo fearleſs as to attack companies of armed men, and even to board ſmall veſſels. When on land, they live on birds and their eggs; and allured by the ſcent of ſeals fleſh, often break into and plunder the houſes of the Greenlanders: their greateſt enemy in the brute creation is the morſe, with whom they have terrible conflicts, but are generally worſted, the vaſt teeth of the former giving it a ſuperiority. The fleſh is white, and ſaid to taſte like mutton: the fat is melted for train-oil, and that of the feet uſed in medicine: but the liver is very unwholeſome, as three of Barentz's ſailors experienced, who fell dangerouſly ill on eating ſome of it boiled. One of this ſpecies was brought over to England a few years ago; it was very furious, almoſt always in motion, roared loud, and ſeemed very uneaſy, except when cooled by having pailfulls of water poured on it.

3. The luſcus, or wolverene, has a black ſharp pointed viſage; ſhort rounded ears, almoſt hid in the hairs; the ſides of a yellowiſh brown, which paſſes in form of a band quite over the hind-part of the back, above the tail; the legs are very ſtrong, thick and ſhort, of a deep black: the whole body is covered with very long and thick hair, which varies in colour according to the ſeaſon. It inhabits Hudſon's Bay and Canada, as far as the ſtraits of Michilimakinac; is found under the name of the *glutton* in the north parts of Europe and Aſia, being a native of the moſt rigorous climates.

It is a moſt voracious animal, and ſlow of foot; ſo is obliged to take its prey by ſurpriſe. In America it is called the *beaver-eater*, watching thoſe animals as they come out of their houſes, and ſometimes breaks into their habitations, and devours them. It often lurks on trees, and falls on the quadrupeds that paſs under; will faſten on the horſe, elk, or ſtag, and continue eating a hole into its body, till the animal falls down with the pain; or elſe will tear out its eyes: no force can diſengage it; yet ſometimes the deer in their agony have been known to deſtroy it, by running their head violently againſt a tree. It devours the iſatis, or white fox; ſearches for the traps laid for the ſables and other animals; and is often beforehand with the huntſmen, who ſuſtain great loſſes by the glutton: authors have pretended that it feeds ſo voraciouſly, that at length it is in danger of burſting; and that it is obliged to eaſe itſelf of its load, by ſqueezing it out between two trees.

In a wild ſtate, it is vaſtly fierce; a terror to both wolf and bear, which will not prey on it when they find it dead, perhaps on account of its being ſo very fetid, ſmelling like a pole-cat: it makes a ſtrong reſiſtance when attacked; will tear the ſtock from the gun, and pull the traps it is caught in to pieces. Notwithſtanding this, it is capable of being tamed, and of learning ſeveral tricks; burrows, and has its den under ground. The ſkin is ſold in Siberia for 4s. or 6s.; at Jakutſk for 12s.; and ſtill dearer at Kamtſchatka, where the women dreſs their hair with its white paws, which they eſteem a great ornament. The fur is greatly eſteemed in Europe: that of the north of Europe and Aſia, whoſe ſkins are ſometimes to be ſeen in the furriers ſhops, is much finer, blacker, and more gloſſy than that of the wolverene, or American kind. The glutton has by ſome authors been confounded with the hyæna.

4. The lotor, or raccoon, has the upper part of the body covered with hair, aſh-coloured at the root, whitiſh in the middle, and tipped with black; tail very buſhy, annulated with black; toes black, and quite divided.—It inhabits the warm and temperate parts of America; is found alſo in the mountains of Jamaica, and in the iſles of Maria, between the ſouth point of California and Cape Corientes, in the South Sea: is eaſily made tame, very good-natured and ſportive; bus as unlucky as a monkey. It is almoſt always in motion; and very inquiſitive, examining every thing with itt paws. It makes uſe of them as hands; ſits up to eat; is extremely fond of ſweet things, and ſtrong liquors, and will get exceſſively drunk. It has all the cunning of a fox; and is very deſtructive to poultry; but will eat all ſorts of fruits, green corn, &c. At low water it feeds much on oyſters, and will watch their opening, and with its paw ſnatch out the fiſh; it ſometimes is caught in the ſhell, and kept there till drowned by the coming in of the tide: it is alſo fond of crabs. It climbs very nimbly up trees. It is hunted for its ſkin; the fur next to that of the beaver for making hats.

5. The meles, or common badger, is an animal of a very clumſy make, with ſhort thick legs, long claws on the fore-feet, and a fetid white matter exuding from the orifice below the tail. It inhabits moſt parts of Europe, as far north as Norway and Ruſſia, and the ſtep or deſart beyond Orenburgh, in the Ruſſian Aſiatic dominions, north of the Caſpian Sea: inhabits alſo China, and is often found in the butchers ſhops in Pekin, the Chineſe being fond of them; but a ſcarce animal in moſt countries. It ſeldom appears in the day; confines itſelf much to its hole: is indolent and ſleepy; generally very fat: feeds by night; eats roots, fruits, graſs, inſects, and frogs; but is not carnivorous: it runs ſlowly; when overtaken, it comes to bay, and defends itſelf vigorouſly; its bite is dangerous. It burrows under ground; makes ſeveral apartments, but forms only one entrance from the ſurface. It is hunted during night for the ſkin, which ſerves for piſtol-furniture; the hairs for making bruſhes to ſoften the ſhades in painting. Its fleſh makes good bacon.

URTICA, the NETTLE; a genus of the tetrandria order, belonging to the monoecia claſs of plants.

1. The urens, or leſſer ſtinging nettle, grows in waſte places, on dunghills, &c. The ſtings or prickles of this are very numerous and inflammatory; the leaves of a roundiſh oval figure, and light green colour: the male and female flowers grow in different parts of the ſame plant, in crowded oblong green cluſters, erect, nearly ſeſſile in the alæ of the leaves. The ſtings are very curious microſcopic objects: they conſiſt of an exceedingly fine pointed tapering hollow ſubſtance, with a perforation at the point, and a bag at the baſe. When the ſpring is preſſed upon, it readily perforates the ſkin, and at the ſame time forces up ſome of the acrimonious liquor contained in the bag into the wound.

2. The dioica, or common ſtinging nettle, grows plentifully in waſte places, and under hedges. The male and female flowers grow on diſtinct plants; the cluſters branched, and generally in pairs. The aculei, or ſtings of the nettle, have a ſmall bladder at their baſe, full of a burning corroſive liquor: when touched, they excite a bliſter, attended with a violent itching pain, though the ſting does not appear to be tubular, or perforated at the top, nor any viſible liquor to be infuſed into the puncture made by it in the fleſh. It ſeems certain, however, that ſome of this liquor is inſinuated into the wound, though inviſibly, ſince the ſtings of the dried plant excite no pain. The chives afford a very pleaſing appearance: they are rolled inwards under the ſegments of the cup, which fold over them them till they are ripe, when the ſegments gradually expanding, the chives releaſed from their confinement, roll back with an elaſtic force, and diſcharge the contents of their tranſparent tips which float in the air like a cloud of duſt, that it may ariſe to the ſummits of the fertile flowers.

Nettle-tops in the ſpring are often boiled and eaten by the common people inſtead of cabbage-greens.

In Arran, and other iſlands, a rennet is made of a ſtrong decoction of nettles: a quart of ſalt is put to three pints of the decoction, and bottled up for uſe. A common ſpoonful of this liquor will coagulate a large bowl of milk very readily and agreeably. The ſtalks of nettles are ſo like in quality to hemp, that in ſome parts of Europe and Siberia they have been manufactured into cloth, and paper has been made of them. The whole plant, particularly the root, is eſteemed to be diuretic, and has been recommended in the jaundice and nephritic complaints. It is alſo reckoned aſtringent; and of ſervice in all kinds of hæmorrhagies, but is at preſent but little in practice. The roots boiled will dye yarn of a yellow colour. The larvæ, or caterpillars of many ſpecies of butterflies, feed on the green plant; and ſheep and oxen will readily eat the dried.

URTICA *Marina*. See ANIMAL-*Flower*.

USANCE, in commerce, is a determinate time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called becauſe regulated by the uſage and cuſtom of the places whereon they are drawn.

USE, in law, the profit or benefit of lands and tenements; or a truſt and confidence repoſed in a perſon for the holding of lands, &c. that he to whoſe uſe the truſt is made ſhall receive the profits.

USHANT, an iſland of France, 15 miles weſt of the coaſt of Britany, at the entrance of the Britiſh channel.

USHER (James), archbiſhop of Armagh, one of the moſt illuſtrious prelates in the 17th century, as well with reſpect to his piety and other virtues, as his uncommon erudition, was born in Dublin in 1580, and it is ſaid that two of his aunts taught him to read, though they were both born blind. Dublin college being finiſhed in 1593, he was one of the three firſt ſtudents admitted into it. He made ſo ſwift a progreſs in his ſtudies, that at eighteen years of age he was able to diſpute with Henry Fitz-Simon, a famous Jeſuit, who challenged all the Proteſtant clergy; and defended his cauſe ſo well in the caſtle of Dublin, that he made him repent his challenge. He was ordained prieſt in 1601, and ſoon after was appointed to preach conſtantly before the court at Chriſt church in Dublin, Uſher.

on Sundays in the afternoon. In 1603, he was ſent over to England with Dr Luke Challoner, in order to purchaſe books for the library of Dublin. In 1607, he took the degree of bachelor of divinity; ſoon after, he was made chancellor of St Patrick's cathedral, and the ſame year was choſen profeſſor of divinity, when he made choice of Bellarmine's controverſies for the ſubject of his lectures. Some years after, he made it a conſtant cuſtom to come over to England once in three years, ſpending one month of the ſummer at Oxford, another at Cambridge, and the reſt of the time at London. In 1612, he took the degree of doctor of divinity; at the latter end of the year 1620, he was promoted to the biſhopric of Meath, and in 1625 was made archbiſhop of Armagh. In the adminiſtration of his archbiſhopric he acted in a very exemplary manner, and endeavoured to reform the clergy and officers in the eccleſiaſtical courts. In 1640, he came over to England wish his family, with an intention ſoon to return to Ireland; but was prevented by the rebellion which broke out there in 1641; and in that rebellion he was plundered of every thing, except his library, which was in England, and ſome furniture in his houſe at Drogheda. His majeſty, therefore, conferred on him the biſhopric of Carliſle, to be held *in commendam*: the revenues of which were greatly leſſened by the Scots and Iriſh armies quartering upon it; but when all the lands belonging to the biſhoprics in England were ſeized by the parliament, they voted him a penſion of 400 l. *per annum*, though he never received it above once or twice. He afterwards removed to Oxford; and, in 1643, was nominated one of the aſſembly of divines at Weſtminſter, but refuſed to ſit amongſt them; which, together with ſome of his ſermons at Oxford, giving offence to the parliament, they ordered his ſtudy of books, of conſiderable value, to be ſeized; but by the care of Dr Featly, one of the aſſembly, they were ſecured for the primate's uſe. The king's affairs declined; and Oxford being threatened with a ſiege, he left that city and retired to Cardiff in Wales, to the houſe of Sir Timothy Tyrrel, who had married his only daughter, and was then governor and general of the ordnance. He was afterwards invited to London by the counteſs of Peterborough. In 1647, he was choſen preacher in Lincoln's Inn; and during the treaty in the Iſle of Wight, he was ſent for by the king, who conſulted him about the government of the church. The death of his majeſty ſtruck him with great horror. The counteſs of Peterborough's houſe, where the primate then lived, being juſt over-againſt Charing-Croſs, ſeveral of her gentlemen and ſervants went up to the leads of the houſe, whence they could plainly ſee what was acting before Whitehall. As ſoon as his majeſty came upon the ſcaffold, ſome of the houſehold told the primate of it; and aſked him, whether he would ſee the king once more, before he was put to death. He was at firſt unwilling, but at laſt went up; where, as the ceremonial advanced, the primate grew more and more affected; and, when the executioners in vizards began to put up the king's hair, he ſwooned away; and being carried to his bed, is ſaid to have propheſied what happened in England ever ſince. He died of a pleuriſy, in 1655; and was ſolemnly buried at Weſtminſter, in St Eraſmus's chapel. He publiſhed, 1. *Britannicarum Eccleſiarum Antiquitates*. 2. *Polycarpi et Ignatii Epiſtolæ, Græce Latine*, &c. 3. Annals of the Old and New Teſtament, in Latin. 4. *De Græce Septuaginta interpretum Verſione Syntagma*; and many other books which are eſteemed. A conſiderable number of his works ſtill remain in manuſcript.

Uſher ‖ Uſury.

USHER, an officer or ſervant who has the care and direction of the door of a court, hall, chamber, or the like.

USHER *of the Black Rod*, the eldeſt of the gentlemen uſhers, daily waiters at court, whoſe duty is to bear the rod before the king at the feaſt of St George and other ſolemnities.

USK, a river of Wales, which riſes on the weſt of Brecknockſhire, and runs ſouth-eaſt through that county and Monmouthſhire, falling into the mouth of the Severn.

USQUEBAUGH, a ſtrong compound liquor, chiefly taken by way of dram.

There are ſeveral different methods of making this liquor; but the following is eſteemed one of the beſt: To two gallons of brandy, or other ſpirits, put a pound of Spaniſh liquorice, half a pound of raiſins of the ſun, four ounces of currants, and three of ſliced dates; the tops of baum, mint, ſavory, thyme, and tops of the flowers of roſemary, of each two ounces; cinnamon and mace, well bruiſed, nutmegs, aniſeeds, and coriander-ſeeds, bruiſed likewiſe, of each four ounces; of citron or lemon, and orange-peel, ſcraped, of each an ounce; let all theſe infuſe 48 hours in a warm place, often ſhaking them together; then let them ſtand in a cool place for a week; after which the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white port, and a gallon of canary; after which it is to be ſweetened with a ſufficient quantity of double-refined ſugar.

USTION, in pharmacy, the preparing of certain ſubſtances by burning them.

USUFRUIT, in the civil law, the uſe of enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating or changing the property thereof.

USURER, a perſon charged with a habit or act of uſury. See USURY.

USURIOUS CONTRACT, is any bargain or contract whereby a man is obliged to pay more intereſt for money than the ſtatute allows.

USURPATION, in law, is an injurious uſing or enjoyment of a thing for continuance of time, that belongs of right to another.

USURY, an unlawful contract upon the loan of money, to receive the ſame again with exorbitant increaſe. Under the article INTEREST, it was obſerved, that by ſtatute 37 Hen. VIII. c. 9. the rate of intereſt was fixed at 10 l. *per cent. per annum*: which the ſtatute 13 Eliz. c. 8. confirms, and ordains, that all brokers ſhall be guilty of a *præmunire* that tranſact any contracts for more, and the ſecurities themſelves ſhall be void. The ſtatute 21 Jac. I. c. 17. reduced intereſt to 8 l. *per cent.*; and it having been lowered in 1650, during the uſurpation, to 6 *per cent.* the ſame reduction was re-enacted after the reſtoration by ſtatute 12 Car. II. c. 13. and, laſtly, the ſtat. 12 Ann.

ſt. 2. c. 16. has reduced it to 5 *per cent.* Wherefore not only all contracts for taking more are in themſelves totally void, but alſo the lender ſhall forfeit treble the money borrowed. Alſo if any ſcrivener or broker takes more than 5 s. *per cent.* procuration-money, or more than 12 d. for making a bond, he ſhall forfeit 20 l. with coſts, and ſhall ſuffer impriſonment for half a year.

UTERUS, in anatomy. See there, n° 372, g.

UTICA (anc. geog.), a town of Africa Propria, on the Mediterranean: a Tyrian colony, and older than Carthage, (Sil. Italicus); its name, according to Bochart, denoting *old:* reckoned ſecond to it; but after the deſtruction of Carthage, became the capital and centre of all the Roman tranſactions in Africa, according to Strabo; who adds, that it ſtood on the ſame bay with Carthage, at one of the promontories called *Apollonium,* bounding the bay on the weſt ſide, the other to the eaſt called *Hermeia,* being at Carthage. It became famous by the death of Cato, who thence was called *Uticenſis.* Now called *Biſerta,* or a town near the ſpot on which Utica ſtood, in the kingdom of Tunis. E. Long. 9° Lat. 37°.

UTRECHT, one of the ſeven United Provinces, or States of Holland, wholly ſurrounded by Holland and Guelderland, excepting a ſmall part of it that borders on the Zuyder-Zee. Its greateſt length is about 32 miles, and breadth about 22. It enjoys a good air; and in moſt places the ſoil is fruitful, but in ſome ſandy, or what is called *turf-ground,* and in others over-run with wood. It is watered by the Leck, Rhine, Vecht, and other ſmaller rivers, beſides ſeveral canals; of which that extending from the village of Vreeſwyk to Utrecht is one of the chief. The ſtates here, as in the other provinces, are compoſed of the nobility and the towns; the latter of which are Utrecht, Amersfoort, Wyk, Rhenen, and Montfoort; but Utrecht bears the chief ſway. The biſhops of that city were anciently temporal lords of the province, as well as of Overyſſel, till Henry of Bavaria ſold the ſovereignty thereof to Charles V. In 1559 the ſee of Utrecht was raiſed to an archbiſhopric by Philip II. of Spain. In 1579 it acceded to the alliance of the other provinces, and became a free ſtate. The provincial ſtates are compoſed of 22 members, and three deputies are ſent by them to the aſſembly of the States-general. The eſtabliſhed clergy are divided into three claſſes, making 79 miniſters, of whom a ſynod is held once a year at Utrecht.

UTRECHT, or, Latin, *Ultrajectum, Trajectum vetus* or *inferius,* or *Trajectum Rheni,* capital of a province of the ſame name, ſo called from its ancient ferry or paſſage here over the Rhine; the word being compounded of *trecht,* which in Dutch ſignifies a "ferry," and *oud* or *olt,* i. e. "old." It is a fair, large, and populous city, the capital of the province, and the ſeat of the ſtates, ſituated 19 miles from Amſterdam, 25 from Rotterdam, and 27 from Leyden. There were ſeveral large and rich monaſteries, and other religious houſes here, before the Reformation. The churches are magnificent, eſpecially that of St Martin, formerly the cathedral, and uſually called the *dome.* Over that of St Salvador or the old minſter, where the Britiſh have a place of worſhip, is a muſeum of all ſorts of antiques and rarities. Here is a ſtately town-houſe, with a commandery of the Teutonic order, and a celebrated univerſity, which was founded in 1630, ſince which it hath flouriſhed greatly, though it has not all the privileges of moſt other univerſities; being wholly ſubject to the magiſtrates of the city. The mall without the town, having five rows of lofty limes on each ſide, is very pleaſant; and the phyſic-garden belonging to the univerſity, is extremely curious. There are five churches here that have chapters; but the members of theſe purchaſe the places, of which ſome coſt 6000 or 7000 guilders. The ſtreams which run through ſeveral of the ſtreets, contribute much to the beauty and cleanlineſs of the town; and the canal that is cut from the Leck, and paſſes through it to Amſterdam, will carry ſhips of any burden. Pope Adrian VI. was a native of this city. Here, in 1579, the memorable union was formed between the ſeven provinces; and, in 1713, the celebrated peace concluded between France on the one part, and the allies on the other. The Papiſts have a nominal archbiſhop of this city; and there is a ſilk manufactory carried on in it, which employs a number of hands.

VULCAN, in Pagan worſhip, the god of ſubterraneous fire and metals, was the ſon of Jupiter and Juno; and was ſaid to be ſo remarkably deformed, that his father threw him down from heaven to the iſle of Lemnos, in which fall he broke his leg, and there he ſet up his forge, and taught men how to ſoften and poliſh braſs and iron. Thence he removed to the Liparian iſles, near Sicily, where, by the aſſiſtance of the Cyclops, he made Jupiter's thunder-bolts, and armour for the other gods. Nothwithſtanding the deformity of his perſon, he had a paſſion for Minerva, and by Jupiter's conſent made his addreſſes to her, but without ſucceſs. He was, however, more fortunate in his ſuit to Venus; who, after her marriage, choſe Mars for her gallant; when Vulcan expoſed them to the ridicule of the other gods, by taking them in a net.

He had ſeveral names: that of *Lemnius,* from the iſle of Lemnos; *Mulciber,* or *Mulcifer,* from his art of ſoftening ſteel and iron; and (among the Greeks) *Hephaiſtos,* from his delighting in flames. In the ancient medals of the Greeks and Romans, he is repreſented as a lame, deformed, and ſqualid man, working at the anvil, and attended by the Cyclops, or by ſome other god or goddeſs who comes to his aſſiſtance. But the Egyptians repreſented him as proceeding out of an egg placed in the mouth of Jupiter, to expreſs the radical and natural heat diffuſed through all created beings.

It was cuſtomary with many nations after a victory, to gather the enemies arms in a heap, and offer them to Vulcan. His principal temple was in a conſecrated grove, at the foot of mount Ætna, guarded by dogs, who are ſaid to have had ſuch ſagacity as to diſtinguiſh his votaries, to fawn upon the virtuous, and to tear the vicious to pieces.

VULCANO, in natural hiſtory. See VOLCANO.

VULGATE, a very ancient Latin tranſlation of the Bible, and the only one acknowledged by the church of Rome to be authentic. See BIBLE.

VULNERARY, in medicine, an epithet given to remedies proper for the cure of wounds and ulcers.

VULTUR, a genus of birds belonging to the order of accipitres. The beak is ſtraight and crooked at the point; the head has no feathers; on the forepart being only naked ſkin; and the tongue is bifid. There are eight ſpecies. The moſt remarkable are,

1. The condor, which is not only the largeſt of this genus, but perhaps of all others which are able to fly. The accounts of authors in regard to its extent of wing are various, *viz.* from 9 to 18 feet, from the tip of one wing to that of the other. One gives it ſtrength ſufficient to carry off ſheep, and boys of 10 years old; while another ventures to affirm, that it can lift an elephant from the ground high enough to kill it by the fall! M. de Salerne ſays, that one of this kind was ſhot in France in the year 1719, which weighed 18 lib. and whoſe extent of wing was 18 feet. But to come nearer the truth, perhaps it is better to abide by deſcriptions which bear a moderate proportion. In Hawkeſworth's Voyages, mention is made of one of theſe birds ſhot at Port Deſire, off Penguin Iſlaud, of which he gives the following deſcription: "The head of this bird reſembled that of an eagle, except that it had a large comb upon it. Round the neck it had a white ruff, exactly reſembling a lady's tippet; the feathers on the back were as black as jet, and as bright as the fineſt poliſh could render that mineral: the legs were remarkably ſtrong and large, and the talons like thoſe of an eagle, except that they were not ſo ſharp; and the wings when they were extended, meaſured, from point to point, no leſs than 12 feet." This laſt account ſeems by no means to exceed the natural ſize, ſince we have an account in the Philoſophical Tranſactions of one of the quill-feathers of this bird, brought from Chili, which meaſured 12 feet 4 inches; the diameter of the quill half an inch; and the extent of wing 16 feet. This bird was met in lat. 33 ſouth, not far from the iſland Mocha, in the South Sea, in the year 1691. The ſeamen ſhot it on a cliff by the ſea-ſide; and taking it for a kind of turkey, made a meal of it. In this account we are told that the colour was black and white, like a magpie, and the creſt, or comb, ſharp like a razor.

It has been ſuppoſed, that theſe birds were peculiar to South America: but Buffon believes they are likewiſe inhabitants of Aſia and Africa, and not unlikely of Europe alſo, if the laemmergeir of the Germans be the ſame bird, which he ſeems inclined to think; and that the roc, or ruch, mentioned frequently in the Arabian Tales, may alſo prove to be the ſame.

Alberto Fortis, in his travels into Dalmatia in the year 1778, p. 245, ſays, that he meaſured a vulture himſelf, (one found near the mouth of the Cettina) whoſe extent of wings was above 12 feet; and in a note below ſays, that the ſort found in the Swiſs mountains, called *le voutour des Alpes*, is of the ſame race. We further learn, that the throat of the condur is naked, that is, bare of feathers, and of a red colour; the comb brown, but not indented; that in ſome the upper parts are variegated with black, grey, and white; and under the belly ſcarlet, as was that bird mentioned by Mr Salerne. Mr Briſſon obſerves, that theſe birds vary in colour; which will account for the difference in the plumage by which authors have deſcribed them: which circumſtance frequently happens in other birds, as well as in this ſpecies.

2. The phœncopterus, or Egyptian vultur, is thus deſcribed by Mr Haſſelquiſt. They light in great flocks on the lay-ſtalls near the city of Cairo, and there promiſcuouſly feed, together with the dogs and other beaſts, on dead carcaſes and other offal. They aſſemble with the kites every morning and evening, in the ſquare called *Rohneli*, below the caſtle (which is the place for executing capital offenders) there to receive the alms of freſh meat, left them by the legacies of wealthy great men.

The appearance of this bird is as horrid as can well be imagined, *viz.* the face is naked and wrinkled; the eyes are large and black; the beak black and hooked; the talons large, and extending ready for prey; and the whole body polluted with filth: theſe are qualities enough to make the beholder ſhudder with horror. Notwithſtanding this, the inhabitants of Egypt cannot be enough thankful to Providence for this bird. All the places round Cairo are filled with the dead bodies of aſſes and camels; and thouſands of theſe birds fly about, and devour the carcaſes before they putrify and fill the air with noxious exhalations. The inhabitants of Egypt, and after them Maillet in his Deſcription of Egypt, ſay, that they yearly follow the caravan to Mecca, and devour the filth of the ſlaughtered beaſts, and the carcaſes of the camels which die on the journey; but we were not eye-witneſſes of this. They do not fly high, nor are they afraid of men. If one is killed, all the reſt ſurround him in the ſame manner as do the royſton-crows; they do not quit the places they frequent though frightened by the exploſion of a gun, but immediately return thither. Maillet imagines this bird to be the ibis of the ancients: but it is ſcarcely to be imagined, that a wiſe nation ſhould pay ſuch honours to an unclean, impure, and rapacious bird, which was not perhaps ſo common before the Egyptians filled the ſtreets with carcaſes. If the ibis is to be found, it muſt certainly be looked for in the ordo of grallæ of Linnæus; and we imagine it to be the white ſtork, (*Ardea cicona*), which is ſo common in Egypt. The Arabians call it *rochæme;* the French living in Egypt, give it the name of *chapon de Pharaon*, or *de Mahometh.*

3. The aura, or carrion vulture, according to Mr Latham, is about the ſize of a turkey, though it varies in ſize in different parts. The bill is white; the end black; irides blueiſh ſaffron-colour. The head, and part of the neck, are bare of feathers; and of a red, or rather rufous colour. The ſides of the head warted, not unlike that of a turkey. The whole plumage is brown black, with a purple and green gloſs in different reflections; but in ſome birds, eſpecially young ones, greatly verging to dirty brown. The feathers of the quills and tail are blacker than the reſt of the body. The legs are fleſh-colour; the claws black.

This bird is very common in the Weſt Indies, and both North and South America. It feeds on dead carcaſes, ſnakes, &c. like moſt of this genus; which makes the ſmell of it very offenſive. In general, it is very tame in its wild ſtate; but particularly ſo, when trained up from being young. This our author experienced in two birds ſent home from Jamaica. They were ſuffered to run wild about the garden, and were alert and briſk during the ſummer months: but impatient of the leaſt cold; for a rainy day, with the ſlighteſt degree of cold, obliged them to creep for ſhelter. In the Weſt Indies they rooſt together of nights, in vaſt numbers, like rooks in this country. They are reckoned a moſt uſeful animal in the places where they reſort; which ſecures their ſafety, added to a penalty for killing one, which is in force in Jamaica and other iſlands of the Weſt Indies

4. The ſagittarius, or ſecretary, is a moſt ſingular ſpecies, being particularly remarkable from the great length of its legs; which at firſt ſight would induce one to think it belonged to waders: but the characters of the vulture are ſo ſtrongly marked throughout, as to leave no doubt to which claſs it belongs.

The bird, when ſtanding erect, is full three feet from the top of the head to the ground. The bill is black, ſharp, and crooked, like that of an eagle; the head, neck, breaſt, and upper parts of the body, are of a blueiſh aſh colour: the legs are very long, ſtouter than thoſe of a heron, and of a brown colour; claws ſhortiſh, but crooked, not very ſharp, and of a black colour; from the hind-head ſprings a number of long feathers, which hang looſe behind like a pendent creſt; theſe feathers ariſe by pairs, and are longer as they are lower down on the neck; this creſt the bird can erect or depreſs at pleaſure; it is of a dark colour, almoſt black; the webs are equal on both ſides, and rather curled; and the feathers, when erected, ſomewhat incline towards the neck; the two middle feathers of the tail twice as long as any of the reſt.

This ſingular ſpecies inhabits the internal parts of Africa, and is frequently ſeen at the Cape of Good Hope. It is alſo met with in the Philippine iſlands.

The deſcription was taken by Mr Latham from three that were alike, which he ſaw in England alive, ſome years ſince; two of which are now in the Leverian muſeum. From confinement, they had loſt their two long tail-feathers; but this want was ſupplied by ſome accurate drawings by Mr Banks, taken from the life at the Cape.

As to the manners of this bird, it is on all hands allowed that it principally feeds on rats, lizards, ſnakes, and the like; and that it will become familiar: whence Sonnerat is of opinion that it might be made uſeful in ſome of our colonies, if encouraged, towards the deſtruction of thoſe peſts. They call it at the Cape of Good Hope, *ſlangeater*, i. e. ſnake-eater. A great peculiarity belongs to it, perhaps obſerved in no other; which is, the faculty of ſtriking forwards with its legs, never backwards. Dr Solander has ſeen one of theſe birds take up a ſnake, ſmall tortoiſe, or ſuch like, in its claws; when daſhing it from thence againſt the ground with great violence, if the victim was not killed at firſt, it repeated the operation till that end was anſwered; after which it ate it up quietly. Dr J. R. Forſter mentioned a further circumſtance, which he ſays was ſuppoſed to be peculiar to this bird; that ſhould it by any accident break the leg, the bone would never unite again.

VULVA, in anatomy. See there, n° 372.

UVULA, in anatomy. See there, n° 366.

UZ, or UTZ, the country and place of reſidence of Job. In the genealogy of the patriarchs there are three perſons called *Uz*, either of which might give this diſtrict its name. The firſt was the grandſon of Sem, by his ſon Aram, Gen. xxii. 23. who, according to Joſephus, occupied the Trachonitis, and Damaſcus, to the north of Paleſtine: but Job was among the ſons of the Eaſt. Another *Uz* was the ſon of Nahor, Abraham's brother, Gen. x. 21. who appears to have removed after paſſing the Euphrates, from Haran of Meſopotamia to Arabia Deſerta. The third *Uz* was a Horite, from mount Seir, Gen. xxxvi. 28. and thus not of Eber's poſterity. Now the queſtion is, from which of theſe Job's country, Uz, took its name. Not from the firſt, as is already ſhown: nor from the ſecond, becauſe his country is always called *Seir*, or *Edom*, never *Uz*; and then called a *ſouth*, not an *eaſt*, country, in Scripture. It therefore remains, that we look for the country and place of reſidence of Job in Arabia Deſerta; for which there are very probable reaſons. The plunderers of Job are called *Chaldeans* and *Sabeans*, next neighbours to him. Theſe Sabeans came not from Arabia Felix, but from a nearer Sabe in Arabia Deſerta, (Ptolemy); and his friends, except Eliphaz the Themanite, were of Arabia Deſerta.

UZBECK TARTARY. See TARTARY.

W.

W or w, is the 21ſt letter of our alphabet; and is compoſed, as its name implies, of two v's. It was not in uſe among the Hebrews, Greeks, or Romans; but chiefly peculiar to the northern nations, the Teutones, Saxons, Britons, &c. But ſtill it is not uſed by the French, Italians, Spaniards, or Portugueſe, except in proper names and other terms borrowed from languages in which it is originally uſed, and even then it is ſounded like the ſingle v. This letter is of an ambiguous nature; being a conſonant at the beginning of words, and a vowel at the end. It may ſtand before all the vowels except *u*; as *water*, *wedge*, *winter*, *wonder*: it may alſo follow the vowels *a*, *e*, *o*, and unites with them into a kind of double vowel, or diphthong; as in *ſaw*, *few*, *cow*, *&c*. It alſo goes before *r*, and follows *ſ* and *th*; as in *wrath*, *ſwear*, *thwart*: it goes before *h* alſo, though in reality it is ſounded after it; as in *when*, *what*, *&c*. In ſome words it is obſcure, as in *ſhadow*, *widow*, *&c*.

WAAG, a river of Hungary, which riſes in the Carpathian mountains, on the confines of Poland, and running firſt from eaſt to weſt, then turns ſouth, and paſſing by Leopoldſtadt, falls into the Danube, oppoſite to the iſland of Schut.

WAAL, a river of the United Netherlands, being one of the branches of the Rhine, which runs from eaſt to weſt, through the Betu, in the province of Guelderland, paſſing by Nimeguen, Tiel, Bommel, and Gorcum; and continuing its courſe eaſtward, unites its waters with the Maes, and paſſing by Dort, falls into the German Sea below the Briel.

WADD, or Wadding, is a ſtopple of paper, hay, ſtraw, or the like, forced into a gun upon the powder, to keep it cloſe in the chamber; or to put up cloſe to the ſhot, to keep it from rolling out.

WADSET, in Scots law. See Law, N° clxix. 1.

WAFERS, or *Sealing* Wafers, are made thus: Take very fine flower, mix it with glair of eggs, iſinglaſs, and a little yeaſt; mingle the materials; beat them well together; ſpread the batter, being made thin with gum-water, on even tin-plates, and dry them in a ſtove; then cut them out for uſe.

You may make them of what colour you pleaſe, by tinging the paſte with braſil or vermilion for red; indigo or verditer, &c. for blue; ſaffron, turmerics, or gamboge, &c. for yellow.

WAGER *of* Law. See *(Wager of)* Law.

Wager *of Battel.* See *(Wager of)* Battel.

WAGGON, a wheel-carriage, of which there are various forms, accommodated te the different uſes they are intended for. The common waggon conſiſts of the ſhafts or rads, being the two pieces which the hind-horſe bears up; the welds; the ſlotes, or croſs pieces, which hold the ſhafts together; the bolſter, being that part on which the fore-wheels and the axle-tree turn in wheeling the waggon acroſs the road; the cheſt or body of the waggon, having the ſtaves or rails fixed thereon; the bales, or hoops, which compoſe the top; the tilt, the place covered with cloth, at the end of the waggon. See Mechanics, n° 58.

WAGTAIL, in ornithology. See Motacilla.

WAIFS, bona waviata, are goods ſtolen, and waived or thrown away by the thief in his flight, for fear of being apprehended. Theſe are given to the king by the law, as a puniſhment upon the owner for not himſelf purſuing the felon, and taking away his goods from him. And therefore if the party robbed do his diligence immediately to follow and apprehend the thief (which is called *making freſh ſuit*), or do convict him afterwards, or procure evidence to convict him, he ſhall have his goods again. Waived goods do alſo not belong to the king, till ſeized by ſomebody for his uſe; for if the party robbed can ſeize them firſt, though at the diſtance of 20 years, the king ſhall never have them. If the goods are hid by the thief, or left any where by him, ſo that he had them not about him when he fled, and therefore did not throw them away in his flight; theſe alſo are not *bona waviata*, but the owner may have them again when he pleaſes. The goods of a foreign merchant, though ſtolen and thrown away in flight, ſhall never be waifs: the reaſon whereof may be, not only for the encouragement of trade, but alſo becauſe there is no wilful default in the foreign merchant's not purſuing the thief, he being generally a ſtranger to our laws, our uſages, and our language.

WAIGRATS straits, ſituated between Nova Zembla and Ruſſia, through which the Dutch ſailed to the north, as high as 75°; in order to diſcover a north-eaſt paſſage to China and the Eaſt Indies.

WAINSCOT, in building, the timber-work that ſerves to line the walls of a room, being uſually made in pannels, and painted, to ſerve inſtead of hangings.

WAKE, the print or track impreſſed by the courſe of a ſhip on the ſurface of the water. It is formed by the reunion of the body of water which was ſeparated by the ſhip's bottom whilſt moving through it; and may be ſeen to a conſiderable diſtance behind the ſtern, as ſmoother than the reſt of the ſea. Hence it is uſually obſorved by the compaſs, to diſcover the angle of lee-way.

A ſhip is ſaid to be in the wake of another when ſhe follows her on the ſame track, or a line ſuppoſed to be formed on the continuation of her keel.

Two diſtant objects obſerved at ſea are called in the wake of each other, when the view of the fartheſt is intercepted by the neareſt; ſo that the obſerver's eye and the two objects are all placed upon the ſame right line.

Wake is the eve-feaſt of the dedication of churches, which is kept with feaſting and rural diverſions. Concerning the origin of wakes we have the following diſſertation in Mr Whitaker's Hiſtory of Mancheſter.

"Before a building could be uſed for divine offices, it was required to be conſecrated by the biſhop, formally ſequeſtered from all ſecular applications, and dedicated to the purpoſes of public devotion. And every church at its conſecration received the name of ſome particular perſonage, who was celebrated in the written annals or the traditionary hiſtory of Chriſtianity, and whoſe name had been admitted into that great roll of eccleſiaſtical fame, the kalendar of the church. This cuſtom was practiſed among the Roman Britons; and they had the church of St Martin at Canterbury, and that of St Michael at Mancheſter. It was alſo continued among the Saxons; and the Saxon churches in York, London, and Mancheſter, were diſtinguiſhed by the names of *St Peter*, *St Paul*, and *St Mary*. And in the council which was held at Cealchythe in 816, the name of the denominating ſaint was expreſsly required to be inſcribed on the altars, and alſo on the walls of the church or a tablet within it.

"The feaſt of this ſaint became of courſe the feſtival of the church. And the connection betwixt the church and ſaint being enhanced by the fancifulneſs of ſuperſtition, and the former ſuppoſed to be under the patronage of the latter, the pariſhioners would naturally conſider the day of their ſpiritual guardian with particular reſpect, and celebrate it with peculiar feſtivity. This conduct would as naturally be encouraged by the civil and eccleſiaſtical governors, becauſe it ſubſtituted innocent and Chriſtian feſtivals in the room of the impious and idolatrous anniverſaries of heatheniſm. The common people, generally in all countries as much attached to the feſtivals as they are devoted to the principles of any religion, finding their annual feaſts return as before, and being now able to join in them without guilt, would be the ſooner weaned from their idolatrous attachments. And this would be the natural operation of the affections, equally on the continent and in the iſland, and equally among the Britons and Saxons. Thus, at the firſt commencement of Chriſtianity among the Jutes of Kent, and with a view to promote the converſion of them and the reſt, Gregory prudently adviſed what had been previouſly done among the Britons, Chriſtian feſtivals to be inſtituted in the place of the idolatrous, and the ſuffering-day of the martyr whoſe relics were depoſited in the church, or the day on which the building was actually dedicated, to be the eſtabliſhed feaſt of the pariſh. Both were appointed and obſerved. And they were obſerved and appointed as diſtinct feſtivals. Biſhop Kennet

net indeed, in his ſenſible account of our wakes, has invariably confounded them, and attributed to the day of dedication what is true only concerning the ſaint's day. But they were fully diſtinguiſhed at firſt among the Saxons; as appears from the laws of the Confeſſor, where the *Dies Dedicationis* or *Dedicatio* is repeatedly diſcriminated from the *Propria Feſtivitas Sancti*, or *Celebratio Sancti*. And they remained equally diſtinct to the Reformation: the dedication-day in 1536 being ordered for the future to be kept on the firſt Sunday in October, and the feſtival of the patron-ſaint to be celebrated no longer.

“ But the former could never have been obſerved by the people with the ſame regard as the latter. That was merely a feaſt commemorative of the church's commencement; and this was one previouſly kept by the nation in general, and the day of their own ſaint in particular. This therefore, in a high ſtrain of pre-eminence over the other, was actually denominated the *church's holiday*, or its peculiar feſtival. And while this remains in many pariſhes at preſent, the other is ſo utterly annihilated in all, that the learned and ſenſible antiquary whom I have mentioned before, actually knew nothing of its diſtinct exiſtence, and abſolutely confounded it with this.

“ Thus inſtituted at firſt, the day of the tutelar ſaint was obſerved, moſt probably by the Britons, and certainly by the Saxons, with great devotion. And the evening before every ſaint's day, in the Saxon-Jewiſh method of reckoning the hours, being an actual part of the day, and therefore like that reſigned to the duties of public religion, as they reckoned Sunday from the firſt to commence at the ſunſet of Saturday; the evening preceding the church's holiday would be obſerved with all the devotion of the feſtival. The people actually repaired to the church, and joined in the ſervices of it. And they thus ſpent the evening of their greater feſtivities in the monaſteries of the north, as early as the concluſion of the 7th century. In that of Rippon, and on the anniverſary of Wilfrid particularly, we ſee the biſhops, abbots, and numerous trains of attendants, all convened at the monaſtery in order to celebrate the day, and all aſſembled the evening before it at the prayers of the church. And theſe ſervices were naturally denominated from their late hours *pæccan*, or “ wakes,” and *vigils*, or “ eves.” That of the anniverſary at Rippon, as early as the commencement of the 8th century, is expreſsly denominated the *vigil*. But that of the church's holiday was named the *pæccan*, or “ church-wake,” the *church-vigil*, or “ church-eve.” And it was this commencement of both with a wake which has now cauſed the days to be generally preceded with vigils, and the church-holiday particularly to be denominated the *church-wake*. So religiouſly was the eve and feſtival of the patron-ſaint obſerved for many ages by the Saxons; even as late as the reign of Edgar, the former being ſpent in the church and employed in prayer. And the wake, and all the other holidays in the year, were put upon the ſame footing with the octaves of Chriſtmas, of Eaſter, and of Pentecoſt; and any perſons repairing to the celebration of the day were, as all ordinarily reſorting to the church were, under the immediate protection of the king, and conſequently free from arreſts in their way to and return from it.

“ When Gregory recommended the feſtival of the patron-ſaint, he alſo recommended ſomething more adapted to gain a general reception than religious acts and exerciſes. He adviſed, that the people ſhould be encouraged on the day of the feſtival to erect booths of branches about the church, and to feaſt and be merry in them with innocence. And as the authority of Gregory would certainly cauſe the encouragement to be given, ſo the ſmalleſt would be effectual. Nor would ſuch churches only as had previouſly been heathen temples, but all immediately have the day of their guardian ſaint obſerved with this open feſtivity. As the people had been all idolaters, the reaſon would be equally forcible for one pariſh as another. And the ſtrong tendency of the common people to every ſenſitive enjoyment would make the practice univerſal. In every pariſh, on the returning anniverſary of the ſaint, little pavilions were conſtructed of boughs; and the immediate neighbourhood of St Michael's, and the church-yard of St Mary's, reſounded with the voice of hoſpitality and the notes of merriment.

“ But few perſons are ever to be intruſted to feaſt; and fewer are to be allowed to meet in numbers together. There is a contagious viciouſneſs in crowds. Though each individual among them, alone by himſelf, would act with a religious propriety; yet all together they act with irreligion and folly. The fire imperceptibly runs from breaſt to breaſt; each contributes to ſwell the tide of ſpirits beyond its proper bounds, and wickedneſs and abſurdity enter at the breach that is made in reaſon. And this viciouſneſs is always augmented in its force, when the groſſer ſpirits, that are merely the reſult of feaſting, mingle and ferment the tide. The feaſting of the ſaint's day was ſoon abuſed. And it ſeems to have been greatly ſo before the reign of Edgar, as the intemperance of the feſtival was then creeping even into the vigil, and even mixing with the offices of religion. In the very body of the church, when the people were aſſembled for devotion, they were beginning to mind diverſions and introduce drinking. And ſo groſs an abuſe of the eve could have ſtolen in only from the licentiouſneſs of the feſtival. The growing intemperance would gradually ſtain the ſervice of the vigil, till the feſtivity of it was converted, as it now is, into the rigour of a faſt. Theſe diſorders would be leſs obnoxious on the day itſelf, becauſe they did not intrude within the church and profane the prayers. But they were certainly greater, and went on increaſing in viciouſneſs and folly, till they too juſtly ſcandalized the puritans of the laſt century; and numbers of the wakes were diſuſed entirely. Our own has been long diſcontinued. It was aboliſhed in 1536 by the laws of Henry VIII. which appears to have had little or no influence on the general practice. It was put down by a particular and local order in 1579, and forgotten in the long and rigid reign of puritaniſm that was then commencing at Mancheſter. And Henry earl of Derby, Henry earl of Huntingdon, William lord biſhop of Cheſter, and others of the high commiſſion under queen Elizabeth, aſſembled at Mancheſter in 1579; iſſued orders againſt pipers and minſtrels playing, making and frequenting ales, bear-baitings and bull-baitings on the Sunday, or any other day of the week in time of divine ſervice or ſermons; and prohibited for the future all ſuperfluous and ſuperſtitious ringing, common feaſts, and wakes. But the wake of the neighbouring pariſh of Eccles is celebrated among us to the preſent day; and a conſiderable number of people reſort to it annually from our own and the adjoining pariſhes.

"This cuſtom of celebrity in the neighbourhood of the church on the days of particular ſaints, was introduced into England from the continent, and muſt have been familiar equally to the Britons and Saxons; being obſerved among the churches of Aſia in the 6th century, and by thoſe of weſt Europe in the 7th. And equally in Aſia and Europe, equally on the continent and in the iſland, theſe celebrities were the cauſes of thoſe commercial marts which we denominate *fairs*. See Fairs. The people reſorted in crowds to the feſtival, and a conſiderable proviſion would be wanted for their entertainment. The proſpect of intereſt invited the little traders of the country to come and offer their wares, and the convenience of the accommodation promoted a vigorous ſale among the people. And other traders were induced by the experience of theſe, to bring in different articles, and hope for an equal ſale. Thus among the many pavilions for hoſpitality in the neighbourhood of the church, various booths were erected for the ſale of commodities. In large towns ſurrounded with populous diſtricts, the reſort of the people to the wake would be great, and the attendance of traders at the celebrity numerous. And this reſort and this attendance conſtitute a fair. Baſil expreſsly mentions the numerous appearance of traders at theſe feſtivals in Aſia; and Gregory notes the ſame cuſtom to be common in Europe. And as the feſtival was obſerved on a feria or holiday, it naturally aſſumed to itſelf, and as naturally communicated to the mart, the appellation of *feria* or *fair*; the ſame among the Saxons, the French, the Germans, and the Britons, *fæger*, *foire*, *feyer*, and *faire*: the word was derived from the ſame ſource in all theſe nations, the one eccleſiaſtical language of Weſt Europe at this period. And ſeveral of our moſt ancient fairs appear to have been actually held, and have been actually continued to our time, on the original church-holidays of the places; as that on the feſtival of St Peter, at St Peter's church in Weſtminſter; another on the feaſt of St Cuthbert, at St Cuthbert's in Durham; and a third on the holiday of St Bartholomew, at St Bartholomew's in London."

WAKE (William), archbiſhop of Canterbury, was born in 1657, and educated at Oxford. When he entered into holy orders, he was appointed preacher to the ſociety of Gray's Inn; and in the reign of James II. attended lord Preſton, ambaſſador to France, as his chaplain. Upon his return to England, he diſtinguiſhed himſelf by ſeveral tracts againſt Popery; particularly againſt the biſhop of Meaux's Expoſition of the Doctrine of the Catholic Church. After the revolution, he was appointed deputy-clerk of the cloſet, and chaplain in ordinary to king William and queen Mary, and the year following was made canon of Chriſt-church. In 1694 he was collated to the rectory of St James's, Weſtminſter; and in 1701 was inſtalled dean of Exeter. In 1705 he was conſecrated to the ſee of Lincoln, and in 1715 16, tranſlated to the archbiſhopric of Canterbury. He died at Lambeth in 1737. Beſide ſermons, he publiſhed ſeveral pieces, particularly an Engliſh verſion of the Genuine Epiſtles of the Apoſtolical Fathers, &c.

WALACHIA, a province of Turkey in Europe, bounded by the Irongate mountains, which ſeparate it from Tranſylvania on the north-weſt, by Moldavia on the north-eaſt, by the Danube, which ſeparates it from the province of Servia, on the ſouth-weſt. It is 225 miles in length, and 125 in breadth where it is broadeſt. In the laſt war between the Turks and Germans, the latter having loſt the fatal battle of Crotzka, were obliged to give up this diſtrict to the Turks, by the treaty of Belgrade concluded in 1739 The air is good, and the ſoil fruitful; producing corn, wine, oil, paſtures, and all manner of European fruit; and has abundance of oxen and ſheep, and an excellent breed of horſes. The inhabitants are indulged with the free exerciſe of their religion, which is of the Greek church; and this circumſtance renders them the more contented with their maſters; becauſe if the Roman Catholics had the aſcendant, they would be ſure of undergoing perſecution.

WALCHEREN, an iſland of the Low Countries, and one of the principal of thoſe of Zealand; being ſeparated from the iſlands of North and South Beveland by a narrow channel, and from Dutch Flanders by the mouth of the Scheld. It is about nine miles in length, and eight in breadth; and though it lies low, has good arable and paſture land. The chief town of this iſland and the whole province is Middleburg.

WALDEN, a town of Eſſex, commonly called *Saffron Walden*, with a market on Saturdays, and two fairs on Mid-lent Saturday for horſes, and November 1ſt for cows. It is remarkable for the plenty of ſaffron that grows about it, from which the owners derive great profit. This town was incorporated by Edward VI. and is governed by a mayor and 24 aldermen. It is 27 miles north-weſt-by-north of Chelmſford, and 43 north-eaſt of London. E. Long. 0. 15. N. Lat 52. 5.

WALDO, a merchant of Lyons in the latter part of the 12th century, who applying himſelf to the ſtudy of the Scriptures, and finding no warrant there for ſeveral of the Romiſh doctrines, particularly that of tranſubſtantiation, publicly oppoſed them. His followers, who from him were called *Waldenſes*, being chaſed from Lyons, ſpread over Dauphine and Provence; upon which Philip II. is ſaid to have razed 300 gentlemens ſeats, and deſtroyed ſeveral walled towns, to ſtop their growth: but this, inſtead of ſuppreſſing, ſpread them over a great part of Europe. The articles of their faith, which they drew up and dedicated to the king of France, agreed in moſt points with thoſe of the preſent Proteſtants. In the year 1200, thoſe of them in the province of Albigeois in Languedoc, from whence they were called *Albigenſes*, ſtood upon their defence; upon which Philip drove them into Bohemia, Savoy, and England. The cruſade againſt them is ſaid to have conſiſted of 500,000 men, who wore their croſſes on their breaſts, to diſtinguiſh themſelves from thoſe who went to the Holy Land, and wore them on their ſhoulders.

WALES, a county ſituated in the ſouth-weſt part of Britain, into which the ancient Britons retired from the perſecution of the Saxons. Anciently it was of greater extent than it is at preſent, and comprehended all the country beyond the Severn, that is, beſides the twelve counties included in it at preſent, thoſe of Herefordſhire and Monmouthſhire, which now are reckoned a part of England, were then inhabited by three different tribes of the Britons, namely, the Silures, the Dimetæ, and the Ordovices. The Romans were never able to ſubdue them, till the reign of Veſpaſian, when they were reduced by Julius Frontinus, who placed garriſons in their country to keep them in awe. Though the Saxons made themſelves maſters of all England, they never could get poſſeſſion of Wales, except the counties of Monmouthſhire and Herefordſhire, formerly a part of Wales. About the year 870, Roderic king of Wales divided it among his three ſons; and the names of theſe diviſions were, *Demetia*, or *South-Wales; Poveſia*, or *Powis-Land;* and *Venedotia*, or *North-Wales*. Another diviſion is mentioned afterwards in the records, viz. North Wales, South Wales, and Weſt Wales; the laſt comprehending the counties of Monmouth and Hereford. The country derived the name of *Wales*, and the inhabitants that of *Welſh*, from the Saxons, who by thoſe terms denote a country and people to which they are ſtrangers; for the Welſh, in their own language, call their country *Cymry*, and their language *Cymraeg*. They continued under their own princes and laws from the above-mentioned period, and were never entirely ſubjected to the crown of England till the reign of Edward I. when Llewellin ap Gryffith, prince of Wales, loſt both his life and dominions. Edward, the better to ſecure his conqueſt, and to reconcile the Welſh to a foreign yoke, ſent his queen to lie-in at Caernarvon, where ſhe was delivered of a prince; to whom the Welſh, on that account, the more readily ſubmitted. Ever ſince that time the eldeſt ſons of the kings of England have commonly been created princes of Wales, and as ſuch enjoy certain revenues from that country. But though Wales, from that time, was ſubject to the crown of England, yet it was not united and incorporated with it till the 27th of Herny VIII. when, by act of parliament, the government of it was modelled according to the Engliſh form; all laws, cuſtoms, and tenures contrary to thoſe of England being abrogated, and the inhabitants admitted to a participation of all the Engliſh liberties and privileges, particularly that of ſending members to parliament, viz. a knight for every ſhire, and a burgeſs for every ſhire-town, except Merioneth. By other acts made afterwards, the country was divided into four circuits, and two juſtices were appointed for each, containing three counties; but at preſent there are only two circuits and four judges, two for each. In fine, the government here, both civil and eccleſiaſtical, is now the ſame as that of England.

As to the character of the Welſh, they are ſaid to be a brave, hoſpitable people; and though very jealous of affronts, paſſionate, and haſty, yet are eaſily reconciled. The common people look with a ſuſpicious eye on ſtrangers, and bear an hereditary grudge to the Engliſh nation, by whom their anceſtors were expelled from the fineſt parts of the iſland. The gentlemen are apt to value themſelves upon the antiquity of their families; and with ſome reaſon, as they can generally trace them much higher than the inhabitants of moſt other countries.

All the better ſort, both in town and country, can ſpeak Engliſh, eſpecially in the counties bordering upon England. The common people, in general, only ſpeak their own language, which is the ancient Britiſh; and not only differs entirely from the Engliſh, but has very little affinity with any of the weſtern tongues, unleſs we ſhould except the Galic, Erie, or Iriſh. It is ſaid to be a dialect of the ancient Celtic or Gomerian, and in many reſpects to reſemble the Hebrew. Moſt of the clergy are natives of the country, and underſtand Engliſh ſo well, that they could exerciſe their functions in any part of Britain. The public worſhip, however, is as often performed in the Welſh as in Engliſh, excepting in the towns, where the latter is the prevailing language; nay, there, even moſt of the meaner ſort underſtand it. The inhabitants, who are computed at about 300.000, are not, in general, wealthy, though the land-tax of Wales brings in 43752l.

The country, though mountainous, eſpecially in North Wales, is far from being barren or unfruitful; the hills, beſides the metals and minerals they contain, feeding vaſt herds of ſmall black cattle, deer, ſheep, and goats, and their valleys abounding in corn, as their ſeas and rivers do in fiſh. Here are alſo wood, coal, and turf for fuel, in abundance.

Wales is bounded on all ſides by the ſea and the Severn; except on the eaſt, where it joins to the counties of Cheſter, Salop, Hereford, and Monmouth. Its length, from the ſouthernmoſt part of Glamorganſhire to the extremity of Flintſhire north, is computed at about 113 miles; and its greateſt breadth, from the river Way eaſt to St David's in Pembrokeſhire weſt, is nearly of the ſame dimenſions, being about 90 miles.

After the conqueſt of Wales by Edward I. very material alterations were made in divers parts of their laws, ſo as to reduce them nearer to the Engliſh ſtandard, eſpecially in the forms of their judicial proceedings: but they ſtill retained very much of their original polity, particularly their rule of inheritance, viz. that their lands were divided equally among all the iſſue male, and did not deſcend to the eldeſt ſon alone. By other ſubſequent ſtatutes their provincial immunities were ſtill farther abridged: but the finiſhing ſtroke to their dependency was given by the ſtatute 27 Hen. VIII. c. 26. which at the ſame time gave the utmoſt advancement to their civil proſperity, by admitting them to a thorough communication of laws with the ſubjects of England. Thus were this brave people gradually conquered into the enjoyment of true liberty; being inſenſibly put upon the ſame footing, and made fellow-citizens with, their conquerors.

It is enacted by this ſtatute, 27 Hen. VIII. 1. That the dominion of Wales ſhall be for ever united to the kingdom of England. 2. That all Welſhmen born ſhall have the ſame liberties as other king's ſubjects. 3. That lands in Wales ſhall be inheritable according to the Engliſh tenures and rules of deſcent. 4. That the laws of England, and no other, ſhall be uſed in Wales: beſides many other regulations of the police of this principality. And the ſtatute 34 & 35 Hen. VIII. c. 26. confirms the ſame, adds farther regulations, divides it into twelve ſhires, and, in ſhort, reduces it into the ſame order in which it ſtands at this day; differing from the kingdom of England in only a few particulars, and thoſe too of the nature of privileges, (ſuch as having courts within itſelf, independent of the proceſs of Weſtminſter-hall), and ſome other immaterial peculiarities, hardly more than are to be found in many counties of England itſelf.

When the polity of Wales was ſettled in the reign of Hen. VIII. private courts of a limited, though extenſive, juriſdiction were erected all over the country; principally by the ſtatute 34 & 35 Hen. VIII. c. 26. though much had before been done, and the way prepared by the ſtatute of Wales, 12 Edw. I. and other ſtatutes. By the ſtatute of Henry the Eighth beforementioned, courts-baron, hundred, and county courts, are there eſtabliſhed as in England. A ſeſſion is alſo to be held twice in every year in each county, by judges appointed by the king, to be called the *great ſeſſions of the ſeveral counties in Wales*: in which all pleas of real and perſonal actions ſhall be held, with the ſame form of proceſs and in as ample a manner as in the court of common pleas at Weſtminſter: and writs of error ſhall lie from judgments therein (it being a court of record) to the court of king's bench at Weſtminſter. But the ordinary original writs or proceſs of the king's court at Weſtminſter do not run into the principality of Wales; though proceſs of execution does: as do alſo all prerogative writs, as writs of *certiorari, quo minus, mandamus*, and the like. And even in cauſes between ſubject and ſubject, to prevent injuſtice through family-factious and prejudices, it is held lawful (in cauſes of freehold at leaſt, if not in all others) to bring an action in the Engliſh courts, and try the ſame in the next Engliſh county adjoining to that part of Wales where the cauſe ariſes. But, on the other hand, to prevent trifling and frivolous ſuits, it is enacted by ſtatute 13 Geo. III. c. 51. that in perſonal actions, tried in any Engliſh county where the cauſe of action aroſe, and the defendent reſides in Wales, if the plaintiff ſhall not recover a verdict for ten pounds, he ſhall be nonſuited and pay the defendant's coſts, unleſs it be certified by the judge that the freehold or title came principally in queſtion, or that the cauſe was proper to be tried in ſuch Engliſh county. And if any tranſitory action, the cauſe whereof aroſe and the defendant is reſident in Wales, ſhall be brought in any Engliſh county, and the plaintiff ſhall not recover a verdict for ten pounds, the plaintiff ſhall be nonſuited, and ſhall pay the defendant's coſts, deducting thereout the ſum recovered by the verdict.

New WALES. See *New* BRITAIN.

Prince of WALES. See ROYAL FAMILY.

WALKING. Celſus ſays that walking, reading moderately loud, fencing, and playing with the ball, all ſtrengthen a weak ſtomach. Walking, he ſays, is beſt if it is up and down hill, except in caſes of great weakneſs; becauſe aſcending and deſcending exerciſes the whole body more than the plain does. If the viſcera are weak, riding is to be preferred to walking. Walking preſerves, and riding recovers health the beſt.

WALKING *Leaf*. See MANTIS *Sycifolia*.

WALL, in architecture, the principal part of a building, as ſerving both to incloſe it, and to ſupport the roof, floors, &c.—Walls are diſtinguiſhed into various kinds, from the matter whereof they conſiſt; as plaſtered or mud-walls, brick-walls, ſtone-walls, flint or boulder-walls, and boarded-walls. See ARCHITECTURE.

WALLACE (Sir William) a gallant general of the Scots, who endeavoured to reſcue his country from the Engliſh yoke; but being taken priſoner, he was unjuſtly tried by the Engliſh laws, condemned, and executed as a traitor to Edward I. in 1304. See SCOTLAND, n° 103, *et ſeq*.

WALLACHIA. See WALACHIA.

WALLER (Edmund), a celebrated Engliſh poet, was the ſon of Robert Waller, Eſq; of Agmondeſham in Buckinghamſhire, by Anne, the ſiſter of the great Hamden, who diſtinguiſhed himſelf ſo much in the beginning of the civil wars. He was born in 1605; and his father dying when he was very young, the care of his education fell to his mother, who ſent him to Eton ſchool. He was afterwards ſent to King's college in Cambridge, where he muſt have been very aſſiduous in his ſtudies, ſince, at ſixteen or ſeventeen years of age, he was choſen into the laſt parliament of King James I. and ſerved as burgeſs for Agmondeſham. He began to exerciſe his poetical talent ſo early as the year 1623; as appears from his verſes "upon the danger his majeſty (being prince) eſcaped in the road of St Andero;" for there Prince Charles, returning from Spain that year, had like to have been caſt away. It was not, however, Mr Waller's wit, his fine parts, or his poetry, that ſo much occaſioned him to be firſt publicly known, as his carrying off the daughter and ſole heireſs of a rich citizen, againſt a rival whoſe intereſt was eſpouſed by the court. It is not known at what time he married his firſt lady; but he was a widower, before he was 25, when he began to have a paſſion for Sachariſſa, which was a fictitious name for the lady Dorothy Sidney, daughter to the earl of Leiceſter, and afterwards wife to the earl of Sunderland. He was now known at court, careſſed by all who had any reliſh for wit and polite literature; and was one of the famous club of which the Lord Falkland, Mr Chillingworth, and other eminent men, were members. He was returned burgeſs for Agmondeſham in the parliament which met in April 1640. An intermiſſion of parliaments having diſguſted the nation, and raiſed jealouſies againſt the deſigns of the court, which would be ſure to diſcover themſelves whenever the king came to aſk for a ſupply, Mr Waller was one of the firſt who condemned the preceding meaſures. He ſhowed himſelf in oppoſition to the court, and made a ſpeech in the houſe on this occaſion; from which we may gather ſome notion of his general principles in government; wherein, however, he afterwards proved very variable and inconſtant. He oppoſed the court alſo in the long parliament which met in November following, and was choſen to impeach Judge Crawley, which he did in a warm and eloquent ſpeech, July the 16th, 1641. This ſpeech was ſo highly applauded, that 20,000 of them were ſold in one day. In 1642, he was one of the commiſſioners appointed by the parliament to preſent their propoſitions of peace to the king at Oxford. In 1643, he was deeply engaged in a deſign to reduce the city of London and the tower to the ſervice of the king; for which he was tried and condemned, together with Mr Tomkins his brother-in-law, and Mr Challoner. The two latter ſuffered death; but Mr Waller obtained a reprieve: he was, however, ſentenced to ſuffer a year's impriſonment,

ment, and to pay a fine of 10,000l. After this, he became particularly attached to Oliver Cromwell, upon whom he wrote a very handſome panegyric. He alſo wrote a noble poem on the death of that great man.

At the Reſtoration, he was treated with great civility by Charles II. who always made him one of the party in his diverſions at the duke of Buckingham's and other places. He wrote a panegyric upon his majeſty's return; which being thought to fall much ſhort of that he had before written on Oliver Cromwell, the king one day aſked him raillery, "How is it, Waller, that you wrote a better encomium on Cromwell than on me?" "May it pleaſe your majeſty," anſwered he, "we poets generally ſucceed beſt in fiction." He ſat in ſeveral parliaments after the Reſtoration, and continued in the full vigour of his genius to the end of his life, his natural vivacity bearing him up, and making his company agreeable to the laſt. He died of a dropſy in 1687, and was interred in the church-yard of Beaconſfield, where a monument is erected to his memory. Mr Waller has been honoured as the moſt elegant and harmonious verſifier of his time, and a great refiner of the Engliſh language. The beſt edition of his works, containing poems, ſpeeches, letters, &c. is that publiſhed in quarto by Mr Fenton, in 1730.

WALLIS (Dr John), a celebrated mathematician, was educated at Cambridge; where he became fellow of Queen's college, and continued ſo till, by his marriage, he vacated his fellowſhip. In 1640, he received holy orders, and became chaplain to the lady Vere. While he lived in this family, he cultivated the art of deciphering; and it is ſaid, that the elector of Brandenburg, for whom he explained ſeveral letters written in ciphers, ſent him a gold chain and medal. In 1643 he publiſhed, "Truth tried; or, Animadverſions on the lord Brooke's treatiſe called *The nature of Truth*, &c. The next year, he was choſen one of the ſcribes or ſecretaries to the aſſembly of divines at Weſtminſter. Dr Peter Turner, Savilian profeſſor of geometry in Oxford, being ejected by the parliament-viſitors in 1649, Mr Wallis was appointed to ſucceed him in that place. In 1653 he publiſhed at Oxford a Grammar of the Engliſh Tongue in Latin. In 1655 he entered the liſts with Mr Hobbes; and their controverſy laſted a conſiderable time. In 1657 the Doctor publiſhed his Mathematical Works. Upon the death of Dr Langbaine, he was choſen cuſtos archivorum of the univerſity. After the Reſtoration he met with great reſpect, the king himſelf entertaining a favourable opinion of him on account of ſome ſervices he had done both to his royal father and himſelf. He was therefore confirmed in his places, admitted one of the king's chaplains in ordinary, and appointed one of the divines empowered to review the book of common prayer. He complied with the terms of the act of uniformity, and continued a ſteady conformiſt till his death. He was one of the firſt members of the royal ſociety, and correſponded with many learned men. In 1697, the curators of the univerſity preſs at Oxford thought it for the honour of the univerſity to collect the mathematical works of the Doctor, which had been printed ſeparately, ſome in Latin, ſome in Engliſh, and publiſhed them all together in the Latin tongue, in 3 vols, folio. He died in 1703. He ſpeaks of himſelf thus: "It hath been my endeavour all along to act by moderate principles, being willing, whatever ſide was uppermoſt, to promote any good deſign, for the true intereſt of religion, of learning, and of the public good." Beſides the works above-mentioned, he publiſhed many others.

WALLOONS, a name for the inhabitants of a conſiderable part of the Netherlands, *viz.* Artois, Hainault, Namur, Luxemburgh, and part of Flanders and Brabant.

WALSH (William), an Engliſh critic and poet, the ſon of Joſeph Walſh, Eſq; of Abberley in Worceſterſhire, was born about the year 1660. He became a gentleman-commoner of Wadham college, Oxford, but left the univerſity without taking a degree. His writings are printed among the works of the Minor Poets, printed in 1749. He was made gentleman of the horſe in queen Anne's reign; and died in 1708. He was the friend of Mr Dryden and of Mr Pope; the former of whom eſteemed him the beſt critic then living; and Mr Pope has celebrated his character in the Eſſay on Criticiſm.

WALNUT-TREE, in botany. See JUGLANS.

WALRUS, in zoology. See TRICHECUS.

WALSINGHAM, a town of Norfolk, with a market on Fridays, and a fair on Whit-Monday, for horſes and pedlar's ware. It is ſeated not far from the ſea; and in former times was famous for its college of canons, and was greatly frequented by pilgrims who went to pay their devotions to the image of the Virgin Mary at the chapel, where there are two fine ſprings, called the *Virgin Mary's wells*. Not many years ago there were found here 100 urns full of aſhes, by a huſbandman, which was ſuppoſed to be thoſe which the Romans filled with the aſhes of the dead. It is 22 miles north-weſt of Norwich, and 117 north-north-eaſt of London. E. Long. 1. 0. N. Lat. 52. 56.

WALSINGHAM (Thomas), an Engliſh Benedictine monk of the monaſtery of St Alban's, about the year 1440. He applied himſelf to the hiſtory and antiquity of his country, in quality of hiſtoriographer to the king; and compoſed the Hiſtory of King Hen. VI. with other works.

WALSINGHAM (Sir Francis), miniſter and ſecretary of ſtate under the reign of queen Elizabeth, and one of the greateſt politicians of his time, was deſcended from a noble and ancient family at Chiſlehurſt. After having made great progreſs in his ſtudies at Cambridge, he was twice ſent ambaſſador to France, and at his return to England was employed in the moſt important affairs; became ſecretary of ſtate, and was one of the commiſſioners for the trial of Mary queen of Scotland. Sir Francis undoubtedly one of the moſt refined politicians, and moſt penetrating ſtateſmen that any age ever produced. He had an admirable talent, both in diſcovering and managing the ſecret receſſes of the heart. He had his ſpies in moſt courts in Chriſtendom, and allowed them a liberal maintenance; for it was his maxim, That knowledge cannot be bought too dear. In 1587 the king of Spain having made vaſt preparations, which ſurpriſed, and kept all Europe in ſuſpence, Walſingham employed his utmoſt endeavours for the diſcovery of that important ſecret; and accordingly procured intelligence from Madrid, that the king

had

Walſingham.

had informed his council of his having diſpatched an expreſs to Rome, with a letter written with his own hand to the pope, acquainting him with the true deſign of his preparations, and begging his bleſſings upon him; which for ſome reaſons he could not diſcloſe till the return of the courier. The ſecret being thus lodged with the pope, Walſingham, by means of a Venetian prieſt, whom he retained at Rome as a ſpy, got a copy of the original letter, which was ſtolen out of the pope's cabinet by a gentleman of the bed-chamber, who took the key out of the pope's pocket while he ſlept. After this, by his dexterous management, he cauſed the Spaniards bills to be proteſted at Genoa, which ſhould have ſupplied them with money for their extraordinary preparations; and by this means he happily retarded this formidable invaſion for a whole year. In ſhort, he ſpent his whole time and faculties in the ſervice of queen Elizabeth; on which account her majeſty was heard to ſay, "That in diligence and ſagacity he exceeded her expectations." However, after all his eminent ſervices to his country, this great man gave a remarkable proof at his death, which happened on the 6th of April 1590, how far he preferred the public intereſt to his own, he being ſo poor, that excepting his library, which was a very fine one, he had ſcarcely effects enough to defray the expence of his funeral. His principal works are, 1. Memoirs and Inſtructions for the uſe of Ambaſſadors, with his Letters and Negociations. 2. Political Memoirs.

Walton | Wapentake.

WALTON (Bryan), biſhop of Cheſter, a learned Engliſh divine, who gained great reputation by his edition of the Polyglot bible, with his Prolegomena in the beginning; which is more exact, ſays father Simon, than any other which had been publiſhed on that ſubject. He died in 1661.

WAMPUM, the money uſed by the North-American Indians. It is much uſed in all their treaties as a ſymbol of friendſhip. It is made of a ſhell of a particular ſpecies of VENUS.

WAPENTAKE, is all one with what we call a *hundred;* ſpecially uſed in the north countries beyond the river Trent. The word ſeems to be of Daniſh original, and to be ſo called for this reaſon: When firſt this kingdom, or part thereof, was divided into wapentakes, he who was the chief of the wapentake or hundred, and whom we now call a *high conſtable*, as ſoon as he entered upon his office, appeared in a field on a certain day on horſeback with a pike in his hand, and all the chief men of the hundred met him there with their lances, and touched his pike; which was a ſign that they were firmly united to each other by the touching their weapons. But Sir Thomas Smith ſays, that anciently muſters were made of the armour and weapons of the ſeveral inhabitants of every wapentake; and from thoſe that could not find ſufficient pledges for their good abearing, their weapons were taken away and given to others; from whence he derives the word.

WAR.

WAR is a great evil; but it is inevitable, and oftentimes neceſſary. If he who firſt reduced to rules the art of deſtroying his fellow-creatures, had no end in view but to gratify the paſſions of princes, he was a monſter, whom it would have been happy to have ſmothered at his birth: but if his intention was the defence of perſecuted virtue, or the puniſhment of ſucceſsful wickedneſs, to curb ambition, or to oppoſe the unjuſt claims of ſuperior power, mankind ought to erect altars to his memory.

War, in the laſt caſe, is the moſt neceſſary and uſeful of all the ſciences: the various kinds of knowledge which ought to furniſh the mind of a ſoldier are not without great difficulty to be attained. Of moſt other ſciences the principles are fixed, or at leaſt they may be aſcertained by the aſſiſtance of experience; there needs nothing but diligence to learn them, or a particular turn of mind to practiſe them. Philoſophy, mathematics, architecture, and many others, are all founded upon invariable combinations. Every man, even of a narrow underſtanding, may remember rules, apply them properly, and ſometimes draw juſt conſequences from them: but the ſtudy of war is of another kind. Experience can ſo ſeldom be referred to rules, that nothing but a mind enlightened by diligent ſtudy can make a due application of rules to circumſtances.

Moſt artiſts may join practice to theory, and make one perfect by the help of the other. The warrior has has not always the like aſſiſtance: he ſpends part of his life in forming plans, of which humanity does not ſuffer him to wiſh the execution; and when he has an opportunity of judging from experience of the ſolidity of his principles, the operations are ſo rapid, the motions ſo diverſified, the actions ſo confuſed, that he has ſcarcely time for a glimpſe of thoſe things which require the moſt calm and cloſe conſideration.

In learning of every kind, theory is the completion; in the ſtudy of the military ſcience, it is only the introduction. Many a man, depending on his rules, has found that the marches, the camps, the diſpoſitions, the manœuvres, performed with exact and ſtrict order in the cloſet, have not only been very difficult, but even impracticable in the field. A diſpoſition good in a mountainous country, would be bad in an open one; a diſpoſition proper for one open country may fail in another, for want of foreſeeing that a manœuvre, which in one caſe may have been the cauſe of winning a battle, may in another occaſion its loſs: the circumſtances of time and place almoſt always throw the beſt conſtructed ſyſtems out of order. It is therefore only by dint of ſtudy, and by the contemplation of caſes inceſſantly varied, that the want of practice can be ſupplied, or action at leaſt made leſs difficult.

A military man who would be maſter of his profeſſion, has no hours to loſe; in peace, he ought to ſtudy with the greateſt diligence; in time of war, he will ſee his principles open themſelves of their own accord: his ideas are then more diſtinct; he acts with clearneſs and certainty in all caſes he has foreſeen, and applies his rules to all thoſe which now occur for the firſt time, and which till then had eſcaped his thoughts. Who does not know that bravery, courage, and comprehenſion, are uſeleſs, and often fatal, to a military man who wants knowledge of his buſineſs? Having no previous helps from ſtudy, it often happens that the braver he is, the more he is liable to miſtakes, and the leſs able to foreſee or avoid them.

The ſcience of war branches out into ſo many particulars; it takes in ſo many different parts; there are ſo many reflections neceſſary to be made, ſo many circumſtances and caſes to be brought together; that it is only by a continual application, grounded upon the love of his duty, and an inclination to his profeſſion, that any man can attain it.

To march an army in every ſort of country, whether open, woody, or mountainous; to know how to form a camp in all thoſe countries, with which the general muſt be thoroughly acquainted in order to do it with ſecurity; to make a proper diſpoſition for a battle, whether with a view to the poſture of the enemy, or to the ſituation of the country; to foreſee events which depend in a manner upon chance; to be capable of making a good retreat on proper occaſions; to direct the forages without fatiguing or expoſing the troops; to ſend out detachments with precaution; to conduct the convoys in ſafety; to know how to canton an army; to eſtabliſh magazines in places, both ſafe and within reach of the army, ſo that it ſhall never be in want of ſubſiſtence; theſe are the great ends of the military ſcience. The Alexanders of Parma, the Spinolas, the Guſtavuſes, the Weimars, the Condés, the Turennes, the Montécucullis, the Vendomes, the Marlboroughs, the Eugenes, and all the great men who have gone before us, would never have been the ſubject of our admiration, if they have neglected this ſtudy in any of its branches. It is by courage, genius, and capacity; by having an head always cool, and an eye at once quick and exact; by a nice knowledge of the country, by ſkill in the choice of officers, and by ſtrict diſcipline kept up in his army, that a general is enabled to take ſuch juſt meaſures as will fruſtrate the deſigns of the enemy.

It is commonly thought ſufficient for a military man to know how to obey; and it is alſo ſuppoſed that the ſucceſs of a day cannot be dubious, if a general joins the confidence of the ſoldiers to all the foregoing qualities.

It is true, that, in caſes of perplexity, many generals have in a great meaſure owed to their own capacity, and the confidence their ſoldiers have repoſed in them, the advantages they have gained over the enemy; but is the officer who loves his duty, and who would make himſelf maſter of it, under the leſs obligation to know what qualifications his ſtation requires? That he ought to have ſuch or ſuch a quality, in ſuch or ſuch a circumſtance? that here only bravery is neceſſary, there only courage? and that he is not always obliged to have both at the ſame time?

Theſe two virtues, which are often confounded in the ſame ſubject, merit a particular diſtinction; they are not ſo cloſely united, but they are often to be found one without the other. Courage ſeems fitteſt for a general, and all thoſe who command; bravery more neceſſary for a ſoldier, and all who receive orders; bravery is in the blood, courage in the ſoul; the firſt is a kind of inſtinct, the ſecond a virtue; the one is an impulſe almoſt mechanical, the other a noble and ſublime conception. A man is brave at a particular time, and according to circumſtances; he has courage at all times, and upon all occaſions: bravery is ſo much the more impetuous as it is leſs the reſult of reflection; courage, the more it is the effect of reaſon, becomes more intrepid. Bravery is inſpired by the force of example, inſenſibility of danger, and the fury of action; courage is infuſed by the love of our duty, the deſire of glory, and zeal for our king and country: courage depends on reaſon, but bravery on the conſtitution. Achilles, ſuch as Horace deſcribes him from Homer, implacable, cruel, deſpiſing every other right but that of force, preſents nothing to the idea but the hardineſs of a gladiator. But the Roman general, whoſe death would have produced the ruin of the army, the great Scipio, when covered by the bucklers of three ſoldiers, to avoid a ſhower of arrows which the enemy directed againſt him, approaches in ſafety the walls he beſieged, and ſtanding only a ſpectator of the action, and contenting himſelf with giving them orders, exhibits the idea of true courage. Bravery is involuntary, and depends not at all upon ourſelves; whereas courage (as Seneca obſerves) may be taught and acquired by education; but yet nature muſt ſow the firſt ſeeds of it. It would be eaſy to make the difference of theſe qualities better underſtood, by running over all the caſes in which they make their appearance, were it not for the fear of going too far in ſo copious a ſubject. It is ſaid of a magiſtrate who expoſes his life and fortune in defence of the laws, that he has virtue. Cicero, ſheltering himſelf from the hatred of Cataline, undoubtedly wanted bravery, but certainly he had an elevated firmneſs of mind (which is in reality courage) when he diſcloſed the conſpiracy of that traitor to the ſenate, and pointed out all his accomplices; or when he pleaded for Deiotarus againſt Cæſar, his friend and his judge.

Coolneſs is the effect of courage, which knows its danger, but makes no other uſe of that knowledge than to give directions with greater certainty: courage is always maſter of itſelf, provided againſt all accidents, and regulated by the preſent occaſions; never confounded by any danger ſo as to loſe ſight of the motions of the enemy, or of the means by which he may be moſt effectually oppoſed. At the battle of Cannæ, when Giſco ſeemed to be much aſtoniſhed at the ſuperiority of the enemy's number, Hannibal anſwered him coolly, “There is, Giſco, a thing ſtill more ſurpriſing, of which you take no notice.” Giſco aſking him what it was, “It is (replied Hannibal) that in all that great crowd there is not one man whoſe name is *Giſco.*” Plutarch obſerves, that this coolneſs of Hannibal greatly animated the Carthaginians, who could not imagine that their general would joke at ſo important a time, without being certain of overcoming his enemies.

Although bravery and courage are the moſt eſſential qualifications of a ſubordinate officer, yet he ſhould not be deficient in thoſe which are required in a general, and which have been already mentioned; obedience to the orders delivered to him is no a longer a virtue than whilſt he comprehends and knows the intention of them. War, ſays a celebrated author, is a buſineſs which, like all others, muſt be learned; it ſuppoſes ſome qualities to be born with us, and demands others which are to be acquired: but ſince all theſe qualities muſt have the original ſource in genius, a man who propoſes war for his profeſſion, ſhould never engage in it without having conſulted his natural bent, or without knowing the particular turn and power of his mind. Ability, whether in a general or an officer, is the effect of his genius, quickened by a natural liking to his buſineſs.

But ſome are by their birth engaged in the profeſſion of arms before time has permitted them to conſult their genius and their powers; are theſe men to quit it if they perceive that they are not endowed with every talent that profeſſion requires? Undoubtedly no; becauſe they may acquire them. Study and application will ſupply the defect of genius; docility may ſerve inſtead of talents, the love of glory be equivalent to a liking for their buſineſs, and the virtues of their fathers ſhould always be preſent to their thoughts. When a man has no anceſtors to imitate, he is, as may be ſaid, at liberty to raiſe a reputation of more or leſs luſtre: by being deſcended from celebrated anceſtors, he is obliged to follow their example, and may often improve upon their virtues. Claudius reproached Cicero with being the firſt of his race. But you, anſwered Cicero, are the laſt of your's. An illuſtrious deſcent is oftentimes a burden; if it adds ſplendour to the man of virtue, it always diſgraces him who knows not how to ſupport it.

A quick eye is natural in ſome, and in them it is the effect of genius; others acquire it by ſtudy or experience; he who knows how to command himſelf, and has courage enough to keep himſelf cool on the moſt urgent occaſions, has the readieſt and quickeſt eye. A quick hot-headed man, however brave, ſees nothing; or if he does, it is confuſedly, and generally too late.

It is this quick eye which enables him to judge of an advantageous poſt, of a manœuvre to be made, and of a good diſpoſition for the troops, whether with reſpect to that of the enemy, or to the ſituation and nature of the country.

There is a quickneſs of eye which depends upon the enemy, and another independent of him: it depends upon the enemy when he has made ſuch a diſpoſition, that to attack him, another muſt be made upon the ſpot which renders his defective and weak in ſome parts; or when, being advantageouſly poſted, the general obliges him to change his poſition, by making him fearful of being taken in flank, or being ſurrounded; or when it is ſo contrived as to render the troops on the right uſeleſs by attacking the left, without their being able to aſſiſt it.

It is independent of the enemy, when a commander being at a diſtance, knows how to take an advantageous poſition, and how to chooſe a camp ſtrong by ſituation; when he ſees at once what diſtances there are upon the right and left of the troops that may prevent their being either moleſted or ſurrouuded, and obſerves the poſts neceſſary to be occupied for their ſafety; when he marches with a detachment, and diligently ſurveys the ground by which he may retreat if he ſhould be attacked and repulſed by ſuperior forces, taking care that he may not be ſurrounded, and that the enemy may not be able to oppoſe to him a front more extenſive than his own.

The quick eye is no other than that penetrating genius which let nothing eſcape it. A general who knows how to unite this quality with perpetual coolneſs, never is in want of expedients; he will ſee how thoſe events, which to any other would be the preſage of his own defeat, may end in the overthrow of his enemies.

The army of Cyrus, in the preſence of that of Crœſus at Timprea, took a clap of thunder for a bad omen: this impreſſion eſcaped not the quick eye of Cyrus; but the coolneſs which on this occaſion he knew how to preſerve, ſuggeſted to him an interpretation which removed his ſoldiers fears. "My friends," cried he, "heaven declares for us; come on, I hear the ſound of victory: Great Jupiter, we follow thee."

The choice of the general officers depends upon this genius, which diſcovers every thing; they ought to be the right-hand of the general, and as capable of commanding the army as himſelf.

Whatever good diſpoſitions a general may make, they muſt prove ineffectual if not ſeconded by the general officers under his command; he cannot be every where, neither can he foreſee all exigencies that may ariſe. He is obliged to give only general orders; it is therefore the buſineſs of thoſe who command under him to know how to take the advantage of a wrong movement of the enemy; to take upon them to attack, or ſuſtain the troops which are engaged; and, as circumſtances vary, to make them advance towards the enemy, either to keep him back or to attack him. But ſtill we muſt except the reſerve, which ought never to march without an order from the commander in chief.

But the qualities already mentioned would be uſeleſs, if order and diſcipline were not ſeverely obſerved: the moſt numerous and beſt compoſed army would ſoon become little elſe than a body of rangers, who being only united by the hope of booty, would ſeparate as ſoon as that motive ceaſed; and truſting each to his own head, or indulging his own humour, would be cut in pieces party by party: ſo that, if the general does not keep up ſubordination (the ſoul and ſtrength of diſcipline) his army will be nothing more than a troop of Tartars acting more from the hope of plunder than the deſire of glory. What art and what genius is there not requiſite to maintain this ſubordination? Too much ſeverity diſguſts the ſoldier, and renders him mutinous, diſcourages him and makes him deſert; too much indulgence ſinks him into indolence, and makes him neglect his duty; licentiouſneſs cauſes that ſubordination to ſeem burdenſome, which ſhould never in any degree be given up: he loſes that reſpect, and often that confidence, which he ſhould have with regard to his officer; and indulgence often makes a well-diſciplined body become a ſet of ſluggards, who march againſt their will, and who, on the moſt preſſing emergences, think only on their own ſafety.

The ability, foreſight, and prudence of a general, gains him the entire confidence of the ſoldier and officer: the ſoldier indeed judges but by inſtinct, and is determined only by the event; but his judgment is not leſs infallible: that of an officer is equally juſt, but he is determined only by full conviction; he puts event out of the queſtion, and places his confidence in nothing but courage and prudence. Confidence is again to be acquired by affability to thoſe who are ſubordinate to us, and by ſupplying their wants before they are complained of; theſe two motives for confidence afford a plentiful and certain harveſt of laurels to the general. M. Luxembourg, M. Turenne, Prince Eugene, Marſhal Saxe, and many others, have partly owed the advantages they have gained over their enemies to the confidence of the ſoldiers, who, loving their general, conſidered it as their duty to pleaſe him, and had no joy in victory but as they ſhared it with him.

Beſides theſe qualities, which are eſſential to a general, and which all who would attain that rank ought of courſe to have, there are ſtill many others neceſſary to make a great man. A hero is always a good member of the community; he conſiders humanity as his firſt duty; he is juſt, open, and unbiaſſed; his temper may be fiery, but this ardour is always regulated by prudence: he gives advice with the ſame openneſs as he would aſk it; and never aſks but of thoſe whoſe experience, which he eſtimates rather by their actions than their age, makes them capable of giving ſuch as may be truſted; he is haughty only to his enemies, free to his equals, affable to his inferiors, brave without either arrogance or raſhneſs, and eaſy of acceſs to all.

The general ought to be acquainted with the intereſts and force of princes, (a ſcience very neceſſary in judging of the power of princes upon whom war is made, that he may fall ſooner upon the country of him who can obſtruct his projects, than upon a prince who, by the ſituation of his dominions and force, can make no oppoſition). In a word, a general who would merit the title of a great man, ought to unite in himſelf all civil, military, and political excellence. It is by this that he will eaſily attain to make war with ſucceſs: nothing will eſcape him; he will know without difficulty the genius of every country, and of the nations which compoſe the enemy's army, the abilities of the generals who command, and the nature of the troops under them. Without theſe precautions he would never think that he could act upon certain grounds; he knows he may venture a motion with ſome troops that he would not dare attempt with others that are equally brave. One nation is vehement, fiery, and formidable in the firſt onſet; another is not ſo haſty, but of more perſeverance: with the former, a ſingle inſtance determines ſucceſs; with the latter, the action is not ſo rapid, but the event is leſs doubtful.

No man is born a general, although he brings into the world with him the ſeeds of thoſe virtues which makes a great man: Cæſar, Spinola, Turenne, the great Conde, and ſome others, ſhowed, even in their earlieſt years, ſuch qualities as ranked them above other men; they carried within them the principles of thoſe great virtues which they drew forth to action by profound ſtudy, and which they brought to perfection by the help of practice: thoſe who came after them, with perhaps fewer natural talents, have by ſtudy rendered themſelves worthy of being compared to them. Cæſar and all conquerors had this advantage, that they were able to make their own opportunities, and always acted by their own choice. A man may be a good general without being a Marlborough or a Turenne: ſuch geniuſes are ſcarcely ſeen once in an age; but the more they are raiſed above the reſt of mankind, the more they ought to excite emulation. It is by endeavouring to ſurpaſs the intellects of the ſecond rate; it is by ſtriving to equal the moſt ſublime, that the imitation of them is to be attained. This paſſion in a ſoldier is neither pride nor preſumption; it is virtue: and it is by this only that he can hope to be ſerviceable to the ſtate, and add to the glory of his king.

How much ſoever the honour of commanding armies may be ſought after, it degrades him who is not worthy of it; this rank, ſo much deſired, borders on the two extremes of glory and ignominy. A military man who labours to make himſelf capable of commanding, is not to be blamed; his ambition is noble: by ſtudying the art of commanding, he learns that of obeying and of executing. But it is aſtoniſhing in the higheſt degree to ſee ſoldiers thinking only on preferment, and neglecting the ſtudy of their buſineſs. It is perhaps leſs ſurpriſing if we ſee others, without having been tried, propoſing to themſelves to command in chief; becauſe ſuch attempts ſuppoſe in the projector an abſurd temerity, founded on a profound ignorance of the talents he ought to have, and the virtues which he has not. Such boldneſs is the character of a man whoſe mind is too narrow to perceive his danger: We ſhould rather approve the timidity that ſuffers itſelf to be dejected by terror, ſince it ſhows at leaſt that he knows to what hazards he is expoſed; both one and the other are blameable: modeſty is the only proper quality of a ſoldier; it gives ſplendour to virtue, it argues diffidence of himſelf, and deſire of arriving at perfection.

Mardonius, Xerxes's general, propoſed himſelf to the king to command his armies; this conceit of his own talents ought to have been anſwered by a refuſal: the innumerable troops which he led were defeated by a ſmall number of Greeks, and his preſumption ſerved but to increaſe the misfortune of his prince. Cincinnatus, endowed with every quality both of a great man and a great ſoldier, was holding his plough when the Roman's came to intruſt the fate of the republic to him: he ſet out; and Rome was delivered from her enemies.

The title of general would be leſs tempting, if proper attention was paid to the qualities it requires, and the duties it impoſes; it would then appear a very honourable, but painful burden. The moſt firm and and intrepid genius might be diſcouraged, merely by thinking that on the conduct of a general depends the fate of a ſtate, the glory of his prince's arms, and his own reputation.

But yet the reward that follows ſuch irkſome labours ought to animate men to undertake them. Obſtacles, however numerous they may be, are not inſurmountable, ſince ſo many great men have got the better of them: difficulties ſhould ſtir up a ſoldier's emulation, but ſhould never terrify him; he ſhould endeavour to copy ſuch great originals, though he ſhould not be able to equal them.

This treatiſe is divided into four parts.

In the firſt are mentioned all the greater operations of a campaign; and the means of executing thoſe operations, in any kind of country, are endeavoured to be laid down.

In the ſecond, the precautions that are to be taken to attack the enemy in all the forementioned operations, are conſidered.

Defenſive Operations.

The third treats of the *Petite Guerre*, or the operations of detached parties, and the war of poſts.

The fourth, of ſieges, both with regard to attack and defence.

Part I. Of the GREATER OPERATIONS in DEFENSIVE WAR.

Sect. I. *Of the Knowledge of a Country.*

A Campaign of which the plan is well formed, and the diſpoſitions well concerted, may nevertheleſs prove unſucceſsful, if the general, to whoſe direction they are intruſted, hath not a thorough knowledge of the country in which they are to be carried into execution. The marches, camps, convoys, forages, detachments, in ſhort the moſt important operations, will be performed with impropriety, if this knowledge is not previouſly acquired: events are often determined by it.

There is one knowledge of a country, which for an officer to be without, ſhould be conſidered as a reproach; that of the ſituation of cities, towns, villages, foreſts, ſtreams, rivers, which is to be acquired by ſtudying of geographical maps. There is another branch of knowledge yet more particular, ſuch as, of the paſſes, or the boundaries of the country, the ſituation, the nature of the ground, whether it is plain, or divided by hollows, rivulets, hills, &c. which is to be acquired by the aſſiſtance of topographical maps. In the ſtudy of theſe laſt, care muſt be taken, not blindly to follow the marks they lay down. It very ſeldom happens, that topographical maps are perfectly exact: for, beſides the many circumſtances which may ſometimes in a year alter a large extent of country, they ſeldom take notice of fords, bridges over the ſmall rivulets, ſmall hills, and hollows of little importance; neither can they mark whatever may be occaſioned by recent inundations and diſruptions of the earth: whereas any of theſe unforeſeen circumſtances may prove an obſtruction to a great deſign, either by retarding the the march of an army, preventing a column of troops from advancing, or leaving the enemy in poſſeſſion of ſome paſſes from which he might have been driven.

It is nevertheleſs impoſſible for a map to explain every particular: for example, an hollow way may be marked, but its depth will ſtill remain unknown; neither can it ſhow whether the aſcent and deſcent of it be eaſy or difficult. A general, ſtudious to avoid the imputation of negligence, ought, before he engages in an enterpriſe, to make himſelf acquainted with every particular relating to the country, and by that means make up for the deſiciences of the maps. In ſhort, if he is deſirous of fixing a camp in a poſition ſtrong by ſituation, but unacquainted how that is to be done, or in what manner the wings can be ſupported, he ſhould then get information whether there is any river by which the camp may be covered, whether this river can be paſſed eaſily, and what is the nature of its banks.

In order to avoid the errors into which a general may be drawn by the maps, the ſafeſt method is to apply to the inhabitants of the country, and go over it with the moſt intelligent of them, and remark every obſtacle, however trifling in may appear.

For marching with greater ſecurity, a general ought to form a company of guides of the peaſants, be aſſured of their fidelity, and attach them to him by all poſſible methods, particularly by unbounded liberality. It is by money only that truſty ſpies and faithful guides can be ſecured; the latter are leſs expenſive, but full as neceſſary as the former. Parſimony ſhould be avoided in war; for, as Vigetius obſerves, money ſhould never be ſpared when expence is neceſſary to ſecure poſſeſſion. In proportion as an army advances into a country, great care muſt be taken to change the guides.

The command of this company ſhould be given to an intelligent man, who ſhould be perfectly acquainted with every thing relating to the country, and who ſhould alſo be fully able to anſwer any objections ſtarted by the general or officer that accompanies him. This company of guides will be capable of informing the general of whatever may have eſcaped his obſervation, of directing him in his inquiries, by which means his diſcoveries will always be to be depended upon. By this manner of proceeding, neither will the poſition, or the diſtance of one place from another, nor the ſituation of any particular city, town, or village, nor any circumſtance be unknown to a general who joins their information to what he himſelf already knows: he will be informed of all the pathways, of the different roads leading into the country, and what number of them terminate at the ſame point; he will judge what number of men, either horſe or foot, can march abreaſt, whether the enemy can prevent his purſuing his intended route, by taking the field, and to what diſtance he will be able to march in ſafety.

The general ſhould ſend out detachments along with ſome of theſe guides to examine the ſtreams which croſs the country, whether or no their mouths are at a diſtance, into what river they empty themſelves, from whence they take their ſource, whether they may be eaſily forded, if their banks are ſteep or ſlooping, marſhy or covered with buſhes; other detachments ſhould be employed in examining the woods, in order to find out whether troops can paſs through them or not.

A general ought himſelf to examine into the truth of the reports made to him by theſe ſmall detachments, or ſend out others more conſiderable under the command of general officers: however certain a general may be of the fidelity of his ſpies and guides, yet he ſhould not always rely upon their reports: miſtruſt, which in general is accounted a vice, may almoſt be eſteemed a virtue in the buſineſs of war.

Furniſhed with theſe lights, a general can allot the eaſieſt road to the artillery and baggage, the ſhorteſt to the infantry, and longeſt to the cavalry: he can at once judge, from the nature of the ground, into how many columns the army can be divided in order to expedite the march, and what diſpoſitions will be neceſſary for the columns with regard to the enemy's poſition.

By the knowledge of the country, a general is informed of what camps the enemy doth or can occupy, and of thoſe neceſſary to be taken to oppoſe his deſigns;

ſigns; whether the enemy's detachments can eaſily approach, or how he can himſelf advance towards him, without being diſcovered; if there is forage in the neighbourhood of the enemy's camp, or whether he is obliged to draw it from a diſtance; where he hath fixed his magazines, and whether an attempt to carry them off is practicable or not; in what manner his quarters are diſpoſed, and which of them is moſt expoſed; what diſtance there is between himſelf and the enemy; where the enemy hath eſtabliſhed poſts, and which thoſe are that himſelf ought to occupy with regard to the ſituation of his own camp and quarters, and thoſe belonging to the enemy; which is the propereſt road for the detachments and the patroles to keep, in order to gain intelligence; and laſtly, with what degree of eaſe the enemy can attack the army on its march, and whether in front or flank. This knowledge is eſſential to a general in every kind of country; but in a woody or mountainous country, it would become more particularly dangerous, and even impoſſible for him to march an army, if unacquainted with it.

By the maps, a general will know whether there be foreſts in a country: but if he does not endeavour to get a more particular information, he will be unacquainted with the nature of them; whether they are boggy, ſmooth, or rugged; and conſequently, whether it be poſſible for the troops, artillery, and baggage, to paſs through them.

In 1702, the duke of Burgundy, being deſirous to attack the enemy who were behind Cleves, but not being perfectly acquainted with the foreſt in his front, he detached the marquis d'Alegre with 500 grenadiers, and 800 horſe, to ſee if it was not poſſible to find ſome paſſage through it. M. d'Alegre met with a defile which was occupied by the enemy: he attacked and forced it; but being advanced beyond it, found it was not poſſible to proceed farther, by reaſon of the great number of defiles that ſucceeded to each other: he thereupon turned back, ſent, and had another paſſage ſurveyed, where there were found ſtill greater obſtacles. He gave an account of this to the duke of Burgundy, who, not chooſing to miſs the opportunity of attacking the enemy, ſent him out again with a larger detachment, that he might examine whether, by keeping along the ſide of the foreſt, it would not be practicable for him to march up to them by way of the heaths of Mook, on the ſide of Grave and Nimeguen. The marquis d'Alegre diſcovered a defile which led to theſe heaths: he took poſſeſſion of it, and ſent notice thereof to the duke of Burgundy; who ordered the army to advance, obliged the enemy to ſend their infantry into Nimeguen, and cannonaded their cavalry which had taken poſt on the glacis, but were unable to maintain it; and the conſequence was, that the enemy ſuſtained a great loſt in men, artillery, waggons, and baggage.

This example tends to prove, that maps are not always to be relied on. There can be no reaſon to doubt that the duke of Burgundy was furniſhed with the moſt exact: but yet it is probable that he might not have ſucceeded in this enterpriſe, if he had neglected ſending M. d'Alegre to ſurvey the paſſes, and examine two, before he proceeded to that through which he marched.

The following is a general rule: That it is upon the ground, and not upon maps, that the roads thro' which an army is to march muſt be examined, as well as the ſituation of places where camps are to be fixed, and fields of battle choſen. An army ſhould never move before ways are opened for every column: with regard to a detachment it is different, as there may ariſe circumſtances which will prevent the general from foreſeeing what road it may take. The command of a detachment ſhould always be given to an intelligent officer, and one who has made his buſineſs his only ſtudy; who hath been particularly careful to acquire a knowledge of the country, and of whoſe genius the general ſhould entertain no doubt. A particular choice ſtirs up emulation in young men, and induces them to exert their utmoſt endeavours to deſerve ſo diſtinguiſhing a mark of approbation.

Into how many miſtakes have even the greateſt generals fallen, by not being thoroughly acquainted with a country, and by ſuffering themſelves to be guided by general notions? M. de Feuquieres cites many examples of great enterpriſes which have miſcarried by it.

Toward the end of the year 1673, when a conſiderable body of infantry, with only few cavalry, was on its return from Holland, under the conduct of M. de Luxemburg, the prince of Orange having aſſembled the whole force of the Dutch and the Spaniards (under his command) came upon the Maeſe, with an intention to fight M. de Luxemburg between Maeſtricht and Charleroy. This march made it neceſſary for the court to ſend an order to M. de Schomberg to aſſemble all the cavalry that were in Hainault and Flanders, and immediately join M. de Luxemburg, who was greatly inferior to the prince of Orange in cavalry. The prince's aim then ſhould have been to prevent the two generals from joining, and to have fought one or other of them before their junction. The prince's being unacquainted with the country, made him miſtake for real the feints made by M. de Luxemburg, whilſt he was upon the river Ourte; as if his intention was to march by way of the Condros and the Ardennes, in order to gain Sedan and the Mezuris. The prince of Orange drew near Huy and Namur; and by that means was at ſuch a diſtance from the high-road, that M. de Schomberg had an opportuuity of advancing with his cavalry to Tongres; at the ſame time that M. de Luxemburg, by a forced march, paſſed the Maeſe at Maeſtricht, and arrived at Tongres, where the junction of the two armies was effected without any accident.

If the prince of Orange had made only two reflections upon the nature of the country, he would have avoided the miſtake he fell into; the firſt of which is, that ſcarcely any body can be ignorant that the Condros and the Ardennes are ſterile and mountainous countries; from whence it is evident, that M. de Luxemburg could not have ſubſiſted his army, eſpecially in the month of December: the roads in thoſe parts, very bad in the ſummer, are almoſt impaſſable during the winter; conſequently the carriages could not have paſſed but with the utmoſt difficulty.

The ſecond reflection is, that if M. de Luxemburg had actually deſigned to paſs through the Ardennes, why did M. de Schomberg advance towards Tongres, and ſo expoſe himſelf to the danger of being beaten, without a poſſibility of receiving help from M. de Luxem-

Defenſive Operations.

Luxemburg, who was on the other ſide of the Maeſe? If the prince of Orange had had a thorough knowledge of the country through which M. de Luxemburg pretended he would paſs, he would ſoon have perceived that it was only to throw him into a perplexing uncertainty with regard to the road which the enemy's general ſhould naturally take: in a word, he would not have remained a moment in doubt on the part he had to act.

By this, then, it appears, that the prince ought to have continued on the ſide of Liege; by which poſition he would have ſtopped M. de Schomberg, who would have ſcarcely dared to advance to Tongres, nor would M. de Luxemburg have attempted the paſſage of the Maeſe at Maeſtricht: by this means, the junction would have been prevented; or, if either of the two armies had advanced, the prince could have attacked and beaten it; neither would it have been in the power of the other to have aſſiſted it.

It is certain, that a thorough knowledge of the country would have induced the prince of Orange to have remained on the other ſide of Liege; by which poſition the junction of M. de Schomberg and M. de Luxemburgh would have been impoſſible: this laſt would then have been, in a manner, compelled to continue his march by the Condros and the Ardennes; and the prince of Orange, without loſing a man of his own army, would have made M. de Luxemburg loſe a great number of his, who would have been unable to have reſiſted both hunger and cold.

With the company of guides, and an exact knowledge of the country, a general will be enabled to undertake an enterpriſe, that another with double the number of troops durſt not thing of attempting. Theſe precautions will furniſh him with ſtratagems, oftentimes more efficacious than force and courage: under the appearance of flight, a general will often get poſſeſſion of an advantageous poſt, and decoy the enemy into one that may prove his undoing.

It hath frequently happened, and will continue to do ſo, that a general who knows how to take advantage of the knowledge of the country, although inferior in point of force, may change a defenſive into an offenſive war. In 1671, M. de Créqui, who began the campaign on the defenſive, ended it with obliging the duke of Lorrain to paſs the Rhine: that prince diſperſed his army, and then M. de Créqui formed the ſiege of Fribourg.

The knowledge of a country is ſtill more eſſential in retreats: there is more art and more precaution required in a retreat, than in any other action; that operation is the concluſion of all preceding ones. If a general, obliged to retreat precipitately, hath but a ſuperficial knowledge of the country, how will he be able to reaſſemble his troops, reeſtabliſh order, or march with any degree of ſecurity?

Xenophon's retreat with the ten thouſand Greeks, is one of the moſt uſeful leſſons a commander can ſtudy: in that undertaking were united the virtues of a conſummate general, and the moſt intrepid courage of a ſoldier; and in particular it exhibits the moſt profound knowledge of the country.

The knowledge of a country is as neceſſary for a private officer as for the commander in chief, becauſe he is to execute in part what the general performs with all the troops. When an officer, to whoſe conduct an expedition is intruſted, joins this knowledge, one of the chief branches of military ſcience, to practice and experience, he will with ſo much the greater eaſe comprehend and execute the general's intention and plan; and he will be alſo enabled to take the propereſt meaſures for ſucceſs: if, on the contrary, he begins a march, without being acquainted with the country, his mind miſgiving him, will increaſe the danger, by the very means he takes to avoid it: he will ſuppoſe it in places where there is nothing to be feared, and often fall into it where he was leaſt apprehenſive of it.

The general who commands in the cantonments and winter-quarters, and each officer who commands a particular quarter, will never be able to take proper meaſures if they are unacquainted with the country: they will be unable to preſerve a proper ſtrength when ſeparated, or to aſſemble without difficulty on the firſt order; and for want of knowing the poſts which it is proper to guard, they will occupy ſuch as are unneceſſary, and leave thoſe defenceleſs that are moſt liable to be attacked; the troops will be greatly fatigued by increaſing the number of poſts without occaſion, by ſuperfluous or too numerous detachments or patroles. In a word, whatever precautions are taken within, the quarters will never be in ſecurity, if the country round about them is not perfectly known.

Unleſs a general demoliſhes thoſe bridges which from their diſtance he cannot guard; if he neglects getting poſſeſſion of all the paſſes, occupying the country that is between him and the enemy with detachments, and cutting off all commnnication with the enemy and his camp, he will be liable to be ſurpriſed in it. A general ſhould always know whether there are any rivers between his camp, his quarters, and the enemy's; he ſhould conſtantly have detachments upon thoſe rivers, to prevent the enemy from repairing the bridges or paſſing the fords; he ſhould cauſe the woods to be carefully ſcoured; he ſhould occupy the avenues and the defiles, and know at what place the roads begin, and where they meet: if any of theſe precautions are neglected, a general can never remain quiet, but will always lie open to ſome ſurpriſe.

SECT. II. *Of the Preparations before taking the Field, and the March of an Army on leaving its Quarters to go into Cantonments.*

THE time for an army to come out of winter-quarters, is always regulated by the plan which the general has formed for the enſuing campaign. It leaves them very early, when they are at a diſtance from the country where the war is to be carried on; but later, if, by their ſituatton, the operations of the campaign can be commenced after having made two or three marches; but whether by the ſituation of the quarters the army is enabled to enter immndiately on the campaign, or whether it muſt be firſt of all cantoned, the magazines ſhould be ſo ſituated as to be always within reach, eſpecially in that early ſeaſon of the year, when there can be no forage upon the ground, and conſequently the cavalry muſt be ſubſiſted out of the magazines. The magazines ought to be diſtributed about in different parts, that the troops may have leſs way to go for their forage. The general is to iſſue his orders to the intendant of the army for whatever regards the magazines, and to mark thoſe places to him where he would have them eſtabliſhed; and, for the greater ſecurity of theſe places, there muſt be troops poſted in them, the roads ſhould be good, and the communication well guarded, by which means the convoys will arrive in ſafety.

The diſtribution of the magazines ſhould be regulated by the movements which the general foreſees the army will make on leaving its quarters, ſuppoſing it leaves them when there is only dry forage; but if the army is in an enemy's country, and there is forage upon the ground, it is certainly better to reſerve the magazines entire, by which not only great trouble will be avoided in tranſporting the forage, but alſo a great expence ſaved to the government.

Of what nature ſoever the country may be (an enemy's country is ſuppoſed) it ſhould be foraged in front, as much as poſſible, in order to reſerve that which is in the rear, that, when the campaign is over, it may be found laid up in the barns: if this precaution is not attended to, the army will be deſtitute of forage at its return, and will of courſe be obliged to draw it from home, and conſume thoſe magazines which were before ſpared; conſequently there will be nothing ſaved, the expence will only have been deferred, but it will be increaſed by tranſporting the forage from the magazines to the army.

The forming of the magazines ſhould never be delayed till the time for opening the campaign approaches. The intendant, purſuant to the general's order, ſhould lay in the proviſions during the winter, and diſtribute them in the frontier towns, by which means they can eaſily be tranſported to whatever place the general ſhall order. By theſe precautions, the general will not only avoid the inconvenience of being obliged to wait till there is forage upon the ground, but he will alſo be enabled to be firſt in the field.

The ſame precautions ſhould alſo be taken with reſpect to the artillery; whether for that wanted for a ſiege, if it is intended to open the campaign by that operation; or whether for that which is neceſſary in the courſe of a campaign. It ſhould be aſſembled upon the glacis of the frontier towns, or rather upon that of the conquered places: the more it is within reach of readily joining, the ſooner the operations will be commenced.

From prudence in the execution of theſe diſpoſitions, as well for the magazines and for the artillery, as for every thing that is neceſſary to an army, it follows, that a general hath often formed a ſiege, or at leaſt inveſted a place, and completed his lines of circumvallation, before the enemy could be in a condition of coming out of his quarters: he will likewiſe have made many marches, and will have poſſeſſed himſelf of advantageous poſts, without the enemy having it in his power to oppoſe him.

The ſucceſs of the general's deſign is aſcertained by his own forecaſt, and the diſpatch with which his orders are executed; negligence and ſloth are always productive of miſcarriages.

Here would be the proper place to point out the order which an army ſhould obſerve in its march to inveſt a town, and to mention the precautions neceſſary to be taken for doing it with ſecurity; but this would be only repeating what has been already ſaid by the marſhal de Vauban, with regard to this grand operation. What could be ſaid here would not in the leaſt add to the depth and wiſdom of his inſtructions: the reader is therefore referred to the writings of that great man, as this branch of military ſcience doth not fall within the deſign of this work.

A general ſhould obſerve, that, in order to make an army come out of its quarters, and cauſe it to be cantoned within a march of the country where he deſigns to commence the operations, he muſt make all the troops leave their quarters together; aſſemble them in many bodies, in different frontier towns; proportion the marching days to the diſtance of the quarters and the rendezvous that ſhall have been appointed for them, that they may arrive on the day appointed, and that from thence they may march in a body to the place where they are to canton.

All the bodies march, either in the number of columns that the ſituation of the country will allow, and arrive at the cantonment together; or elſe they march ſeparately, and arrive on different days: but, in either of theſe caſes, the cantonments for each regiment ought to have been marked out; and, if poſſible, forage for at leaſt three or four days diſtributed to each quarter.

In the marching-orders which are ſent to each commander, the ſituation and name of the place where each regiment is to canton, ſhould be carefully expreſſed; whether on the right, the left, or in the centre: the diſcipline to be there obſerved, the place where to go and receive orders, and that where to receive forage, ſhould alſo be particularly ſpecified.

Troops, when upon a march, ſhould always obſerve the moſt exact diſcipline; and never be ſuffered to advance, but in the ſame order, and with the ſame precaution, as if they were in danger of being moleſted or attacked.

Wherever an army is cantoned, it is generally in an enemy's country; therefore, for the greater ſecurity of the cantonments, there ſhould at leaſt be one place that may ſerve for a ſupport. In 1746, Bruſſels was the centre of the cantonments of M. Saxe's army. In 1747, his quarters were ſuſtained by Anvers on the left, Malines and Louvain ſupported the centre, and Namur the right. If no place of this ſort can be found, the army muſt then march out together and encamp, inſtead of going into cantonments.

As the cantonments are properly nothing more than a halting place, where the troops are to remain till the ſeaſon permits them to take the field, till the proper quantity of forage is collected, or till the neceſſary preparations for the intended operations are completed, they ſhould neceſſarily be more connected than the winter-quarters. But as ſoon as the weather permits, and all the neceſſary preparations which ſhould have been forwarded during the winter are finiſhed, there is then no time to be loſt; for an army will always find its advantage in encamping early, getting the ſtart of the enemy as much as it poſſibly can, and beginning the campaign, no matter by what operations, before the enemy can have time to aſſemble.

The greateſt generals of former times have conſtantly adhered to this rule; and, in our times, it hath always been followed by marſhal Saxe. The cantonment

ment of his army under Bruſſels in 1745, and the famous march he made in 1748 to inveſt Maeſtricht on leaving his quarters, are examples which ought to ſerve as models; but in all theſe caſes, the varying of circumſtances muſt be attended to.

If any particular column, upon the march, preſents its flank to any of the enemy's towns, although it is indiſpenſably neceſſary for every column to obſerve all poſſible order and diſcipline on the march, yet this column is more particularly obliged to it; neceſſity makes it become a duty. But that it ſhould not be too much expoſed, ſome huſſars ought to be appointed to march upon its flank, who ſhould alſo be ordered to advance till they come within ſight of thoſe towns. This column, whether conſiſting of infantry or cavalry, muſt detach ſome troops to ſuſtain the huſſars, in caſe they ſhould be attacked and repulſed. By poſting theſe detachments upon the flank, the enemy will be kept at a diſtance from the column, and the huſſars will be alſo ſuſtained.

Sect. III. *The March of an Army in an open Country.*

If, according to the obſervation of Vegetius, an army is in a more dangerous ſituation upon a march than when it is drawn up in order of battle, becauſe a ſoldier, not ſeeing his enemy, is not ſo much upon his guard, there is conſequently a greater degree of precaution required in a general, that he may not be ſurpriſed by an unexpected attack, or fall into ambuſcades, the likelihood of which ſhould always make him proceed with caution.

It is upon a thorough knowledge of the country which is the ſeat of war, that a general ſhould direct the march of armies; that he ſhould concert the meaſures for conducting them in ſafety; and that he will be enabled to foreſee the enemy's motions.

There are but three ſorts of countries which may became the theatre of war, an open country divided by rivers, a woody, or a mountainous one. The diſpoſitions for a march muſt be varied as the ſituations of places are different. Although the face of an open country is ſometimes interrupted by woods or hollows, there are nevertheleſs fewer precautions neceſſary, becauſe it expoſes, or at leaſt does not greatly conceal, the enemy's manœuvres from the general. In a mountainous country the danger becomes more conſiderable, becauſe thoſe very obſtacles which ſerve to impede the progreſs of an army may prove ſo many reſources to the enemy, who can march without being ſeen, and lay ſnares at almoſt every ſtep they take.

When an army is in an open country, the general may take whatever road he thinks moſt convenient, without being under a neceſſity of keeping the beaten road. If he chooſes to march acroſs the country, it may be done by cutting down the hedges, filling up the ditches, levelling the ridges, and filling up the hollow ways, thereby rendering their aſcent or deſcent eaſy, and by building bridges over the ſtreams and rivulets which divide the country. But nevertheleſs it is very imprudent for a general to ſuppoſe himſelf entirely free from danger upon a march; for the conſequences of ſelf-ſecurity are generally fatal. The effects of negligence in any military operation are pernicious, but more particularly ſo upon a march; and although a general ſhould never fear his enemy when in preſence of him, he ſhould nevertheleſs always apprehend the worſt from him when he is out of his ſight.

The number of columns in which an army can march in an open country is arbitrary, whilſt it is advancing, and the enemy at too great a diſtance to attack or annoy it upon its march. But if, on the contrary, the enemy is near at hand, and there is a poſſibility of his attacking the army, it ſhould then be diſpoſed after ſuch a manner, as to form in order of battle in a very ſhort time, and to be able to take a favourable poſition for action upon the firſt ſignal.

The ill ſucceſs of the French at the battle of Ramillies may perhaps be in ſome meaſure attributed to the neglect of this precaution, as it is certain that the French general preſerved his original poſition, notwithſtanding the Duke of Marlborough changed his.

If the army preſents its flank to the enemy, the diſpoſitions, without conſidering the probability of its being attacked, ſhould be changed; for an army upon a march ought to be always prepared againſt any accident that may happen.

A general ſhould never cauſe an army to move without having previouſly conſidered and examined the intended march of it, nor without a thorough knowledge of the enemy's poſition, and where he is, or without knowing particularly the ground intended to encamp on. An army ought never to move but with ſome deſign, either to ſeize on ſome advantageous poſt, to prevent an intended march of the enemy's, to draw him into a diſadvantageous ſituation, to deprive him of ſubſiſtence, or to procure ſome for itſelf.

This maxim being eſtabliſhed, let it be ſuppoſed, that a general would cauſe his army to march, and the enemy's diſtance to be alſo ſuch as to ſecure him from any danger of attacks; the general hath it in his power to open four, ſix, or eight roads, in proportion to the number of the troops under his command: for the more number of columns, the leſs is the body of troops contained in each; conſequently there will be leſs confuſion, and the ſooner will the army arrive at its deſtined camp.

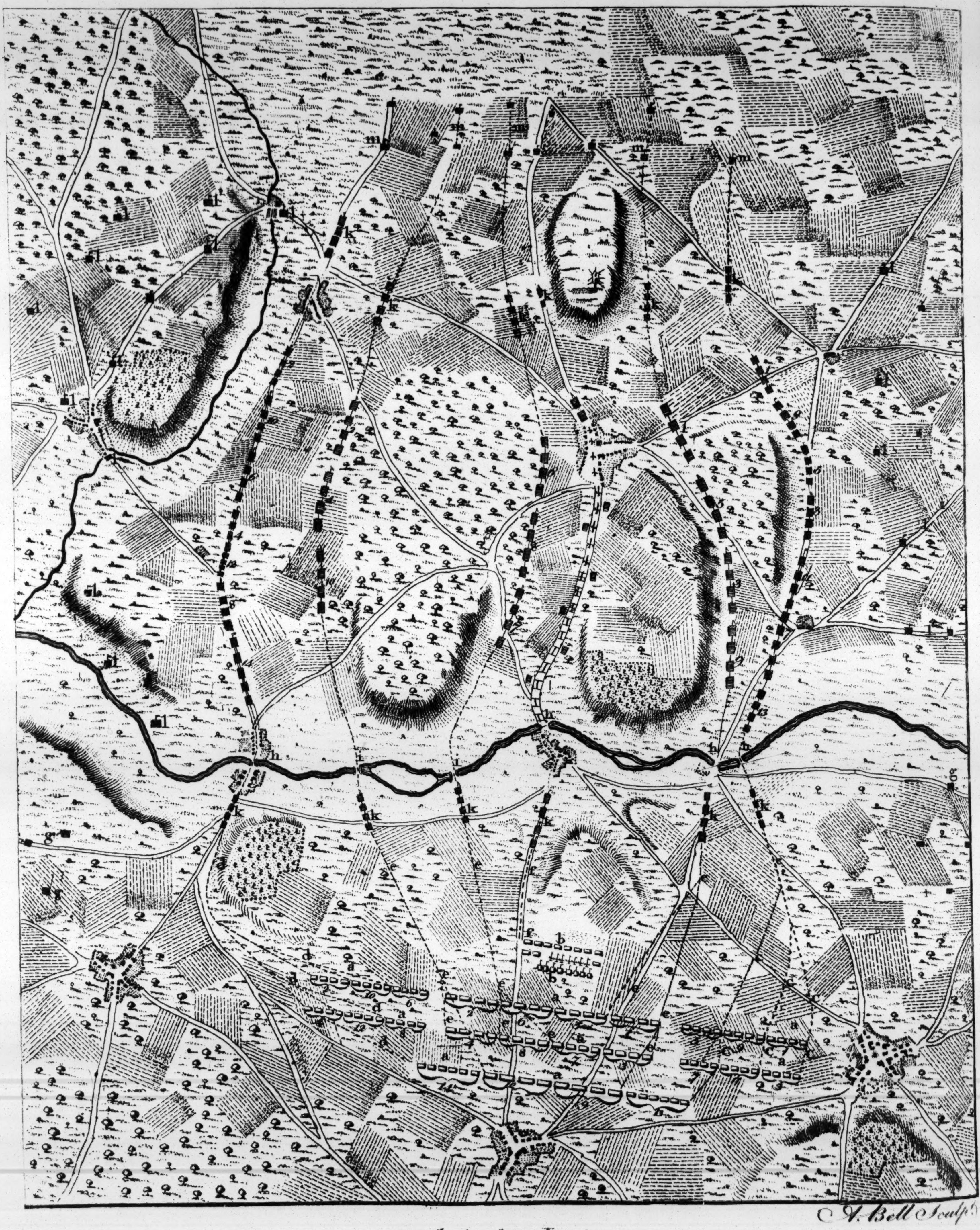
The general having nothing to fear from the enemy, who, as hath been juſt ſuppoſed, is at a diſtance, orders the army to march in ſix columns; it ſeems probable he would cauſe it to be executed by the following diſpoſitions, of which, however, only a general idea can be formed, the whole being dependent upon particular circumſtances.

Before the march is planned, and the number of columns determined upon in which the army is to march, notwithſtanding the general is acquainted with the country, he ſhould ſend out a detachment ſome days before, to reconnoitre the intended route of the army, as well as the camp it is to occupy. This detachment is to be commanded by the officers of the day appointed for its ſetting out: they muſt have ſtaff-officers and guides with them, to conduct and to inform them of the nature of whatever may prove an obſtacle, of the places where the roads begin, and thoſe where they terminate: they ſhould alſo have labourers with them, to mend the ways, enlarge the roads, and make new ones, if neceſſary; to cut down the hedges, fill up the ditches, level the ridges of the hollows, and build or repair bridges.

3 MA 53

WAR.

Plan of the March of an Army in Six Columns.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A. Bell Sculp.

Scale of ½ a League.

50 100 200 300 400 500 600 1200 T.

When the general commanding this detachment is ready to enter the different ways through which the army is to follow, he will divide his detachment into as many ſeparate bodies as the army is to be divided into upon its march: if into four, the major-general takes the command of one, the brigadier of another, the colonel of the third, and himſelf will remain at the head of the fourth. This diviſion being thus made, he will diſtribute ſtaff-officers, guides, and labourers, to each detachment, with orders to meet again at the ſame place from whence they ſeparated.

Each of theſe detachments ſhould advance to the extremities of the woods, if they meet with any, and of the roads leading to the camp intended to be occupied: the commanding and ſtaff-officers will then advance with an eſcort to reconnoitre its ſituation, and will leave part of their men in ambuſcade in the woods, or concealed behind ſome heights, or in ſome hollows. The knowledge of the ſituation of the camp being attained, each detachment will return by the road it came; but firſt, the commanding officer of each detachment will make a report to the general of the roads they have paſſed, what diſcoveries they have made, and, in ſhort, will give him a particular detail of every thing they have met with on their way, whether woods, villages, hollows, bridges, and of every thing they have done to render the road eaſy for the column that is to paſs through it. This detachment being aſſembled at the place appointed for meeting, will take the road to the camp, where being arrived, the lieutenant-general will make his report to the commander in chief of the army.

With theſe precautions the army may not only advance in ſafety, but the roads alſo for every column having been reconnoitred and repaired, no accident can happen to retard the march of the army.

The general muſt take care to have detachments of huſſars or dragoons always in the front and upon the flanks, to obſerve and clear the march of the army; neither ſhould a general ſuppoſe himſelf to be in an entire ſecurity from the diſtance of the enemy: but whilſt he ſees all clear before him, it would ſhow great weakneſs for him to be apprehenſive of a ſurpriſe, eſpecially when every neceſſary precaution for avoiding it hath been taken. It is certainly a mark of prudence to take precautions; but multiplying them without cauſe is an undoubted ſign of fear and anxiety.

It is proper to make the army march, as near as poſſible, in the ſame order in which it is to encamp; by which means the troops may enter the camp without confuſion. The army being ſuppoſed to march in ſix columns, the infantry will form three, the artillery and baggage the fourth; the cavalry, with the remainder of the corps of huſſars that are not detached, and the dragoons, the two laſt upon the flanks; ſo that the army, on its march, will be in the following diſpoſition: The column upon the right will conſiſt of cavalry, the one adjoining to it of infantry, and that which comes next will be formed by the artillery and baggage; then two columns of infantry, and the ſixth cloſing, the left will be compoſed of cavalry. It is to be obſerved, that, if the baggage-waggons belonging to the army form too long a row, ſome of them may be ſent into the rear of the columns of infantry, with expreſs orders to the officers to make them march in the column.

There ſhould be an advanced and a rear guard to each column, formed from the troops of which the column is compoſed; there ſhould be alſo detachments of light horſe upon the flanks of the cavalry, in order to keep off any of the enemy's parties that might advance to annoy the army upon its march. The rear-guard to the column of baggage ſhould conſiſt of infantry, cavalry, or dragoons, beſides the eſcort always appointed for it. The general officers who are at the head of the two columns of cavalry, ſhould not march too faſt, leſt they ſhould get too far advanced before the infantry; a matter always to be avoided. The march of an army being diſpoſed after this manner, every column will enter the camp at the ſame time, and find itſelf oppoſite to its ground. See Plate CCLXXXVIII.

If, by the enemy's poſition, although at a diſtance, the army ſhould, on its march, preſent a flank to the enemy, without fearing its being attacked; yet as the enemy may have ſtolen one or two marches, as hath happened on many occaſions, there muſt be only two columns of infantry placed in the centre. The third muſt be placed upon that flank which the army preſents to the enemy; ſo that the army will find itſelf diſpoſed upon its march after the following manner: Suppoſing it is the right which preſents the flank to the enemy, the firſt column will conſiſt of infantry, the ſecond of cavalry, the third of artillery, the fourth and fifth of infantry, and the ſixth of cavalry. The baggage will then be diſtributed to the three columns upon the left; ſo that neither the two columns upon the right, or the artillery, will have the leaſt embarraſſment, in caſe an action enſues. The ſame diſpoſition muſt be made upon the left, if it is that which preſents the flank. Particular care muſt be taken that the artillery have orders, ſuppoſing the enemy advancing in full force to attack, to tranſport itſelf to the column of infantry, and to divide itſelf along the front, when it ſhall be in order of battle, and to keep up a conſtant fire, in order to give the general time to make ſuch diſpoſitions as he ſhall find neceſſary.

The column of cavalry ſhould be divided into two, and be poſted upon the flanks of the infantry that is drawn up in the face of the enemy; the other columns muſt follow the orders which have been delivered to them, and execute them with the utmoſt diſpatch.

If it appears, either from the proximity or poſition of the enemy, that the army is liable to be attacked in front, the diſpoſition for the march ſhould be in the ſame order as the army is to form in for action: the artillery muſt then be diſtributed among the columns of infantry; ſo that, following the diviſions where it is placed, the brigades will find themſelves ſpread over the front of the firſt line. In this caſe, the infantry will form four columns, which will march in the centre of the two columns of cavalry upon their flanks; ſo that the head of each column, as far as the centre, when placing itſelf in order of battle, ſhall make the firſt line, and the remainder, from the centre downward, the ſecond; and the reſerve which follows ſhall form itſelf behind the other two lines.

It is neceſſary that an army diſpoſed after this manner, ſhould have orders to draw itſelf into order of battle on the very firſt ſignal, which ſhould be a diſcharge of two or three pieces of cannon. The ſignal being given, the firſt and ſecond lines, and the reſerve, will find themſelves formed in a very ſhort time. If, from the proximity and poſition of the enemy, and the facility with which he can attack, the general hath reaſon to imagine he will do it, the heavy baggage, with a good guard and eſcort, ought to be removed into the rear.

On this occaſion the *campement* (A) ſhould not be far before the army, the eſcort ſhould be increaſed, and ſome detachments of light horſe ſhould march in front to cover it, and alſo to make obſervation at a diſtance. The remainder of the body of light horſe ſhall continue upon the flanks of the army ſuſtained by dragoons, who, on the ſignal being given, ſhall immediately go and form themſelves in the place aſſigned to them during the action.

On the firſt ſight of the enemy the campement ſhould retire; for when fighting becomes neceſſary, all thought of encamping muſt be laid aſide; but the eſcort ſhall put itſelf in order of battle, and the light horſe ſhall approach the enemy as near as poſſible, in order to reconnoitre his diſpoſition and ſtrength. The officer commanding them will immediately ſend a report of the diſcoveries he hath made to the commander in chief, who on every occaſion ſhould be in the front, and even a little advanced, to ſurvey the nature of the ground; it being very certain, that in theſe caſes a man can much better rely upon his own than upon the judgment of others. This was marſhal Saxe's method; particularly when he was apprehenſive of being attacked upon a march, or had himſelf an intention of attacking. In proportion as the enemy ſhall advance, the eſcort of the campement muſt retire in good order; at the ſame time not neglecting the opportunity, if it offers, of harraſſing the enemy's advanced guard, ſo as to retard his march, and give more time for the army to form in order of battle, and to the general to make ſuch diſpoſitions as he ſhall judge neceſſary: after which, the eſcort having amuſed the enemy, or cauſed him to ſlacken the briſkneſs of his march, muſt retire in good order; and when it ſhall be near the body of the army, each body ſhall return to its own brigade.

If, from his knowledge of the country, although an open one, the general knows there are any thickets, hollows, or heights, either on the right or the left, and that this ſpot may prove favourable to the enemy, he ſhould try to poſſeſs himſelf of it. If that attempt is not practicable, as the enemy will undoubtedly take advantage of it, and poſt infantry either at theſe thickets or heights, the general muſt place a brigade of infantry at the head of each column of cavalry, which ſhall mix by platoons with that line of cavalry when formed in order of battle. This diſpoſition was made by M. de Turenne at the action of Sinzheim, and at the battle of Enzheim.

If, by the ſituation of the country, the flanks cannot be ſheltered either by an hollow, a moraſs, a river, a town, or a village, the huſſars and dragoons muſt be poſted upon the wings, but ſidewiſe, ſo as to be able to take the enemy in flank when he ſhall come down to charge the firſt line, or at leaſt to keep back his ſecond: theſe huſſars and dragoons ſhould be ſuſtained by the infantry of the light troops belonging to the army. If the right can be formed next a village, and the left next an hollow, ſome infantry and artillery muſt be poſted there: if there is only the right or the left that can be ſheltered, that which cannot muſt be properly ſuſtained; and the ſame diſpoſition muſt be obſerved that hath been juſt now mentioned, with regard to an army whoſe flanks cannot be covered.

If, on leaving the camp, the army preſents a flank to the enemy, who may have it in his power to attack it on the march, it muſt then march but in two or three columns at moſt. Each column ſhould be diſpoſed after ſuch a manner, that by a motion to the right or to the left, according to the wing that is liable to be attacked, each battalion and ſquadron may find itſelf formed in order of battle before the enemy.

The advanced guard ſhould be compoſed of light horſe, ſuſtained by dragoons; the rear-guard of cavalry ſuſtained by infantry: there ſhould be alſo ſome light horſe upon the flanks of the cavalry, and ſome pieces of cannon with the infantry. The artillery ſhould be diſtributed by brigades in the column of infantry neareſt to the enemy; ſo that, performing the ſame movement as the troops, it may find itſelf placed in the front of the firſt line, ready to fire on the firſt order. The number of three columns is given to the army, in order that the firſt and ſecond lines and the reſerve ſhall be formed at the ſame time, which cannot be done if the army marches only in two columns: for troops muſt then be taken from theſe two lines in order to form the reſerve, which would require a conſiderable time, and conſequently retard the diſpoſitions; whereas this reſerve, forming the third column, is ſeparated from the main body, and in a condition to act with readineſs, according to the orders it ſhall have received. As the baggage, in this manner of marching, muſt neceſſarily be an embarraſſment, it muſt be ſent into the rear under a good eſcort, with orders to join the next day at the new camp.

It is neceſſary to obſerve, that every different ſpecies of troops ſhould be placed in that part where it is to fight; conſequently the two columns which are to form the two lines when the army ſhall be in order of battle, ought to be compoſed of cavalry and infantry; ſo that when the columns ſhall make a motion to the right from the left, the infantry may be placed in the centre, and the cavalry upon the wings, unleſs the nature of the country ſhould make another diſpoſition neceſſary: then the general ſhould regulate his motions according to the ſituation of the country, and give ſuch orders as will enable the troops to act with the greateſt facility.

SECT.

(A) This is a French term, for which we have not a ſynonyme equally expreſſive in the Engliſh language. It is uſed to denote a certain number of troops, who proportion their time of ſetting out before the army, by the diſtance or proximity of the enemy, in order to trace or mark out the camp. For this purpoſe, a quarter-maſter and a trooper is draughted from every troop of every regiment of horſe; and a ſerjeant and a corporal, in like manner, from every regiment of infantry, furniſhed with ropes and pickets, to lay out the ground for the tents and the intervals; ſo that every regiment will, on its arrival, find its ground properly marked out. A field-officer of every regiment alſo marches with the campement, beſides the officers of each corps, who command the detachment.

SECT. IV. *The March of an Army in a mountainous and woody Country.*

IF the ſituation of the places in a mountainous country furniſhes a general with a greater variety of expedients to conceal his diſpoſitions, it alſo renders more precautions, and a greater degree of knowledge, neceſſary to avoid being ſurpriſed. If theſe kind of countries, on the one hand, preſent greater advantages for the concealment of marches, they alſo, on the other, offer many difficulties in the tranſporting of the proviſions and the artillery, and require a greater degree of vigilance for the ſafety of the magazines and the preſervation of the communications with the frontier towns.

The general ought to diſpoſe the march of the army according to the ſituation of the country: he ſhould carefully guard againſt ſurpriſes, whether by night or by day; make himſelf ſure of the paſſes, and turn them to advantage againſt the enemy; in a word, he muſt not overlook any one circumſtance, and he ſhould contrive to make even the obſtacles themſelves turn to advantage.

It is to be feared, that in mountainous countries, in roads that cannot be enlarged, the troops preſſed too cloſe together will not be able to move but with great difficulty; and as they will embarraſs each other, the front, the rear-guard, and the flanks, muſt be equally ſecured; the columns muſt be unbroken and cloſe, that there be no diſtance left between them; and halting ſhould be particularly avoided, as that is a circumſtance by which an army is moſt fatigued.

It is again dangerous, as the commentator upon Onoſander obſerves, when troops find themſelves ſtraitened of room in a narrow road, for the general, in order to enable them to move with greater eaſe, to lengthen the columns too much: from whence would ariſe two inconveniences; the firſt of which is, that the columns would be weakened, and that in caſe of a ſurpriſe it would not be difficult for the enemy to ſeparate them entirely, and it would alſo be impoſſible for them to rally; in the ſecond place, theſe columns thus lengthened, in going round a mountain and deſcending into a valley, would take up a prodigious extent; from whence it hath often happened, that the windings of the road hiding the middle of the column, thoſe who march in the front-rank can ſee only thoſe who are in the laſt, and retard their march, becauſe that, being deceived by diſtance, they will be ſcarcely able to diſtinguiſh whether they advance or whether they are halted.

In order to avoid theſe inconveniences, it is not barely ſufficient for a general to have a thorough knowledge of the country: he ought immediately to inform himſelf of every particular, however minute, relating to it; he ſhould take the ſame precautions which have been pointed out as neceſſary for a march in an open country, and ſend out a detachment, ſuch as hath been ſuppoſed in the foregoing ſection. This detachment will examine the narrow paſſes, ſurvey and ſound the fords, run round the windings of the mountains; and if there are many roads, it will find out which is the moſt practicable, and that through which the army, the artillery, and baggage, can paſs with the greateſt eaſe; what ſtreams croſs it, and whether there are bridges over them: it will examine whether they are ſufficiently ſtrong, and repair them, or build new ones. It often happens in a mountainous country, that the road which would be very ſhort and commodious proves to be divided, either by the ſeparation of two rocks or by hollows. As theſe breaches, however deep they may be, cannot be all of a certain breadth, therefore, in order to avoid marching over the unneceſſary ground that going round them would take up, bridges ſhould be thrown over, if poſſible, from one rock to another.

But as in a march, whether in an open or in a mountainous country, occaſions for throwing bridges very often preſent themſelves, it is very neceſſary to ſay a word or two relative to the manner of their conſtruction.

Six or eight thick pieces of timber are laid acroſs a rivulet, or any other bad place neceſſary to be paſſed, at ſix feet diſtance from each other; theſe muſt be croſſed again by other pieces of timber not ſo thick, at the diſtance of three feet from each other; which muſt be fixed to one another by large pegs, and faggots well faſtened together muſt be laid over them. When the bridge ſhall be thus covered, ſome earth muſt be thrown over it, which ought to be well trampled, in order to fill up the vacancies of the faggots; and then, for the greater firmneſs, new earth ſhould be thrown over it, which ought to be well beaten down. The bridge thus made, the troops, the artillery, and the baggage, will paſs over it with great eaſe.

It muſt be obſerved, that the bridges ſhould be of the ſame breadth with the roads; they ſhould be broader rather than narrower, becauſe, excluſive of the danger the artillery and baggage would run if they were narrower, the ranks being obliged to be ſtraitened and the column to be lengthened, the march would of courſe be retarded, and it would be difficult to avoid confuſion. The labourers that accompany the detachment ought to be furniſhed with every ſort of tool neceſſary for the removing of earth, the felling of trees, and working and fitting them for uſe.

This detachment being divided, as has been already obſerved, into as many bodies as there are roads thro' which the army is to paſs, will meet again at the place from whence it is parted; and the reports of the commanding officers of the different bodies being given to the lieutenant-general, he muſt make a report of the whole to the commander in chief.

On this report, the general will order as many detachments as there are columns intended to ſet out, two or three hours before the time appointed for the march of the army. Theſe detachments will march carefully over the ways already examined and prepared: they will ſcower every thing, hedges, narrow paſſes, entrances of paſſes, woods, heights, villages, in ſhort all that may ſerve as ſhelter for troops in ambuſcade; and for greater ſecurity, they will poſt guards in the villages, which guards are not to retire till the rear-guard of the army comes up.

The commanding officer of each detachment ſhould poſſeſs himſelf of the heights on the right and left, and ſhould diſtribute platoons of infantry at proper diſtances from the rocks and narrow paſſes: he ſhould be careful of what may be done to oppoſe him, and be attentive even to the ſmalleſt paths. When the commanding officer of the detachment ſhall be advanced to the end of the paſſes, or to the ground intended for the camp, he will eſtabliſh his infantry in the moſt advantageous poſts; he will place his light horſe or dragoons in the front, but within reach of aſſiſtance; he will ſend out patroles of light horſe advanced before the infantry. If he receives any intelligence of the enemy, he will ſend immediate notice of it to the general; but if, from the repoet made to him, the enemy does not appear to be ſufficiently ſtrong to annoy the army on its march, or only ſome parties were willing to try if they could enter the paſſes, his detachment will be ſufficient to keep them at a diſtance, particularly as he is in poſſeſſion of the heights and the paſſes.

Theſe troops, in the ſituation they have been placed, ſhould wait the arrival of the campement. As ſoon as they perceive it, they ſhall advance; and whilſt the major-general, aſſiſted by the ſtaff-officers, marks out the camp, they ſhall poſſeſs themſelves of the villages, paſſes, and roads by which it is probable the enemy might come and make an attack. Theſe detachments ſhall remain in their poſts till relieved by the proper officers, which will not be done till the guards of cavalry and poſts of infantry neceſſary for the ſecurity of the camp are poſted. Then, although the army ſhould be yet at a diſtance, it may on its arrival enter the camp, which will be found covered by the guards which eſcorted the campement.

With theſe precautions, if the enemy is at too great a diſtance to attack the army, the march will be performed without any trouble: there will be no obſtacle in the roads, or reaſon to fear that the waggons will be mired; and if the wheels or axle-trees of any of them ſhould break, they will be repaired from thoſe which have ſpare ones: if, on the contrary, the enemy ſhould be ſo near as to give cauſe to apprehend an attack, the neceſſary precautions are taken for forming the troops in order of battle, and for the neceſſary diſpoſitions during the action.

It has been already obſerved, that an army on a march ſhould be divided into as many columns as the detachments have found openings or roads leading to the camp the general intends to occupy; ſuppoſe two, the army will conſequently march in two columns. The diſpoſition of the troops in their march differs entirely from what it would be in an open country; the advanced-guard of each column muſt conſiſt of infantry, ſome muſt be diſtributed either in the narrow paſſes or on the heights, and there ſhould be ſome advanced detachments of light horſe to ſcower the narrow paſſes: the rear-guard ſhould conſiſt of infantry only; the remainder of the troops may be diſpoſed after the following manner:

Four or five brigades of infantry, according to the number which compoſes the army, ſhould be placed at the head of each column; the ſame partition ſhould be made with regard to the artillery, which muſt follow the infantry; the cavalry muſt march next, and the baggage of each column, well eſcorted by infantry, muſt follow the cavalry; then the remainder of the corps of light horſe which are not detached; and the dragoons are placed the laſt, in order to diſmount and ſuſtain the rear-guard in caſe it ſhall be attacked.

Each column ſhould conſiſt of the ſame number of troops as well infantry as cavalry. Platoons of infantry ſhould be detached to march on the heights, at proper diſtances, in order to cover the flanks on the right and left. Care muſt be taken to march very leiſurely in the front, otherwiſe the rear will not be able to keep up; then, in order to give the rear time to come up, the front will be forced to halt, by which the march will be retarded and the troops fatigued. See Plate CCLXXXIX.

Theſe diſpoſitions are neceſſary, becauſe as the enemy in a mountainous country will be able to attack with infantry only, it is neceſſary to oppoſe him with troops of the ſame nature: the reaſon why the artillery is poſted behind the infantry is, that in caſe the enemy ſhould attack briſkly in front, and the road through which the columns paſs is broad enough, ſome pieces of cannon may be ſent into the front, which firing with grape-ſhot will ſoon thin the enemy's ranks, and abate ſomething of his ardour: if the road is too narrow, and there is not room for more than four or five men to march abreaſt, conſequently the artillery muſt be carried on ſledges, which has been often obliged to be practiſed in the Alps. In this ſituation reſolution muſt ſupply the want of that aſſiſtance which the cannon would give, and the enemy muſt be charged with bayonets; which is the eaſier to be performed, as the enemy will not be able to preſent a larger front than that oppoſed to him by the army, which is alſo ſuppoſed to be in poſſeſſion of the heights. The cavalry does not follow immediately, becauſe, not being able to act in this ſort of country, it muſt be covered by infantry. The baggage which follows is ſufficiently defended by the columns that cover it, and the infantry that eſcorts it: this infantry ſhould nevertheleſs join as often as circumſtances will permit, without being fearful of expoſing itſelf, that upon the heights being to reinforce it in caſe the head of the army ſhould be attacked. The remainder of the corps of light horſe being as incapable of acting as the cavalry, is free from inſult: the dragoons which have been poſted behind can, by diſmounting, aſſiſt it if it is attacked. Troops thus diſtributed will march on ſecurely; by this means thoſe troops who can act with facility cover and protect thoſe who cannot, neither will they be in the leaſt embarraſſed.

There are ſome mountainous countries ſo difficult of acceſs, that it is impoſſible for the cavalry to follow, becauſe ſome poſt muſt either be immediately ſeized, or the enemy, being in poſſeſſion of the hills, muſt be driven from them before it can advance; or becauſe it would be difficult for it to be ſubſiſted.

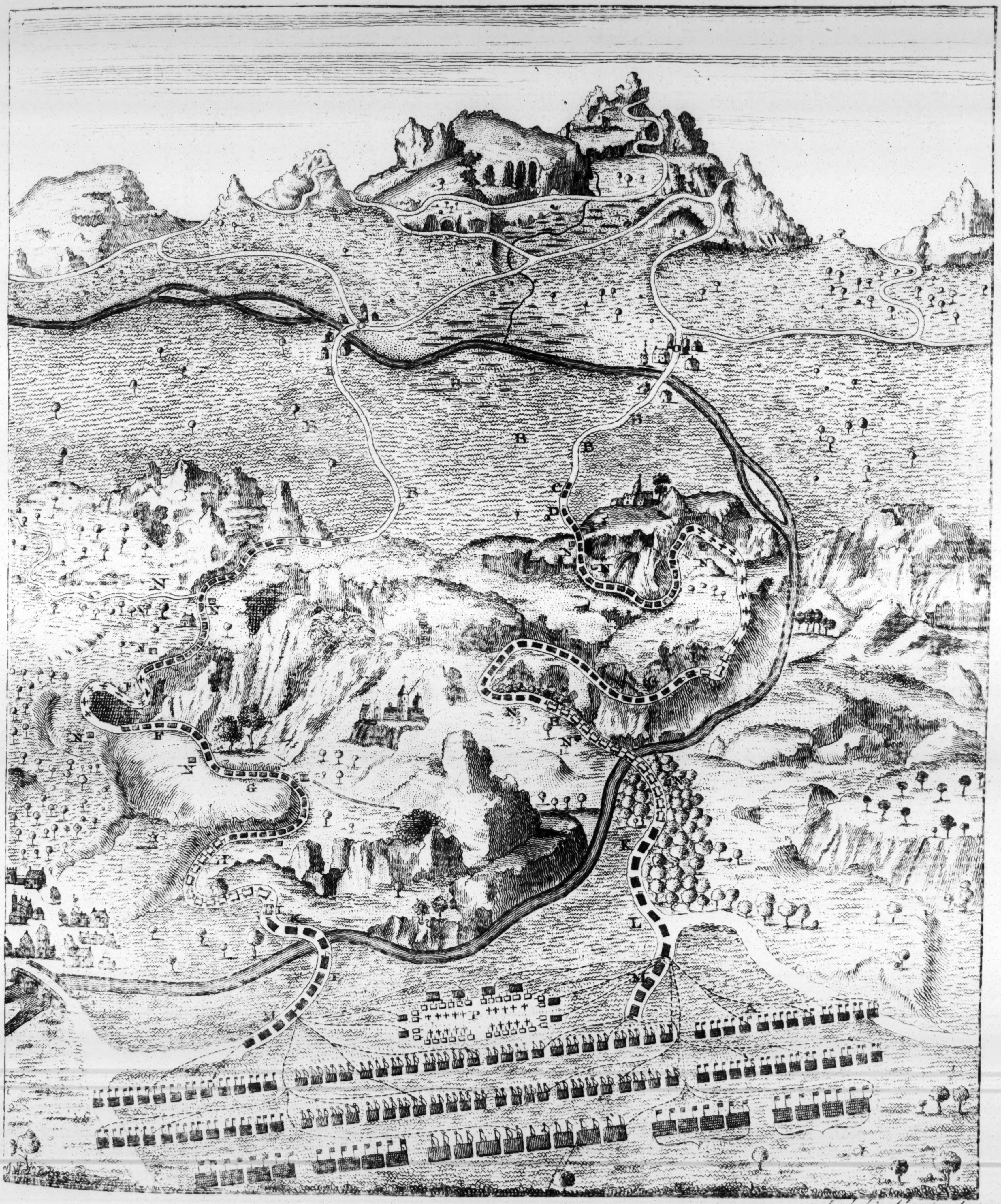
If the army can march in four columns, the diſpoſitions ſhould ſtill be the ſame; but as the head of the columns will be weaker in infantry, the heights ſhould be guarded accordingly, and the rear-guard ſufficiently ſtrong to reſiſt the enemy: the ſame diſpoſition ſhould be made for one column only.

If the march is to be made through a woody country, the precautions which have been already mentioned in regard to examining the ways through which the army is to paſs, and for the detachments which ſet out in order to be before the army, ſhould ſtill remain; but the diſpoſition and order of the troops are different. If by the ſituation of the country the army is obliged to march continually through woods till it arrives at the camp, the cavalry and the baggage ſhould be in three columns in the centre; but ſome infantry

ſhould

WAR.

The March of an Army through a Mountainous Country.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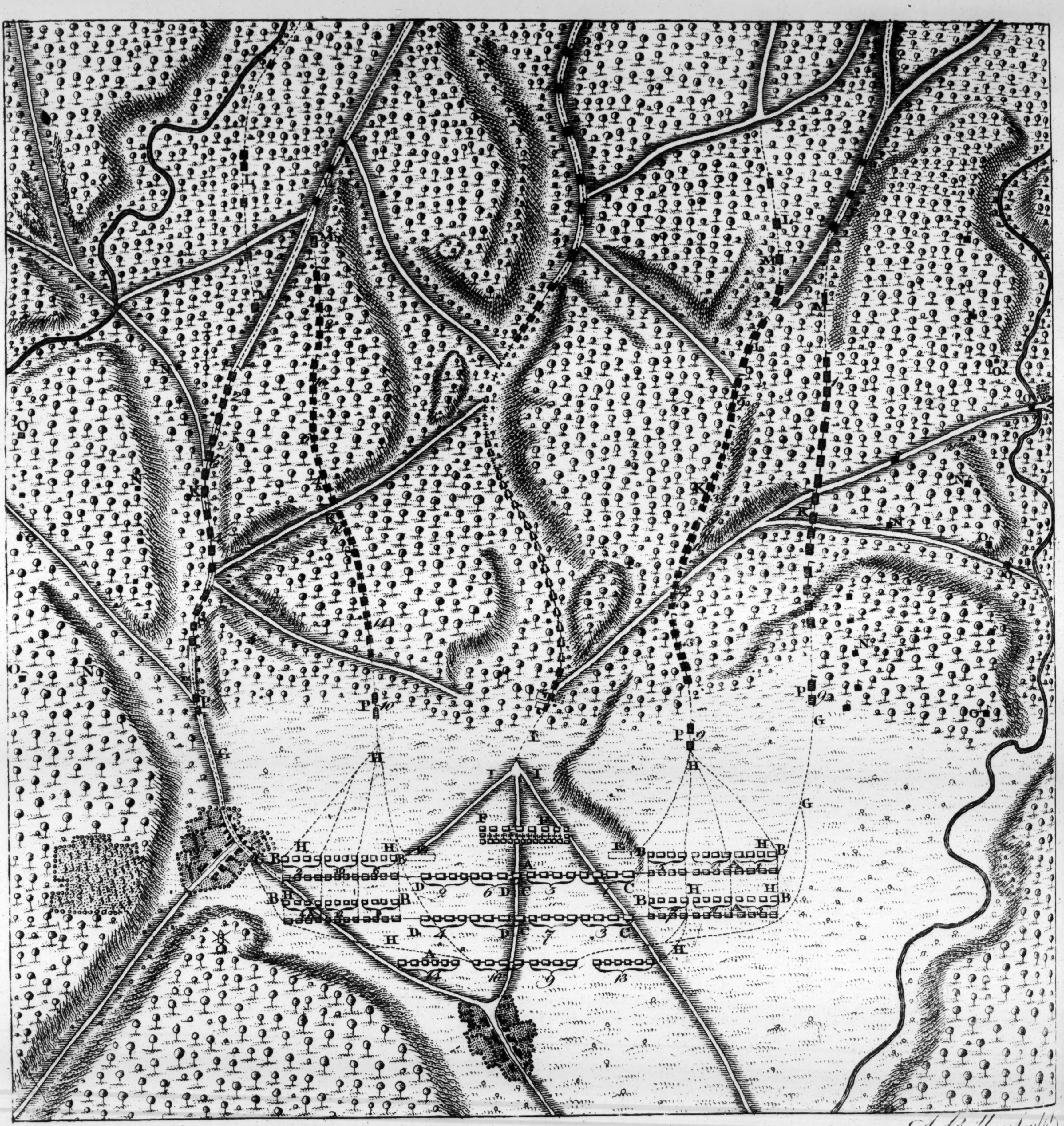
WAR. **Plate CCXC.**

Plan of the March of an Army through a Woody Country.



A. Bell Sculp.

Scale of ½ a League.

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ſhould be placed at their head and their rear-guard: the infantry ſhould march in two columns, one on the right, the other on the left of the cavalry and baggage; ſome brigades of artillery ſhould be diſtributed to each column of infantry, the remainder muſt march at the head of the columns of baggage; the flanks of the columns muſt be covered by platoons of infantry, placed about at proper diſtances, which are to follow the columns at 40 or 50 paces diſtance, without ever loſing ſight of them. See Plate CCXC.

If by the knowledge which the general has of the country, or rather from the report of the officers who commanded the detachment ſent out to view, open, and repair the roads, he knows that the country is interrupted by woods and little plains, the diſpoſition ought to be wholly changed; it will then be ſufficient that the ſecond detachment, which in other caſes ought to ſet out the evening before, ſets out only two hours before the campement. This detachment ſhould be compoſed of infantry, light horſe, and dragoons; the infantry to ſcour the villages and the woods, the light horſe to penetrate into the woods wherever they can enter, and clear the march of the infantry, and the dragoons to ſuſtain the whole.

When the diſpoſition for the march of the army is ſuppoſed to be in five columns, the infantry ſhould form two, the cavalry two more, and the artillery and baggage the fifth. If it is thought there will be any occaſion for artillery, a brigade or two may be diſtributed to the columns of infantry; and the remainder may march at the head of the eſcort of the baggage, which is to be defended by the regiment of artillery; to which muſt be added a detachment of infantry, which will form the advanced guard. The cavalry and dragoons are to keep the open country as much as poſſible, and the infantry the incloſed; the dragoons and cavalry ſhould avoid the woods as much as poſſible, and the beſt and moſt acceſſible road ſhould always be given to the artillery and baggage. In order that the columns may preſerve the ſame length in marching, a brigade of infantry ſhould be placed at the heads of the columns of cavalry; if this precaution, which fixes the head of the columns of cavalry, is neglected, the cavalry will extend a great way before the columns of infantry, which ſhould always be avoided. The rear-guard ſhould conſiſt of infantry, cavalry, or dragoons: the light horſe ſhould always march on the flanks on the right and left, and before the army.

It is after this manner that the march of an army may be diſpoſed through a woody and a mountainous country; but an army muſt always ſuit its motions to circumſtances, and to the ſituation of the country where the war is carried on. Were the general always free to chooſe his own route, he ſhould ſooner be determined by the nature and number of the troops he has with him, than by the goodneſs of the road: it is not without great difficulty that cavalry can act in a woody country; in a mountainous one they are of no uſe; there infantry only can be ſerviceable. If the general is inferior in point of number, he ſhould always make choice of defiles; becauſe in them he can always preſent a front equal to the enemy's. Who can be ignorant that Leonidas with 8000 Greeks, at the ſtraits of Thermopylæ, ſtopped the almoſt innumerable army of Xerxes, who was unable to force him?

A mountainous and woody country, when thoroughly known, becomes a more favourable theatre for practiſing the wiles and ſtratagems of war than an open country; it is true that the knowledge of it is more difficult to attain, and that it requires more vigilance and readineſs in the general. Hannibal was even drawn into ambuſcades by his own guides; an example worthy the notice of a general who takes guides that have either but little regard for him, or are unacquainted with the country: it is impoſſible to try them too much, and their ignorance is often more fatal than treachery itſelf.

The general ſhould chooſe brave and active ſoldiers for the forming of the detachments which precede the army. It has often happened that guides, and even entire detachments, ſeized with a panic, have imagined the enemy where he was not; and by that means have miſſed the opportunity of finding him where he really was.

The places where the enemy can lay ambuſcades ought to be known: neither is it always in the moſt hidden and ſecret places that they are to be found; they are often in thoſe that are moſt uncovered; for the more open a place is, the leſs ſuſpicion will there be of any ambuſcade in it.

The marches that require moſt precaution are thoſe made in the night, thoſe made in ſight of the enemy, and thoſe that ſhould be kept ſecret.

The firſt ſhould be avoided as much as poſſible, eſpecially in a mountainous country, becauſe ſurpriſes are more unavoidable, and the ſoldier's fear, which always magnifies the danger he cannot ſee, renders thoſe marches more difficult, and very dangerous. If the army is beat, the retreat becomes more fatal than the action itſelf: ſhould it get the better, that advantage becomes uſeleſs, becauſe it will not be able to purſue the enemy; whether on account of the ambuſcades he may have laid to ſecure his retreat, or whether from the fear of loſing the way. The Numidians, who had more cunning than ſtrength in war, attacked Marius in the night; becauſe, ſaid they, if we are beaten, the darkneſs will befriend us in our flight; and if we beat the Romans, it will not prevent our purſuing a vanquiſhed enemy through a country of which they have no knowledge, and with which we are perfectly acquainted.

But if circumſtances require and force an enemy to march over a mountainous country in the night, care ſhould at leaſt have been taken that the roads have been well ſurveyed during the day; that the guides march at the head of the army; that the ranks are kept very cloſe together, that the men may not loſe ſight of each other: and that part of the troops do not miſtake one defile for another, which may eaſily happen in the dark, if the advanced guard has marched a little too faſt, and the officers haſtened too much. The Greeks, according to Xenophon, on like occaſions, gave the heavieſt arms to the troops that marched at the head, thereby to oblige them to proceed leiſurely.

In thoſe marches that are made in ſight of the enemy, beſide the precautions neceſſary to be taken for the ſafety of the troops, and which have already been mentioned, the general ſhould endeavour to deceive them by falſe appearances, and by an oſtentation, often, in ſuch circumſtances, neceſſary: as extenſive a front as poſſible ſhould be given to the army; the intervals

of

Defenſive Operations.

of the ranks and columns ſhould be widened, but not ſo as to weaken them; the general ſhould take advantage of an height, poſſeſs himſelf of it, and poſt ſome troops in it, in order to make the enemy ſuſpect there may be ſtill more behind: advantage ſhould be taken of a wood, and, by marches and countermarches, the ſame troops ſhould be made to paſs and repaſs, in order to make the enemy believe the army ſtronger than it really is. There have been inſtances of generals, who, on like occaſions, have made ſuch good uſe of their ground, that, by the arrangement of troops, they have ſeemed to multiply them in the enemy's eyes; and who, although inferior in ſtrength, appearing to have the advantage of numbers, have kept the enemy in awe.

But ſtill, unleſs it is to deceive the enemy, a general ſhould conceal his force and management: his force, becauſe, if ſuperior, he will not fail to profit by that advantage; and if inferior, he ſhould avoid a battle: he will conceal his management, becauſe he will prevent the deſigns of the enemy's general, who will receive as much information from his ſucceſſes as from his miſcarriages. Pyrrhus, who taught the art of war to the Romans, was in the end conquered by them. The Mexicans often turned the arts and wiles of Cortez and the Spaniards againſt them; and the czar Peter I. never regretted a defeat when it became the means of inſtructing him how to conquer in his turn.

It is impoſſible to lay down fixed rules for ſecret marches: it is by his addreſs that a general will improve circumſtances; it is by art and contrivance that he will evade the enemy's vigilance, and deceive his ſpies. The march performed by the great Condé and M. de Turenne, in 1674, may be ſeen, as related by M. de Feuquieres in his memoirs.

However difficult it may be to attain a thorough knowledge of a mountainous country, this march certainly ſuppoſes, in the two princes who executed it, the moſt digeſted ſtudy and the deepeſt knowledge: the juſtneſs of the orders, and the exactneſs with which each commander arrived, almoſt at the ſame time, on the ſpot where they were to aſſemble in order to make the attack; and the infinite precautions they muſt have taken for the ſubſiſtence of an army, that, during a march of eleven days in a barren ſandy country, wanted for nothing, are circumſtances not to be ſufficiently admired.

If, in the paſſing of mountains, there is only one paſſage, it is oftener by art than by force a general can get poſſeſſion of it. The duke of Valentinois intending to paſs through Tuſcany, and fearing the paſſage of the Alps would be ſhut againſt him, ſent to demand a paſſage of the Florentines; but during that negotiation he paſſed the Alps, without waiting for their anſwer.

If there are many iſſues, they muſt all be guarded, and not one of them neglected. In 1515, Francis I. deſirous to paſs into Lombardy, and being alſo appriſed that the Swiſs waited for him at the different openings of the mountain, ſent detachments towards each of theſe places, as if he intended to force them; and whilſt he, by this means, kept them in ſuſpence, he paſſed with his army through another opening which was ſhown to him by a peaſant. But if it is impoſſible to deceive the enemy, and if circumſtances render ſtratagems ineffectual for concealing of the march, all poſſible care muſt be taken: any, even the moſt trifling thing, may cauſe a diſcovery; the neighing of horſes, the light in a pipe, the noiſe of the arms, &c. during the night; and in the day, the duſt, and the ſun-ſhine glittering upon the arms. During the march, all theſe inconveniences muſt be guarded againſt as much as poſſible, by recommending ſilence to the men, while in woods and paſſes; by leaving the horſes and mares behind, if they neigh to each other, and alſo every thing that can contribute to noiſe.

Defenſive Operations.

But if, notwithſtanding all theſe precautions, an enemy ſuperior in force is in poſſeſſion of a paſs from which he cannot be diſlodged but by art, a feint ſhould be made of attacking ſome poſt, in order to draw the enemy; from the paſs and poſſeſſion ſhould be taken of whatever the enemy abandons, or withdraws his troops from. The general ſhould make diverſions, pretend retiring, and even flight: he ſhould obſerve whether there are any heights commanding thoſe occupied by the enemy; and if there are, he ſhould attack the enemy on the ſide next them; ſo that whilſt the enemy is taken up in defending himſelf, the troops may ſeize on that poſt which overlooks him: art and force ſhould be employed by turns, and ſhould be blended together as often as poſſible. A Greek general ſet fire to a wood which was at the foot of a mountain in the enemy's poſſeſſion, and which he wanted to go over; the flames and ſmoke forced the enemy to abandon it, and leave the paſſage free to him.

General rules only can be given of the diſpoſitions to be made of troops upon a march; particular ones would be merely conjectural, becauſe the general of an army muſt always depend upon circumſtances: it is the ſituation and nature of the country, the number of troops, the nearneſs of the enemy, the facility of foraging, and the paſſes of which the enemy is poſſeſſed, that ought to determine him.

In a word, whatever is the order and diſpoſition of the troops, it muſt be ſuch, that they ſhall always be able to ſuſtain each other; that the flanks ſhall be well guarded, and the fronts ſecured; the roads muſt have been ſurveyed and opened; and whatever the nature of the country is, all the columns ſhould arrive at, and enter the camp at the ſame time.

SECT. VI. *Of Camps in defenſive War.*

It is in general more difficult to carry on a defenſive war, but more particularly ſo in an open than in a mountainous country. In the former there is nothing to conceal the movements and diſpoſitions of the army from the enemy, whereas in the latter the nature of the places prevents the enemy from diſcovering them: but whatever may be the nature of the country, the choice of a camp when on the defenſive, and the art of pitching upon an advantageous ſituation, is what proves the genius and talents of a great officer. Excluſive of a thorough knowledge of the country, this operation requires a quick and penetrating eye in a general to enable him to ſeize the poſts which from their ſituation may prevent the enemy either from attacking him or penetrating into the country. It is not difficult for a general to ſtop an enemy by his courage, when of equal force; it is ſtill eaſier to preſcribe bounds to him when he hath the advantage over him in number: but a general, under the neceſſity of receiving them, muſt ſeek for ſuch expedients from his own talents and underſtanding as may ſerve to balance the enemy's ſuperiority, or make himſelf equal to him in ſtrength.

A general who acts on the offenſive takes what ſtate or circumſtances he pleaſes; he may act as he chooſes, and is not under a neceſſity of regulating himſelf entirely by the enemy's motions: whereas a general that is not ſufficiently ſtrong to attack, is commonly obliged to continue quiet till the enemy hath acted, and then to regulate his motions according to thoſe made by the oppoſite army, unleſs his ſuperior abilities give him a particular advantage over the enemy's general.

Although it is always neceſſary for a general to have a thorough knowledge of the country, this knowledge will yet become more neceſſary to him when acting on the defenſive. He ought to prevent the enemy's entering his country and forming any ſiege there (a plan which he cannot execute, unleſs he is poſſeſſed of the moſt advantageous poſts, and alſo of thoſe which cover the towns liable to be threatened) by proper diſpoſitions that ſecure his camp; by covering his fronts and rears, and keeping the communication between the camp and the places where the magazines are; by endeavouring to annoy the enemy in his convoys and foragings; by harraſſing him in his camp, and perplexing him with ſmall detachments, to which the enemy will be obliged to oppoſe more conſiderable ones: theſe diſpoſitions, properly managed, may deſtroy any enterpriſes the enemy may have formed againſt the army.

By the enemy's ſuperiority, the nature of the country, and the ſucceſs of campaigns, the general ſhould determine whether or not his camp ſhould be entrenched: the entrenching of camps requires much obſervation. It is eaſy, ſays Vigetius, to entrench a camp while at a diſtance from the enemy; but it becomes a very difficult operation when the enemy is near at hand. The Romans, according to him, uſed to keep all their cavalry and half their infantry drawn up in order of battle, in order to cover thoſe troops that were employed in working at the intrenchments. Cæſar, when in Sapin, fortified himſelf after this manner under the eyes of Afranius and Petreius, without their having the leaſt knowledge of it.

Before a general fortifies a camp in a plain, he muſt obſerve the poſition in which the ground will permit him to form his camp; whether or no it will be liable to be ſurrounded; if it will entirely cover the country it is to protect, and the towns for which there is moſt reaſon to be apprehenſive; if the parts in the rear are open; if forage is in plenty; if proviſion can eaſily be brought; if there is wood and water; if it is impoſſible for the enemy to enter the country without forcing the camp; if all theſe circumſtances concur, it is certainly moſt advantageous to entrench the camp.

A general ſhould never be too ſecure by having a ſuperiority of numbers; he ought not on that account to neglect fortifying his camp: even when he acts on the offenſive, theſe entrenchments will not hinder him from marching out to the enemy whenever he judges it proper, and his army will by that means be ſheltered from the enemy's attempts.

Cæſar, whoſe good luck was equal to his intrepidity, after having ranged over all the territory of Beauvais, like a conqueror certain of victory, being diſtreſſed for forage, was conſequently obliged to weaken his army, in order to increaſe the detachments which he ſent out to forage; he therefore firſt took the precaution of ſurrounding his camp with all neceſſary fortifications.

If a general is fearful of fatiguing his troops or weakening his army by employing part of it at theſe works, he muſt, for that purpoſe, make uſe of all thoſe who follow the army: they will work equally the ſame as the ſoldiers; for nothing will render men ſo induſtrious and laborious as the common danger to which they are all expoſed: As formerly, at the ſiege of Carthage, the women, the children, and the old men, all worked; and their united labours retarded, at leaſt for ſome time, the taking of that city: Cæſar, that he might not fatigue his troops, employed only peaſants to entrench his camps.

There are many methods of intrenching a camp by lines beginning on the right, and covering the whole front of the camp to the left; theſe lines, in their extent, have redoubts and angles at proper diſtances; and the line being continued from one to the other, forms the curtains. In the front of them there is a large and alſo deep ditch; ſometimes a covered way is added, which is a palliſadoed and ſtoccaded throughout the whole front of the lines. To render them yet ſtronger and more difficult to be forced, there are pits ſunk before the covered way. Theſe pits are ranged chequer-wiſe, about ſix feet deep and five broad, and are in form like a reverſed cone. Such were the lines which the duke of Berwick cauſed to be made in 1734, to the lines of circumvallation before Philipſburg; only with this difference, there was no covered way. Without doubt theſe lines are formidable, and even very difficult to attack; but a great deal of time is required for conſtructing them: and if there is not a ſufficient number of peaſants in the army to work at them, troops muſt be employed to expedite them; which will not only greatly fatigue them, but may alſo coſt the lives of many; becauſe removing of earth often cauſes great diſorders, particularly where the ground is ſwampy or clayey. Beſides the time which theſe lines take in raiſing, they are generally defective; and there are but few inſtances of their being attacked without being forced; and if the enemy penetrates at any one part, the troops which guard them are obliged to retire to avoid being attacked in front and flank.

The method practiſed by marſhal Saxe ſeems much ſuperior to theſe lines. It contained as large an extent of ground, without diminiſhing the labour; becauſe, inſtead of lines, it conſiſted of redoubts, which require as much work to form the four faces and the covered way, as lines always continued. At the ſiege of Maeſtricht in 1748, he uſed theſe redoubts inſtead of lines; their diſtance from each other was 48 yards; they were ſtoccaded, and the covered way palliſadoed. Theſe redoubts preſent an angle to the field, and conſequently were a mutual protection to each other; they were each of them capable of containing a battalion.

His deſign was, ſuppoſing the enemy was come to attack the army, to cauſe all redoubts to be occupied; to plant ten pieces of cannon between each, and to draw the army up in order of battle behind them: by this means the enemy would be obliged to force the re-

redoubts before they could attack the army, which could not be done without great loſs. But ſuppoſing the redoubts to be forced, how would the enemy be able to enter the intervals without dividing? The army behind, in order of battle, would charge him, without giving him time to recover himſelf, and it is highly probable would beat him.

By following this method of entrenching a camp, if ſome of the enemy's battalions ſhould, for example, force three of four redoubts, they certainly will not dare to advance as long as the remainder hold out; ſo that a general might, by detaching ſome brigades, and cauſing them to march to the aſſiſtance of the battalions that have been forced, retake the redoubts; or, without diſordering the order of battle, may drive away the troops which are in poſſeſſion of them with his cannon. In ſhort, this method ſeems to be excellent, becauſe it proves, that all the redoubts may be forced, and yet the army not be beaten, becauſe it has not ſuffered in the action, but remained the whole time in order of battle with all its cannon; ſo that the enemy will be reduced to the neceſſity uf beginning a ſecond battle. Lines, on the contrary, have not the ſame advantage; all the troops, or the greateſt part of them, muſt line them; the cannon is planted at proper diſtances either on the angles of the redans, or thoſe of the redoubts. If one part only is forced, the army is beat, and the cannon taken, becauſe the enemy makes the attack with his whole front; and the front of the army being buſied and taken up, the troops which have entered, ſeize on the flanks of the lines, and conſequently the army is ſurrounded, unleſs it immediately retires.

Lines are never good, unleſs when there is a large extent of country to be guarded, and ſome frontier to be covered from the incurſions of the enemy: the front of an entrenched camp ſeldom exceeds ſix miles, more or leſs, whereas lines to cover a country have ſometimes extended thirty miles in front. By ſome it is thought, that, in order to cover a country, it is ſufficient to have certain holds, which ſhall be ſtrong and well entrenched, with patroles continually going from one end of the poſts to the other, and each poſt to be provided with ſignals both for day and night. It is unneceſſary that theſe patroles ſhould be ſtrong, provided they follow and are continually croſſing each other; this will be ſufficient to prevent the enemy paſſing undiſcovered. It is certain that the enemy will not dare to paſs between theſe poſts, whether he be ſtrong or weak: if he paſs in a body, he will be cut off behind, and his convoys intercepted; if he paſs only in parties, they will be cut off with the greater eaſe. However, lines of this nature would require much labour, and alſo take up years to complete them.

The lines of Stolhoffen are a proof, that however well fortified lines may be, they are not impregnable. The prince of Baden had employed a conſiderable time in the conſtruction of them, had neglected nothing, to render them formidable, and they were deemed impoſſible to be taken: nevertheleſs, M. Villars forced them in 1704, without the loſs of a man. There are many inſtances of lines, which, encompaſſing a large extent of country, having been forced: thoſe of Flanders guarded by the French were forced by the duke of Marlborough in 1705, and many others which are needleſs to mention.

Marſhal Saxe's method for entrenching a camp in a woody country interſperſed with ſmall plains, ſeems alſo to be a very good one. The redoubts are to be erected in the plain; and lines thrown up in the woods according to the uſual method, with redans placed on the ſide of each other, at 24 toiſes diſtance: there ſhould be a palliſadoed ditch in the front, and the lines as well as the half-moons ſhould be fraiſed with pointed ſtakes: behind theſe lines, which cannot be very extenſive becauſe they only cover part of the front of the camp, muſt be placed the troops neceſſary for defending them; a conſiderable intrenchment of felled trees muſt be made behind with the branches of the trees entangled with each other, and ſome openings muſt be left wide enough to permit the troops who guard the lines to paſs through, in caſe they ſhould be overpowered and obliged to retire: the cannon moſt be planted in the face of theſe openings; and the remainder of the army muſt be drawn up in order of battle, 100 paces at moſt behind the intrenchments of trees and the half-moons. The retrenchments of trees are placed about 60 or 80 paces behind the lines, and not before them; becauſe it will be a new and unexpected obſtacle to the enemy. Theſe retrenchments, carefully made, and with large trees, can be deſtroyed by cannon only, which would take up a conſiderable time: if they were in the front of the lines there would certainly be a rampart more; but that might be uſeleſs and perhaps hurtful, becauſe the fire of the enemy to make a paſſage, would drive the ſplinters of the trees into the lines, which would do more harm than even the ſhot itſelf. See Plate CCXCII.

In a mountainous country, the diſpoſitions for intrenchments are different: it is impoſſible there to find plains ſufficiently large to draw up an army in order of battle, and place it beyond redoubts, as in an open country; the avennes and the paſſes only can be entrenched; the redoubts would not be ſufficient, becauſe the avenues not only muſt be guarded, but the heights alſo occupied. Now, as it will often happen among mountains that there is not a foot of earth, how then can redoubts be erected there? A general muſt then make uſe of ſuch aſſiſtance as the country can furniſh him with, whether by heaping ſtones upon each other, or by retrenchments of trees well joined; and thus conſtruct lines ſufficiently ſtrong to ſhelter the ſoldier from fire and all injury. In an open country, a general in a manner ſuits the ground to his diſpoſitions; in a mountainous country. he muſt apply his diſpoſitions to the ground; but in any country whatever, he muſt uſe all the aſſiſtance of art for entrenching of camps. In mountainous countries there are more inequalities of ground, which render the enemy's approach to the lines difficult; and although it is almoſt impoſſible for a camp in a mountainous country to be attacked in front, nothing ſhould be neglected for its ſafety: but all the avenues by which it may be ſurrounded muſt be entrenched with care, and all the heights which overlook it ſecured; becauſe the enemy, without intending to attack in front, will amuſe him during the time neceſſary for troops to take a long round, in order to penetrate to the camp on another ſide. If Leonidas, with his 8000 Greeks, had been poſſeſſed of all the avenues, ways, and heights, by which he could be cut off, in the ſame manner as he was of the

Plate CCXCI.

WAR.

Plan of the Poſition of an Army in its Camp.

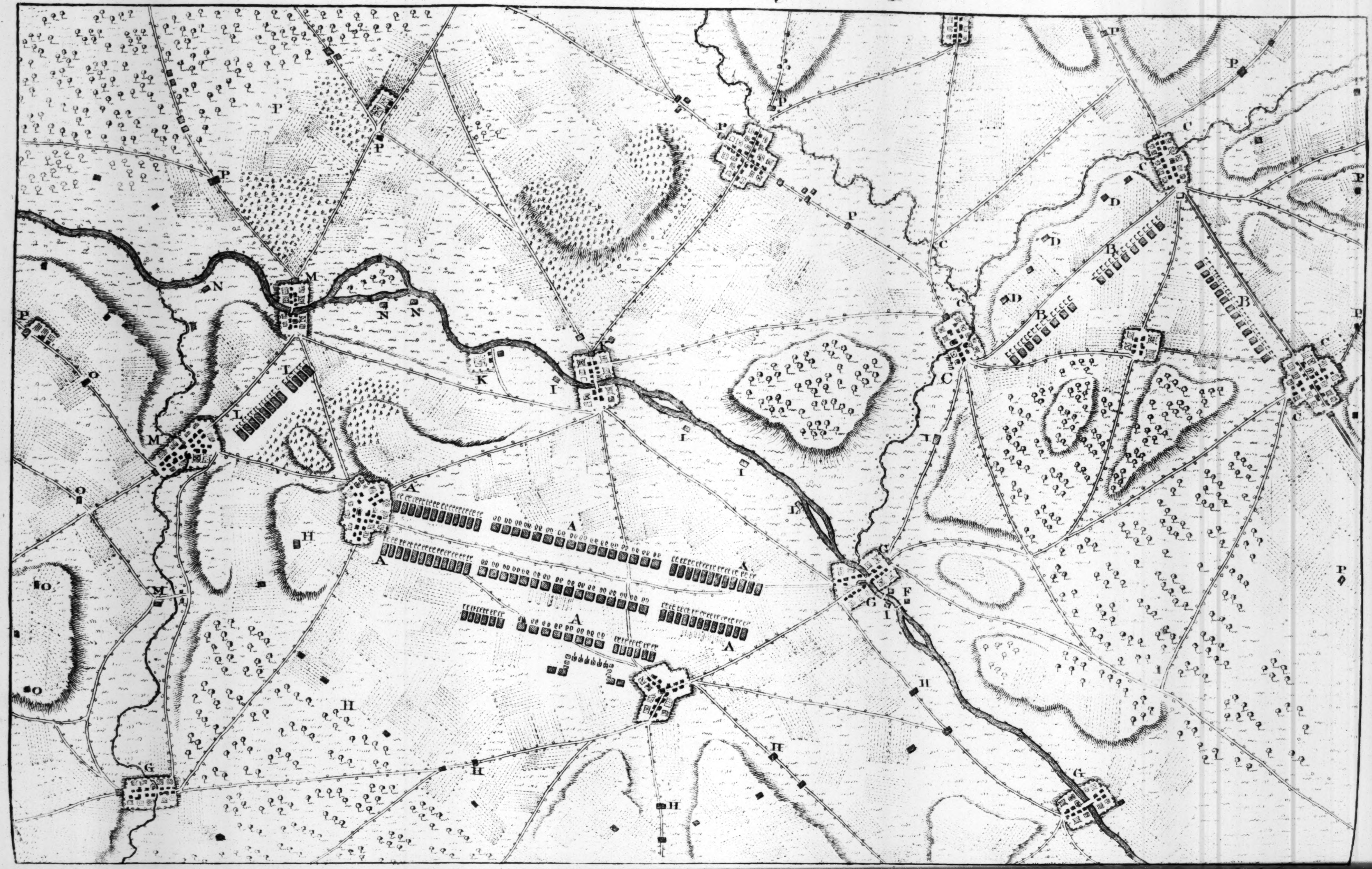
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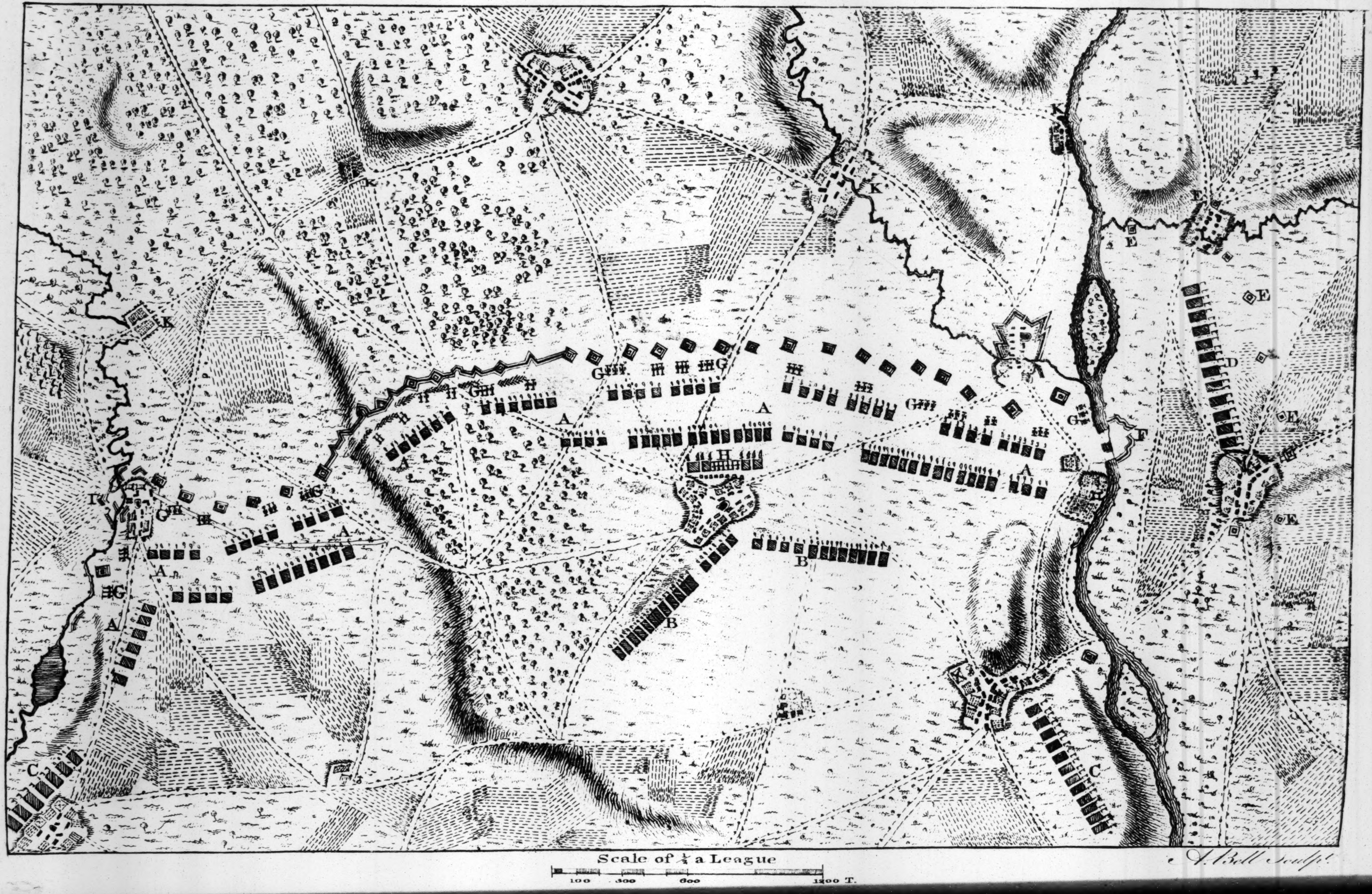
Plate CCXCII.

WAR.

Plan of an Intrenched Camp.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paſs of Thermopylæ, Xerxes with his innumerable army could never have forced him in the defiles which he guarded. The three actions of Fribourg are memorable examples of the neceſſity of ſecuring all parts in the rear, and of occupying the poſts by which they can be turned. M. de Mercy, attacked by two generals of the higheſt reputation, the great Condé and the viſcount de Turenne, took ſuch good poſitions in theſe three attacks, that, although forced to retire and followed from poſt to poſt, he could never be turned, but made his retreat quietly through the valley of St Peter, without the French army's ever being able to break in upon him.

The intrenchment ſhould never be more than 250 or 300 toiſes, which make from 500 to 600 paces, diſtant from the camp, and which ought to be divided into three parts. This diſtance ſhould be made, that the troops may be able to judge of the parts that can be carried with greateſt eaſe, and of thoſe which are moſt in need of aſſiſtance, that they may march there with greater order, diſpatch, and facility: whereas if this diſtance is not obſerved, it will happen, as hath been ſometimes ſeen, that the troops not having ground ſufficient to range themſelves in order of battle, the diſpoſitions will be impeded by confuſion and diſorder, and the enemy will have forced the lines before the troops can be in a condition of oppoſing him.

But in a mountainous country, it is not ſufficient for a general that he cannot be turned; that he hath profited ſo well by the advantages of ground, as to render the enemy's approach to the camp difficult; that the aſſiſtance of art hath been joined to nature, and that the country to be guarded is entirely covered: he muſt alſo be careful that the communication with the neighbouring towns where the magazines of war and proviſion are eſtabliſhed, is ſafe and eaſy. If any one of theſe particulars is neglected, the camp is expoſed, neither can the general continue in it the time that would be neceſſary to retard the march and deſigns of the enemy. As it hath been already obſerved, that there is ſcarcely any poſt that is not liable to be turned or overlooked, the camp ſhould be entrenched only ſo far as the entrenchments may become an obſtacle to the enemy, and as they may be a means of giving the general time to retire to occupy another poſt.

When the enemy undertakes the ſiege of ſome town, and the general, although with an inferior army, is willing to ſuccour it, or cauſe the ſiege of it to be raiſed, he ſhould ſeek out a ſpot naturally ſtrong, and entrench it according to its ſituation: if an open country, according to the method above mentioned; if among mountains, according to the aſſiſtance that the nature of the country may give; and make uſe of theſe entrenchments as a ſure aſylum from whence to make ſallies upon the enemy, to attack his forages and his convoys, and to oblige him to raiſe the ſiege as well by the fatigues of it, when it hath been drawn out to a greater length of time than was deſigned by the enemy, as by the want to which he is reduced by the continual inquietudes that the intrenched army hath given him.

When an army is in an open country, it generally continues in the ſame camp for ſome ſpace of time; becauſe it is certain the enemy cannot conceal his deſigns ſo effectually from the general, but he may be able to circumvent them; but in a mountainous country it is uncertain whether an army will continue in the ſame poſt till morning that it occupied over-night. A general muſt then encamp in ſuch a poſition, and after ſuch a manner, that in caſe the enemy comes to attack him in force and with advantage, he may be able, without danger, to proceed to another poſt, and evade the enemy's deſigns.

It requires great ſkill in a general to judge when it is proper or improper to make choice of places which have a great many avenues on one ſide; becauſe if he ſhould be attacked in a camp incloſed by rocks, or deep in a valley which hath but one or two paſſes open, it will be very difficult for him to diſengage himſelf from the enemy: on the contrary, if there are many ſmall paſſes or avenues to the ground of which he is poſſeſſed, and by which the enemy may eaſily inveſt his camp, it will require a great number of men to guard them. But on theſe occaſions a general ſhould be ever careful to make a good diſpoſition of his troops, to maintain ſtrict order and diſcipline in his camp, and to ſend out his patroles with the greateſt regularity; by which means he will free himſelf from all apprehenſions of being ſurpriſed.

There ought to be no difference between a well-governed town and a well-ordered camp; the exacteſt order ſhould be obſerved, and the ſtricteſt diſcipline kept up: if a ſoldier is at liberty to quit or enter it at pleaſure, the enemy's ſpies will not fail to make their advantages of it. If the camp is unhealthy or diſtreſſed for proviſion, water, wood, or forage, and the ſoldier hath real cauſe of complaint, every method ſhould be tried to avoid the danger that will attend his being diſcouraged. It is often owing to the little order exiſting in the camp, that the ſoldiers are ſeized with a panic, occaſioned by the abſurd and groundleſs reports that are diffuſed throughout it; troops thus terrified, are in a manner vanquiſhed before they come to action.

In a mountainous country, ſuch places ſhould be avoided as are ſubject to be overflowed, either by the melting of the ſnow, or by torrents which, at ſome ſeaſons, appear no more than trifling rivulets, but which, at others, ſwell and carry off every thing they meet with in their way: of this nature were thoſe mentioned by M de Feuquieres, which he found near the rock that he attacked and took in 1690 from the Badouais. Situations in the neighbourhood of woods are generally to be feared, becauſe the enemy may ſet them on fire, and the flames be communicated to the camp. The general ought alſo to ſatisfy himſelf with regard to the nature of the ſprings, which may agree very well with the inhabitants, but prove very unwholeſome to ſtrangers: ſuch, according to the reports of the French, is the nature of the ſprings in many parts of Italy. The water belonging to certain ſtreams or rivers will be pernicious, while that belonging to the fountains and wells in the ſame country will be very wholeſome and ſalutary.

The reader may ſee in Vegetius, Santa-Cruz, Montécuculli, and Puyſégur, the kind of order neceſſary to be obſerved in a camp, whether entrenched or not: it is impoſſible to uſe too many precautions for its ſecurity; they depend upon the general's ability, and upon the diſcipline he cauſes to be obſerved.

Sect. VII. *Of eſcorting Convoys.*

The conducting of convoys is one of the moſt important and moſt difficult of all military operations. In the eſcort aſſigned them, and the number of horſe and foot of which this eſcort is compoſed, the general ought to be guided by the diſtance of the town from whence they ſet out; the dangers to which they are expoſed from the different parties they may meet; the diſtance and ſtrength of the enemy, and the extent and nature of the country they have to travel over, whether an open or a mountainous one; the number of waggons, and the quality of the convoys, whether they conſiſt of money, or ammunition for war or proviſion; and whether they are extraordinary or daily. When eſcorts are too numerous, the troops are fatigued, and no end anſwered; and when they are too weak, they are liable to be beaten. M. de Puyſégur obſerves, that it is as dangerous to give an eſcort of 2000 men to a convoy where only 1000 are requiſite, as to give but 500 to one where 1000 are abſolutely neceſſary; in the firſt the troops are unneceſſarily fatigued, and in the ſecond the convoy is expoſed to the danger of being carried off.

All theſe conſiderations ſuppoſe the general to be a man whoſe natural parts are matured by experience, and who is ſenſible that, without a thorough knowledge of the country, the foundation of all conduct, it will be impoſſible to make a proper diſpoſition of troops. If a general is ignorant of the places moſt proper to form ambuſcades; of thoſe where there are bridges and fords; of the paſſes which are moſt dangerous, and thoſe which will favour the enemy's approach in order to attack, and whether in head, flank, or rear, he acts but as chance directs, and his diſpoſitions will have no meaning, either with reſpect to the ſituation of places, or the nature of the ground; the orders will be ill executed, the evolutions performed without exactneſs, and the diſpoſition of the troops will be faulty; the ſeparate bodies being, conſequently, unable to ſuſtain and aſſiſt each other, will ſoon be beaten and diſperſed, and the convoy carried off.

The general officer commanding the convoy ought, for its ſecurity, to diſtribute his troops after ſuch a manner that they may be a mutual aſſiſtance to it. The choice of the troops to form the eſcort is undetermined, as it is by the nature of the country their quality ſhould be decided. In mountainous and woody countries, only infantry, huſſars, or dragoons, can be made uſe of; the huſſars or dragoons are to march in the front and on the flanks, to ſcour the woods, examine the avenues, and make ſure of the defiles: in an open country, the eſcort ſhould be compoſed of infantry, cavalry, huſſars, or dragoons. But whatever may be the nature of the country, the convoy ought never to advance without firſt ſending out detachments to reconnoitre at a diſtance.

If the convoy marches through a mountainous country, a large body of cavalry would not only be uſeleſs, but alſo an embarraſſment, as it would be unable to act, except with great difficulty; whereas, in an open country, cavalry is very ſerviceable. In any kind of country a convoy can be eſcorted with infantry, eſpecially when the enemy can only act with his; but as in an open country it is neceſſary for the infantry to be ſupported, the cavalry muſt be uſed for that purpoſe. In a mountainous country, infantry can carry on war alone.

In this laſt caſe the officer commanding the eſcort ought to place a body of infantry at the head, another in the centre, and a third at the rear-guard; to diſtribute ſmall bodies at proper diſtances on the right and left, and he ſhould be particularly careful to poſſeſs himſelf of the heights. The huſſars muſt be diſtributed to the advanced and rear guards, and, in order to be more certain that every part hath been ſtrictly examined, as the convoy advances, notwithſtanding the huſſars of the advanced guard have already ſcowered the avenues, woods, valleys, villages, and hollows, the huſſars belonging to the rear-guard ſhould again look into thoſe places, to ſee whether any thing hath eſcaped the notice of the advanced guard. Theſe precautions are never without their uſe, and do not in the leaſt retard the march of the convoy.

The ſmall detachments ſhould advance as far as poſſible into the country, without expoſing themſelves to the danger of being cut off, the huſſars with piſtol or muſquetoon, and the dragoons with their carbine in hand, in order that if they ſhould meet the enemy, they may, by firing, give the officer commanding the eſcort notice of it, ſo that he may have time to make his diſpoſitions for defending and preſerving the convoy. The convoy may continue marching on, till the enemy is diſcovered: but on the firſt notice of him, it muſt ſtop, and the officers belonging to the convoy ſhould park their waggons; or, if the ground will not admit of that, they ſhould cauſe them to keep very cloſe together, and double them up with the diſtance of four paces, which ſhould be filled with infantry, between each waggon. By this movement the length of ground taken up by the waggons will be contracted, the troops will be brought cloſer together, and will form a ſtronger and heavier body, capable of aſſiſting each other with more eaſe.

In a mountainous country it is very ſeldom, and almoſt impoſſible, for the enemy to attack the advanced and rear guards and the centre at the ſame time. Nevertheleſs, if he ſhould find an opportunity of forming theſe three attacks at once, by following the diſpoſitions above mentioned, he will find troops at every part to receive him: neither will he be able to make himſelf maſter of the heights without attacking them, and the troops already in poſſeſſion of the ground will eaſily repulſe him; and by the aſſiſtance which the officer commanding the eſcort ſhould endeavour to ſend them, they will be enabled to maintain themſelves in them, to protect the convoy, and the enemy will be unable to attack by more than one or two paſſes.

If the enemy forms but one attack, only a part of the troops muſt be oppoſed to him, becauſe it is to be ſuppoſed this attack may be made only with a deſign to draw the whole ſtrength of the detachment to that part, and which, by being altogether in that one place, will give the enemy concealed in ambuſh an opportunity of falling with eaſe upon that part of the convoy that is unprovided with troops, and which will of courſe be incapable of making any defence. The troops of the centre ſhould never march to the aſſiſtance of the advanced guard, if it is that which is attacked, nor thoſe of the rear-guard to the aſſiſtance of the centre;

Defenſive Operations.

centre; but a party from thoſe troops which cover the flanks of the convoy ſhould be collected in a body, and ſent to aſſiſt the part that is attacked. However narrow and confined the country may be, a convoy may be eaſily conducted by infantry, when it would be impoſſible to do it with cavalry.

When any paſs or avenue croſſes the road on which the convoy marches, it ſhould be covered by a body of infantry, which will remain there till the rear-guard is come up; then it will fall into the poſt aſſigned it for conducting the convoy. It is always to be ſuppoſed, that this paſs hath been examined by the advanced detachments. If the eſcort is compoſed of infantry and dragoons, the latter ſhould be diſmounted, in order to give an additional ſtrength to the guards, and their horſes may be tied to the waggons. The huſſars, if the nature of the country renders them unſerviceable on horſeback, may alſo be diſmounted; by which means, inſtead of being an embarraſſment to the infantry, they will become uſeful to it. The nature of huſſars is ſuch as will admit of their being employed on every occaſion; and although the difference of their arms will not permit them to be as ſerviceable as dragoons, they may nevertheleſs amuſe a party of troops belonging to the enemy in ſuch a manner as to enable the infantry to beat them, or at leaſt to oblige them to retire.

Huſſars are more particularly neceſſary in the eſcorting of convoys, becauſe they ſcamper about on all ſides, and are very active and ready in ſcowering a country thoroughly; they leave no place till they have perfectly examined it, unleſs the thickneſs of the woods, or any other unavoidable obſtacle, ſhould prevent their penetrating as far as they would otherwiſe do; and even then they protect the infantry, who can with greater eaſe paſs into thoſe places where the huſſars cannot. Whatever country the convoy paſſes through, there ſhould always be huſſars with it; otherwiſe the officer commanding the eſcort cannot be certain that the country is thoroughly ſurveyed, becauſe for want of huſſars he muſt employ cavalry on that ſervice. Not that there can be any doubt of the cavalry's expoſing itſelf to danger with as much cheerfulneſs and courage as the huſſars; but as the horſes belonging to the cavalry are naturally heavier than thoſe of the huſſars, and often encumbered with forage, they cannot venture to a proper diſtance without running the danger of being taken, becauſe they cannot retire with that expedition which is requiſite: On the other hand, the huſſar being more active, and more accuſtomed to reconnoitre, knows how to go over a country with proper caution and care to himſelf: beſides, the trooper who is uſed always to march in a body, and to be under command, will have a very imperfect idea of the method of ſcowering a country. Although the diſpoſition of the troops ſhould always be regulated by the nature of the country through which the convoy marches, and by the nature and number of the enemy by which it is liable to be attacked, yet the general ſhould never neglect, whatever his ſituation may be, to ſecure the head, centre, and rear. Before the convoy begins its march, the diſpoſition in caſe of an attack ſhould be ſettled; by which means the commanding officers of different corps will know where to poſt themſelves, and after what manner to act at the time the attack is made. By the knowledge which the commanding officer ought to have of the country, he will form a judgment of thoſe places where it is moſt probable he may be attacked, and of courſe make his diſpoſitions accordingly. In any diſpoſition that may happen, a general ſhould always foreſee in what manner the attack, defence, and retreat, will be conducted.

When a convoy marches through an open country, the advanced and rear guards ſhould conſiſt of cavalry ſuſtained by infantry; the infantry in the centre ſhould be continued on the right and left of the waggons, and the cavalry divided into troops ſhould be diſtributed on the flanks, at 100 or 150 paces from the infantry; ſquadrons of horſe, intermixed with platoons of infantry, ſhould be placed at proper diſtances on the flanks of the remaining part of the convoy. By this poſition, if the convoy ſhould be attacked in head, centre, or rear, theſe ſquadrons and platoons ſhould have orders to march immediately to the aſſiſtance of the party that is attacked.

The advanced detachments of huſſars, and thoſe upon the flanks, by giving notice that the enemy is at hand and coming to attack, will furniſh time for parking the waggons and uniting the troops; in which caſe the infantry muſt form in the park, and the cavalry poſt itſelf on the flank of that front which expects to be attacked, and the huſſars place themſelves upon the flanks of the cavalry.

The attack of a convoy is always ſudden and rapid, and the ſucceſs of it is generally decided in the firſt onſet; and as the enemy, whether he ſucceeds in his attempt or not, muſt retire with great expedition, for fear of any ſuccour that may arrive, it is evident that it can be attacked only by cavalry, huſſars, or dragoons; there have indeed been ſome inſtances where the cavalry have brought infantry behind them. If the convoy has had time to park itſelf, the effort of the infantry can only be turned againſt that which is entrenched behind the waggons. The enemy's cavalry and that belonging to the eſcort attacking each other, will fight upon equal terms: but with regard to the infantry, it will be different; that which is ſheltered by the carriages having a great advantage over that which attacks it. On the contrary, if the enemy's infantry is ſuſtained by huſſars only, they will be briſkly attacked by the cavalry and huſſars belonging to the eſcort, who will take them in flank and rear. The enemy's huſſars being hemmed in, his infantry, for want of being ſuſtained, will be eaſily beaten: part of the cavalry and huſſars belonging to the eſcort, ſhould be left in purſuit of the enemy's huſſars, and the remainder ought to take his infantry in flank. If the enemy is beaten, as it is probable he will, his retreat ſeems impracticable, or at beſt very difficult; becauſe, being deprived of his cavalry, he will be forced to make head againſt the infantry that attacks him in front, and to repulſe the cavalry that harraſſes him in flank.

If the convoy, in an open country, is obliged to march upon a cauſeway, theſe precautions will ſtill become more neceſſary: the huſſars which are advanced, ought to examine the country very exactly; for it may happen that the country not allowing the carriages to be taken off the cauſeway in order to be parked, they muſt conſequently be obliged to remain upon it; in which caſe they can only be doubled up, the extent of ground contracted, and the troops drawn nearer to each other, in ſuch a manner as to become ſtronger and more cloſely knit together. The diſpoſitions will then, in a great meaſure, depend upon circumſtances; but they ſhould nevertheleſs be ſo managed, that each corps may mutually contribute to the preſervation of the convoy; and that from the reſiſtance with the enemy ſhall find in every part, there may be time ſufficient to ſend ſuccour where it ſhall be moſt needed.

If the enemy gives ground, the general ſhould be cautious of purſuing him too far, leſt, if he ſhould receive a reinforcement, the troops in purſuit of him, finding themſelves at too great a diſtance, will not only be beat, but alſo be deprived of every method of retreating.

There are ſome occaſions on which the enemy muſt not be purſued at all; ſuch as when the armies are very cloſe to each other, or the convoy draws near to ſome of the enemy's poſts; becauſe then, by the nearneſs of the army, the enemy's infantry can come to the attack without being under the neceſſity of mounting behind the cavalry, as it happened in 1747; when the French convoys which ſet out for Antwerp for Bergen-op-Zoom, were continually attacked by the infantry that was poſted from Breda quite to Voude: in which circumſtances the ſame diſpoſitions ſhould be uſed for its defence; and in caſe the enemy ſhould be forced to retire, the commanding officer ought to be contented with having ſaved the convoy, and not purſue him, for fear he ſhould find advantage from the nearneſs of the quarters, and receive aſſiſtance that might prove fatal both to the convoy and its eſcort. A general to whoſe care a convoy is intruſted, ſhould never ſeek any other advantage than the conducting it in ſafety, even though he ſhould be ſure of beating and taking a detachment belonging to the enemy; a real advantage is often given up by endeavouring to follow an uncertain victory. There is leſs ſhame in being beat, when an officer hath done his utmoſt, and acted with propriety, than there is glory acquired in conquering when he hath exceeded the limits of his duty. An officer is no longer praiſe-worthy, than whilſt he acts up to the orders he hath received with exactneſs and diſcretion; whereas he who, depending too much on his own courage, raſhly ſuffers himſelf to be drawn on by the appearance of ſucceſs, is not only charged with, but ought to be anſwerable for, the conſequences.

If the convoy hath a bridge or a defile to paſs, it is not only ſufficient that the country, as far as the bridge or the defile, ſhould be known, but alſo neceſſary that the huſſars ſhould paſs over it, and take a ſurvey of the country a great way beyond it. The time in which the huſſars are reconnitering, ſhould be employed in making the waggons double up by four, eight, or ten in front, if the ground allows of it, in order to unite the troops belonging to the eſcort. The troops in the centre muſt join the advanced guard, and cover the carriages; the rear-guard form in order of battle, and face toward the country they have marched over; and the ſquadrons and platoons of infantry which marched on the ſide of the convoy, place themſelves on the flanks, in order to cover them. When the country in front ſhall have been thoroughly examined, the advanced guard and the troops belonging to the centre, covered by huſſars, ſhall paſs over the bridge, and advance far enough on the other ſide to give room for the carriages either to double up or to be parked. The corps of cavalry and infantry which marched on the ſides of the convoy muſt be placed on the flanks, to protect them. As ſoon as the convoy and the eſcort have paſſed, the waggons muſt proceed, and the troops fall into the ſame diſpoſition they were in before the paſſage; that is, if there is no alteration in the nature of the ground to make another diſpoſition neceſſary: in that caſe, the commanding officer muſt give ſuch orders as he ſhall find neceſſary. For the greater ſecurity of the convoy, a detachment of huſſars ſhould be left near the bridge, or the opening of the defile, till the rear-guard hath marched to ſome diſtance, which detachment will afterwards join the eſcort.

There ſtill remains another diſpoſition to be made in an open country, whether the convoy marches on a cauſeway or in the high road, which is to divide the eſcort into many equal parts, with troops of every ſort belonging to each; the firſt body ſhould ſet out an hour before the convoy is to begin its march, the ſecond half an hour after, with orders to the commanding officers to ſcower the adjacent country with great exactneſs, and to be careful not to be cut off by any detachments the enemy may have in the country; for which reaſon theſe two bodies ſhould never be more than three quarters of a league diſtant from each other, by which means they will be within reach of aſſiſting each other. The body which ſets out laſt ſhould never be more than half a league before the advanced guard of the eſcort.

As the convoy is ſuppoſed to march through an open country, the above-mentioned diſtances are allotted between the firſt and ſecond bodies, and between the ſecond body and the advanced guard of the convoy; but if the country ſhould grow rough and unequal, theſe bodies ſhould draw cloſer together, and always keep ſight of each other, ſo as to be able to aſſiſt one another in caſe of an attack.

When theſe bodies are ſet out, the general muſt put the convoy in motion, and form the advanced guard of one of the divided detachments belonging to the eſcort; the infantry of which detachment will remain at the head of the waggons, the cavalry ſhall march by troops 300 paces in advance, and the rear-guard muſt be formed equal to the advanced; but beſides this rear-guard, there ſhould be a body of huſſars and dragoons reſerved, to march a quarter of a league or more, according to the nature of the country, in the rear of the convoy; the remainder of the infantry ſhall be diſtributed at proper diſtances on the ſides of the convoy, and the remainder of the cavalry ſhall be placed on the flanks of the convoy, about 300 paces diſtance.

The commanding officer ſhould take care to keep ſome huſſars with him, to ſcower the country round about the cavalry that are on the flanks and the rear-guard; and thus by running over the country again that hath already been examined by the advanced detachments, the commanding officer will be certain there is no enemy at hand.

There have been often inſtances of a ſwarm of huſſars falling upon the rear-guard from woods, which have been reconnoitered, and where no enemy hath been found, and where they themſelves were not half an hour before.

When a convoy happens to be of ſuch importance that its being taken many influence the operations during the remainder of the campaign, the general ſhould not only aſſign a ſtronger or more numerous eſcort to it, but ſhould alſo ſend off detachments, which, without having orders to attack the enemy, ſhould keep between him and the road that the convoy keeps, in order to oppoſe and baffle any deſigns the enemy may have formed carry it off. The following examples will ſhow both the ſecurity and neceſſity of this method.

During the campaign of 1746, marſhal Saxe, being encamped on the Orne, was in expectation of a conſiderable convoy from Judoigne. As its ſafe arrival in the camp was of great conſequence, he cauſed the marquis of d'Armentieres, then major-general, to ſet out with a large detachment, in the night preceding the day on which the convoy was to begin its march, with orders to march on the ſide of Ramillies. At the ſame time, he cauſed another detachment to ſet out from the camp of his ſerene highneſs the prince of Clermont, with orders to march on the ſide of the abbey of Rame: theſe two detachments, by amuſing the enemy on one ſide, and by entirely concealing the march of the convoy on the other, enabled it to proceed in ſecurity, and it arrived in the camp without having been at all moleſted.

In the beginning of the campaign in 1748, the ſame general having a deſign to lay ſiege to Maeſtricht, and conſequently having occaſion for all his troops, was willing to throw a ſupply of proviſions into Bergen-op-Zoom, as he was going to a diſtance from that place, and could no longer be in a ſituation of aſſiſting it. For that purpoſe he ordered a conſiderable convoy, which ſet out from Antwerp for that town under a good eſcort; but in order to prevent an attack, which circumſtance had often happened during the winter, and that with loſs, the allies at that time occupying a chain of quarters from Breda as far as Voude, he detached the count d'Eſtrees with a conſiderable body of cavalry to march on the ſide of Breda, with orders to puſh on detachments almoſt to Voude. This detachment had two objects in view; one of which was to keep the allies in ſuſpence with regard to the ſiege that was to be formed, and the other to cauſe them to remain near Breda. This large body of cavalry kept the allies, who were in the neighbourhood of that town, in ſuſpence; during which interval marſhal Saxe marched to Maeſtricht, the allies not daring to attack the convoy, becauſe they would have put themſelves between the eſcort and the troops under count d'Eſtrees. From theſe two examples may be concluded the neceſſity of covering convoys of importance by detachments, independent of the eſcort aſſigned them. In ſhort, a general ſhould do every thing that will contribute to the ſecurity of his diſpoſitions; and precautions ought never to be thought ſuperfluous when they are managed with prudence, and have for their end the ſucceſs of a well-concerted plan.

SECT. VIII. *Of Detachments for forming a Chain of green Forage.*

THOSE operations whoſe object is the ſubſiſtence of the troops require the exacteſt precautions; for famine, as Vegetius ſays, proves oftentimes more deſtructive to armies than battles, hunger being more fatal than the ſword. A general can defend himſelf againſt an enemy, however ſuperior; but when forage and proviſion are wanting, there can be no hope remaining.

It is very difficult to provide a large army with forage; and a general often expoſes it to inevitable danger, if he is not thoroughly experienced in this operation, or if he is deſtitute of that knowledge which at once preſents all the wants of an army, and the means of ſupplying them, to his view.

Foraging parties, like convoys, are attended with a greater or leſſer degree of danger, according as the country is more or leſs acceſſible, and the forage at a diſtance or near at hand. The diſpoſition for the chain in an open country is different from what it muſt be in a mountainous one. When forage is within reach of the camp, and the enemy at a diſtance, fewer troops and attendants are required; becauſe, in caſe of an attack, there is aſſiſtance near at hand: but in proportion as the forage is farther from the camp and nearer to the enemy, the precautions ſhould be increaſed, and more troops ſhould be allotted to the chain, which ſhould alſo ſometimes be furniſhed with cannon.

A general ſhould never forget that maxim which ſays, The enemy muſt always be oppoſed by troops of the ſame nature as thoſe with which he makes the attack: if the forage, therefore, is in an open country, the chain, as it is certain the enemy will be more numerous in cavalry than infantry, ſhould conſiſt chiefly of cavalry, and only have infantry ſufficient to occupy ſuch poſts as are neceſſary to be guarded: in a mountainous country the diſpoſitions will be quite different; becauſe, as it is impoſſible for cavalry to move eaſily, the chain ſhould be ſtrongeſt in infantry. In ſhort, the number and quality of the troops for the chain ſhould be regulated in the ſame manner as in regard to the convoys; in proportion to the nearneſs or diſtance of the enemy; by the extent of ground to be foraged; and by the nature of the country: and as marſhal Puyſegur obſerves, before the ground to be foraged is examined, there ſhould be a calculation made of the number of horſes to be fed, and of the fertility of the ground that is to be foraged; for if it is a plentiful ſpot, a leſs extent will be ſufficient; if it is not plentiful, a larger muſt be taken; but in either caſe the chain muſt be always proportionable.

Before a forage is undertaken, the ground on which it is to be performed ſhould be always thoroughly known; in order for which the general ſhould ſend out in the evening, or the day before, the officer who is to command it, with a detachment, to ſurvey the ſituation of the country; the places where he muſt poſt his troops of cavalry and dragoons; the poſts which the infantry muſt occupy; the ground neceſſary for the foragers; that where the corps of reſerve muſt be poſted; and what part in the front of the chain it will be neceſſary for the huſſars to ſcower. After having examined all theſe particulars, the officer makes his report to the general, who, from the account given him, will order the troops neceſſary to ſecure the forage, and render the execution of it eaſy. The chain of forage ſhould be in proportion to the number of troops that are to forage, as well as to the quantity of ſown fields and the thickneſs of the grain. Beſides the horſe, dragoons, and infantry, there ſhould be huſſars to ſcower the country in the front of the chain: the number of them is undetermined, as it will be ſufficient for them to cover and protect the front, and give the commanding officer immediate notice of every thing that makes its appearance.

If the forage is to be made at a diſtance from the camp, the troops deſtined for the chain ſhould ſet out at day-break, or the evening of the foregoing night, as was done by marſhal de Coigny in the campaign of 1735. This general being deſirous of foraging under the cannon of Mentz, the troops taken from the army to form the chain, one body under the command of the count de Belleiſle, and and the other under the command of the marſhal de Dreux, ſet out after retreat-beating, and at break of day the chain found itſelf properly placed. When the diſtance is not ſo great, it is ſufficient that the troops ſet out at day-break, and the general will have time enough to eſtabliſh his chain, eſpecially as the ground and the poſts neceſſary to be occupied have been ſurveyed two days before. The commanding officer muſt take care to eſtabliſh the chain before the foragers arrive, and alſo that the huſſars have ſcowered the country; firſt, becauſe the foragers ſhould not, by waiting, fatigue the horſes; and ſecondly, that no trooper or ſervant ſhall paſs; which will undoubtedly be the caſe if there is any vacancy where troops are not placed.

The whole of the troops ſhould be diſpoſed after ſuch a manner, as to be able to ſee one another; and the vedets alſo, that are placed between the troops to prevent the foragers from paſſing, ſhould be within hearing. The infantry ſhould be poſted in hollows and villages and behind hedges, with horſe or dragoons to ſuſtain it and ſupport the flanks; and the diſpoſition of the chain will be ſtill better, if theſe troops can be mixed with it, provided the infantry can be ſheltered by any hollows, hedges, or buſhes.

Grenadiers, ſuſtained by horſe and cannon, if there are any, ſhould be poſted on thoſe ſides which, either from the ſituation of the country or the nearneſs of the enemy, are moſt liable to be attacked; but in reinforcing theſe poſts, the commanding officer muſt be careful not to weaken the chain too much in any particular part. When an enemy attacks a foraging party, he generally attempts to penetrate at different parts; but if he forms only one atrack, the diſpoſition of the chain becomes uſeleſs, as all the troops muſt be brought to that part where the attack is made. But as it is naturally to be ſuppoſed the enemy will form many attacks, particularly if his general acts like a man underſtanding his buſineſs, he muſt be ſtrong in every part; the reſerve, which is in the centre, will, with expedition and ſpeed, ſend aſſiſtance to the parts which are attacked.

Before the commanding officer fixes the chain, he ſhould detach ſome huſſars to ſurvey and ſcower with great exactneſs the woods, villages, hollows, and all ſuch places, for at leaſt three quarters of a league or a league in front, as may be capable of containing ambuſcades: and during the time of this ſurveying, the troops deſtined for the chain will remain in order of battle, in the front of the ground that is to be foraged, in order to cover it and protect the huſſars, in caſe they ſhould be attacked.

When this examination is finiſhed, the commanding officer may begin to eſtabliſh his chain, and the huſſars will remain in the front till the foraging is finiſhed; and will detach ſmall bodies to march round about the chain, croſſing each other, halting at times, and ſending ſome huſſars before them to patrole.

If the huſſars gain intelligence of the enemy's being either in march, or placed in ambuſcade, they will ſend immediate notice of it to the commanding officer of the chain, who ſhould always fix himſelf in a particular ſpot, that there may be no time ſpent in ſeeking him; his poſt ſhould be in the rear of that part of the chain that is neareſt to and moſt in front of the enemy, and he will regulate the diſpoſitions for his defence according to the report made to him. When an ambuſcade is diſcovered, and troops marching to attack, a general ſhould always ſuſpect there may be more ambuſcades, and more troops in march, to form different attacks; he muſt therefore, inſtead of weakening the chain in any part, ſtrengthen it as much as he can, by cauſing either the whole reſerve, or part of it, to march where circumſtances ſhall require.

The avenues and the heights in a mountainous country ſhould be occupied by infantry; the avenues, in order to prevent the enemy from penetrating into the valley or plain where the forage is made; the heights, in order to obſerve the enemy at a diſtance, and to prevent his getting poſſeſſion of them, and flanking the troops which guard the avenues. In this caſe there ſhould be a greater number of infantry than cavalry; no more of the latter being requiſite than what is neceſſary to ſuſtain and ſupport the infantry, in caſe it ſhould be attacked, repulſed, and obliged to retire through a valley or plain. Then, if it hath no cavalry to ſupport it, the wings will be entirely expoſed, and the enemy being ſuperior, can at the ſame time attack the front and the flanks; whereas, by the means of horſe, which can act with eaſe in a plain or a valley, this inconvenience will be prevented, and the infantry greatly aſſiſted.

If the forage is made at a diſtance from the camp, and in the neighbourhood of the enemy, the infantry guarding the avenues ſhould throw up ſome entrenchments in its front, which will be ſoon done; and it is then cannon becomes neceſſary, as there ſhould be two or three pieces planted at each avenue. The heights alſo muſt, on every occaſion, be occupied, which ſhould be conſtantly obſerved as a general rule, whether the enemy is at a diſtance or near at hand, in every diſpoſition that is to be executed in a mountainous country.

When the forage is made in an open country, the chain ſhould be more numerous in cavalry than infantry; but ſome infantry is abſolutely neceſſary to guard villages, hollows, and ſuch other places as it would be difficult for cavalry to guard. In ſhort, the number of the troops ſhould always be in proportion to the extent of ground to be encompaſſed, and their ſpecies determined by the nature of the country that is to be foraged: and as it is generally known with what troops the enemy will attack, he muſt always be oppoſed by thoſe troops from whom the beſt defence may be expected; and it would be ſtill better to force him, in ſome meaſure, to uſe troops of the ſame kind as thoſe by which he is oppoſed.

If the enemy forms one or more attacks, the ſmall eſcorts belonging to each regiment muſt join on the firſt order, and cover the foragers as much as poſſible, who ſhould at the ſame time aſſemble in the centre by regiments. The foragers ſhould always be provided with their carbine or ſword; and although they may not be very formidable againſt troops completely armed, yet there have been inſtances where they have charged with ſucceſs.

If it is in a plain, and the enemy, having formed but one attack, charges the chain in one particular part, the troops of horſe and dragoons which are oppoſite to him ſhould march up reſolutely and ſuſtain his efforts: if they are repulſed, they will be ſupported by the infantry that hath remained in its poſt; the huſſars which were in front will unite, and place themſelves upon the flanks of the troops which are attacked, in order to cover them, and endeavour to defeat the enemy by charging him in flank and rear. If the general is certain that the whole of the enemy's troops are engaged in this one attack, he may then bring up all the troops belonging to the chain, both cavalry and infantry, in order to oblige him to retire the ſooner: which if he does, ſome huſſars, ſuſtained by horſe and dragoons, ſhould be ſent in purſuit of him, till his retreat becomes certain; but with caution not to purſue too far, leſt he ſhould rally upon thoſe troops, who, being too far from the chain, cannot receive aſſiſtance ſo ſoon as would be neceſſary; and beſides, the making and accompliſhing the forage being the grand object, the commanding officer ſhould be contented with ſucceeding in that, without ſeeking for any other advantage unconnected with the original deſtination of the troops.

As ſoon as the enemy is retired, and the commanding officer is certain of his retreat, for he may return in greater force and with freſh troops, he will re-eſtabliſh the chain, at the ſame time neglecting nothing that may contribute to its ſecurity. But if the enemy, inſtead of being forced to retire, ſhould break into the chain, the commanding officer, who, on the firſt notice given him that the enemy was marching to attack him, had cauſed all the foragers to aſſemble in the centre, and to retire in good order, the ſmall eſcorts forming their rear-guard, will then aſſemble his troops as readily as poſſible, and oppoſe them to the enemy, in order to cover the retreat of the foragers; always taking care to regulate his diſpoſitions by the enemy's, and according to the nature of the ground.

If the enemy forms more attacks than one, the foragers, who, as hath been already obſerved, muſt be aſſembled in the centre, ſhould have orders to take the road to the camp, and will re-enter it covered by the ſmall eſcorts from the rear-guard: but as a forage ſhould never be abandoned till the laſt extremity, they ſhould be ordered to draw up in order of battle, when they are within a quarter of a league of the camp, in order to return and complete the forage on the firſt order. But if the enemy is in force, and by his ſuperiority all hope of obtaining the forage is deſtroyed; or if it is made at ſo great a diſtance from the camp that the troops belonging to the chain cannot expect to be readily aſſiſted; the commanding officer ought to make a retreat, with every diſpoſition a good officer is capable of, and to join courage and vigilance with knowledge and experience.

If, on the contrary, the enemy is weaker, or of equal force with the chain, he ſhould be charged without heſitation; becauſe the enemy, regulating his attack by his defence, will be obliged to contract himſelf, in order to make his attack heavier and more conſiderable: ſo that the troops being united, will charge the enemy: and if, by the aſſiſtance of the huſſars who are advanced, and act after the manner already mentioned, the enemy is forced to retire, he muſt be purſued in the manner above directed; after which the troops muſt return and complete the forage.

As a commanding officer is, in caſe of a forced retreat after being beat, obliged to ſubmit to circumſtances, and regulate his diſpoſitions by the enemy's; he muſt retire with the greateſt order poſſible, cauſing the infantry to march in the centre, either in columns or in order of battle, as the ſituation of the ground will beſt allow, the horſe and dragoons upon the wings, the huſſars upon the flanks, that they may not confuſe the diſpoſitions, but ſerve as a ſupport for the chain, and prevent its being taken in flank; and the diſpoſition of the troops ſhould be ſo managed, that the enemy ſhall not be able to preſent a larger front than that which is oppoſed to him: and although it is impoſſible for a general to foreſee, for certain, what will be the diſpoſitions for an attack and retreat, becauſe they muſt be changed according as thoſe of the enemy alter, or as the nature of the ground varies; they ſhould nevertheleſs be ſo ordered, that each body ſhall be ſupported, and capable of acting without confuſion. It is only on occaſions thus preſſing, that the commanding officer ſhould ſuffer the forage to be abandoned; and even then it will be ſome ſatisfaction to the commanding officer that he hath been able to place the foragers and their horſes in a ſtate of ſecurity.

If, during the retreat of the chain, it ſhould receive aſſiſtance from the army, it ſhould charge the enemy, notwithſtanding it may be too late to go on with the foraging; and if this charge ſhould prove ſucceſsful in either beating or cauſing the enemy to retire, he ſhould be purſued without intermiſſion, in order to deprive him of all deſire for repeating the attack. In order to improve this advantage to the utmoſt, it ſeems probable, that the commanding officer ſhould leave a large detachment, conſiſting of infantry, cavalry, dragoons, and huſſars, to continue all night upon the ſpot, and the next morning betimes, the foragers, properly eſcorted, will come to take away the forage; and as ſoon as the eſcort is arrived in the front of the chain, the detachment which hath remained there all night, muſt return to the camp.

There ſtill remains many other precautions to be taken for the ſecurity of foraging parties. If the nearneſs of the enemy renders the execution of them difficult, a greater number of troops ſhould be employed to form the chain. Forages thus conſiderable ſhould not be often repeated, becauſe the army muſt neceſſarily be fatigued, by the number of troops abſolutely requiſite to form the chain; and the great diſtance will harraſs the horſes, particularly on their return, as they will then be heavily loaded.

Defenſive Operations.

Theſe forages are not uſual, except in caſes where the general is willing to ſpare the forage in the neighbourhood of the camp, that he may, in the end, be provided nearer home. As a general cannot be certain how long he ſhall remain in the ſame camp, M. de Montecuculli, in this ſtate of uncertainty, always adviſes foraging at a diſtance, and ſo by degrees to come nearer and nearer home; becauſe, in proportion to the œconomy uſed with regard to forage, an army is enabled to remain longer in the ſame camp, and the troops leſs under a neceſſity of making fatiguing and fruitleſs movements: by foraging at a diſtance, the enemy is deprived of the means of ſubſiſting, and is often obliged to quit an advantageous ſituation, in order to ſupply his neceſſities elſewhere.

Care muſt alſo be taken that the foragers, in entering the ground they are to encompaſs, do not occupy more than is abſolutely requiſite, and that they do not ſpoil more grain than they carry away with them; firſt, becauſe by extending the chain it would be weakened, and become eaſier to be forced; and in the ſecond place, every prudent officer ſhould be an œconomiſt in the article of forage; the officers commanding the ſmall eſcorts which march at the head of each regiment ſhould be charged with the care of this. Theſe officers will cauſe their troops to march as much as poſſible through roads and over grounds which are untilled, till they arrive at the place intended to be foraged. If all the grounds are ſown, the commanding officer muſt cauſe the cavalry to diſmount at the place where the chain halts, and part of the troopers furniſhed with ſcythes muſt go and cut the grain, while the remainder hold the horſes, and when there ſhall be no farther room to fear damaging the forage, the cavalry will remount and take it up. Each place ſhould be marked out for a brigade or a regiment, which diſtribution ſhould be made by the ſtaff-officers before the troops arrive.

The general officer commanding the chain ſhould not aſſemble his troops till ſuch time as all the foragers are gone off the ground; but nevertheleſs, in proportion as they retire, he may contract the chain, in order to give himſelf greater ſtrength: the officers commanding the ſmall eſcorts are not to depart without leave of the general, nor till the regiment they belong to hath completed its forage; then they will form the rear-guard, and on their arrival at the camp go and make a report of the forage to the brigadier and their colonel.

As ſoon as all the foragers are gone, the general commanding the chain will aſſemble all the troops of it, form a rear-guard, and cauſe the remainder to march with as large a front as poſſible; the rear-guard to the whole will be compoſed of ſome troops of huſſars, and will keep at ſuch a diſtance as not to embarraſs the rear-guard in caſe it ſhould be attacked briſkly and repulſed; the remainder of the huſſars will be placed on the flanks of the rear-guard, which muſt be compoſed of infantry, horſe, or dragoons; thoſe huſſars which form the rear-guard of the whole ſhould have orders to retire, in caſe they are attacked, to thoſe upon the flanks of the rear-guard, and not to the infantry that forms it. By this diſpoſition, if the general ſhould be attacked in his retreat, the troops will be able to perform all the neceſſary evolutions, and to ſuſtain each other, without the order of march being in the leaſt deſtroyed.

SECT. IX. *Of the Detachments for forming a Chain of dry Forage.*

If there is great exactneſs and knowledge required in the conducting of parties for green forage, thoſe for dry forage perhaps require more; and, in general, every thing that regards foraging parties, whether green or dry, excites a particular attention in the commander in chief; and, according to the chevalier Folard, all ſucceſs in war depends upon ſecreſy, diligence, activity, and the thorough knowledge of the country.

The diſpoſitions for forming a chain of dry forage, which differ from thoſe for forming one of green, will direct the means for extending the chain in proportion to its ſtrength, and at the ſame time place the foragers in ſecurity; although, in parties of dry forage, the foragers generally take up leſs ground, according to the diſtance of the villages, that are to be foraged, from each other.

The diſpoſitions for a chain of dry forage are alſo varied according to the nature of the country; but whether it be open or mountainous, each different body ſhould be placed in that part where it can act with the greateſt facility; the infantry therefore ſhould occupy the villages, and the cavalry the plain in front, and ſhould be diſpoſed after ſuch a manner as to be able to retire eaſily to the protection of the infantry. Before the foraging is put in execution, the commander in chief ſhould mark out the villages to the general officer who is to command the foraging party, and regulate their number by the quantity of troops that are to forage. The firſt diſpoſitions will be the ſame with thoſe mentioned in the foregoing ſection in relation to green forage: therefore the general who is to command the forage, ought to ſet out with a detachment in order to examine the ground, the poſts neceſſary to be occupied, the villages which are to be foraged, their ſituation, the rivers which cover or run through them, the bridges to be guarded, the diſtance from one village to another, and with what degree of eaſe the communication with them may be ſecured. After having thoroughly examined into theſe particulars, he can with eaſe form a judgment of the number of troops that will be neceſſary to form the chain and ſecure the foragers: after having done this, he will order the bailiff or burgo maſter of every village to come to him, and inquire of them the number of huſbandmen, and how many ploughs each huſbandman hath belonging to him; by which he will be able to calculate the number of ſheafs reaped by each huſbandman.

The general may, for every plough, reckon about 30 acres of ground; and, in proportion to the fertility of the ground, every acre will produce from 120 to 160 ſheafs: by this method may be computed the number of ſheafs reaped by an huſbandman who hath three or four ploughs; and from this calculation the general will judge whether the number of ſheafs, ſuppoſed to be in each village, will be ſufficient for the troops coming to them.

Let every acre of ground be ſuppoſed to yield 144 ſheafs; then a huſbandman who hath three ploughs, will have reaped 12,960 ſheafs; ſo by reckoning 12 ſheafs to a truſs, and every truſs to weigh 600 pounds weight, this huſbandman will ſupply ſufficient for 124 truſſes. It is true, that ſome deduction ſhould be made from the number of truſſes that every acre may yield, as the huſbandman or farmer may have preſerved or conſumed ſome either for daily uſe or for ſeed.

It is very neceſſary that the general ſhould take care to leave ſufficient grain, not only to enable the huſbandman to live, but alſo to ſow his grounds; particularly if he foreſees a probability of the next campaign being carried on in the ſame country.

Nevertheleſs, as this manner of reckoning may be attended with inconveniences, becauſe there are ſome villages which keep up a particular trade of forage and grain, and therefore the granaries and barns may ſometimes be found empty, yet the quantity of ſheafs and grain remaining in the village may be calculated by the number of inhabitants to be ſubſiſted. Marſhal de Puyſégur's method, which conſiſts in informing himſelf of the number of horned cattle and horſes, and by deducting the time they graze, is a very good one; but ſtill there muſt be ſome deficiency in this calculation, as it will be impoſſible to fix with certainty the time of their grazing.

When the general ſhall have arrived at a tolerable certainty of the quantity of forage; the ground where to eſtabliſh his chain; the poſts which the infantry are to occupy; and taken a note of the quantity of forage; he will carry away one or two of the bailiffs or burgomaſters, as hoſtages for the ſecurity of the forage: he will alſo direct them to inform the inhabitants, that if they conceal or purloin but even a ſingle ſheaf from the whole, he will cauſe their village to be firſt pillaged, and afterwards ſet on fire; ſo that the peaſants, on whom theſe threats have often great effect, will ſcarcely give the enemy information of the intended forage. The general muſt leave ſome companies of infantry, ſuſtained by a detachment of huſſars, in every village, who, by conſtantly patroling on the outſkirts, will ſtop all comers and goers; while the infantry will keep a ſtrict guard on the inſide of the village, and permit no perſon to go out of it; nor ſuffer the bells to be rung, colours to be hoiſted upon the ſteeple, or fires to be lighted; and will put a ſtop to every thing that may be ſuppoſed to be a ſignal agreed on with the enemy. When the general hath completed all theſe diſpoſitions, he will return and give an account of them to the commander in chief.

The ſame general ſhall, upon the day appointed for the forage, ſet out at day-break, with the troops deſtined for the chain, and the ſtaff-officers. As ſoon as he ſhall be got within ſight of the villages, he will not fail to have them examined, notwithſtanding he left troops in them the foregoing evening. When they are all examined, he will leave them in the rear, march on into the front, and draw up in order of battle; after that, he will form the chain, regulating the diſpoſitions of it by the ſituation of the ground, and of the villages examined over-night. The huſſars will advance three quarters of a league or a league, in order to ſcower the country; during which time the ſtaff-officers, inſtructed by the general of the quantity of ſheafs contained in each village, will, attended by the bailiffs or burgomaſters, make a diſtribution of the forage by regiment or brigade, and aſſign a barn to each, or one to two. When this diſtribution is made, the ſtaff-officers will make a report of it to the general commanding the party.

In forming of the chain, the infantry muſt occupy the villages, hollows, and hedges, which may be found in the circumference of the chain, and the horſe and dragoons will be left in the plain in the front of the villages, but within reach of being aſſiſted and ſupported by the infantry; and care ſhould be taken to have a reſerve of ſuch troops as can with the greateſt eaſe tranſport themſelves to thoſe parts where aſſiſtance is needful: this reſerve ſhould be placed in the centre, or neareſt to the part that is moſt expoſed, or moſt liable to be attacked.

As all the villages marked out to be foraged are not in the ſame line, thoſe which are in the rear, and covered by others in which there is infantry, and by the chain of horſe and dragoons in the front, require but a ſmall number of troops; and if a detachment of infantry is poſted in them, it is more with a view of preventing the troopers and ſervants from marauding than any thing elſe.

The eſcort belonging to each regiment, commanded by a captain, ſhould remain upon the ſpot where the regiment forages, and, with the aſſiſtance of the infantry, prevent diſorder among the foragers, and ſend off thoſe who are loaded. As ſoon as a regiment is ſet off, the captain commanding the ſmall eſcort muſt report it to the general officer commanding the forage; after which he will follow, and form the rear-guard of it.

As ſoon as the general ſhall be appriſed by the ſtaff-officers, and the captains commanding the ſmall eſcorts, that a village is evacuated, he may contract his chain, and draw it nearer together, till the foragers are gone; which when they are, he will aſſemble his troops, and detach as many platoons of infantry as there are villages: or rather the body of infantry poſted in each village during the forage, ſhould leave a party to make a ſtrict ſearch after all ſtragglers and marauders; the firſt they ſhould keep with them, and make the others priſoners, and puniſh them ſeverely on their return to the camp. When all the different bodies ſhall be re-aſſembled, and the officers commanding them have made the report, the general will order the huſſars to be called in, and form a rear-guard according to the manner directed in the foregoing ſection, and return to the camp in the ſame order, and with the ſame diſpoſitions, as if he expected to be attacked.

There ſtill remains another diſpoſition that will be executed with greater expedition, and prove more ſecure for a dry forage; that is, to obſerve exactly the ſame precautions which have been already mentioned, with regard to the detachment's ſetting out the evening or two beforehand, in order to get information of the quantity of forage, of the nature of the ground for the diſpoſition of the chain, and the enemy's diſtance.

If the forage is to be performed at a diſtance from the camp, the general commanding it ſhould ſet out in the evening at retreat-beating, with the troops deſtined for the chain, the ſtaff-officers, and the majors or adjutants belonging to the regiments which are to forage: but if the forage is to be performed near to the camp, it will be ſufficient for them to ſet out at break of day; and the commanding officer ſhould always take care never to advance quite up to the villages, till they have been examined, notwithſtanding troops have been left in them the preceding evening; theſe precautions are always neceſſary, and can never prove uſeleſs. As to what remains to be done after, the ſame precautions which have been directed for the firſt manner of foraging muſt be obſerved.

Theſe firſt diſpoſitions being made, the general, from the knowledge he hath acquired the evening before of the quantity of forage contained in each village, will allot one to one or two brigades, or in proportion; he will next ſend the ſtaff-officers, with the majors or adjutants, to every village, and order them to make the peaſants take all the forage out of the barns, and lay it in one or more heaps on the outſide of the village; not in front, but in the rear of it, in order for the greater ſecurity, and every heap will be for a brigade. If the villages are ſo nigh each other, as to admit of the heaps of forage being placed together in the ſame field, the diſpoſition will certainly become better; becauſe the chain being more united, and taking up leſs ground, will undoubtedly become ſtronger, and that with fewer troops. But if the nature of the ground will not allow of this, the ſecond method is in appearance the beſt; that is, to cauſe the forage to be placed in as many heaps, on the outſide of the villages, as there are brigades; taking care, as in the firſt diſpoſition, to have the hedges, hollows, avenues, &c. occupied by the infantry, while the horſe and dragoons remain poſted in the plain: the forage will be ſooner completed, confuſion avoided, and all marauding prevented; and if any information ſhould be received of the enemy, the foragers can aſſemble with greater eaſe than if they were diſtributed in the villages. All the troopers and ſervants ſhould have expreſs orders not to enter the villages, under pain of being treated as marauders; and the general ſhould be very ſtrict in puniſhing all thoſe who break through this order. Whichever method the general makes uſe of, whether that of leaving the forage in the barns, or that of placing it in heaps on the outſide of the villages, it is neceſſary the diſtribution ſhould be made before the foragers arrive; and great care ſhould be taken not to make them wait, which fatigues the horſes more than the burthen they carry, although it is 600 or 700 pounds weight, the trooper included.

If this forage is made in a mountainous country, the diſpoſition ſhould be changed: the villages of mountainous countries are either in the avenues, at the entrance into the valley, or very much incloſed in them, or bordering upon the mountains. There are ſome mountains where villages are more frequent than in many plains; but in others they are ſcarce to be met with, and are more diſperſed; therefore, in the firſt caſe, the extent of the forage will be leſs, but in the laſt it will be increaſed: but in either of theſe ſituations, a great deal of infantry is required, becauſe, beſides its taking poſſeſſion of the villages which are to be foraged, it muſt alſo occupy the avenues leading to them, and the heights and roads in the front, which may be in theſe avenues. Among mountains, it is unneceſſary to have any cavalry in the chain, unleſs there ſhould be ſome plain where it can act and ſupport the infantry, ſuppoſing it ſhould be repulſed by the enemy's. None of the precautions above mentioned ſhould be neglected; and if the general can purſue the method the propoſed, and by means of waggons tranſport the forage of many villages into a valley or ſmall plain, and then divide it into as many heaps as there are brigades, there ſhould not at moſt be more than three hours taken up in the performance of it; and then it will be unneceſſary to leave troops in the villages which are in the avenues, and already foraged; and it will be ſufficient to place infantry in the entrances of the avenues, which may be in the plain, and on the heights by which it is overlooked.

When the foragers are gone, the general commanding the chain will aſſemble the troops, and march toward the camp in good order, as hath been already mentioned with regard to foraging in an open country.

Part II. Of the OPERATIONS of OFFENSIVE WAR.

JUSTICE and humanity having been conſidered, in this article, as the firſt principles of war, the chief intention of the firſt part hath therefore been, rather to convey maxims for a juſt defence, than to lay down rules for attacking. According to the original laws of nature, man, weak and fearful, was not deſirous to attack; peace and ſelf-preſervation being in that ſtate, according to M. de Monteſquieu, the firſt natural law: but that timidity hath by degrees, and by the prevalence of the paſſions, been converted into fury; and man now imagines the ſecurity of his own being to depend upon the deſtruction of his fellow-creatures, his liberty upon their bondage, and his grandeur upon their depreſſion. It is even poſſible that the authority which ſome have uſurped over others, and the deſire of appearing formidable, was originally owing to ſolicitude for their own ſafety; neither would it be impoſſible to prove, that the bravery and courage which have immortaliſed ſo many heroes, were, in reality, nothing more than the ſpecious coverings of fear. This truth, ſeemingly paradoxical, is not leſs ſtriking, if the cruelties, which have been at all times exerciſed againſt the conquered, are properly conſidered. If conquerors fought only in defence of juſtice, and to puniſh vice, why ſhould they be ſo ſtrongly bent upon the deſtruction of their enemies? It is becauſe, blinded by paſſion, they dread becoming themſelves the victims of their revenge another time. Thus even attack may be proved to be only a neceſſary precaution for avoiding thoſe dangers with which a man imagines himſelf threatened, and it may be alſo ſaid to differ from defence only in ſuperiority of force. This is one reaſon why the ſubject of attack has been reſerved for the ſecond part. By obſerving the various operations from the opening to the cloſing of a campaign, it may be ſeen, that the whole is nothing more than a ſeries of defence, and that the fear of being attacked is the real ſource from whence theſe precautions for attacking ſpring.

Sect. I. *Of Spies.*

It is impoſſible for a general, or even for any officer charged with the command of a detachment, to act with certainty, if they have not ſpies or ſecret intellitelligence diſperſed about the enemy's army; they will have the mortification to ſee all their deſigns miſcarry, and all their precautions will become nſeleſs, becauſe they will be improperly taken.

Strade, Turenne, and Vauban, ſtrongly recommend having them, whatever expence they may occaſion: Vauban alſo adds, that a general had better be in want of many particulars, however neceſſary, than be deſtitute of ſpies. Nothing, ſays M. de Puyſegur ſhould be ſpared to procure them; and even the promiſes made to them ſhould be obſerved with the moſt inviolable integrity.

M. de Feuquieres obſerves, that ſpies are of many ſorts. They are to be found in the cabinets of princes, in the cloſets of miniſters, amongſt officers of the army, and in the councils of generals; in towns belonging to the enemy, and in monaſteries: ſome offer of themſelves; others are formed by the generals, or by the miniſters; but the deſire of gain is what chiefly encourages and tempts them to undertake this buſineſs.

Beſides the ſpies of the cabinet, there are again others who make it their buſineſs to go from one camp to another, and give an account of all the enemy's tranſactions. Care ſhould be taken that they are unacquainted with each other, and particularly that they are not known to any general or officer: they ſhould be always ſpoken to alone, and never be ſuffered to meet each other.

The general ſhould ſtudy their character, and prove them by repeated trials; he ſhould ſound them by degrees, beginning with things not difficult to be explained, and which, if diſcovered, will not be of great conſequence; he ſhould engage them in long converſations, thereby to form a judgment of their parts and comprehenſion; and he ſhould alſo employ them often in bringing him intelligence.

Although a general ſhould always be upon his guard with a ſpy whom he hath cauſe to ſuſpect of treachery, he may nevertheleſs draw great advantage from him, provided he knows how to deceive him properly; becauſe he may be very certain he will inform the enemy of all the reſolutions which have been taken.

The emperor Leo, in his Tactic, adviſes a general, who hath reaſon to imagine his counſels are betrayed to the enemy, to conceal his real deſigns, by ſpeaking in a manner quite oppoſite to them: For, ſays he in the maxims at the end of his book, an enemy muſt be deceived who receives intelligence from ſpies or deſerters directly contrary to what is actually reſolved upon; and ſhould not the enemy give credit to their reports, he will of courſe neglect their intelligence, and then the general may take his precautions accordingly: but ſhould the enemy repoſe confidence in them, he will be deceived, and conſequently fall into the ſnare laid for him. But, adds he, ſhould theſe ſpies be entruſted with the general's real intention, he ſhould, by ſome alteration in his operations, endeavour to perſuade the enemy they have deceived him; upon which he will grow miſtruſtful of them, and be obliged to look out for others, no longer daring to confide in the former.

If a ſpy employed by the enemy is diſcovered, and brought to the general, he ought to take him in private, queſtion him with mildneſs, ſpeak to him with a ſort of confidence, and, inſtead of threatening, ſhould promiſe him a reward if he will diſcover to him what he knows of the enemy's intentions. If the general finds him intelligent, he ſhould endeavour to engage him in his ſervice; and, provided he can gain him over by force of money, a thing not difficult, he may derive great advantage from him; but he ſhould be careful how he employs him, till he hath very good reaſon to be aſſured of his fidelity.

There are many different methods of trying the veracity of a ſpy: if, for example, the general receives information, that, on ſuch a day, a detachment of the enemy is to ſet out on ſome expedition, he ſhould then ſend out troops to double the number of thoſe detached by the enemy; by which means, if the ſpy's intelligence is true, the enemy will not only be baulked in his deſign, but may alſo be beat by the ſuperior detachment. If the enemy's detachment has but a trifling object in view, it will be ſufficient to ſend juſt troops ſufficient to examine into the truth of the ſpy's report. The general may alſo pretend to appoint a foraging within two days, and order but few troops for the chain; in which interval, if the ſpy is falſe, he will find an opportunity of giving the enemy notice of it: but, inſtead of the few troops publicly ordered, the general will privately add another body to them, which will be placed in ambuſcade behind the place where the pretended forage is to be made. If the enemy, in conſequence of this information, ſhould come and attack the chain, it ſhould immediately retire, as if too inferior in number to continue the forage, toward the troops in ambuſcade; when, being joined, they will fall upon the enemy on all ſides, who will certainly be ſurpriſed at ſeeing the troops which he attacked ſo prodigiouſly increaſed, and attacking him in flank, front, and in rear. If this attack is made with vivacity and reſolution, there may be great reaſon to expect it will terminate in a complete victory.

If, on the contrary, the ſpy does not appear intelligent, or affects ſtupidity, the general ſhould puniſh him with death, and cauſe him to be hanged in the ſight of the whole army, in order to deter others, which may be diſperſed in the camp, by his fate. It would be needleſs to queſtion him concerning the enemy, becauſe it would appear inhuman to execute a man who had given intelligence of importance, whether extorted from him by fear, force, or perhaps a promiſe of pardon.

Spies are as neceſſary to a general, as arms are to an army: but it is money only that can ſecure their fidelity; and if a general finds himſelf ill ſerved, it is becauſe he has been too ſparing of the funds intended by his ſovereign for that purpoſe. Notwithſtanding it is the duty of a good ſubject to manage his maſter's finances as much as it is in his power, yet there are intelligences of ſo great importance, that it is ſcarcely poſſible to pay ſufficiently for them. A man is ſufficiently indemnified when, by means of the intelligence he has received, he has concerted his meaſures in ſuch a manner, as to beat the enemy, gain ſome marches over him, or to be beforehand with him in ſome enterpriſe.

The emperor Leo, in his Sentences, ſays, that ſpies ſhould be reſolute, induſtrious, and active. Spies thus qualified will be exact and true in their reports; but if they are trifling, vain, and timid, it is to be feared they will never be able to relate the truth.

Offenſive Operations.

Spies, when diſcovered, ſhould not always be puniſhed with death; great advantage may be made of them, by pretending ignorance of their real quality, eſpecially if they are not ſufficiently diſguiſed. Tacitus, in his Annals, ſays, that Vitellius's party got information of Otho's deſigns by means of his ſpies, who, by endeavouring to dive too minutely into their enemy's ſecrets, did not ſufficiently conceal their own.

Vigetius's method for diſcovering ſpies who are ſuſpected to be ranging about in a camp, is to order all the ſoldiers and ſervants into their tents during the day, and the ſpies will be taken immediately.

The general ſhould be careful that the ſpies are unknown to each other; for ſpies having a knowledge of each other may occaſion great inconveniences, which may be very prejudicial to the ſchemes of a general or any particular officer. When ſpies are ſtrangers to each other, a general is better ſerved, and he can depend with greater ſecurity upon what they ſay; becauſe, by being unknown to each other, he can try the fidelity of one, by comparing what he ſays with the reports of others: If they all agree in the ſame ſtory, their intelligence ſhould be looked on as certain; whereas, if they know each other, they can with eaſe cook up a tale among themſelves, and not vary in their relation. Beſides, a ſpy conſcious of being known, always fearful of being ſold, acts neither with confidence or reſolution.

When a general is ignorant of the enemy's deſigns, he ſhould always affect a knowledge of them; but whenever he is informed of them, he ſhould, on the contrary, pretend to be ignorant of them; by which means the enemy, being eaſy with regard to his ſpies, will not alter his deſigns, or ſuſpect the general of having any knowledge of them.

If the general can procure ſuch ſpies as, by their employment, are near the perſon of the enemy's general; as, for example, a ſecretary, or any others who are near him, and who conſequently can give intelligence more to be relied upon than thoſe who are conſtantly paſſing from one army to another; and as it is very often by means of theſe people of conſequence that common ſpies gain their intelligence, their ſervice may be turned to a very great account.

If a general diſcovers an enemy's ſpy to be one of thoſe who, by their employment, are near his perſon, he can receive great advantage, by forcing him to write a letter of falſe intelligence, thereby to divert the enemy's attention from the plan he would execute; but he ſhould cauſe him to be hanged immediately after, for it would be very imprudent to uſe him above once. The prince of Orange, when he came to attack M. Luxemburg at Steinkirk, having diſcovered one of his muſicians who gave the enemy intelligence of every thing he intended, made uſe of this ſtratagem; and although it was rendered abortive by the vigilance of M. de Luxemburg, and the courage of his troops, there are nevertheleſs but very few inſtances where it hath failed: and even M. de Luxemburg would have been beaten, if he had not had timely notice given him by his advanced detachments; by which means he had time ſufficient to make his diſpoſitions, and to avoid being ſurpriſed.

There is a ſtratagem which may be made uſe of when ſpies are wanting, and which is leſs expenſive; that is, to ſend ſuppoſititious letters by the firſt peaſant that comes in the way, who will have nothing to fear; and ſo far from concealing himſelf, he muſt take a road where he will be ſure of falling into the enemy's hands: theſe letters ſhould be directed to the general officers commanding a body of troops, or even to the general of the army, ſuppoſing they come from an advanced body. They ſhould contain ſchemes that are good, and practicable in their execution, but quite oppoſite to what is intended and will really be undertaken: it often happens that the enemy, too credulous, abandons his original deſigns to purſue chimerical ones, which to him appear very good, and do not preſent any obſtacle to thoſe which the general deſigns to execute. Prince Eugene ſucceeded, by this ſtratagem, in raiſing the ſiege of Coni, formed by the French in 1691.

But nevertheleſs a general ſhould take care that, through a fear of being deceived by ſuppoſititious letters, he does not himſelf too much neglect the intimations which are given him: a general ought, ſays Onozander, to liſten to every body at all times, and upon all occaſions. Alexander, when at a great diſtance from his own country, not being able to receive his couriers till very late, refuſed to give attention to a peaſant, who came to inform him of a ſhorter route; but ſoon repenting of what he had done, he ſent to ſeek after him, but in vain.

The ſame reaſon that ſhould make a general always have ſpies in the enemy's army, ſhould alſo make him ſuſpect that the enemy has ſome in his; therefore he ſhould endeavour to deceive them, he ſhould keep his intentions ſecret, mention them to very few, and always talk openly, contrary to what is really deſigned. Onozander obſerves, that it ſhows great folly in a general to mention his deſigns publicly, eſpecially when they are on the eve of execution; for deſerters generally go over to the enemy, at the time an action is unavoidable.

But if it is diſcovered that the enemy has received information, Vigetius ſays, that the diſpoſitions muſt be immediately changed. Polybius, on like occaſions, particularly recommends ſilence and diſſimulation; he even ſtretches this rule as far as the thoughts themſelves, which he ſays muſt ſometimes be repreſſed, for fear our actions ſhould ſometimes betray and diſcover them. Metellus anſwered one of his friends, who, on an important occaſion, aſked him the reaſon of certain diſpoſitions, "that if his ſhirt knew what he thought, he would burn it."

To avoid the danger of treachery, ſealed orders have been uſed with great ſucceſs, which have been ſent to officers, with expreſs orders not to open them till at ſuch a time and at ſuch a place: this is an eſtabliſhed rule at ſea, and can alſo be practiſed on ſhore when employed in an expedition which it is eſſential to conceal from the enemy.

SECT. II. *Of Ambuſcades from the Army.*

A GENERAL who loſes a battle, ſays Vigetius, may attribute his ill luck to fortune, although theſe kind of events are generally the effects of art and ſkill; but he who ſuffers himſelf to be ſurpriſed, and who falls into the ſnares laid for him by the enemy, has no excuſe to make, becauſe, by his vigilance, and the goodneſs of his ſpies, he might have avoided them.

Offenſive Operations.

A deſign ſhould never be formed for an attack upon marches, detachments, convoys, forages, or upon one or many quarters, without knowing the ways which are to be paſſed, and the places where ambuſcades may be formed; whether to avoid, or whether to conceal troops in them, in order to facilitate a retreat, or to draw the enemy into it. A general who receives information from his ſpies that ſome enterpriſes are intended upon ſome bodies detached from the army, upon one of his convoys, on a forage, or upon his quarters, ought alſo, on his ſide, to form ambuſcades in the ways leading to it. The number of troops in ambuſcade ought to be regulated by that of the detachment intended to be ſurpriſed; it ſhould be ſufficiently ſtrong to attack the enemy on all ſides, that is, in head, flank, and rear. The troops who ſet out to form an ambuſcade ſhould always march by night, unleſs it be in a country ſo covered that the enemy cannot perceive them.

A general, according to Santa Cruz, ſhould endeavour to form as many ambuſcades as poſſible; ſo that, if the enemy ſhould not fall into one, he may not eſcape the others: they ought to be diſpoſed after ſuch a manner, that one can neither attack or be attacked without being heard, ſuſtained, and aſſiſted by the others: this junction is a ſtratagem which the enemy could not expect, and which will aſſure the victory. If, from the fewneſs of the troops, or the fatigues of the campaign, it is impoſſible to form many, there ſhould at leaſt be one ſufficiently ſtrong to reſiſt the enemy it would attack: but ſtill it is not requiſite that it ſhould be as numerous as the enemy, becauſe troops in ambuſcade, who charge a detachment that is unprovided on all ſides, ought, by this ſurpriſe, to have a particular advantage, and conſequently ſupply the place of number; which will certainly be the caſe, particularly if the enemy falls into the ambuſcade during the night, and that care hath been alſo taken to place a great number of drums and trumpets, that when the troops in ambuſh charge, they may ſerve to increaſe the numbers in appearance, by the terror which noiſe always raiſes in the night-time.

In order to deceive the enemy who is in detachment, ſmall bodies ſhould be ſent out towards him, with orders to retire to the troops in ambuſcade as ſoon as they meet him.

Ambuſcades ſhould always have ſome object. Before they are undertaken, it ſhould be known whether the enemy is in the field; if he intends either to attack or moleſt the quarters; whether it is proper to wait for him or to ſeek him: without theſe precautions the troops will be fatigued, and no end anſwered.

Ambuſcades may be compoſed of infantry, huſſars, or dragoons; but it is the ſituation of the country that muſt determine which. Theſe troops may be mixed together or ſent ſeparately; but that muſt be according to the deſign intended to be executed, or according to the nature of the troops employed by the enemy in his detachments.

If the deſign is to attack a convoy, all theſe troops are neceſſary, becauſe the eſcort of it will undoubtedly conſiſt of infantry, cavalry, or dragoons, and alſo ſome huſſars to clear the march; if a green forage, infantry is very neceſſary, but it ſhould always be left in the rear to ſecure the retreat: cavalry, with huſſars or dragoons, is ſufficient to attack a forage, to beat the eſcort of it, or at leaſt to prevent the foraging being executed. If a dry forage is to be attacked, it muſt be done with infantry, becauſe, as it can only be performed in the villages, it is certain they will be occupied by infantry, and that there will be a chain of cavalry in the front, which will be protected by it: if a detachment, it is according to the nature of the country through which it marches; if an open country, horſe, huſſars, or dragoons, muſt be employed; but in a woody or mountainous country, infantry muſt be made uſe of. After all that can be ſaid, it is impoſſible to lay down fixed rules for the kind of troops which ſhould be employed: there are ſome woody countries where huſſars and dragoons can act with eaſe, and be of great ſervice: there are mountains where they can act ſecurely, becauſe very fine plains, divided by woods, are to be found in the bodies of them, where they can place themſelves in ambuſcade; but care muſt be taken to ſecure their retreat. There are, on the other hand, plains ſo divided by hollows and canals, that infantry only are capable of acting; therefore it is the general's buſineſs to diſcover from which kind of troops, in either country, he may expect the greateſt advantage.

An ambuſcade, ſeaſonably and properly formed, may overturn the beſt concerted enterpriſe; it is a ſpring of great reſources during the courſe of a campaign; it is by the aſſiſtance of that a general attains the completion of thoſe ſtrokes which are owing to vigilance, and which will never happen when, by a negligence to be condemned, or through pretence of conſulting the eaſe of the troops, they are ſuffered to linger away their time in camp or in quarters, without being ſent out in detachments.

Foreſight and activity are the firſt ſteps toward great actions; a general endowed with theſe qualities may accompliſh all, or at leaſt a great part of whatever he undertakes. The more difficult an enterpriſe appears, the more ſhould a general try his genius to find out ſuch expedients as may do honour to the imagination of a great ſoldier. A general, with a genius and a liking for his buſineſs, will find reſources on every occaſion: want of ſtrength will be ſupplied by art, and ſtratagem will prevail over ſtratagem.

There is no country but preſents ſome place proper for forming ambuſcades; hollows, a rotten place, from which it is eaſy to ſally, the leaſt height, woods, hedges, ruins, vineyards, ſometimes corn-fields, marſhes covered with reeds, all preſent expedients to a general who knows how to take advantage of them: he muſt only be careful to place the ambuſcades after ſuch a manner that they ſhall not be diſcovered by the enemy's parties; and that they are not themſelves diſcovered by the inattention of any of the ſoldiers, by noiſe or by other accidents.

If the ambuſcade conſiſts of huſſars or dragoons, the horſes muſt not be together, their neighings may prove very prejudicial. Even a peaſant, attracted by the barking of a dog or the neighing of a horſe, may go into a wood, diſcover an ambuſcade, and, often induced by the hope of a reward, will go and give the enemy information of the whole. Every perſon paſſing near an ambuſcade ſhould be ſtopped, and that without noiſe; the peaſants ſhould be tied to trees, and guarded by ſentries. If the ambuſcade is formed in an hollow way, behind an high ground, or in any places whatever, the general muſt cauſe every body that is taken to be tied together, and well guarded.

The troops in ambuſcade muſt fall on all parties of the enemy that paſs near them, unleſs when the deſign is to carry off a convoy or to attack a large detachment. It ſhould in that caſe continue ſilent, and let them paſs: but if theſe parties, by making a ſtrict examination, diſcover the ambuſcade, as there can no longer remain any hope of attacking the convoy or detachment, it ſhould fall upon and endeavour to ſurround them, and, if poſſible, take them priſoners; and if the troops in ambuſcade are ſo lucky as not to let any of the enemy eſcape, the ambuſcade may remain in its firſt ſituation, but always purſue its firſt object, becauſe here will be no reaſon to apprehend the enemy's having received intelligence of it.

The troops in ambuſcade ſhould attack theſe parties ſword in hand, and not with their fire-arms, and, if poſſible, prevent them from uſing theirs. From this manner of attacking, there will reſult two conſiderable advantages. The firſt is, that a briſk and unexpected attack aſtoniſhes, and ſcarcely gives them time to think of their defence. The ſecond is, that, by firing, it is to be feared, that if there are any other parties farther off they will hear it, and ſend and give notice. It is true, that if thoſe who have heard the firing come to the aſſiſtance of the firſt, and if the troops of the ambuſcade find themſelves the ſtrongeſt, this would then be an advantage; but if the enemy's parties ſhould be ſtronger, the advantage would then turn on their ſide. Again, ſhould they not come, the enterpriſe on the convoy or detachment will fail, becauſe there is no doubt, that being ſenſible of their inferiority, they are gone to ſeek freſh aſſiſtance: in this caſe, the ambuſcade muſt change ſituation, and place itſelf in ſome other part, but not abandon its original project till the laſt extremity, and till there is no longer any hope of ſucceeding otherwiſe.

The leaſt thing, as has already been ſaid, may be the occaſion of an ambuſcade's being diſcovered. The fire of a pipe may be ſeen at a great diſtance in the night-time: beſides, however ſmall the number of ſoldiers who ſmoke may be, the wind may carry the ſmoke and the ſmell of the tobacco toward that part where the enemy patroles. The ambuſcade ſhould not be cumbered with ſervants, or any thing elſe that is unneceſſary; orders ſhould be given that the horſes are tied with care, and that a profound ſilence is obſerved by every body. As it is very difficult for huſſars or dragoons to march without leaving marks behind them, by which means the road leading to the ambuſcade may be diſcovered, they ſhould try to enter it by ſome bye-way, or at leaſt by as dry a one as poſſible. In order to efface the marks of the horſes feet, eight or ten huſſars or dragoons may tie branches of trees to their horſes tails, and, by marching behind the detachment, in as large a front as the whole body, will deſtroy any marks that are made: as ſoon as they ſhall have entered the wood, they will cloſe up the entrance with the ſame branches, of which they will make a ſort of hedge.

If the wood is large, it may be entered at different parts, and the huſſars and dragoons may alſo be made to enter it ſeparately; the footſteps will be more trifling: although the marks which are left by the infantry are not ſo plain, it may yet practiſe the ſame method of entering the wood. If the detachment intended to form an ambuſcade, whether infantry or cavalry, is obliged to march upon a high-way, as ſoon as it comes near the place appointed, the commanding officer ſhould detach a body on before, with orders to take up the ſame front as the whole detachment. As ſoon as it ſhall have proceeded a quarter or half a league, it will return by another way; and it ſhould alſo make a large circuit, ſo that the enemy's parties, coming the ſame way, will not perceive that they ſhall be ſtopped by any troops in that place. This body will rejoin the troops which are in ambuſcade, by a road the moſt out of the enemy's view, never in a body, but ſcattered, ſo that they may leave fewer marks behind them. Sentries ſhould be concealed behind buſhes, in the front of the ambuſcade, ſo that they may be able to ſee the country and ways about them, without being ſeen themſelves: two or three ſoldiers ſhould alſo be made to climb into trees, in order to ſee at a great diſtance, and give notice if they perceive any troops; the ſame method muſt be obſerved with regard to huſſars or dragoons.

Before the commanding officer enters the wood where he would form his ambuſcade, he ſhould detach two or three patroles to ſcower it, for fear the enemy ſhould happen to be there in ambuſcade himſelf; after every part has been ſearched, the troops muſt enter the wood, and range themſelves according to the order that ſhall have been given them. The commanding officer will form three bodies of his detachment, and place them at a diſtance one from another; one will be deſtined to attack the advanced guard, the other the centre, and the laſt the rear-guard. If the detachment conſiſts of cavalry, the half of each corps ſhould be on horſeback; no perſons ſhould ſlip or paſs the ſentries or vedettes under pain of being declared deſerters. During the night, the cavalry ſhould be mounted, and the infantry under arms: in the day-time, half thoſe on foot will relieve thoſe on horſeback every three hours; and the ſame ſhould be done with the vedettes, as well as the infantry and ſentries.

If the ambuſcade is behind an height or ſmall mountain, ſentries muſt be placed on the top, lying on their bellies, and without hats: in other reſpects the ſame diſpoſitions ought to be obſerved, whether on the march or for the conducting of ambuſcades, always paying a proper regard to circumſtances and the ſituation of the country.

There are divers methods of drawing the enemy into ambuſcades. The general commanding the army or quarters ſends out a detachment under the command of an intelligent officer, to form an ambuſcade, at the diſtance of one or two leagues, more or leſs, according as the country is fitting for thoſe ſort of diſpoſitions, or according to the diſtance of the enemy. The general muſt acquaint this officer, that two hours after he is ſet out, he will ſend out another detachment, of leſs force, with orders to go on the ſide where the enemy is, to endeavour to meet him, and at firſt ſight to make a feint of charging him; but, as if finding him too ſtrong, he will begin his retreat, directing it toward the place where the troops are in ambuſcade: furniſhed with theſe inſtructions he will ſet out.

Then the general will ſend for the officer intended to command the detachment that is to go in ſearch of the enemy, and inform him of that which is ſet out to form the ambuſcade, and of the place where it is; he will order him to advance as near to the enemy as he can, and to draw him by a feigned retreat upon the troops in ambuſcade.

Theſe two officers ſhould be the only perſons informed of the deſign: but nevertheleſs the commandant of the detachment which is to go towards the enemy, may communicate it to the principal officers under his command; ſo that in caſe he ſhould be taken or killed in the retreat, he that ſucceeds in the command may be able to act according to the general's intentions. He muſt be particularly careful, that no ſoldier, trooper, huſſar, or dragoon, penetrates into the deſign of the detachment, as it would then be in the power of a ſingle deſerter to make the ambuſcade miſcarry. It may, as has been already ſaid, be compoſed of different kinds of troops without diſtinction, or of one ſort only: the ſituation of the country ought to determine whether it ſhould conſiſt of huſſars, dragoons, or infantry; but the detachment which is to go and ſeek the enemy, in order to draw him into the ambuſcade, ought to be compoſed of huſſars, unleſs the country be of ſuch a nature that infantry only is capable of acting.

During the time that the huſſars are gone before, endeavouring to draw on the enemy, the troops in ambuſh will be on horſeback, and waiting in ſilence for their commander's order to go out and charge. As ſoon as they ſhall have charged and beaten the enemy, for fear leſt another detachment, at a little diſtance from that which has been beaten, ſhould come to its aſſiſtance, they will take the ſhorteſt way, and march leiſurely, but with order, towards the camp or the quarters. The detachment which drew the enemy into the ambuſcade, muſt form the rear-guard of it, and will march ſlowly on, while the reſt of the troops will retreat, conducting the priſoners with them. If the enemy ſends any ſuccours, as ſoon as the rear-guard perceives them, it will double its pace, but with order: there will be no reaſon to apprehend the enemy's coming too briſkly upon it, becauſe he will be fearful of falling into another ambuſcade: thus the rear-guard will retreat with eaſe, and the troops who conduct the priſoners have time enough to reach the camp, without any moleſtation.

It is on theſe occaſions that a man ſhould know how to keep his courage within proper bounds, and be ſenſible that flight is glorious: the deſpair of an enemy that is ſurpriſed, and even beaten, is always to be feared, when he is not entirely defeated. A man ſhould always be content with one victory, without attempting a ſecond: he may, by purſuing the enemy too eagerly, fall himſelf into ambuſcades more dangerous than that he has juſt drawn the enemy into.

Robert, count of Artois, having diſcovered a ford, obtained permiſſion of St Louis to paſs it, in order to facilitate the paſſage of the Chriſtian army, with a promiſe of undertaking nothing till ſuch time as it ſhould be paſſed. He paſſed it ſafely; but, contrary to his word, he threw himſelf with eagerneſs upon a detachment of 300 Saracens, who fled before him. Carried away by his courage, he followed them to their entrenchments, which he forced; and, not being content with this ſucceſs, more glittering than ſolid, he ſtill purſued them to a ruin which he ſaw open: he engaged himſelf in it, contrary to all the remonſtrances of the moſt intelligent generals of the army; he entered, followed by his ſoldiers, who at length, buſied in plundering, were charged in their turn by the Infidels, who had rallied. In ſhort, the count of Artois, the generals who had not been able to ſtop him, the Hoſpitallers, and the Templars, who accompanied him, periſhed on that unfortunate attempt; a loſs which was the cauſe of the taking of St Louis, brother to the count, and of the calamities which the Croiſes ſuſtained in that campaign.

If there is reaſon to apprehend that the enemy, having notice from ſome deſerters, are coming in full ſtrength, the ambuſcade muſt then change its ſituation and draw nearer to the place from whence it ſet out: ſo that, if the enemy ſhould be ſtronger than the ambuſcade, it will have leſs way to retreat, becauſe it is certain that he will march cautiouſly; that he will not go towards an ambuſcade which he knows to be formed, but with deſign to attack; and his ſuperiority cannot but prove fatal to the troops forming the ambuſcade.

It may again happen than the enemy, not finding the ambuſcade in the places pointed out by the deſerters, will imagine it to be retired, and, in that belief, will neglect the precautions neceſſary in ſuch a ſituation. In this caſe, the detachment muſt change place and poſt itſelf a quarter of a league, at moſt, from where it firſt was, in order to fall upon the enemy, who will march on with confidence: but the detachment in ambuſcade ſhould be ſufficiently ſtrong, to be at leaſt able to retreat before the enemy, if he is ſuperior, and ſupport itſelf by its own ſtrength. Detachments of 1000 men have been often known to retire in order from before others of double or treble their number, which undoubtedly proceeds from the advantageous poſitions which the commander has known how to take; from the diſpoſition he has made of his troops; the order he has eſtabliſhed among them; and from the reſolution with which he has inſpired them: with theſe qualities, a commander may at leaſt be certain that his troops will not be beaten, although they do not get the better, unleſs by a force ſo much ſuperior, as to prevail over courage and a wiſe and judicious conduct.

An ambuſcade that is ſucceſsful, may cauſe the deſtruction of a whole army. The example cited by M. de Feuquieres, in his Memoirs, on that head, is ſtriking. M. de Luxemburg, ſtill attached to the prince, took all the baggage belonging to M. Turenne's army, becauſe the lieutenant-general who commanded the eſcort did not foreſee that the enemy, ſhut up in his lines of circumvallation before Arras, having two armies near his camp with a deſign of attacking him in his lines, could think of ſending out a large detachment of cavalry on an enterpriſe of ſuch a ſort. In the mean time M. Luxemburg, who was in ambuſcade, within reach of the column of baggage, ſeeing that the lieutenant-general was gone on before with the head of the eſcort, imagining the baggage in ſecurity, marched ſpeedily to the head of that column, whoſe march he ſtopped, and turned toward St Pol, where he conducted the whole baggage belonging to M. Turenne's army, without his knowing any thing of the matter. It is thus that, by the negligence of an officer, and by an ambuſcade ſeaſonably placed, an army finds itſelf ſtripped of all its baggage, and, as may be ſaid, not in a condition of continuing the campaign.

If this lieutenant-general had been provided with ſpies, detachments in front and on the flanks, theſe detachments would have diſcovered the ambuſcades, and, by the precautions uſual on ſuch occaſions, he would have placed the baggage of the army in ſafety. Again, his ſpies would have given him notice, that a large body of cavalry was detached from the camp before Arras, conſequently he would have been upon his guard; inſtead of which, being full of a falſe confidence, he marched as if in a champaign country, and, by this unpardonable remiſſneſs, occaſioned the loſs of the whole baggage.

An officer who commands a detachment for any expedition whatever, cannot poſſibly take too much care to foreſee the checks that may happen to him; if he is beaten, it ſhould be wholly owing to a ſuperiority of force. He who, after having taken all the precautions poſſible, is beaten by an enemy who has the advantage of number, has nothing to reproach himſelf with: but he who, with ability, has nevertheleſs neglected certain precautions, and is beat becauſe they were not taken, is certainly culpable in the eyes of intelligent men. But if this check induces him to neglect nothing neceſſary to the avoiding of a ſecond, he cannot paſs for a bad officer; that appellation is only applicable to him who, ſuffering himſelf to be blinded by conceit, or the falſe lights which ſelf-love makes him take for the effects of a ſuperior genius, ſuffers the enemy to obtain an eaſy victory.

A general overcome, as Pompey was at Pharſalia, is not the leſs deſerving of laurels and ſtatues, provided that he does not ſuffer himſelf to be diſcouraged, like that great man, after his defeat: but he who is beaten like Antony at Actium, raiſes compaſſion of none but a freed man or a miſtreſs.

Misfortune is an addition to the glory of an illuſtrious ſoldier, when he knows how to derive inſtruction from it for the future. The marſhal de Créqui, before loſing the battle of Conſarbrick, was a great general; afterwards, he was a great man. This was the judgement formed of him by the great Condé, who notwithſtanding did not love M. de Créqui: "Sire, (ſays he to Lewis XIV.) your majeſty has juſt acquired the greateſt man that ever profeſſed the ſcience of war."

SECT. III. *Of Camps in offenſive War.*

To take an advantageous poſition for an army; to make choice of a ſpot that by its ſituation is ſtrongly ſecured; to eſtabliſh a camp there, and to be alſo able to have the army within diſtance of marching eaſily to the enemy, without fear of being moleſted; in ſhort, to throw ſuch difficulties in the enemy's way as may prevent his harraſſing the army, is one of the moſt eſſential branches of knowledge for a general. He who is endowed with this talent can, with an inferior army, not only make head againſt, but alſo cauſe his enemy's deſigns to miſcarry; fatigue him the whole campaign by marches and counter-marches, which lead to nothing; oblige him to remain inactive, and at length draw him into a favourable poſition, where he will be morally ſure of beating him; as was done by Mr Turenne in 1675, who, after having exhauſted every expedient wherewith his military knowledge could furniſh him to draw M. de Montécuculli into a diſadvantageous poſt, at length ſucceeded, found an opportunity of attacking him, and gloriouſly fell at the inſtant victory declared itſelf in his favour.

Before a general takes the field, he ought to be very certain whet number of troops he ſhall have, that his magazines both of war and proviſion are ready, as well as the waggons, pontons, and all other implements whatever that are neceſſary for an army; for events may happen that it is almoſt impoſſible to foreſee, and which often alter the beſt concerted deſigns. There have been inſtances of generals who, having taken the field with an intention of acting offenſively, have been obliged to change their plan to the defenſive; becauſe the magazines which they had ordered, have, through the negligence of thoſe intruſted with the care of them, not been collected; or becauſe the army has been weakened by detachments neceſſarily ſent from it, either to the aſſiſtance of allies, or to ſome towns threatened by the enemy: by ſuch kinds of accidents the plan of a compaign is entirely deſtroyed.

But let it be ſuppoſed that the general has the troops neceſſary for acting on the offenſive, or that the events of the foregoing campaigns force the enemy to keep on the defenſive; that the heavy artillery, the field-pieces, and the carriages of all ſorts, are ready to march; that the magazines are filled, and the roads free and ſafe; that the pontons and the boats got together, either for the paſſing of the troops, or the tranſporting the proviſion, in caſe the country ſhould be divided by rivers; then a general poſſeſſed of the neceſſary talents, can foreſee the event even before taking the field: he will know beforehand the marches he is to make, the camps he is to occupy, and thoſe which the enemy will endeavour to ſeize in order to oppoſe his deſigns.

An offenſive war is undoubtedly carried on with greater eaſe in an open, than in a mountainous country. In plains an army acts openly, forage is in greater abundance, the proviſions can be conveniently tranſported from one place to another, and the marches are performed with more eaſe. Among mountains, he who is beſt acquainted with the country, who has a head fraught with expedients, and is the moſt vigilant, hath often the advantage, although inferior in numbers; at leaſt he maintains himſelf in and preſerves the poſts of which he is in poſſeſſion with greater eaſe; and an attention to ſeize ſuch advantages as the ground offers will put ſuch a general upon an equality with his adverſary.

But whether in an open or in a mountainous country, and however ſuperior the army be to the enemy's, the leaſt negligence in the choice of ſituation may render the ſuperiority of troops uſeleſs, and even hurtful: uſeleſs, if, from a deſire of taking up too much ground, the enemy is ſo divided that the enemy may fall either upon the right or left without a poſſibility of its receiving ſuccour; hurtful, if, from a deſire of aſſembling the army in too narrow a ſpot, the troops too cloſe together are unable to act without embarraſſment to each other. This ſuperiority ſhould not cauſe a general to be neglectful of the ſafety of his troops in their camp; he ſhould always be aſſiduous in preſerving the ſtricteſt order and diſcipline among them; one or two checks are generally ſufficient to diſcourage the ſoldier, and take away that confidence which he ought to have in his general: the advanced poſts ſhould be well guarded, the flanks ſecured, and detachments frequently ſent out towards the enemy; for as ſucceſs is inſured by vigilance and care, ſo negligence and ſlack diſcipline are ruin to the moſt formidable army, and entertaining a contemptible opinion of an enemy renders him more daring.

Whatever ſituation the army is in, it ought always to avoid preſenting a flank to the enemy, and ſhould alſo uſe every endeavour to take a camp in a ſituatiun that is naturally ſtrong; the wings ſhould be ſheltered, and every part both before and behind ſhould be covered by detachments: but whatever the nature of the country is, an army ſhould never fix upon a camp where there is not wood, water, and forage, within reach.

It is to be obſerved, that a camp ought never to be fixed on the banks of rivers; but a ſufficient ſpace ſhould always be left between them and the camp, to draw out the army in order of battle. If this precaution is not taken, it may happen that the enemy, encamped either near to or at a diſtance from the other ſide of the river, being informed of the poſition of the army, will come in the night to alarm the camp, and by a diſcharge of artillery and ſmall arms throw the whole camp into confuſion, without riſking the loſs of a ſingle man: but again, by encamping an army upon the banks of rivers, how will there be a poſſibility of drawing it out in order of battle, or poſting advanced guards? For theſe reaſons, a camp ſhould always be placed at leaſt eight or ten hundred yards from a river; ſo that the guards may be advanced without being expoſed, and within the circumference of the camp and compaſs of the guards the army may be ſupplied with forage for at leaſt four days, and more if poſſible.

There are ſome ſituations for a camp which are in appearance ſtrong, but may notwithſtanding prove very dangerous, if care be not taken to examine whether or not the army can with eaſe come out of it, to form itſelf in order of battle; or whether the enemy can prevent it, by blocking up the avenues and outlets. If this precaution be not taken, an army may be the means of ſhutting itſelf up; as was done at Seneff in 1674, and by the allies at Aſchaffenbourg in 1743.

If the war is carried on in a woody country, the ſame precautions muſt be uſed for the ſecurity of the camp; but the diſpoſitions muſt be changed according to the nature of the country: there is ſcarcely any country ſo entirely woody but has ſome plains in it. The choice and ſtrength of a camp depend on the poſition of the enemy and ſituation of the country: a general ſhould always avoid encamping the cavalry in a wood, and ſhould be particularly careful that the wings are ſheltered; the woods ſhould be occupied by the infantry, and entrenchments thrown up in front, according to the deſigns intended to be put in execution. If the wings are ſheltered by a village, it ſhould be entrenched, and infantry poſted in it; and the camp ſhould be covered by a river as much as poſſible, unleſs the intention is to march towards the enemy; then all the obſtacles that can prevent the army coming up with him ſhould be avoided: but if, from ſome ſucceſſes of the enemy, or from his ſuperiority of troops, the general cannot determine upon opening the campaign offenſively, he muſt uſe other means to bring it about; and in the mean time ſhould ſtrengthen himſelf in his camp, eſtabliſh poſts on the banks of the river, and cover them by continual detachments of light horſe, who, by extending themſelves, will prevent parties of the enemy from paſſing to ſeize on the hind-parts of the camp, moleſt the convoys, and attack the foragers. If there are woods at a ſmall diſtance from the camp, poſts of infantry muſt be eſtabliſhed in them. Guards of cavalry are never advantageouſly poſted but in a plain; but if there ſhould be any ſpace between two woods where cavalry can act, and from whence it can take ſurveys at a great diſtance, a guard of cavalry ſhould be placed there; but poſts of infantry ſhould be placed in the woods to protect it, and to which it may retire in caſe it is attacked.

Whatever may be the nature of the country, it is often neceſſary to have corps detached from the body of the army, to cover or keep open a communication with ſome place, in order to prevent the enemy from foraging too near the camp; to preſerve the forage; to raiſe contributions at a diſtance; to occupy ſome advantageous poſt; to oblige the enemy to divide his forces in order to oppoſe that body; to cover the camp either in the front or on the flanks, according to that ſide which is left moſt unguarded and expoſed: in a word, there ſhould always be continual detachments toward the enemy, as hath been the practice of many generals, and of marſhal Saxe in the late war. The ſtrength of this body is to be proportioned to the uſe deſigned for it by the general; but it is uſually compoſed of light horſe, ſome regiments of light infantry, and a brigade or two of dragoons. In the end will be ſeen what uſe ſhould be made of this body; but in whatever ſituation it is to be placed, the communication between it and the army muſt always be kept open, that it may always be able to join it on the firſt order; and its camp muſt be ſo choſen, that the general may always receive intelligence from it of the leaſt movements made by the enemy. See Plate CCXCI.

If the war is carried on in a mountainous country, there are generally ſome ſmall plains or valleys where an army may be encamped, if not altogether, at leaſt ſome part of it: beſides, in theſe ſort of countries a general is almoſt always obliged to ſeparate his troops; to ſend out many detachments in order to guard the paſſes and communications between each other; to endeavour to out-flank the enemy, or for ſuch like diſpoſitions; ſo that the army not being all together, it muſt be diſcerned where to fix the moſt conſiderable body.

A general who carries on war in a mountainous country, and who by the ſuperiority of his army is enabled to act offenſively, ought to endeavour by the poſitions which he takes to ſurround the enemy; to render his foraging difficult; to harraſs him by continual ſmall detachments, which the enemy will be forced to oppoſe by others more conſiderable: he ſhould endeavour to ſteal a march of him; and although a general ſhould never expect ſucceſs from the enemy's negligence, there have nevertheleſs been ſeen inſtances where armies, by activity and diſpatch, have gained a march or two on their enemies, although commanded by able generals.

If the enemy's vigilance prevents the general from ſucceeding, he muſt employ new ſtratagems, and never give up his point; he ſhould try all thoſe that lead to the ſame end, although by different channels; either attacking ſome detached poſts, oblige the enemy to ſend ſuccours to it, and by that means weakening other places which he ſhould endeavour to force; or decamping, and feigning to penetrate on ſome other ſide, to oblige the enemy to abandon a camp that is advantageouſly poſted, and by that means to draw him into ſome poſt that is weaker either from ſituation or from the extent of country he is obliged to defend; and by this method find an opportunity of attacking him with advantage.

In ſhort, in whatever country, and on whatever occaſion, a camp is always defective if the wings are not ſheltered, or are to be eaſily diſtreſſed by the enemy; if the front is not guarded and the rear well covered; if the communications with the frontier-towns are not ſecure and eaſy; if there is any want of forage, wood, and water; and if there are not detachments in front, to prevent the enemy from approaching the camp.

A general who joins experience and ſtudy together, ought to ſee into the intention of the enemy's general, and judge of his deſigns by any of his proceedings, however trifling.

All thoſe who are deſtined to the command of armies cannot be endowed with this quick and exact eye, that ready power of judging of a good motion or a good poſition upon the ſpot. Some generals have excelled in marches, others in the poſition of camps; theſe in the arrangement of troops in order of battle, thoſe in their conduct in time of action; others in providing ſubſiſtence; others in projecting a campaign. There have nevertheleſs been ſome of theſe great men, whoſe genius and temper have united and carried theſe qualifications to the greateſt degree of perfection; but the rarer theſe examples are, the more a man ought, by continual ſtudy, to endeavour to augment their number, and ſtrive to merit the honour of being enrolled among thoſe heroes, the ornament of mankind, their country's ſupport, and their maſter's glory.

SECT. IV. *Of the Attack of an Army on its March.*

HOWEVER difficult certain operations in war may appear, they are nevertheleſs not impracticable when a general knows how to take the neceſſary precautions for ſoftening thoſe difficulties. The attack of an army on its march ſeems to be above all reach of attempting; whereas the ſucceſs of ſuch an attempt depends only upon knowing how to take proper meaſures, on chooſing the ground, and of ſeizing a favourable opportunity. It ſeems more difficult to ſurpriſe an army on its march, than to attack it openly: the number of the enemy's troops; the precautions which their general ſhall have taken, the order, the care, the ſecreſy which muſt be obſerved, preſent obſtacles almoſt inſurmountable; but yet, by taking the bye-roads, by concealing his march from the enemy, a general may attack him in force in the rear or upon the flank, at the ſame time that he cauſes his advanced guard to be attacked by ſome infantry, cavalry, and even cannon, to make him the leſs ſuſpicious that the attack upon the flank is the real one.

When an army would attack another upon its march, it ſhould endeavour to be beforehand with it, and, by the means of ſtolen marches, come up with it before it can know any thing of the matter: ſome parties ſhould be detached, who muſt place themſelves in ambuſcade, in order to ſtop all the comers and goers, ſo that the march and deſigns of the army may be kept ſecret from the enemy. Whenever a general hath determined to attack his enemy, he ſhould ſend off all the baggage, both great or ſmall, belonging to the army; and it ſhould be left in the rear under a good eſcort, near enough to join after victory, without the army's being obliged to wait three or four days for it.

The general ſhould be well aſſured of the day on which the enemy's army ſets out; of the country through which it is to march; whether it is an open, mountainous, or woody country; if it is divided by rivers; whether there are many bridges to paſs; and in how many columns it marches: he ſhould alſo get all poſſible information of the diſpoſition of it. In the third ſection of the firſt part, relative to the march of an army in an open country, the diſpoſition which it ought to make, in caſe it preſents its front or flank to the enemy, hath been laid down. The general deſigning to attack ought to regulate his diſpoſitions by thoſe which the enemy hath taken, and which he can only know from his ſpies; but if the general cannot receive any information concerning them, the beſt rule for him is to ſuppoſe them good, and to form his own accordingly; it would be very imprudent of a general to ſuppoſe his enemy's diſpoſitions are bad, when there is no danger in ſuppoſing them to be good, and acting in conſequence of that ſuppoſition.

A general may march his army in ſix, eight, or ten columns, as the nature of the country will allow; they ſhould arrive at the place appointed at the ſame time. The nearer the army is to the enemy, the briſker the attack ſhould be; becauſe the columns having leſs way to go, the enemy will have leſs time to make his diſpoſitions.

As in the caſe of a ſurpriſe there cannot be ſignals given, without running the riſk of the enemy's diſcovering that he is going to be attacked; it is therefore neceſſary, that every general officer leading columns ſhould have a watch, regulated by the general's, ſo as to march all at the ſame time, at the hour agreed on and ordered. The ancients, deſtitute of watches, regulated their motions by the courſe of the ſtars; and it is, without doubt, on that account that Polybius, Onozander, Ælian, and many others, exhorted military men to the ſtudy of aſtronomy: but as it is not often that an army marches by night, this knowledge would be very uſeleſs for an attack in the day-time; beſides, the ſun, by which they were alſo regulated, could be no way ſerviceable to them, ſhould the ſky be overcaſt.

If the general's intention is to attack the enemy's army in front, he muſt detach all his light troops, ſuſtained by a large body of cavalry and ſome battalions, with orders to harraſs the flanks, in order to perplex the enemy with regard to the real attack. It is impoſſible to give the enemy too many falſe alarms with regard to what is really deſigned: the huſſars, from their readineſs in retreating, and their quickneſs in paſſing from one ſpot to another, are the fitteſt troops for theſe ſort of expeditions. The ſame rule ought to be obſerved if the real attack is deſigned to be upon the flank; then the falſe attacks ſhould be upon the front.

front: In Santa Cruz may be ſeen the diſpoſitions which he has made to attack an army on its march.

Stratagem, and the means of ſurpriſing an army, are allowable in war, provided treachery is avoided. Whilſt the law of nations is not infringed, ſucceſsful ſtratagems add luſtre to the genius of the general: however irreproachable the conduct of Scipio Africanus might be, the means made uſe of by him to ſurpriſe the army of Syphax are by no means to be approved of.

The Roman general amuſed the Numidian king with feigned propoſitions of peace, during which time he had his camp reconnoitred by officers, diſguiſed like ſlaves, belonging to the train of the Roman ambaſſadors. There is no profeſſion where a rectitude of mind is more neceſſary: a real ſoldier ſcorns to act by indirect methods; he abhors deceit, and conſiders treaſon as belonging only to mean ſpirits.

Attilius, after the battle of Cannæ, came to Fabius, and offered to deliver Arpi up to him, which he had formerly delivered up to Hannibal. Fabius having carried this propoſal to the ſenate, they debated whether they ſhould put Attilius to death as a runagate, who was neither a friend to the Romans nor an enemy to the Carthaginians, and whoſe fidelity fluctuated according to the changes of fortune. Hannibal afterwards put the wife and children of this traitor to death.

Onozander obſerves, that promiſe and faith ſhould be kept even with traitors: a man may keep his word with them, and have nothing to fear, provided he knows how to miſtruſt them. The difference between ſtratagem and treaſon is very great; the one a man may guard againſt, but no degree of human prudence is ſufficient to ſhield him from the other. When, as related by Virgil, by the contrivance of Sinon, the Trojans themſelves introduced the enemy within their walls, they could caſt the blame only upon their own imprudence and credulity; but when, in the Iliad, Minerva is ſeen, in contempt of a ſworn alliance, perſuading Pandarus to ſhoot an arrow at Menelaus, one is apt to wonder how Homer dared to intitle Minerva, The Goddeſs of Wiſdom.

In order to carry on a ſurpriſe by ſtratagem, one of the moſt certain methods is, to calculate what time is neceſſary for the army to arrive at day-break near the road by which the enemy is to paſs, ſo as to be able to examine the country, and make the neceſſary diſpoſitions for the attack: in an open country the army may be concealed behind corn, or behind a riſing ground.

Prince Eugene, in 1702, after the battle of Croſtolo, having gained ſome days march of the king of Spain, poſted himſelf between the Zero and the Po. He ſo well concealed his army behind the bank of the Zero, that the combined army of France and Spain, which was on its march, and ready to enter into its camp, was obliged to range itſelf in order of battle, and to fight, without having ſcarcely time to make any diſpoſition; and had it not been for thoſe, which had been wiſely foreſeen by the king of Spain and M. de Vendome, it is probable the combined army had been beaten.

A woody country offers more expedients for the concealing of troops: but as it is to be ſuppoſed the enemy's advanced guard will be advanced at leaſt half or three quarters of a league, to ſcower the country; therefore, if the general's deſign is to attack the enemy's flank, he muſt preſent ſome cavalry and huſſars in the front of the enemy's army, ſo as to engage his attention. Some infantry ſhould be placed in the woods, in the rear of theſe troops, in order to ſuſtain them: this cavalry and the huſſars ſhould retire in proportion as the advanced guard advances, in order to induce the enemy to believe they are not ſufficiently ſtrong, and that the reaſon of their advancing was only to examine the march of the army. As ſoon as the enemy ſhall have reached the place agreed on by the generals leading columns that are to attack, the body of infantry that is in ambuſcade in the wood, the number of whoſe columns ſhould be regulated according to the ſituation of the country, will march ſilently, and near enough to the enemy, and will charge him with bayonets, without giving him time to recover himſelf: during this attack the cavalry, dragoons, and huſſars, who keep the enemy's front in awe, will charge the troops who have paſſed the wood and ſpread themſelves over the plain. Theſe troops of cavalry muſt be ſuſtained by the infantry which was in their rear in the wood, and which ſhould be furniſhed with cannon. Theſe two attacks, made one after the other, but at ſome ſmall diſtance of time, will render the enemy doubtful with regard to the diſpoſitions he is to make; he will be undetermined where to ſend aſſiſtance, as the cannon which he will hear at the head will induce him to believe that attack the real one: he will fly to that part, and will conſequently weaken the flank, which is deſigned to be attacked by all the infantry. By this diverſion the flank will with greater eaſe be broken through, and the enemy taken in rear: the enemy thus ſurrounded, and finding himſelf between two fires, cannot avoid being beaten.

It is more difficult to form ambuſcades in an open country, particularly for a whole army, unleſs it ſhould find a bank like that at Zero; then the general ſhould conſider whether or not the attack of the army on its march is practicable. If the general by his ſuperiority can, without weakening himſelf, divide his army, and find means to conceal it, he will attempt the attack, provided that each detached body is poſted before the enemy has begun his march, and that they can all join on the firſt order, without a poſſibility of being cut off or finding any obſtacle to prevent their marching up to the enemy: but, in order for a greater certainty of ſucceſs, theſe firſt diſpoſitions being made, great exactneſs in giving, and diligence in the execution of the orders, is neceſſary; each ſeparate body ſhould charge at the ſame time, and at different parts. But as it may happen the attack may prove unſucceſsful, whether owing to the good diſpoſition of the enemy, or whether becauſe the attacks were not made together or executed with equal vivacity, it is neceſſary that the general ſhould have provided for a retreat, and that the officers commanding different bodies ſhould know after what manner and from what part it is to begin. For the greater ſecurity, the general officers ought to communicate their inſtructions to the commanding officer of each body compoſing that which they command, ſo that at the time of the attack or of the retreat, they may inſtantly comprehend the meaning of whatever they are ordered to perform.

If the army intending to attack the enemy on his march is weaker, or equal, either in number or in the nature of the troops, it is then only the ſituation of the country, and the facility with which the enemy may be ſurpriſed, that ſhould determine the attempt of this grand enterpriſe: the prudence of the general, his experience; that of the generals who are under his command; the quality of his troops; whether they are well diſciplined or not; whether they are compoſed of one or of many nations; the quality of the troops to be attacked; and, in ſhort, the genius of their general, are circumſtances by which the attacking or not attacking ſhould be decided. It is impoſſible to be deciſive upon theſe circumſtances, which depend entirely upon the ground, upon the vigilance of the enemy's general, upon the order which he cauſes his troops to obſerve in their march, and in ſhort upon the troops under his command. A general, at the head of a well-diſciplined army, compoſed of veterans and good general officers, will undertake and execute deſigns which he would not even dare think of with a new-raiſed army, however numerous: it is alſo very difficult to ſurpriſe a vigilant general, who is beſides a good ſoldier, and who is alſo aſſiſted by the counſels of able and intelligent officers.

A general ſhould alſo be guided, in attacking the enemy on a march, by the country and the nature of the troops of which his army is compoſed. If the enemy marches through an open country, and the general is equal to him in infantry but ſuperior in cavalry, he ſhould make no heſitation in attacking him; but if the country is woody or mountainous, and the enemy's army is more numerous in cavalry than infantry, the general has ſtill the ſame advantage with a ſuperiority of infantry; becauſe the enemy's cavalry, in thoſe kind of countries, is unable to act againſt infantry; and the infantry alſo which the enemy may have will never be ſufficiently ſtrong to maintain itſelf upon the heights againſt forces ſo ſuperior: and if the heights are forced, there can be no doubt of the enemy's being beaten, of his cavalry being ruined and cruſhed to pieces, or that his retreat will be attended with great difficulty, and that he will loſe the greater part, if not the whole, of his army.

It is true, that an army ſo weak in infantry and ſtrong in cavalry rarely engages itſelf in a woody or mountainous country; but it may happen that the enemy is obliged to paſs through theſe countries in order to tranſport the ſeat of war to a ſpot more favourable for the cavalry. On this occaſion the general muſt endeavour to concert his meaſures after ſuch a manner as to render it impoſſible for the enemy to moleſt him, to diſpute any paſs with him, or to attack him on his march; if a general on any occaſion engages himſelf raſhly, it is a mark both of imprudence and want of capacity. If Amilcar Barcas had engaged himſelf in the ſtreight of Hache with a greater number of cavalry than infantry, he would never have been able to overcome the African rebels, whoſe chief ſtrength conſiſted in infantry. Hannibal would not have engaged himſelf in the Alps without being much more numerous in infantry than cavalry; and yet the difficulty which he found in that paſſage was more owing to the trouble cauſed by the cavalry and baggage, than by the mountaineers, by whom he was continually harraſſed.

In a word, the attack of an army on its march ſhould be foreſeen beforehand. This operation requires the agreement of many circumſtances, an inviolable ſecreſy and an exact knowledge of the country: a plan ſhould be laid relative to the precautions the enemy may be ſuppoſed to take in his march, as well as thoſe neceſſary to be taken to ſteal marches of the enemy, to approach him in order, and for obſerving ſtrict ſilence in the march. The general ſhould alſo endeavour by all means to gain the inhabitants of the country over to him, to chooſe a ſpot where he can march under cover, without which he can march only by night; in which caſe it will be difficult to prevent ſome of the columns from ſtraggling, which will be ſufficient to cauſe the miſcarriage of the enterpriſe. The general ſhould have ſafe and intelligent guides, be certain of his troops, and have nothing to apprehend from deſerters; one of which is enough to baffle the beſt-concerted meaſures. In 1693, prince Eugene, on receiving intelligence that the Turks had prepared a large convoy for the garriſon of Temeſwar, formed the deſign of carrying it off: he therefore put himſelf at the head of the detachment deſtined for the execution of this deſign; but a ſoldier who deſerted to the enemy prevented the Turks from marching, and the prince was therefore obliged to return without accompliſhing his deſign.

SECT. V. *Of the Attack of entrenched Camps.*

The principles of war among all nations and in all times have been ſtill the ſame; but the little experience of the early ages of the world would not permit thoſe principles to unfold themſelves, as they have ſince done, and to which it is owing that new expedients both for attack and defence have been diſcovered.

In the fabulous times of Greece, the firſt conquerors were eſteemed as gods, becauſe they, by their genius and valour ſupplying the want of art, were regarded as beings ſuperior to humanity, as mortals born for its deſtruction; but now, as arts of all kinds, and particularly the art of war, have ſoared to a pitch of almoſt perfection, theſe gods of antiquity are no longer conſidered in any other light than as great men who made themſelves ſuperior to the reſt of their cotemporaries. In proportion as poſterity hath become more enlightened, it hath alſo become more juſt; it hath preſerved the title of hero for thoſe who have not made an ill uſe of their ſuperior talents and ſtrength; but hath given the deteſtable name of tyrants to thoſe whoſe deſire of revenge and rage have outlived their ſucceſs.

The firſt epocha wherein the military talent became conſpicuous, is the ſiege of Troy, although there were even wars prior to that. Homer, when deſcribing the ſhield of Achilles, mentions wars raiſed for the carrying off cattle. Horace confirms this; and in his Satires alſo mentions a war anterior to that of Troy, the occaſion of which was the ſame, and without mixing ſacred authority with theſe profane ones: and thoſe who know the paſſions can want no arguments to convince them that men have been in a ſtate of warfare from the time they have been actuated by them, or, to uſe a better expreſſion, as ſoon as mankind was formed into ſociety. Even before the ſiege of Troy, Hercules and Theſeus had already aſtoniſhed the Greeks by their conqueſts; but although theſe two heroes have purged the world of many flagitious men, their victories are rather a proof of their ſtrength and cunning, than of their knowledge in the military ſcience. In proportion as Greece became poliſhed by the laws of Lycurgus, the people, more enlightened, diſcovered, in the neceſſity of ſelf-defence, the principles of attack. The Grecians gave birth to that ſcience which the Romans extended, which ſucceeding ages improved, and which we have almoſt brought to perfection.

What a ſenſible difference is there in the military art, ſuch as it at preſent is, compared with that of which the rules are handed down to us by Onezander, Vigetius, the emperor Leo, Frontinus, Ælian, and many others? The towns, in their times, had no other defence than walls, raiſed at a great charge, flanked at little diſtances with towers, and a large ditch in front: it is true that the little force of their weapons contributed much to the advantages of their fortifications. Their entrenched camps had only a large ditch with ſome waggons placed behind it; and whenever the ancients were willing to practiſe all the art at that time known in war, they ſurrounded the camp with walls, in the ſame manner as they did their towns, with towers at little diſtances. Of this kind was Pompey's camp at Dyrachium in Epirus, the plan of which is given in the marſhal de Puyſégur's Art of War: the wall by which it was ſurrounded was 15,000 paces in extent.

The emperor Leo was unacquainted with any other method of entrenching a camp, than by heaping faſcines together, putting trees upon one another, and poſting advanced guards.

The experience which hath been ſince acquired, hath, without abridging the labour, rendered the works of places ſtronger, and eaſier to be defended: the labour of the entrenchments for camps hath been ſhortened; they have taken a new form; and being conſtructed upon the ſame principles as the fortifications of towns, they are become more difficult to be forced. By this ſame experience the means of attacking them hath been diſcovered; and in proportion as offenſive weapons have changed, and are become more powerful, the ſyſtem of fortification has been new-modelled.

The power and force of arms being become more conſiderable, it has been thought neceſſary to oppoſe them by ſuch fortifications as were capable of reſiſting them; and neceſſity has done that which genius was till then unable to effect. It is for this reaſon that in the latter wars, and in thoſe of the preſent time, generals have not been contented with making ditches in the front of their camps in order to entrench them, after the manner of the Romans, but have to them added lines, angles, and redoubts, at proper diſtances. Art hath been carried yet farther, by the addition of walls in front of the ditch: in ſhort, M. Saxe, in the laſt war, inſtead of making uſe of lines to entrench his camp before Maeſtricht, only cauſed redoubts to be erected at proper diſtances, each of which had a covered way which was palliſadoed, and the redoubt fraized; and he alſo cauſed large and deep wells to be ſunk in the ditch. Our poſterity may perhaps diſcover ſomething to add to the ſtrength of theſe entrenchments; the knowledge of a ſucceeding age being always increaſed by that of the preceding.

A general ſhould be determined upon the attack, and the manner of it, by the nature of the entrenchments and the ſituation of the country. Such entrenchments as thoſe of M. Saxe at Maeſtricht, are very difficult to be forced; nor can the deſign of it be formed without great ſuperiority of force: even then the ſucceſs is uncertain. The ſtrength of theſe entrenchments hath been ſeen in the ſixth ſection of the firſt part.

But a camp entrenched with lines may be attacked; although, at the ſiege of Philipſburg, Prince Eugene at the head of 80,000 men, did not dare attack thoſe which were erected by the duke of Berwick: but this example ſhould not ſerve as a rule. Two great men naturally fear and reſpect each other: Prince Eugene being thoroughly acquainted with the duke of Berwick's ability, was therefore convinced that his rival had taken all thoſe precautions which he himſelf would have done in the ſame ſituation: the duke of Berwick, doing the ſame juſtice which all Europe did to Prince Eugene's talents, had to the prudence of his diſpoſitions added all the aſſiſtance of art. The prince having examined the lines, and finding them ſtrong in every part, acted the part of a wiſe and experienced man; the lines were not attacked, and Philipſburg was taken.

Camps entrenched with lines are not always equally ſtrong in every part; they are neither always commanded, nor even to be attacked, by generals equal in talents, capacity, and experience: and when they are, there are ſome occaſions where force and reſolution muſt be joined to the prudence of the diſpoſitions.

Let an army be ſuppoſed entrenched behind lines where art and nature are both joined; whoſe flanks are ſuſtained and ſecured, furniſhed with troops and artillery along the whole front, with more troops behind to ſuſtain thoſe which line the lines. The general who would attack, ought firſt to ſurvey the ſituation of the lines himſelf, and as much as poſſible the enemy's diſpoſition; he will examine the conſtruction of the lines, how they are ſupported, their extent, and whether the ſoil is firm or light. As ſoon as he ſhall be perfectly acquainted with theſe circumſtances, he may form his plan of attack, and cauſe his army to march in as many columns as there are attacks to be made; but he ſhould endeavour as much as poſſible to occupy the whole front of the enemy, whether for the ſtrength, or whether to prevent the enemy from ſending aſſiſtance to thoſe places where the attack will be briſkeſt. The head of each column ſhould be well furniſhed with artillery; and as ſoon as it ſhall be within diſtance of cannonading the lines with effect, it ſhould keep up a briſk and continual fire for the ſpace of an hour at leaſt, ſo as to beat down the earth of the parapet, and tumble it into the ditch, which will in ſome meaſure render the paſſage of it leſs difficult for the troops. The time of the attack ſhould be an hour before day, ſo that the cannon may have fired before the enemy ſhall know where to direct his artillery: after every diſcharge, the ſituation of the cannon ſhould be changed either to the right or the left, in order to deceive the enemy's gunners, and prevent their knowing where to direct their pieces. If there ſhould be any height within proper diſtance, the cannon ſhould be planted upon it: if the cannon can be brought to croſs each other upon the lines, the artillery will then have a very great effect.

The infantry ſhould follow the artillery, furniſhed with hurdles, planks, faſcines, pick-axes, and ſhovels; the faſcines will ſerve to fill up the wells, if there are any, before the ditch; or if there are no wells, they will fill up the ditch, and the hurdles will be thrown over them. The cavalry ſhould be formed in two lines in the rear of the infantry, in order to ſuſtain it. The general ſhould endeavour to find ſome ridges, to conceal the cavalry from the enemy; but ſhould there be none, it muſt be placed at ſuch a diſtance, as not to be expoſed to the cannon of the lines; for ſhould it be placed too near, it will very ſoon be deſtroyed, without having it in its power to be of any ſervice: the great fire which it will ſuſtain, may ſtrike it with terror, which may cauſe it to give back, and diſcourage the infantry, or at leaſt deprive if of that reſolution and vivacity which it had, knowing itſelf to be ſuſtained; beſides, it is great inhumanity in a general to expoſe troops which he can place in ſecurity. The enemy appears leſs formidable when force can be oppoſed by force; but the braveſt ſoldier will be often diſheartened when he ſees himſelf expoſed to blows which he has not in his power to return. Beſides, as in the beginning of an attack of lines, the cavalry cannot be of any aſſiſtance, and cannot act till the infantry hath penetrated in ſome part, it would be uſeleſs to cauſe it to advance too near, provided it is within reach of marching readily when the infantry has paſſed, and hath made a paſſage large enough for it, by beating down the lines and filling up the ditch; the cavalry then will have no more to fear from the cannon of the lines, becauſe the enemy's attention will be more engaged with endeavouring to repulſe the infantry, than with firing upon the cavalry. As ſoon as the lines have been ſufficiently cannonaded to beat them down, and throw the enemy into confuſion, the infantry ſhould march reſolutely and together; and ſhould take care to leave room for the artillery, ſo that it may advance at the ſame time, and continue its fire. The attack ſhould be made by the grenadiers, ſuſtained by the piquets: they will protect the ſoldiers who fill up the wells and the ditch; and as ſoon as they find an opportunity of paſſing, they will endeavour to get over the entrenchments, ſuſtained by the whole infantry of the column, which will then be diſencumbered of the faſcines, hurdles, &c. in order to drive the enemy from his lines. As ſoon as there are ſoldiers enough upon the lines to bear the reſiſtance of the enemy, the ſoldiers who have the ſhovels and pick-axes, and who ought to be laſt, will finiſh the filling up of the ditch by beating down the parapet of the lines, and making an opening ſufficient for the paſſage of a ſquadron in order of battle. Then the whole infantry of the column that has broke through, will paſs and divide into two parts, to let the cavalry paſs, which will form under the cover of the fire of the infantry, and will not attack the enemy's cavalry till it ſhall have collected its whole force together.

If one of the attacks ſucceeds, on the firſt news, which will ſoon be ſpread throughout the army, all the troops at that time ought briſkly to attack the whole front of the line, in order to employ the enemy, and prevent his ſending aſſiſtance to that part that is forced. The reſerve, which is compoſed of infantry and cavalry, ought to join the troops that have broke thro' the lines, to ſuſtain the cavalry charging that of the enemy, and cannot be ſuſtained by the infantry who paſſed the firſt, becauſe it is employed in taking the enemy in flank to the right and left. In this ſituation, when the reſerve and all the cavalry which followed the column that hath paſſed, and to which others may yet be joined ſhall have paſſed, it ſhould attack the enemy; if it is repulſed, it can never be to any great diſtance, becauſe it has infantry behind it, to ſuſtain it, and by its fire to ſtop the enemy. If the lines are forced by many columns, the ſucceſs and alſo the defeat of the enemy will be thereby rendered more certain.

This diſpoſition appears to be good, becauſe the lines having been partly deſtroyed by the cannon, becauſe the enemy cannot but have loſt a great number of men, and becauſe part of his artillery has been diſmounted, without the army that attacks having ſuſtained much loſs. The prince of Orange in 1639, being poſted upon the Ghete, at Nervinde, entrenched his army after ſuch a manner that it could not be ſurrounded; his right was ſupported by a river, and his left by the village of Romdorff, bordering upon the rivolet of Landen. M. de Luxembourg, being willing to attack him, could only get up with his cavalry in the evening, his infantry and cannon not being able to come up till night: that general during this time formed his diſpoſition, and between five and ſix in the morning he put his army in motion, which formed in order of battle as it marched along, the infantry and cannon in front, and the cavalry in the rear.

When the duke of Savoy and prince Eugene, ſtill encamped between the town of Pianeza and la Venerie, in 1706, marched to attack the lines of the French army that beſieged Turin, they cauſed their armies to march in eight columns; the infantry formed the advanced guard, the artillery, diſtributed by brigades, marched at the head between the columns, the cavalry was behind in ſix, and out of reach of cannon-ſhot.

The diſpoſition of marſhal de Coigny in 1744, in order to attack the lines of Wiſſembourg, of which the enemy were in poſſeſſion, was like it, except that the whole of his army had not time to get up; but as the moments were precious, he did not wait for it. The army which came from Landau divided itſelf into four, which formed the four attacks; one of which was at Wiſſembourg, the other at the mill between that town and the village of Picards, the third at the village of Picards, and the laſt was made above that village, which was entruſted to the Heſſian troops. His cavalry, which was behind, paſſed after the infantry had broke through the lines; but the enemy were then almoſt either killed or taken, and thoſe who could ſave themſelves, retired to Lautrebourg, where their army had aſſembled after having paſſed the Rhine. It is difficult to determine which is moſt to be admired, whether the general's diſpoſition, the quickneſs and exactneſs of his eye, and his coolneſs in a circumſtance ſo delicate, or the courage of the French troops, who forced theſe lines in leſs than two hours.

As ſoon as the enemy is beat and abandons his lines, he muſt be purſued, but with precaution. The vivacity

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with which he ſhould be purſued, depends upon the order with which he retires: if it is an open country, the general may follow him ſo long as he ſees all clear before him; but if the country is divided with defiles and woods, it would by no means be prudent for him to engage himſelf in them, for fear of any ambuſcades being placed there by the enemy, in order to ſecure his retreat: nevertheleſs, the general ſhould endeavour to make the moſt of his victory, and ſhould never be content to win a battle by halves; at leaſt it ſhould be carried ſo far, as to make the enemy ſenſible of his loſs, and of rendering him incapable of continuing openly in the field.

But if the army that attacks the lines ſhould be unable to force them, after many repeated attacks, and if the general perceives his troops are diſcouraged, he ſhould immediately retire. If the retreat is made over an open country, he ſhould begin it by marching off the cannon, the infantry next, and the cavalry will form the rear-guard in two or three lines; the huſſars and dragoons will be upon the flanks of the cavalry: if there are any defiles or woods to paſs through, the general ſhould leave ſome infantry at the entrance of them, to ſuſtain and protect the cavalry, which will retreat by files. If the enemy is in full ſtrength, the general ſhould leave ſome field-pieces with the infantry that is poſted at the entrance of the woods and defiles, which will certainly ſtop the enemy's impetuoſity: if, on the contrary, the enemy purſues the army with only a few troops, it will be proper to charge him if he approaches too near. In this diſpoſition an army may retreat eaſily, provided that order is obſerved, and the movements not made with too much precipitation.

Sect. VI. *Of the Attack of a Convoy.*

The ſame motive that ought to oblige a general to practiſe every reſource of art, in order to conduct the eſcort of a convoy in ſafety, ſhould alſo induce him to uſe the ſame expedients to carry off the enemy's ſubſiſtence, to oblige him to retire, if advanced into the country, into the neighbourhood of ſome one of his own towns, in order to find ſubſiſtence: to carry off the enemy's convoys, and deprive him of the means of ſubſiſting, is, in reality, to overcome him without fighting. Vigilance, ſo neceſſary for all kinds of operations, becomes more particularly ſo for thoſe which may decide the fate of a campaign. Whatever may be the nature of the convoys, a general ſhould never neglect an opportunity of attacking them: if they conſiſt of proviſion, the moſt numerous army in want of that becomes its own deſtruction; if of forage, the taking of that cauſes the ruin of the horſes, and renders the cavalry uſeleſs: the ammunition neceſſary for carrying on war cannot be tranſported to the army, nor the artillery conducted to it. Without ammunition the wiſeſt and braveſt general cannot have any reſource; and if deſtitute of money, the ſoldier is diſheartened, and thoſe very men whom pay renders heroes, are converted into ſo many deſerters: the braveſt man who, without fear, expoſes himſelf, inſenſible to the greateſt terrors of war, cannot ſupport even the appearances of famine.

If the eſcort of a convoy marches in a mountainous country, the officer who commands it ſhould have a body of infantry at his advanced guard, another at the rear-guard, and a third in the centre; for it may happen that he may be attacked in flank, particularly if the enemy, diſcovering an opening, preſents himſelf in the road that the convoy keeps; and there ſhould be alſo troops in all parts to oppoſe any attack that may be made.

An advantageous method for attacking a convoy is, by forming three attacks, one real and two falſe. Thoſe attacks are called *real* which the troops make with vigour and in full ſtrength, and when their charging is provided for and determined; the *falſe* ones are when the general's intention is only to keep back the enemy, and prevent his ſending aſſiſtance to the troops that are really attacked.

Theſe attacks, true or falſe, are determined by the ſituation of the country, and in proportion to the degree of eaſe with which the convoy may be turned from the road it is in; that is, if the general ſhould meet with an avenue near the advanced guard, which will draw the enemy ſome diſtance from his main body, and which alſo leads to that of the troops which attack, it is at that part the real attack ſhould be made: if this avenue is found at the rear-guard, the two falſe attacks ſhould be made at the advanced guard and at the centre, ſuppoſing there is an opportunity of attacking the centre. Theſe falſe attacks ought to be ſufficiently numerous in troops, to be able to employ the enemy, without running a hazard of being beaten, and to prevent his ſending aſſiſtance to other parts.

If the troops deſigned to attack the convoy are ſufficiently numerous, although divided into three bodies, to attack every part at the ſame time with equal vigour, the ſucceſs will thereby become more certain. The eſcort of a convoy is often more numerous than the troops which attack it; but it being certainly weakened by the diviſion it is obliged to make in order to guard the whole length of the convoy, the troops which attack have greatly the advantage, although inferior in number, becauſe thoſe which they attack cannot ſend aſſiſtance to the parts attacked, eſpecially if attacked on all ſides.

If the road is wide enough, and there is room for a waggon to turn, the general ſhould rather chooſe to attack the advanced and rear guards than the centre, to prevent the enemy's ſaving any of the waggons belonging to the rear-guard, which will undoubtedly be the caſe, if only the advanced guard and centre are attacked. If the road is ſo narrow that the waggons cannot turn about in order to go back, the general ſhould attack the advanced guard, and employ the centre and rear-guard as much as poſſible.

A convoy may alſo be attacked at the opening of a defile into a ſmall plain; then it is again the advanced guard that the general ſhould attack, who ſhould alſo contrive to have the rear-guard attacked at the ſame time. The troops in the centre will be confuſed, and not know where to ſend aſſiſtance, becauſe they will hear firing both in front and rear; nevertheleſs, the general ſhould defer charging till part of the waggons are paſſed, and the troops of the centre are ſtill on this ſide the defile. An attack, when unforeſeen, briſk, and ſuſtained, can never fail ſucceeding, particularly when the troops attacked are ſo divided as not to have it in their power to aſſiſt each other; and if the whole convoy is not taken, there is almoſt a certainty of taking

king a great part of it, or at leaſt depriving the enemy of it, by ſetting it on fire, and by hamſtringing the horſes, if there is not time to carry them off.

The ſucceſs of theſe attacks partly depends upon the choice of thoſe places where the troops which are to fall upon the convoy are placed in ambuſcade; the moſt ſecure are thoſe which are leaſt liable to the inſpection of the enemy's parties. It is ſufficient to have ſentries upon the tops of the hills, ſo that they may ſee into the roads, and give notice when the convoy is near the place appointed for the attack: then the troops charged with the attack of the rear-guard, having nothing more to apprehend from being diſcovered by the enemy's parties, may draw near the entrances of the avenues.

If the ambuſcade is diſcovered, the conduct which ought to be obſerved by the troops compoſing it depends entirely upon their force and that of the eſcort; nevertheleſs, even when they are weakeſt, the attack ſhould be attempted, which, if unſucceſsful, will at leaſt have retarded the march of a convoy, for want of which the enemy may be greatly diſtreſſed. A general never never riſks much in attacking a convoy; the object of the officer commanding the eſcort being to conduct it in ſafety, and to avoid fighting: it is the ſame with the eſcort of a convoy, as with a chain of forage, the end of which is only to complete it; and conſequently the troops charged with them will rather be attentive to execute the orders which have been given them, than to purſue the enemy, although beaten and drove back. The conducting of a convoy, and the diſpoſitions which relate to foraging, are very different from thoſe of a detachment only: foraging and convoys have a fixed deſtination, and a point where they are to terminate; whereas a detachment has no other view, than to ſeek the enemy and fight him, unleſs it is ordered to carry aſſiſtance, or to get poſſeſſion of ſome poſt. Then the commanding officer ſhould act in the ſame manner as if he was charged with the conduct of a convoy or a forage; that is, he ſhould endeavour to execute his orders without fighting: but if the intention is only to ſeek the enemy, the troops in ambuſcade, finding themſelves too weak for him, ſhould retire; but if they are ſuperior, or even equal in number, they ſhould attack him, and the vigour of their charge ſhould determine the ſucceſs of it.

In a woody country the ſituation of it ſhould be conſidered, in order to regulate the manner of the attack: if the wood is thick, infantry only can act in it; if it is not thick, ſome huſſars or dragoons may be added to it. If the road through which the convoy paſſes is large, the advanced and rear guards ſhould be attacked; the troops in the centre will be eaſily kept employed by a few troops: if the road ſhould be ſo narrow, that the waggons can neither turn back or double up, the head ſhould be attacked, and the falſe attacks made at the rear-guard and the whole length of the convoy.

When a convoy marches through an open country, there ſhould be many ambuſcades formed: an enemy is leſs apprehenſive in an open country, becauſe, ſeeing all before him, his ſearches become the leſs exact, in proportion as the country is unfavourable for troops to form ambuſcades; nevertheleſs, a general may always find ſome hollows, heights, or places of the ſame nature, where troops may be concealed. As ſoon as the convoy ſhall be arrived at the place fixed on for the attack, the general ſhould fall upon the advanced and rear guards, in order to take in the whole, and to induce, if poſſible, the troops in the centre to divide themſelves, to run to their aſſiſtance; then the third ambuſcade muſt ſhow itſelf, and attack the centre, and endeavour to divide the convoy, before the commandant of the eſcort has had time either to park it or double it up. If the general ſucceeds in dividing the convoy, and if the troops in the centre of the eſcort are beaten and broke, he ſhould detach ſome infantry, cavalry, and huſſars, in purſuit of them: the remainder muſt be divided in two parts, in order to attack the troops lining the convoy; after which they muſt join thoſe who attack the advanced and rear-guards. The troops, when re-united, ought to make this attack with vigour, and entirely determine the defeat of the eſcort, and conſequently the taking of the convoy.

A convoy that is divided is half taken, as ſoon as the detachment of the centre is beaten; becauſe the victorious troops can be divided, and part ſent in purſuit of the body that is beaten, and the other part employed to reinforce thoſe who ſtill meet with reſiſtance; whereas, if only one part is attacked, that which is not attacked can readily ſend aſſiſtance, eſpecially in an open country, where there is nothing to prevent either cavalry or infantry from acting, and being a mutual aſſiſtance to each other.

A general who would attack a convoy never runs any hazard by dividing his troops, in order to divide thoſe of the enemy: the more the troops of an eſcort are divided, with the greater eaſe will they be beaten. An officer who would attack, ſhould know the ſtrength of the eſcort, in order to regulate the number of his troops by the enemy's, and to be proportionably ſtronger. He who is attacked, being ignorant of his enemy's force, and being charged on all ſides, is at a loſs where to ſend aſſiſtance, and how to take care of every part: he who attacks by the knowledge he ſhould have of the country, is enabled to poſt his troops after ſuch a manner, as to employ all thoſe belonging to the enemy, without weakening himſelf. The troops which attack have certainly great advantages, becauſe, in dividing them, they are ſtill ſtronger than the body attacked; and then they can chooſe the place moſt favourable for the attack: whatever may be the precautions taken by the officer commanding the eſcort, whatever may be his vigilance, it will be very difficult for him, conſidering theſe different attacks and the number of the enemy's troops, to diſpoſe his own with ſufficient quickneſs to place the convoy in ſecurity, eſpecially if the attack is made with great quickneſs and vigour.

The attack and the defence ſhould always be provided againſt, and the moſt certain means for ſucceeding ſhould be taken beforehand. Upon this principle he who would attack a convoy ought to be informed of the day it is to ſet out, and the number of troops with which it is to be eſcorted. From the knowledge which he ought to have of the country, he will place his ambuſcade out of the ſight and ſearches of the enemy's advanced detachments; he will chooſe ſuch places for the attack as are moſt favourable for him, and moſt diſadvantageous for the enemy; and ſhould the convoy have a bridge to paſs, that will be the moſt favourable place for the attack.

On this occaſion the commanding officer ſhould divide his troops, which ought to attack, into three bodies: two muſt be placed in ambuſcade on the oppoſite ſide of the bridge, and the third remain on its own ſide. As ſoon as the officer of the troops in ambuſcade ſhall ſee the head of the convoy, he will permit the advanced guard, the body at the centre, and ſome waggons, to paſs; then the two bodies in ambuſcade on the oppoſite ſide of the bridge will ſhow themſelves, and charge the troops; one thoſe of the advanced guard, and the other thoſe of the centre: he will alſo permit ſome waggons to follow the troops of the centre, ſo that the paſſage of the bridge may be embarraſſed; the third body, which is on its own ſide, ought to march in order to attack the rear-guard, which cannot have any communication with the advanced guard and the troops of the centre, the paſſage of the bridge being ſtopped up with the waggons with which it is covered; and becauſe alſo the advanced and rear guards are attacked. It is to be preſumed that theſe three attacks, made at the ſame time by ſuperior force, will have the whole advantage of the action; and the more ſo as the troops of the eſcort being every where employed, cannot ſend aſſiſtance to any particular part. If the two bodies which attacked the advance guard and the centre ſhould break them and put them to flight, there ſhould be troops enough left in purſuit of them to finiſh their entire defeat, without any fear of being repulſed; the remainder ought to march to the bridge, and cauſe the waggons that are upon it to be ranged in order, and march to the rear-guard, in order to finiſh its defeat, if it ſtill continues to make reſiſtance.

It is neceſſary to obſerve, that ſome troops ought to be left at the head and along the convoy, in order to take care that the horſes are not taken off from the waggons, and that none of the ſoldiers or drivers make uſe of that method to eſcape.

If the general has not troops ſufficient to be divided into three bodies, the ambuſcade on this ſide the river can no longer take place, but the advanced guard and the centre muſt be vigorouſly attacked. The general muſt obſerve not to attack till the troops of the centre ſhall have paſſed: this attack ſhould always be executed by the infantry with the bayonets fixed, and without firing, and by the cavalry, huſſars, and dragoons, ſword in hand. The general ſhould not then ſtay to make priſoners; but ſhould put to death all thoſe whom he finds armed. If the two firſt detachments are beaten, the general ſhould march with the remainder to the rear-guard, which, not being ſtrong enough to reſiſt a body of troops much more numerous, will undoubtedly betake itſelf to a retreat. As it is the convoy, and not the troops of the eſcort, that is the principal object, the general ſhould leave only ſome troops of huſſars to purſue the rear-guard; he ſhould make the waggons file off as faſt as poſſible, and conduct them the neareſt way to the camp or the neighbouring town.

If the action has happened at too great a diſtance from the army, and waggons cannot be conducted without running the hazard of being attacked, the traces muſt be cut, the horſes carried away, and the waggons ſet on fire. The huſſars and the dragoons which have been left in purſuit of the advanced and rear guards and the centre, ſhould not follow them more than half a league, and then ought to return, in order to form, together, the rear-guard of the convoy that is taken: to which ſome infantry ſhould be added, eſpecially if it is to paſs through a woody country; if it is in a mountainous country, the purſuit of the enemy, as well as the rear-guard, on the return, ought to be entruſted to the infantry.

Sect. VI. *Of the Attack of green and dry Forages.*

Next to the convoys, the forages become moſt neceſſary for the ſubſiſtence of an army, as it is by them the cavalry is ſupported; and if a general can contrive to deprive the enemy of them, or to moleſt him in the making of them, his cavalry will ſoon be without reſource, his infantry without baggage, and his artillery without the means of being conveyed. An army, however numerous, reduced to this extremity, is neceſſarily obliged to keep upon the defenſive, however inferior in number or troops the army oppoſed to it may be, its movements will tend only to find ſubſiſtence, and all its deſigns will be by that means deſtroyed. A general who is ſo vigilant as to ſeize on ſuch like opportunities, will fight more ſecurely, and, inſtead of continuing upon the defenſive, he will find himſelf in a capacity of acting offenſively.

With regard to green forage, it is neceſſary the general ſhould be informed of the time and place where it is to be made, and, if poſſible, of the number of troops which are to forage. In conſequence of this knowledge, he will calculate the extent of ground they will take up, and alſo the number of troops neceſſary for forming the chain: from this judgment, and upon this examination, he muſt make a detachment ſufficiently ſtrong to attack the chain in many parts; and ſhould alſo be ſure, by the number of attacks made in different parts, of penetrating on one ſide or another.

A general ſhould, on this occaſion, make uſe of ambuſcades; it is a very uſeful and alſo ſecure method of acting, when well performed. War, in the field, is almoſt entirely founded upon ambuſcades; the great point conſiſts in knowing how to place them advantageouſly: but it is unneceſſary to enlarge upon this ſubject here, there having been a ſufficient detail given of it in the ſecond ſection of this part.

If the forage is made in an open country, the detachment deſtined to attack it, ſhould be compoſed of infantry, cavalry, and huſſars: the infantry ſhould not appear, but ought to remain in ambuſcade in ſome hollows, behind ſome hedges, and other favourable places; and it ſhould be careful not to ſhow its arms; becauſe, by the glittering of the ſteel, they may be diſcovered: the cavalry ſhould be divided into two bodies, three quarters of a league one from the other, taking care to be able to join in caſe of neceſſity. As for the huſſars, they ſhould be diſtributed about in many ſmall detachments to the right and left, and in the centre of the two bodies of cavalry; upon one of the flanks, there ſhould be a more numerous body of huſſars placed in ambuſh, at a greater diſtance than the ſmall detachments. Every one of thoſe ſmall troops ſhould have a number of trumpets with them;

and when the chain is formed, and the foragers ſpread over the plain, a part of theſe detachments ſhould leave the ambuſcades, making a great noiſe, and attack thoſe belonging to the enemy which are advanced: and theſe detachments will charge them with ſo much the more vigour, as they will be ſuſtained by the large body of huſſars in ambuſcade behind them, and which ſhould march to ſuſtain them, and attract the attention of the officer commanding the eſcort. It may happen that this firſt attack, made on one ſide only, may induce the enemy to unfurniſh the chain in ſome place, by which it will conſequently be weakened; that is the time for the other detachments of huſſars to advance, followed by one of the bodies of cavalry, in order to attack the part that has been unfurniſhed. If the enemy, more prudent, does not weaken the chain in any particular part, which is every where ſtrong, but contents himſelf with making the reſerve march to the aſſiſtance of the troops which have been attacked, the ſecond attack ought always to take place; but in order to employ the enemy every where, the ſecond body of cavalry ſhould march and attack the centre. This attack ought to be made with great briſkneſs ſword in hand, whether the enterpriſe ſucceeds or not: if it ſucceeds, a great advantage may be drawn from the rout of the chain; and, by purſuing the troops of the chain with the cavalry and part of the huſſars, the other part ſhould fall upon the foragers, where they will without doubt find but little reſiſtance: if the attack does not ſucceed, and that, by the good diſpoſition of the troops of the chain, the detachment has not been able to force it, it ſhould retire to the infantry that has remained behind in ambuſcade; this infantry will facilitate the retreat of the cavalry and huſſars. But ſuppoſe, that the enemy, too eager, is carried away by this firſt ſucceſs, a great advantage may be derived from his imprudence, by attacking him reſolutely. The whole ſtrength, and each body being united, it is to be imagined and even hoped, that the advantage will turn on the ſide of thoſe troops which were repulſed but a moment before; and the more ſo, as the general commanding the chain can have purſued only with his cavalry, his huſſars, and dragoons, becauſe his infantry will have remained in the poſts which it occupied, either to guard them or to ſuſtain the horſe, ſuppoſing they ſhould be repulſed.

If the forage is made in a mountainous country, the infantry muſt act alone, the cavalry being only neceſſary in caſe it can have any ground on which to act, and ſuſtain the infantry in caſe it is repulſed: the infantry ſhould attack the avenues and the heights, and poſſeſs itſelf, as much as poſſible, of thoſe which have the greateſt command, and make the attack in many places, as in an open country. Theſe different attacks render the enemy undetermined with regard to his diſpoſitions; he does not know where to ſend aſſiſtance: the uncertainty of the general becomes viſible to every officer, and ſoon communicates itſelf to all the troops; from thence proceeds their confuſion, and conſequently their defeat.

When the enemy is beaten and driven off, the detachment ſhould purſue him far enough to prevent his returning to finiſh the forage; taking care not to go too near his camp, from whence there may come aſſiſtance, becauſe the alarm will have been undoubtedly carried there by the foragers who may have eſcaped.

The priſoners and horſes that have been taken ſhould be ſent off firſt with an eſcort; the reſt of the troops will retire immediately after by the ſhorteſt road. It is cruelty to abandon the wounded, whether friends or enemies; and as the detachment has undoubtedly found, within the circumference of the chain, ſome waggons with horſes to them, they ſhould be made uſe of to carry off the wounded, who ſhould alſo be ſent on before: if there are no waggons, the detachment muſt take them from the neighbouring towns.

The attack of a dry forage is conducted nearly in the ſame manner as that of a green one; but it is often neceſſary to employ a greater number of troops; becauſe, as the forage is made in the villages, it is almoſt a certainty they will all be guarded by infantry ſuſtained by cavalry; whereas the chain of green forage is formed with a much greater number of cavalry than infantry, unleſs it ſhould be in a country where cavalry cannot act. It is difficult to force the villages where infantry is ſuſtained by cavalry; whereas it is eaſier for cavalry to attack each other in a plain, where the affair is immediately determined; but it is not ſo ſoon decided when entrenched infantry is attacked by infantry: but whatever reſiſtance a commander may find, he ſhould always attempt to force it. As the principal object is to prevent the forage, it is obtained by attacking the chain briſkly and in all parts; becauſe it is certain that the general commanding the forage will cauſe the foragers to aſſemble; or elſe, ſeeing the chain attacked, without waiting for an order, they will of their own accord diſmiſs, and fly toward the camp: but whether they aſſemble, whether they retire in order, or ſhift for themſelves, the end is anſwered, and the forage is left unperformed. If by their flight the commander cannot hope to make any priſoners, he muſt keep the troops of the chain at bay ſuch a length of time, as to make it impoſſible to continue the forage for that day: he ſhould even, if poſſible, endeavour to force them to retire; which if they do, he ſhould purſue them long enough to be certain of their retreat, and then collect all the waggons from the neighbouring villages, cauſe them to be loaded with the forage intended for the enemy's army, and conducted to the camp: if they do not retire, the commander muſt remain in ſight of them during the night, and ſend to the camp to demand a reinforcement of troops, in order to oblige the enemy to retire. For the ſame reaſon that a forage ſhould not be abandoned till the laſt extremity, the troops that would prevent the enemy from making it, ſhould be abſolutely bent upon it, at the ſame time without expoſing themſelves to the danger of being beat by any aſſiſtance that may come from the camp to the troops belonging to the chain.

Sect. XI. *Of the Paſſage of Rivers.*

The ſubject of this chapter is perhaps the moſt intereſting of all hitherto treated of. This ſubject, which has never been thoroughly underſtood by the ancients, and upon which the greateſt part of modern authors have but lightly touched, hath been placed in a new light by the chevalier Folard, in his commentaries upon Polybius.

Before an army attempts the paſſage of a river, it ſhould be furniſhed with every thing neceſſary for it. Rivers are paſſed by ſwimming, fording, or upon bridges.

It is only ſmall bodies that can paſs a river by ſwimming; yet it will be very difficult to paſs a river in this manner, particularly if the enemy makes the leaſt effort of oppoſition. Antiquity furniſhed but few examples where whole armies have paſſed rivers by ſwimming. This trial was reſerved for the French, encouraged by the example of their king, when they croſſed the Rhine at Tolhiutz. It is an action, ſays M. de Feuquieres, the ſucceſs of which was owing to its raſhneſs, and which ſhould never be cited as an example worthy imitation.

When a ford is diſcovered, it ſhould be ſounded in every part, the goodneſs of the bottom examined, and whether the oppoſite bank is of difficult or eaſy acceſs.

There are fords which become impracticable as ſoon as ſome troops have paſſed it, becauſe the bottom has not been ſufficiently firm.

If there is reaſon to apprehend that the enemy has armed the bottom with pointed iron, with ſtones chained together, or any other kind of thing, ſome ſoldiers ſhould be ſent with rakes to clear away every thing that may retard the paſſage; they ought alſo to take pick-axes and ſhovels with them, and indeed every inſtrument proper for removing of earth, becauſe if the bank oppoſite to the ford is too ſteep, they will ſlope it properly.

If the river is not fordable, bridges made with boats or pontons muſt be made uſe of; and if there is neither, then rafts. The reader may ſee what M. de Folard ſays upon this ſubject.

When a river is not ſufficiently large to oblige an army to make uſe of boats or pontons for the building of bridges, they are made upon piles, or upon wooden horſes; then they are either fixed or flying. If they are ſupported upon piles, they are fixed; if upon wooden horſes, they are flying. The method of conſtructing bridges with beams, or thick planks ſtrongly faſtened to each other, has been given in a former ſection; if the river is ſo wide that the beams or planks cannot reach from one ſide to the other, piles driven into the gravel muſt be made uſe of, that they may ſerve as props to the ends of the beams, in order to be able to eſtabliſh the bridge; if the army is furniſhed with boats or pontons, they had better be made uſe of, becauſe the bridge will be the ſooner completed.

The head of the bridge is ſecured by entrenchments of earth, that is, by ſinking a ditch, and raiſing a parapet formed of the earth taken out of the ditch. Theſe entrenchments are proportionably large, according to the uſe to be made of them, or the advantage intended to be derived from them. Sometimes an hornwork is erected, with an half-moon before it, the whole well fraiſed: a covered way palliſadoed is alſo ſometimes added; but it is generally thought ſufficient to cover the head of the bridge with an half-moon only; but that depends upon the importance of the poſt. Intrenchments are again made with waggons, where Turkiſh wells are made in the front; that is, deep holes, placed chequer-wiſe, at certain diſtances.

The paſſage of a river upon rafts is leſs dangerous than upon boats; but a very rapid river cannot be paſſed in this manner, becauſe the rafts are ſecured only by ropes, which are liable to break: beſides, this manner of paſſing is very tedious, unleſs there is a very great quantity of rafts; and during the time they take up in conſtructing, three bridges may be built: this expedient ſhould never be uſed except when there are no boats, and it would take up too much time to ſend for them. Rafts are joiſts of deal faſtened together. In the chevalier de Folard, the reader may ſee thoſe which he has invented: his contrivance for making the cavalry ſwim over is more ingenious than practicable.

The ancients had ſtill many other methods for paſſing navigable rivers; they paſſed them, according to Vigetius, by means of wooden horſes, which they ſunk in the water; or elſe made uſe of empty tubs, which they tied together in a hurry, and floored; but, adds he, nothing was found more commodious than ſmall boats, made of a ſingle tree, very light by the quality of the wood, and which followed the army upon waggons.

Before a general engages in an enterpriſe ſo conſiderable as paſſing a river in preſence of the enemy, he ſhould, according to the chevalier de Folard, conſider opportunity; the condition of the enemy's forces; by what circumſtances the attack and the defence may be prevented or facilitated, and compare them together: he ſhould examine the nature and the courſe of the river; remark the places where the fords are, the ſize and depth of them, their diſtances from one another, the nature of the bottom, whether it is firm or boggy; if there are marſhes either on one ſide or the other, whether theſe marſhes are practicable; whether the paſſage will become difficult in proportion to the numbers which paſs; whether the banks are ſteep, and at what part they are moſt ſo; whether the ground on the oppoſite ſide is more favourable for infantry than cavalry; the heights on this ſide to place cannon on them; thoſe which are on the other, where they may be carried; the nature of the river, whether it is apt to ſwell on a ſudden by the rains, or the melting of the ſnow.

Whenever a general attempts the paſſage of a river in ſtrength, as the whole advantage will be on the ſide of the oppoſing party, he ſhould ſuppoſe the enemy vigilant, reſolute, capable of profiting from circumſtances, ſteady in his reſolutions, and ready to try all poſſible means of oppoſing the paſſage.

A general ſhould be particularly acquainted with the nature of the banks of the river, as well thoſe of the oppoſite ſide as of that where he is, in order to be ſtrong in every part, and that all the attacks may be equally made, and that with every advantage the ground will allow. In ſhort, it is very eſſential for a general to be acquainted, not only with every thing relative to the rivers he has to paſs, but alſo with all concerning rivers in general.

Theſe principles eſtabliſhed, this ſection will be divided into four articles; in the firſt, an army ſhall be ſuppoſed to meet a river in its march, which it is obliged to paſs.

In the ſecond article, the defence neceſſary to be made for oppoſing the enemy, and preventing his paſſage, ſhall be treated of.

Thirdly, ſhall be particularized the means which a general ſhould employ in order to facilitate the paſſage, notwithſtanding the enemy's oppoſition.

Fourthly, the ſecureſt method of retreating ſhall be demonſtrated by facts.

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Art. I. It is eaſy for an army to effect the paſſage of a river when the enemy is at too great a diſtance to oppoſe it. A general may chooſe his own time and place, and make what diſpoſition he thinks proper: he may either paſs it upon bridges, rafts, or at a ford; if he finds a ford, he may let the cavalry paſs there, provided the bottom is good; it is much better to throw over a bridge for the infantry, than to expoſe them to the wet, and unneceſſary fatigue.

“Infantry,” according to M. de Montécuculli, “is the baſis and the ſupport of an army, whether for battles or ſieges; and it is with that the Romans and the Swiſs have performed ſuch ſurpriſing exploits.” A general ſhould therefore be very careful of it, and not expoſe it to the danger of diſeaſes, by making it ford over rivers, when it is as eaſy to cauſe it to paſs over upon bridges. The artillery and baggage ſhould likewiſe paſs over upon bridges: thus, inſtead of cauſing two or three bridges to be made, one or two only will be ſufficient, according to the number of troops compoſing the army, upon which the infantry, artillery, and baggage will paſs, while the cavalry ford it over; if there is no ford, the general ſhould order many bridges to be built, in order to expedite the paſſage.

The method of turning the courſe of rivers, laid down by Santa-Cruz, by chooſing a ſpot lower than its channel, making of trenches, and by forcing it to take a new courſe, by the great quantity of ſtones which are thrown into the channel, is an enteprriſe to be executed only upon ſmall ſtreams, or by armies ſuch as thoſe of Xerxes, whoſe thirſt, according to Juvenal, could dry up a river in a day.

As to the manner by which a general may open himſelf a paſſage acroſs the waves, it would be eaſier, in caſe of a deficiency of boats, and if time and the enemy's diſtance would allow of it, to make a cauſeway by the means of piles and ſtones, and by raiſing up the ground. The only inconvenience to be apprehended, is, that the waves coming in front, and their body being augmented by this impediment, the force of the water will probably break the bank; therefore, in order to render it more ſubſtantial, it ſhould be made with an angle in the centre, and each ſide of it ſhould be ſloped like a glacis. But theſe operations require a length of time too conſiderable, and labours which would be too tedious and fatiguing.

The ropes which are ſometimes thrown acroſs rivers, and which ſerve as a ſupport for the infantry, when the ford becomes too deep, may prove of ſome uſe; but it is to be feared, that the ſoldiers, by hanging to it, will only embarraſs each other, and that thoſe in the front will be an hindrance to thoſe who follow.

Santa-Cruz propoſes that ſome ſquadrons of horſe ſhould be placed at the head of the fords, who ſhould keep themſelves firm and cloſe together, in order to break the force of the current, while the infantry ſhall paſs lower down, and that they ſhall open from time to time, in order to let the waters they have retained run out.

He would alſo have ſome ſquadrons at a greater diſtance, in order that any ſoldiers which may have been carried away may be ſtopped there; but this contrivance can be of no uſe againſt the depth of a river, it can only be ſerviceable in ſtopping the rapidity of it: Vigetius alſo never practiſed this method but on an occaſion of this ſort.

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But after whatever manner the fording of a river is attempted, the troops ſhould form as large a front as poſſible, as they will by that means be better able to reſiſt the violence of the current, and will find themſelves in order of battle after the paſſage is effected.

As to the paſſage of a river upon rafts, the infantry who paſs firſt can take the end of a rope with them, the other end of which will be tied to the extremity of the raft; and as ſoon as they ſhall be landed, they will draw theſe rafts to ſhore. As ſoon as the cavalry on them ſhall have debarked, thoſe on the other ſide will draw the raft back, with another rope that ſhall be faſtened to it, and by degrees the whole cavalry will paſs: in order to ſhorten this paſſage, many rafts ſhould be made uſe of.

It is again more ſecure, when practicable, to cauſe the infantry to paſs, mounted behind the cavalry: but then it is alſo dangerous; becauſe if the enemy preſents himſelf on the other ſide, both trooper and foot ſoldier will be confuſed, and it will be with great difficulty that either the one or the other will be capable of defending themſelves, as they cannot diſmount readily enough without embarraſſment. The leaſt impediment on this occaſion throws the troops into diſorder, and expoſes them to the danger of being drowned, or to retire diſorderly by ſwimming, which cannot be done without conſiderable loſs: this method cannot be put in practice, but when there is a certainty of the enemy's being at a diſtance.

It ſometimes happens that an army croſſes a river, which ſwells all on a ſudden by the melting of the ſnow. In which caſe a general ſhould be cautious, as Santa-Cruz remarks, not to undertake the paſſage, but in proportion as he ſhall be certain, that the whole army, artillery, ammunition, proviſions and baggage, ſhall have paſſed before the flood is at its height. In the ſame place he points out the precautions which ought to be taken to prevent confuſion among the troops during their paſſage.

Art. II. It would be impoſſible to run through every precaution that can be taken to diſpute the paſſage of a river; we ſhall therefore confine ourſelves to the principal ones, by a ſuccinct relation of the different ſyſtems of the authors who have treated on that ſubject.

In the paſſage of rivers, the whole advantage is on the ſide of the army on the defenſive. Nevertheleſs, the chevalier de Folard obſerves, that it is very ſeldom that a general attempting the paſſage of a river fails in his undertaking; for which he aſſigns two reaſons: 1. Becauſe the general who would paſs, by falſe attacks, obliges the general on the defenſive to divide his army into ſo many different bodies, that he becomes weakened in every part. 2. Becauſe he cannot have any information of what is doing in the enemy's army, and is ignorant of all the enemy's deſigns, till ſuch time as they are put into execution. There is ſtill a third, which reſults from the firſt, and which ſeems very plauſible: It is, ſays M. de Feuquieres, impoſſible to cover the banks of a river, when the ground to be protected is of a great extent, becauſe the aſſailant who ſeems to make his effort in many parts, at length determines upon that where he finds the leaſt reſiſtance; but if he who is on the defenſive knows the river, and is as well acquainted with the fords as he who attacks, why is he not

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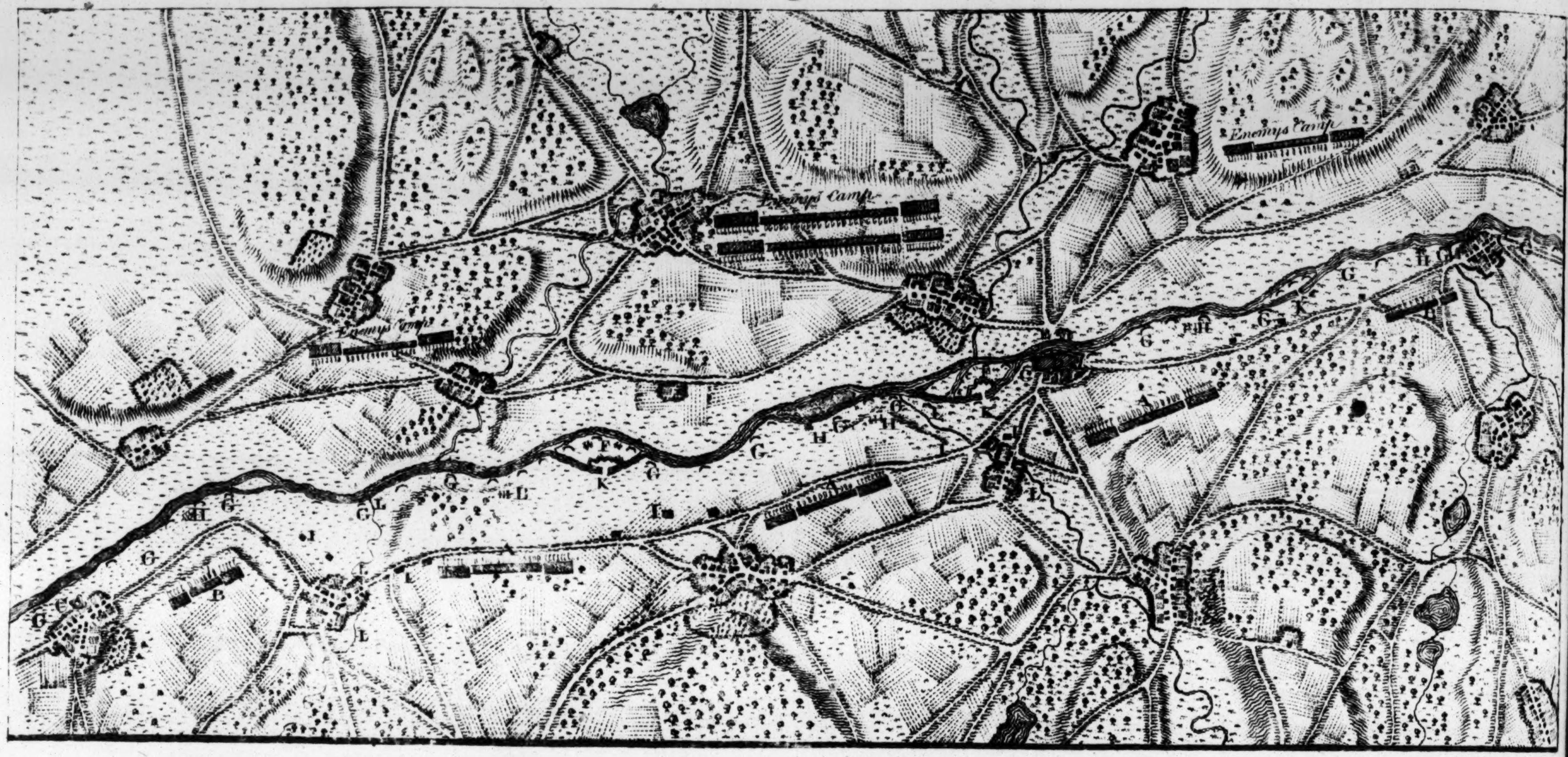
PLAN of the Poſition of an ARMY for the defence of a RIVER.

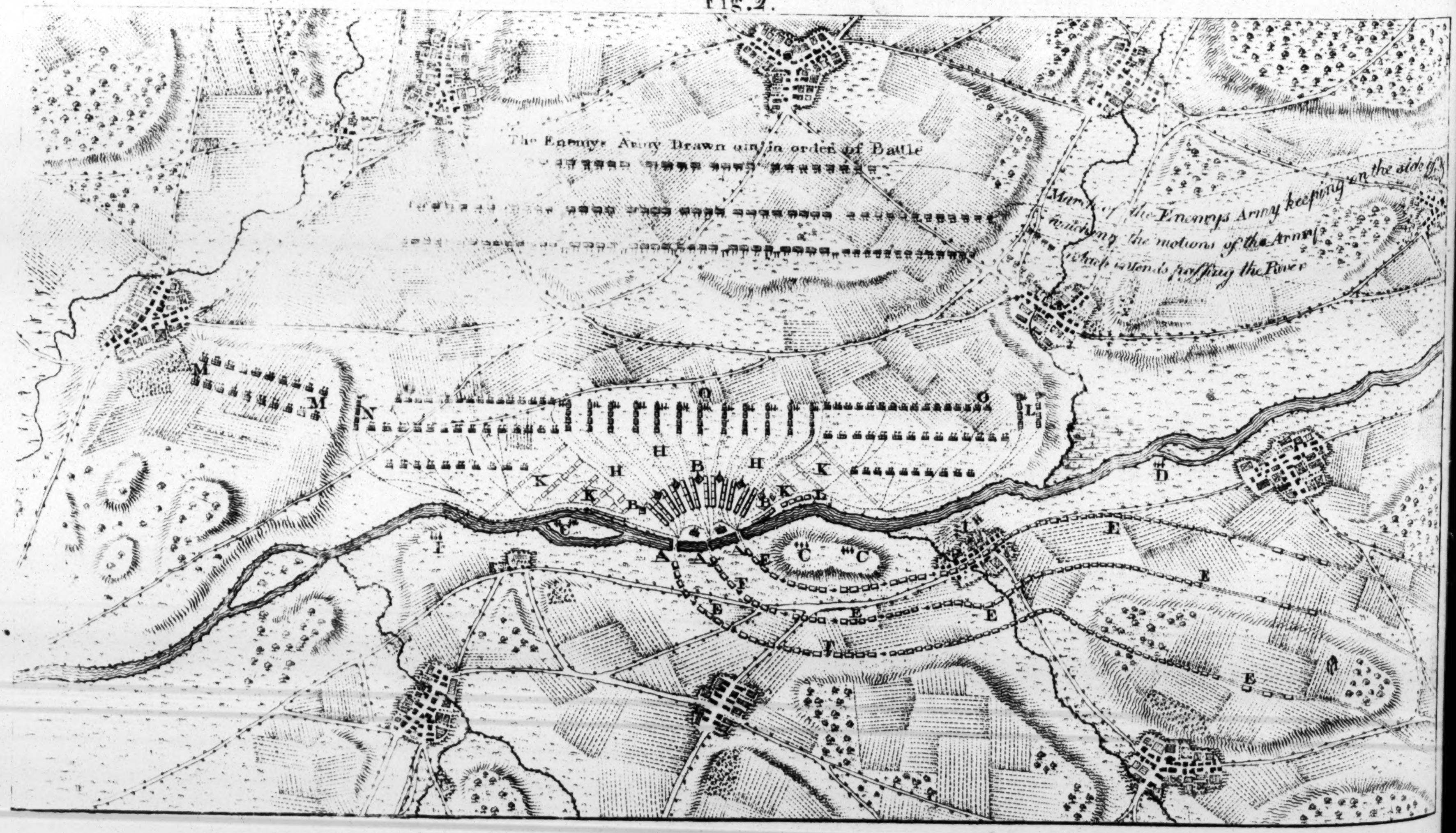
Fig. 1.


Enemys Camp
Enemys Camp
Enemys Camp
A
B
G
H
I
K
L

Scale of 1 League.
1 L.
100 1200 2400

PLAN of the Paſſage of a RIVER.

Fig. 2.


The Enemys Army Drawn out in order of Battle
March of the Enemys Army keeping on the side of
watching the motions of the Army
which intends passing the River
A
B
C
D
E
H
I
K
L
M
N
O

Scale of ½ a League
½ L
100 600 1200 T

A. Bell Sculp.

not as well able to oppoſe the enemy, ſtratagem by ſtratagem? According to M. Feuquieres, the moſt certain method on this occaſion, is to keep together, within a reaſonable diſtance of thoſe places where the enemy can attempt the paſſage, and to have perſons whoſe vigilance may be depended on, upon the bank of the river, ſo as to receive information in ſuch a manner as to have time ſufficient to fall upon the enemy, with the whole army, either before he ſhall have entirely paſſed, or before he ſhall have been able to form himſelf in order of battle.

The firſt precaution to be taken, according to the chevalier de Folard, is, to draw off all the boats which are upon the river; to obſerve whether any other river has a communication with it; to examine the courſe, the windings, and the moſt acceſſible parts of it; to raiſe good redoubts near the banks; to aſcertain the bottom by means of ſacks and baſkets filled with ſtones, large trees with their branches, and by ſtopping them with ſtakes.

To this precaution may be alſo added another, which, executed with exactneſs, may produce great effects; that is, to throw whole trees with their branches into the river, not ſo heavy as to ſink to the bottom, but whoſe ſize and quantity ſhall be ſo conſiderable as not to be eaſily ſtopped; their branches ſhould alſo be interwoven, and formed like a chain from one bank to the other; they ſhould be held faſt, till the enemy's army is engaged in the fords or upon the bridges, at which time they ſhould be let into the current, the quickneſs of which will increaſe the force of this kind of moving bank, which will overturn every thing it meets with, ſoldiers, baggage, horſes, bridges, and boats: in ſhort, nothing will be capable of withſtanding it if there is any degree of rapidity in the torrent. This method is pointed out in M. de Puyſegur as levelled againſt bridges only. To avoid alſo giving any ſuſpicion to the enemy, this chain of trees can be placed upon the bank of the river, of which ſome engineer muſt have been careful to take the dimenſions beforehand; and when it ſhall be nearly the ſame ſize of the river, and the enemy is paſſing, it muſt be held at one end, whilſt it is ſhoved off by the other: the whole of it will be taken by the current, which, without any other aſſiſtance will direct it againſt the enemy.

In regard to the troops deſigned for the defence, the beſt method, according to M. Folard, is to form ſmall camps of 2000 or 3000 men, a league diſtant one from another, with guards and ſignals from one to another; to have canoes, in order that the river may be croſſed ſilently in the night by ſoldiers, who will endeavour to make ſome priſoners, and who will alſo liſten in order to diſcover whether the enemy is preparing to march. A general ſhould particularly endeavour to poſſeſs himſelf of the iſlands, if any, under cover of which the enemy may attempt the paſſage; and if the general can be certain that the enemy's intention is to throw over a bridge where they are, in order to ſet out from thence, to ſave ſo much of the way, the general will by this means aſſure himſelf of the place where the enemy will attempt the paſſage, and which circumſtance will be almoſt ſufficient to prevent him.

But in caſe the general can get poſſeſſion of theſe iſlands, and plant cannon upon them, the paſſage in that part would then become impracticable for the enemy; for beſides the fire of the cannon driving him from the ſhore oppoſite the iſland, it would alſo greatly annoy him on the right and left, to a conſiderable diſtance.

But, in order for the better explaining of the manner in which a river ſhould be defended, let two armies be ſuppoſed, one of which, conſiſting of 40,000 men, defends the paſſage againſt another of 60,000. This laſt is divided into three bodies; that of the centre conſiſts of 40,000 men, and the two others of 10,000 each: the centre-body is encamped nearly oppoſite to the place where the paſſage is intended to be effected; of the two bodies which are upon the flanks of the centre, one will ſerve to keep the enemy in ſuſpence, with relation to the true place where the paſſage is deſigned. They ought to be continually moving, ſometimes at a diſtance from the main body of the army, and pretend to throw bridges higher up, or lower down, in order to induce the enemy to divide and ſeparate the different bodies of his army in ſuch a manner, that they can no longer be of aſſiſtance to each other, or be in a condition of oppoſing a ſuperior body of troops that may attempt the paſſage.

The army defending the paſſage is divided into many bodies; three of 10,000 men each, at a league diſtance from one another, and two others of 5000 men each, compoſed of the light troops, both horſe and foot, and dragoons, encamped at half a league upon the two flanks of the army. The communications ſhould be preſerved between each ſeparate body, and conſtant patroles kept upon the ſide of the river, which ought continually to croſs each other; and detachments of huſſars upon the right and the left, both up and down the river: the general is alſo ſuppoſed to have planted batteries of cannon, in different parts upon the ſhore; and to be poſſeſſed of two iſlands which he has fortified, and in which he has alſo placed troops and cannon: in ſhort, he is ſuppoſed to have taken every advantage of ground, for rendering the paſſage difficult to the enemy, and to oppoſe troops to him in every part where he may attempt it. It is impoſſible to be certain, that the enemy, notwithſtanding all theſe obſtacles, will not effect his paſſage; the means of hindering him, and rendering the paſſage very difficult and bloody to him, can only be laid down. By the moſt prudent precautions, the probability, but not the certainty, of ſucceſs may be determined. See Plate CCXCIII. fig. 1.

If, notwithſtanding all theſe obſtacles, the enemy attempts the paſſage, he ſhould be attacked as he debarks: it is that reaſon therefore which makes it eſſential not to divide the troops into too ſmall bodies, which, too weak to reſiſt a ſuperior number, will be eaſily routed. In attacking the enemy's troops, there is no danger to be feared from their cannon, which they cannot make uſe of without annoying their own troops; whereas the cannon planted upon the ſide of the river, to defend the paſſage, can always fire upon the troops which follow, in order to ſuſtain thoſe who attempt the paſſage: there ſhould alſo be infantry placed near theſe batteries, to defend them, and to flank ſuch of the enemy as have already paſſed.

There yet remains many ſtratagems to be practiſed

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on theſe occaſions: a general may make uſe of thoſe mentioned in the ſection which treats of ambuſcades; and they ſhould be particularly directed againſt thoſe places which are ſuppoſed to be moſt favourable for the enemy. The hiſtory of prince Eugene, whom the chevalier Folard ſtyles a great traverſer of rivers, furniſhes many examples.

The general ſhould be particularly attentive in diſturbing the enemy when conſtructing his bridges; which appears the more practicable, as the bridge is never properly eſtabliſhed, if not guarded at each end: beſides, by the aſſiſtance of artillery, the enemy may be eaſily prevented from going on with his work. M. Feuquieres, in the paſſage already cited, relates examples where the enemy hath not been able to prevent the bridges being built under their very noſes; but beſides the rarity of theſe examples, the precautions he uſed are a very convincing proof of the difficulty attending ſuch undertakings.

A prudent general, and one who is himſelf acquainted with the river, of which the enemy would attempt the paſſage, is guided by its depth, by the difficulty of gaining its banks, and in proportion to its rapidity: he often pretends to be inactive, permits the enemy to throw his bridges over it, and waits till he is in the middle of his paſſage; at which time he makes a furious fire upon him, ſpreads diſorder amongſt his troops, and overthrows his ranks; and the enemy, beſides loſing a great number of men, alſo fails in the ſucceſs of his enterpriſe.

A general may turn a town on the other ſide of the river, either of his own or one in alliance with him, to great advantage: in this ſituation he ſhould cauſe a body of troops to form a camp on the other ſide, reaching from the river to the town, in order to be a check upon the enemy, who will always be apprehenſive of being taken in flank by this body if he attempts the paſſage. The reſt of the army will be encamped on the ſide oppoſite to it, divided into many bodies, to guard a larger extent of country, that the army may be diſpoſed in ſuch a manner as to guard every part of the river,

In 1744, M. de Seckendorff took this poſition near Philipſbourg, an imperial city, and garriſoned by the emperor's troops, then in alliance with France: if he had remained there, if he had repaſſed the Rhine, and joined the right of the army commanded by the marſhal de Coigny, prince Charles would never dared to have attempted the paſſage, at leaſt at the place where he effected it.

Art. III. As to the diſtribution of troops, for the paſſage of a river, a general ſhould always, according to the chevalier Folard, regulate the order of his march, and the diſtribution of the columns of infantry and cavalry, according to the probability of coming to action. His diſpoſitions, as well thoſe relative to the paſſage, as the order to be obſerved upon coming to ſhore, deſerve peruſal. His reflections upon the paſſage of the Granicus are very juſt, and the reader is referred to them, as they would be too long to be related here.

When a general his diſcovered two or more fords upon a river, it is ſometimes proper to attempt the paſſage at each of theſe fords, or at leaſt to make the enemy imagine ſo, that, by having them all guarded, he may weaken himſelf. Among the reflections of the ſame author upon this ſubject, will be found the ſtratagem made uſe of by Xenophon upon a like occaſion. A general can alſo make as many falſe attempts as there are fords; not at the places where the fords are, that would be the means of diſcovering them to the enemy; but either a little above or below them, in order to keep the enemy's troops divided; becauſe, without that, an army not being able to paſs all at the ſame time, would run the danger of being beaten, by degrees, during the paſſage.

A general who attempts a paſſage in preſence of an enemy, ſhould be very certain of his troops; he ought to place the moſt intrepid in the front, in order to encourage thoſe who follow them: on thoſe occaſions every thing is to be apprehended from ill-diſciplined troops, becauſe that, as ſoon as they are engaged in the river or upon the bridges, having no longer any place of refuge to fly to, they will be diſcouraged, and ſpread the panic throughout the whole army.

The emperor Leo relates, that his father, at the paſſage of a river, kept himſelf in the middle of the waves; that he gave aſſiſtance to ſome, reached out his hand to others, and that he reſcued many from the danger of drowning: it is thus a general ought to animate his troops. If, by his rank, he is exempted from expoſing himſelf to the greateſt dangers, he at leaſt ought to encourage his troops, as much as he can, by his diſcourſe and his example; he ſhould even ſhare the moſt painful labours with them, and alleviate them as much as poſſible.

If the army paſſes upon two bridges, it is impoſſible to take too much care for their ſecurity: hiſtory is filled with fatal examples of bridges falling under the weight of troops. One of the greateſt dangers ever experienced by Charles XII. was when, having cauſed a bridge to be thrown acroſs the Viſtula, the wood which had been made uſe of being too weak, and the timber-work ill ſecured, the bridge broke down whilſt the king was paſſing. Charles, the prince of Wirtemberg, and many others, fell into the water: the king, having caught hold of a piece of the timber that was floating, was carried away by the current. The troops which had already paſſed found themſelves at the enemy's mercy, who might have deſtroyed them; but they did nothing, ſays the hiſtorian Nordberg, becauſe of the heights of which the Swedes were in poſſeſſion, and from whence they kept a fire upon the Saxons. Was it not rather an inſtance of the good fortune which uſually attended that intrepid prince?

It is probable, when a river is paſſed upon bridges in preſence of the enemy, that they have been built before his arrival, and conſequently there has been time to entrench them at each end, but particularly on that ſide next the enemy. Theſe entrenchments ſhould be made in ſuch a manner, as to prevent the bridges from being flanked by the enemy's cannon; therefore, inſtead of the entrenchments uſual at the heads of the bridge, ſuch as a horn-work, a crown-work, or a half-moon, the general ſhould cauſe redoubts to be thrown up, the fartheſt of which ſhould be 400 yards diſtance, and oppoſite to the bridge; and the others ſhould be thrown up nearer to the banks of the river, forming a ſemicircle; in order for their

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their better defence, the general ſhould follow the ſame dipoſitions which have been laid down in the preceding part. If there are many bridges, they ſhould be conſtructed as near each other as poſſible, that the ſame redoubts may equally ſerve to cover them: the reaſon of theſe redoubts being placed at a diſtance from the bridges is, becauſe that, as the troops paſs, they will have room to form and ſuſtain thoſe occupying the redoubts. Theſe redoubts undoubtedly require a greater degree of labour than is requiſite for the conſtruction of a half-moon, or even a crown-work; but it ſeems impoſſible to paſs a river upon bridges in preſence of an enemy, however ſtrongly they may be entrenched, if there is not ſpace enough left between the entrenchments and the bridges, to contain a number of troops ſufficient to oppoſe the enemy, and to give time for the remainder of the army to paſs. Labour ſhould never be conſidered, when an enterpriſe is ſucceſsful; a general, therefore, ſhould never ſpare any pains for the attainment of his ends, but ſhould take every precaution neceſſary for ſucceſs, without troubling himſelf about the time and the labour it will coſt: the glory of having forced the enemy to leave the paſſage open to him, makes ſufficient amends for the trouble he has given himſelf in order to attain it.

A general who would hinder his enemy from paſſing a river, ſhould be beforehand with him in all his deſigns, and be himſelf in a condition of attempting it. It is neceſſary that a particular account ſhould be given of the methods of paſſing a river, by attacking the enemy, and facilitating the paſſage of the troops, againſt the enemy's efforts to the contrary. Mr Folard has laid down many different methods, which may be ſeen in his works.

Suppoſe an army of 60,000 men would paſs a river, guarded by an army of 40,000. Let it alſo be ſuppoſed, that the army intending to paſs has got the ſtart of the enemy, either becauſe he was not yet arrived, or becauſe he has been amuſed with marches and counter-marches; that the general has alſo had time to conſtruct three bridges, and to entrench them in the manner above-mentioned: he muſt begin the paſſage by cauſing theſe redoubts to be occupied by a battalion or half a battalion, according to their ſize; and he muſt plant cannon between thoſe redoubts, with infantry to guard them. Theſe diſpoſitions being made, the army muſt march in three columns; the centre column muſt be entirely infantry, and the other two compoſed of infantry and cavalry. As the infantry paſſes the bridges, it muſt divide, and form columns, conſiſting of four battalions each, which muſt paſs between the redoubts, having cannon upon their flanks: the cavalry muſt paſs to the right and the left through the interval of the two redoubts neareſt the river, and form in order of battle upon the flanks of the columns; the right wing with its right towards the river, and the left with its left. When all theſe columns ſhall be formed, and ready to march towards the enemy, the right and left of the two lines of cavalry muſt ſuſtain it; and the right of thoſe of the right, as well as the left of thoſe of the left, will march to put themſelves in a line in preſence of the enemy: in this poſition the army muſt march towards the enemy and attack him, if he is ſo raſh as to hazard an action; and if he ſhould retire before the army is entirely paſſed, the paſſage will be the more eaſily effected. See Plate CCXCIII. fig. 2.

From this diſpoſition it appears, that the army which attempts the paſſage is almoſt certain of ſucceeding; it is ſheltered behind the redoubts during the paſſage of the bridges; it has ground to form itſelf upon, and to ſhow itſelf in full ſtrength. If the enemy would attack the redoubts, he cannot ſo quickly carry them, but that aſſiſtance may be ſent to them: beſides, the cannon planted between each redoubt will prevent the enemy approaching it; or if he ſhould, it will not be without loſing a great number of men, a loſs which will diſhearten the ſoldiers, abate their eagerneſs, and give time for a part of the infantry to paſs, to form itſelf in many columns, and attack with vivacity.

But it is ſeldom a general has time to build the bridges and entrench them after this manner, when the enemy is on the oppoſite ſide with an intention of diſputing the paſſage: ſo circumſtanced, he muſt endeavour to find ſome fords, and, under ſhelter of one or more iſlands, conſtruct a number of rafts behind them; he muſt endeavour to keep the enemy at a diſtance from thoſe places, by marches and countermarches; and when that is done, he muſt cauſe the cavalry to ford over with grenadiers and labourers behind them; theſe labourers muſt throw up entrenchments as faſt as they can, whilſt freſh infantry is cauſed to paſs over upon rafts. Provided theſe entrenchments can ſtop the enemy for ſome time, and contain infantry enough to reſiſt him, the remainder of the army will be very ſoon paſſed: the cavalry will at the ſame time paſs at the fords which have been diſcovered, in order to cover the flanks of the infantry; when it will ſpread over the plain, being itſelf protected by the infantry, as it leaves the entrenchments in columns.

The paſſage of a river cannot be ſafely attempted, if the general does not provide for a defence, and take infinite precautions to protect the army in its paſſage.

All that authors have ſaid upon this ſubject, ariſes from this principle of Vigetius, which they ſeem to have commented upon, and to which they have applied different examples. "As the enemy (ſays he) are accuſtomed to form ambuſcades, or to attack openly at the paſſage of rivers, the general ſhould poſſeſs himſelf beforehand of a good poſt on the oppoſite ſide, and entrench himſelf even on that on which he already is, to hinder the enemy from attacking his troops, ſeparated by the channel of the river; and ſtill, in order for greater ſecurity, the general ſhould cauſe the two poſts to be entrenched and well palliſadoed, that in caſe of an attack, he may be able to ſuſtain the efforts of the enemy without great loſs."

It may not be improper, in this place, to relate a diſpoſition of M. de Valiere's, formed upon this principle.

He ſays, "After the cannon are planted, a parapet ſhould be raiſed upon the banks of the river, 200 yards in length or thereabouts, behind which ſome infantry ſhould be immediately lanched from the centre of the parapet, and ſome ſoldiers with labourers ſent over, who muſt immediately erect a ſmall half-moon: as ſoon as that is done, more ſoldiers ſhould be ſent in order to defend it in caſe it ſhould be attacked; more labourers

ers ſhould alſo be ſent to erect another half-moon, both upon the right and the left.

"If the labourers are not annoyed by the enemy, they ſhould at the ſame time erect an horn-work, whoſe wings ſhould be flanked by the firſt parapet, and the cannon planted in it: if the river is ſo large, that the wing of the horn-work cannot be defended by muſquetry, it muſt be defended from the half-moon, made from thence to the water."

In the mean time, the general ſhould cauſe the bridge to be continually worked at; and, as ſoon as it is finiſhed, make the troops paſs over it, if the enemy is not in ſight; but if he is, the horn-work muſt be completed, to prevent the enemy from falling upon the troops as they paſs. The horn-work being made as ſtrong as is judged neceſſary, as much infantry as it will hold ſhould be lodged in it, with ſome field-pieces; and as the cannon upon the riſing will keep the enemy at a diſtance, the general may order the cavalry to paſs: but ſtill all this cannot be effected but before an army very inferior. If the enemy's army is of ſuperior force, the ſafeſt method is to try a paſſage at ſome farther diſtance, ſtill keeping the army in ſight as long as poſſible, and concealing from the enemy that any troops have been detached.

It is impoſſible to foreſee every ſtratagem that may be employed, as they depend upon many circumſtances; but it is always right to ſend, if poſſible, ſome truſty ſpy to diſcover the enemy's poſition on the other ſide of the river, what obſtacles he can place in the paſſage, what methods are to be uſed to avoid them, and what parts of the bank are moſt acceſſible or beſt guarded.

A general ſhould make many falſe attempts, particularly at thoſe parts where he leaſt intends paſſing; they ſhould be made as ſecretly as poſſible; and alſo, in order to deceive the enemy, the general may throw over two or three bridges at hazard, in ſight of the enemy, at thoſe very places where he has reſolved not to paſs: the enemy's whole attention will be directed to that ſide; and a conſtant fire ſhould be made on him from the other ſide, ſo that he may not be miſtruſtful of the ſtratagem. There is no doubt of theſe bridges being taken, which is of no conſequence, provided the enemy is amuſed, and the general has time to throw over another bridge at a diſtance from that place, by which he can paſs.

Cæſar's method may alſo be practiſed, which he made uſe of in order to paſs the Segre, whoſe oppoſite ſhore was guarded by Afranius. (*De Bell. Civ.* l. 1.)

By uniting theſe two methods, a general can, whilſt he amuſes the enemy by a feigned paſſage, or by the bridges which he has thrown over at hazard, make uſe of the portable boats, and effect a paſſage at thoſe places which the enemy have abandoned in order to oppoſe himſelf to the bridges.

Whenever two armies are on either ſide of a river, a general may pretend to have abandoned all deſign of paſſing it, and ſeem to proceed on his march as if he would attempt a paſſage elſewhere.

If the enemy ſhould follow the army on the oppoſite ſhore, the general may leave a brigade of infantry, pontons, and cannon, in a wood, or behind a hill, to wait till the enemy abandons his poſt, in order to follow the army that is marching lower down; then thoſe who have remained behind will throw a bridge over the river, which they will paſs, and entrench the head of the bridge. That being done, the general will detach ſome brigades of infantry and artillery to reinforce the troops which have already paſſed; ſo that being joined, they will be ſufficiently ſtrong to give the reſt of the army time to arrive and effect the paſſage.

It would be impoſſible to recapitulate every ſtratagem which a general may practiſe: in the hiſtories of prince Eugene and Charles XII. the reader may ſee the different methods which they made uſe of; it will be ſufficient here to relate the rules laid down by Montécuculli, with ſome modern examples, by which they ſeem to be corroborated.

1. The general muſt plant artillery upon the bank oppoſite to the poſt he intends taking; which will be attended with great advantage, if the river forms a re-entering angle, and if there is any ford near it.

2. In proportion as the conſtruction of the bridge advances, he ſhould poſt ſome infantry upon it, in order to keep a fire upon the oppoſite ſhore.

3. When the bridge is completed, he muſt cauſe a body of infantry, ſome cavalry, ſome field-pieces, and ſome pioneers to paſs it, in order to fortify the head of the bridge on the other ſide.

4. The general muſt take great care that the enemy has not poſted armed barks, or other machines, to break down the bridge when half the army ſhall be paſſed.

5. If the general would preſerve the bridge, he muſt fortify it at both ends, and place ſufficient guards in it.

In 1743, prince Charles intending to paſs the Rhine, kept a continual fire upon all the French poſts from 11 o'clock at night till three in the morning, in order to conceal his real deſign with regard to the paſſage.

Marſhal de Coigny aſſembled his army in three large bodies; and lay all night upon his arms, the only prudent ſtep he could take on that occaſion.

By this diſpoſition he found himſelf in a condition of tranſporting himſelf oppoſite to the iſle of Raignac, of which the enemy was in poſſeſſion; and it is well known, that they ended the campaign there, without being able to penetrate into Alſace.

The number of columns ought to be regulated by the breadth of the ford, or by the number of bridges that are eſtabliſhed.

The third of June 1747, at day-break, the army commanded by M. de Belleiſle paſſed the Var in five columns.

This paſſage was effected without any reſiſtance on the part of the enemy, and M. Belleiſle had 15 men drowned, although there was a chain formed of peaſants, acquainted with the fords, to direct the march of the columns, and to aſſiſt the ſoldiers who were carried away by the rapidity of the current.

Art. IV. All paſſages of this nature, whether in a march, whether in defence, or for an attack, may be foreſeen. A general may, at a diſtance, make all the preparations neceſſary for theſe operations; he may anticipate or foreſee the diſpoſitions of the enemy: in regard to a retreat it is otherwiſe; for although it may have been provided for, a general cannot be certain whether it can be effected after the manner he hath intended; beſides, he muſt, in a retreat, unite all the different diſpoſitions already mentioned: the leaſt negligence becomes irreparable, and gives the enemy a very great advantage. A moment loſt, a movement diſcovered, may alſo be the cauſe of a rout, and render the retreat impoſſible, or at leaſt very bloody; therefore if a general, in theſe circumſtances, has not a perfect knowledge of the river he has to paſs, if he has not been careful to preſerve the bridges, or to keep the materials and inſtruments proper for the throwing over of new ones, he will be unable to paſs in ſight of the enemy. Xenophon's retreat with the 10,000 Greeks, furniſhes examples of the paſſages of rivers, which a general ſhould always have preſent to his view. What prudence, what activity in ſounding the fords himſelf, whenever he met with any ſtream or river to be croſſed! What orders to prevent confuſion among his troops, and what ſtratagems to avoid being repulſed!

If a general is certain of returning by the ſame place, at which he has formerly paſſed, the beſt way would be, as Vigetius ſays, to have the bridges guarded, and to erect a fort with large ditches at the head of each, for their ſecurity, and to place troops in it to guard the bridges and the paſſage, as long as ſhall be thought neceſſary.

Thus circumſtanced, a general ſhould entrench the heads of the bridges in the manner directed in Art. 3. and that the troops may paſs the bridges without confuſion, according as one brigade of infantry ſhall enter the circle formed by the redoubts, another ſhall paſs the bridge, and that which enters ſhall take poſſeſſion of the poſts which that which paſſes occupied; he muſt be careful to eſtabliſh batteries of cannon to the right and the left, on the other ſide of the river, to flank the redoubts, and defend the approach to them; ſo that when the whole army ſhall have paſſed, the troops who occupy the redoubts may retire with eaſe. The cavalry will paſs the bridges without ſtopping behind the redoubts.

In a retreat of this kind, the infantry ſhould march in column, and the cavalry in order of battle, upon the flanks of the infantry. Before the march is begun, ſome troops muſt be ſent to occupy the redoubts; as ſoon as they ſhall be in poſſion of them, the army will put itſelf in march, and proceed towards them. The cavalry of the right muſt paſs over the bridge neareſt to it, and that of the left will do the ſame. The columns of infantry muſt enter by the ſpaces which are between each redoubt; the grenadiers and the piquets muſt remain, in order to ſuſtain the troops occupying the redoubts: ſome pieces of cannon ſhould alſo be left to fire upon the enemy in caſe he ſhould approach too near; the columns muſt paſs over the three bridges; the grenadiers and the piquets muſt alſo draw near the head of the bridges at night-fall; the troops occupying the redoubts muſt quit them ſilently, and paſs the bridges; they muſt be followed by the cannon that has been left during the day; the grenadiers muſt paſs laſt of all; after they are paſſed, the bridges muſt be broke down. This may be eaſily executed, provided order and ſilence are preſerved; but if the enemy entertains the leaſt ſuſpicion of the redoubts being abandoned, he will come in full ſtrength to attack the troops ſtill remaining on that ſide. Theſe troops, too weak to reſiſt a ſuperior number, cannot avoid being beaten, ſlaughtered, or drowned, the cannon taken, and the bridges burnt.

For greater ſecurity, the grenadiers and the piquets may be furniſhed with chevaux de friſe, which will make an entrenchment, till the troops which occupied the redoubts are retired. A retreat never merits the epithet of *fine*, except it is performed with order, and with the loſs of as few brave men as poſſible, to ſave the reſt of the army.

In every enterpriſe formed by a general in difficult places, he muſt, according to M. de la Valiere, provide for his retreat. In retreats of all kinds, adds the duke of Rohan, a general cannot be too attentive to render it ſafe, and to avoid diſorder: when it is the effect of his own choice, it ought to be made ſo early, and ſo expeditiouſly, that he may not be under a neceſſity of fighting.

During the paſſage of a river, or even after a general has paſſed it, if he ſhould be repulſed, the retreat becomes very difficult, and cannot be performed without great loſs; it is for that reaſon that many generals, who have been miſtruſtful of the firmneſs of their troops, have burnt their ſhips in the port, in order to animate them to victory, from conſidering the impoſſibility of retreating.

The paſſages of the rivers now going to be mentioned, will ſerve both for examples and rules. The particulars which will be entered into, will leave nothing to be wiſhed for by thoſe who are deſirous of inſtruction only.

In the campaign of 1742, the diſpoſition of M. Saxe for paſſing the Danube, owed its whole ſucceſs to ſecrecy, to the general's addreſs in profiting by circumſtances, and particularly to a very thick fog.

The two armies were encamped two leagues diſtant from each other, and the light troops ſkirmiſhed together the whole day.

At ſeven o'clock at night, count Saxe ſent for the general officers, furniſhed them with inſtructions, and cauſed the guards to be doubled.

At nine o'clock, the baggage filed off over two bridges; one of rafts and another of piles: after which the infantry paſſed, and the grenadiers, who formed the rear-guard, cut down and burnt the two bridges. The enemy advanced in order to charge his rear-guard; but 18 pieces of cannon that had been planted beforehand, very ſoon ſilenced the fire of their muſketry, and he loſt not a ſingle man.

At day-break the army formed in order of battle, upon two lines, in order to give time for the Imperialiſts to retire from Pladling; and as ſoon as they had joined, the army put itſelf in march in four columns.

It is particularly neceſſary, either in paſſages or retreats, to be acquainted with the nature of places, and if they are fit to furniſh the timber neceſſary for making rafts and bridges. In Germany, and countries where wood is very plenty, in order to paſs with greater expedition, a general can make uſe of rafts or flying bridges. Two may be placed, one upon the right, the other on the left, of a bridge built upon piles; by which means three columns can paſs at once. It ſhould be obſerved, that the flying bridges are by no means ſecure againſt torrents.

In 1742, count Saxe having beforehand poſſeſſed himſelf of Thonaſtauf, cauſed two flying bridges of rafts, and a great work of redans, to be erected, in which he poſted five battalions and ſome cannon.

On the ninth of September all the baggage paſſed the

the Danube: on the tenth the army put itſelf in order of battle in two lines, which retired ſucceſſively toward the river.

The lines paſſed one after the other; that is, the cavalry at the ford, and the infantry upon the flying bridges.

Six thouſand of the enemy's advanced guard were witneſſes of this retreat without daring to moleſt it; ſo prudently were the orders given, and ſo exactly executed.

It is in retreats that bridges are moſt liable to break under the weight of the troops; it is at that time the precautions are negelected, becauſe the danger becomes more preſſing, and they are not ſufficiently acquainted with the rivers over which the bridges are thrown.

If Cæſar, ſays M. de Puyſégur, had known there were always floods in Spain at the time of the year he was there, he would have been guarded againſt the accident which he deſcribes: at the end of this reflection the reader may ſee the methods he propoſes for remedying theſe inconveniences.

In the following account it may alſo be ſeen, that a paſſage cannot be unfortunate, when it is executed by reſolute ſoldiers under the command of a prudent and intelligent general.

After the battle given the 16th of July 1746, under Placentia, the combined army of France and Spain, poſted on the other ſide of the Po, ſubſiſted at the expence of the Milaneſe, and by means of the communications of Lody, drew proviſions from the Venetian territory: the Auſtrians, to the number of 12,000 men, attempted the paſſage of the Po, ſuſtained by the king of Sardinia with 30,000 men.

The combined army advanced upon the Ambro, to diſpute the paſſage with them; for that reaſon a very vigorous defence was reſolved on upon the lower part of the Ambro: by theſe diſpoſitions they found themſelves conſtrained to attempt the conqueſt of Lody, a place of no great conſequence; nevertheleſs, as Lody was the only paſs by which the combined army could draw proviſions from the Venetian territory; and thro' the apprehenſion of being a ſecond time ſhut up in Placentia, where there was no longer any proviſion remaining, M. de Maillebois propoſed the repaſſing of the Po; and notwithſtanding the objections which this propoſal already had experienced, and ſtill had to meet with on the part of his royal highneſs the Infant, it was carried in the affirmative.

It was therefore reſolved to paſs the Po upon three bridges, on this ſide of the mouth of the Tydon, the night of the eighth or ninth of Auguſt.

The viſcount of Cruſſol was ordered to abandon Lody, which was greatly ſtraitened by the enemy, the night of the ſeventh or eight. On the eight at night, the retreat having ſerved by way of general, each body put itſelf in motion.

A body conſiſting of 8000 men, under the command of M. de Campoſaneto, was appointed to keep back the king of Sardinia's army, and to form the rearguard.

The marquis de la Chetardie, major-general, with 30 companies of grenadiers, 6 battalions, 500 horſe, and 6 pieces of cannon, formed the advanced guard: he was ordered to throw a bridge over, and to occupy the Tydon, whilſt the marquis de Monteynard, brigadier, with 4 companies of grenadiers, 3 battalions, 300 horſe, and 2 pieces of cannon, landed on the right, to cloſe up the interval between the Po and the Tydon, and oppoſe the detachments of Piedmonteſe and Auſtrians, diſtributed upon the right bank of the Po, as far as Parpenza.

On the eight, at night-fall, the body commanded by M. de la Chetardie came out from Corte St Andrea, and took poſt upon the left bank of the Ambro, where he was to embark part of his troops, whilſt M. de Monteynard, who came out from Albaroni, embarked with his whole detachment upon the ſhore upon the right: the Croats were pontoned beforehand, and placed two and two in the mouth of that river.

Theſe diſpoſitions being made at midnight, M. de la Chetardie gave orders to march out half an hour after, in order that the remainder of the body which he conducted, and which had not been able to embark, might arrive at Bottaroni di Sotto, in the place where the bridge ſhould end on the other ſide.

At one o'clock at midnight, the 68 boats which were to form the two firſt bridges, left the Ambro in two columns.

There were but 12 grenadiers, or voluntiers, killed or wounded in the embarkation; the firſt bridge was completed at day-break, the ſecond two hours after; and the third, which reached as far as Placentia, was finiſhed at noon: the army, followed by its whole baggage, 4000 mules, 1000 waggons, and 60 pieces of cannon, paſſed that day and night.

M. de la Chetardie, with his advanced guard, occupied the Tydon from its mouth as far as Verati, after having cauſed the bridge which belonged to the enemy upon the lower part of the Tydon to be burnt; to which place M. de Nogent went.

The marquis de Pignatelli was ordered to occupy the Tydon from Verati to the Strada Romea; but not having a ſufficient number of troops, he contented himſelf with occupying a caſſine, which was within muſket-ſhot of the Romea. The marquis de Senectere having joined him, and knowing the conſequence of guarding the country up to the Romea, took the right of M. de Pignatelli, with the body under his command; but his body of troops, joined to that of M. de Pignatelli, not being conſiderable enough to occupy the ground neceſſary, he contented himſelf with reinforcing thoſe troops which the Spaniſh general had ſent into the caſſine.

M. de Monteynard drove the enemy from Perpenza, whilſt a Spaniſh detachment advanced up to Caſtel St Giovany.

The order was given to march on the 10th at day-break: the enemy perceiving that the right of M. de Pignatelli did not reach to the Romea, began their attack in that part at eight o'clock in the morning.

M. de Pignatelli, purſuant to the orders of marſhal de Maillebois, with his grenadiers, occupied a little riſing, which was in a creek formed by the Tydon, and which commanded the oppoſite ſhore.

The fire of the grenadiers ſtopped the enemy for a moment, and gave time for M. de Senectre to advance with the two brigades of Anjou, and the Lorrain guards, to cover the cauſeway of Caſtel St Giovany; upon which he cauſed the piquets of this laſt brigade, to take poſt in the caſſines on the right and the left. He cauſed meſſieurs de Larnage and de Saulx to paſs to his left, with the brigade of Anjou behind a hedge, which favoured his fire.

The firſt effort of theſe two brigades forced the enemy to repaſs the Tydon in diſorder, puſhed on the left by the regiments de la Reine, the Saguntum Spaniſh dragoons, and by a ſquadron of Dauphiny.

The enemy being formed again, paſſed the river near the great cauſeway, came out in a column upon the caſſines, which were occupied, and forced the piquets of the Spaniſh guards to give way: then M. de Senectre cauſed M. de Wigier to march with the brigade of Lorrain guards, commanded by the chevalier de Beauveau, which retook the caſſines, and maintained itſelf there till the piquets, obliged to give way by the fire of the enemy's column, left our right and the cannon uncovered; then the Lorrain guards retired in good order into their former poſts.

By a motion to the right, which half the brigade of Anjou made, it took the enemy's column in flank, which wanted to get before the brigade of Lorrain's guards, ſtopped it, and mixed itſelf with it.

Three ſquadrons of Spaniards cauſed it to fall back upon its cavalry; then the brigade of Lorrain guards returned to take its poſt; it received orders to march, to attack a battery of four pieces of cannon; but the Spaniſh cavalry which was to ſuſtain it, not being able to bear the fire which it received, threw the brigades into confuſion, who very ſoon regained their ground, and maintained it, till they were relieved by the Spaniſh guards, ſuſtained by all the French cavalry under the command of M. d'Argouges: at laſt the enemy was obliged to retreat behind the hedges.

Whilſt the prince de Beauveau occupied the caſtle of Verati on the left, M. de la Chetardie, who ſuſtained that village, drew near to the left of M. de Pignatelli, who had been joined by the Waloon guards and the Provincial grenadiers. M. de la Chetardie wanted to charge the enemy with bayonets: M. de Pignatelli oppoſed it; but the French general kept up ſo continual and great a fire, that the enemy's grew leſs and leſs, and at a greater diſtance.

Things remained in this ſituation till two in the afternoon, when the retreat was ordered: M. de la Chetardie cauſed M. de Beauveau to advance with 30 companies of grenadiers and a regiment of dragoons, to guard the great cauſeway: his appearance ſtopped the enemy, and M. de la Chetardie continued his march without being moleſted.

The body which came out of Placentia, along with M. de Caſtellar, retook the ground where our troops had fought: the enemy repaſſed the Tydon, and M. de Caſtellar fell back upon M. de Beauveau with his grenadiers.

The paſſage of the Po, and the battle of Tydon, are two actions worthy of being handed down to poſterity, from the readineſs, reſolution, and ſteadineſs, with which they were executed.

The paſſage of the Po, by the aſſiſtance of three bridges, was executed in 24 hours, notwithſtanding the great quantity of waggons which the Spaniards cauſed to paſs by force. The action which followed this paſſage, is a leſſon for every military man, upon the manner in which he muſt form after a paſſage. The paſſage of the Po was effected betwixt two armies of the enemy, and under their eyes; the enemy were terrified at the ſteadineſs of the troops, and the prudence of the generals.

The ſucceſs of the day of Tydon is partly owing to the marquiſſes of Senectere and Pignatelli, under the orders of marſhal Maillebois.

In a word, a general cannot take too many meaſures in the paſſage of a river, or ſufficient precaution to prevent the enemy from paſſing, nor make uſe of too much contrivance or artifice in a retreat; and he ſhould even employ cunning itſelf, when the enemy is ſuperior in ſtrength, particularly when he harraſſes the troops.

It is impoſſible, ſays M. de Monteſquieu, to give a detail of every thing without tiring the reader; it has therefore been thought better to cite authors, whenever it has been imagined that the reader would find in their works ſolid inſtructions, which it would be uſeleſs to repeat here: but it has again been ſuppoſed, that it will convey pleaſure to the military readers, in placing before their eyes examples, of the moſt part of which they have been witneſſes; a method more conducive to inſtruction than all the rules that can be given.

Sect. XI. *Of Battles.*

Of all the operations of a campaign, the moſt important, and that which is moſt deſerving of attention, is a battle, becauſe it is generally deciſive; every other operation is but preparatory to, or conſequent of it. A general engagement, ſays Vigetius, is often decided in two or three hours; after which there ſcarcely remains any reſource for the vanquiſhed. Battles, ſays M. de Montécuculli, beſtow and take aways crowns; from their deciſions princes cannot appeal; by them war is put an end to, and the name of the conqueror immortalized. A general ſhould, therefore, think of, and try every thing, and ſhould leave nothing unattempted, before he proceeds to this laſt extremity.

A general ſhould by no means ſuffer himſelf to be forced to a battle; neither ſhould he offer it but when there is a real neceſſity for it; and even when he gives battle, it ſhould be rather with an intention of ſaving than ſhedding blood; more with a view of aſſerting the rights of his maſter, and the glory of his country, than of oppreſſing mankind.

However bloody a battle may be, it is always leſs ſo than a long war; which, by reiterated troubles, conſumes the treaſures of ſovereigns, that ſinew of a ſtate, and drains the blood of the ſubjects. Nevertheleſs, there are ſome occaſions where it is not left to a general's choice, either to give or accept of battle. An army of obſervation, and an army acting on the defenſive, neither can nor ought to be deſirous of coming to action. Both the one and the other ſhould have no other object in view, than that of poſting itſelf in ſo advantageous a ſituation, that the enemy may neither entertain a thought of attacking it in its camp, or any hope of forcing it. The army of obſervation, whoſe only object is to protect, or to cover the troops forming a ſiege, ſhould never ſeek to fight the enemy, unleſs attacked by him: the other, obliged by its want of ſtrength to act upon the defenſive, ſhould only be deſirous of occupying advantageous poſts, to prevent the enemy's penetrating into the country, and attacking it in any poſition it ſhall have taken.

If the choice is left to the general, he ought to be particularly careful, before he comes to a reſolution of giving battle, to examine whether he can gain greater advantage by winning it, than he will ſuſtain damage by loſing it.

It is therefore, neither caprice, nor a miſtaken courage, or the deſire of diſtinguiſhing himſelf at an improper time, that ſhould determine a general to give battle. "The reaſons which ſhould induce a general to give battle, are," according to Mr de Feuquieres, "his ſuperiority over the enemy, both in the number and quality of troops, the enemy's incapacity, his ill-choſen encampments and negligent marches, the neceſſity of ſuccouring a place, or the certainty of a reinforcement, by the junction of which the enemy will become ſuperior, or circumſtances which may change the original deſigns of the campaign." This was the reaſon which induced the viſcount Turenne, in 1674, to give the battle of Einſheim, becauſe the prince of Bournonville waited the arrival of the elector of Brandenbourg, who was coming to join him with a conſiderable reinforcement; and if he had not given battle before that junction, the enemy's army would have had a very great ſuperiority over his. The reaſons given by Montécuculli for avoiding a battle are, "when the loſs of it will be more prejudicial than the gaining will be advantageous; when inferior to the enemy, or when ſuccour is expected; when the enemy has the advantage of the ground; when it is perceived the army is working its own ruin, either by the fault or diviſion of the commanders, or through the diſagreement of confederates." It may alſo be added, when the enemy's army labours under ſome diſeaſe; when it is in want of proviſions and forage; and that, diſheartened by theſe circumſtances, his troops deſert from him.

It is on a day of battle that it becomes particularly neceſſary for a general to be acquainted with his own ground, and alſo that which is occupied by the enemy; to know in what manner his wings are ſupported, the nature of the places where theſe ſupports are; whether he can be ſurrounded, and in what part he can be attacked with the greateſt facility.

But however eſſential theſe branches of knowledge may be, it is not always the ſuperiority of number, or quality of the troops, or advantage of ground, that will ſecure the beſt diſpoſed army from being routed: it is the foreſight of the general in the precautions he has taken before the battle; it is his genius, his activity, his coolneſs in the time of action, and the capacity of the general officers acting under him, that determine the ſucceſs.

Ground, ſeemingly the moſt advantageous, often preſents obſtacles, which do not immediately ſtrike a general, although an experienced one, and which may prove fatal in the courſe of a battle; how, therefore, will a general be able to correct theſe miſtakes, if he conſiders them as only trivial? At the battle of Cerignoli, given on the 28th of April 1503, the enemy's front being more extended than at firſt it was ſuppoſed to be, in order to give a greater exent to that of the French army, it was neceſſary to continue the lines acroſs vineyards and thickets; by which means, the neglecting to fill up a ditch cauſed the defeat of the French, and the death of M. de Numours their general.

A general ſhould not always purſue his own opinion, it being impoſſible for one man to ſee every thing; he ſhould, therefore, cauſe an exact account to be given to him of whatever he cannot have an opportunity of ſeeing perſonally; to inform himſelf by ſpies of the enemy's order of battle, and act in conſequence of that knowledge; he ſhould poſſeſs himſelf of all places capable of containing ambuſcades, which he ought to have had examined ſome days before the battle. Santa-Cruz hath given a particular detail of all theſe preparations.

It is in theſe moments, which decide the fate of whole nations, that the genius and prudence of a general ought to be conſpicuous; he ſhould, at the ſame time, ſee what is doing among his own and the enemy's troops. Beſide the precautions which ought to have preceded the day of battle, thoſe which ought to be taken in the courſe of the action are ſo numerous, that it is impoſſible for them all to find a place here.

Some depend upon the general's ability, others upon circumſtances, which it is almoſt as difficult to deſcribe, as to mark out the neceſſary diſpoſitions for them.

It depends upon the general's genius and foreſight to make choice of intelligent, active, and prudent aids-de-camp, to aſſign to each particular body the propereſt to command it; not, for example, to place, at the head of infantry, one who has been long accuſtomed to the ſervice of the cavalry; or, at the head of cavalry, one who is more uſed to the infantry, &c. to encourage the ſoldiers by the hope of rewards, and by motives which may ſpirit them up, and to threaten thoſe who are ſo unmanly as to tremble at the ſight of an enemy, or raſh enough to run forwards without order.

The general ſhould alſo be capable of forming new ſchemes, in order to render thoſe of the enemy abortive; he ſhould alſo take care, whatever may be the nature of the country, to diſpoſe his army after ſuch a manner, as to render it equally ſtrong in every part, and that each body may protect and aſſiſt one another without confuſion; that the intervals neceſſary for acting are well preſerved, and that the reſerve can eaſily march wherever it ſhall be ordered: in a word, the troops ſhould be diſpoſed after ſuch a manner, that even before the action they may perceive in what manner they are to act.

It is the work of genius to take advantage of circumſtances, and to ſubmit to them; it is impoſſible to foreſee the precautions dependant on them, as the very circumſtances muſt be, themſelves, unforeſeen: it is by a general's addreſs, in knowing how to profit by circumſtances, that he ſometimes make a motion, conducive to the whole ſucceſs of the action, from the inequality of the ground, a ſure means of beating him. M. de Montécuculli reduces all the advantages that can be gained over an enemy to four principal heads, which, in reality, are of themſelves reduced to the knowledge of profiting by circumſtances; ſuch are the advantages of number, when the enemy is beaten in his poſts, his convoys, and in his forages; when an ambuſcade is ſurrounded, or when a whole army falls upon a ſmall, weak, and ſeparated body: the ſecond head conſiſts in the knowledge of the commander; the third in the manner of fighting; and the fourth in the advantage of the ground. A general, who properly conſiders theſe heads, will diſpoſe of a combined army after ſuch a manner, that it may, at the ſame time, receive orders without miſtake, and execute them without confuſion; a very neceſſary precaution, and one which Hanno, general of the Carthagenians, neglected to take with regard to the ſtrangers allied with them, which occaſioned the troubles related by Polybius. He ſhould have mixed the ſoldiers belonging to thoſe countries, where bravery is in a manner natural to them, with thoſe belonging to countries where it is more extraordinary.

Notwithſtanding, Tacitus would endeavour to prove that it is much better to keep them together; becauſe, ſays he, each different nation, ſtriving to diſtinguiſh itſelf, will be animated by a deſire of excelling each other: experience, however, has often proved the contrary.

Vigetius points out the precautions neceſſary to be taken by a general, to avoid having either the wind or the ſun in his front. The wind, which raiſed the duſt, and blew it into the eyes of the Romans, contributed to the loſs of the battle of Cannæ: the ſun, on the other hand, dazzles the ſoldiers, and lays open their diſpoſitions and evolutions to the enemy: in a word, the general ſhould not even neglect thoſe precautions which may be in appearance uſeleſs, whether before the battle, or at the very time they may be put in execution after the action; as the rallying the troops, the refreſhing of them, the retreating from before the enemy, or the purſuit of him, ſuppoſing the battle to be gained. A general ſhould have beforehand formed the plans of the marches and the enterpriſes he would attempt, and be almoſt certain of the means of executing them; if, on the contrary, he fails, he ſhould have determined the poſitions by which the army, fixed in a camp ſtrong by ſituation, may prevent the enemy from reaping any great advantage from his victory: he ſhould alſo have provided for the ſecurity of the priſoners, the hoſpitals, the plunder of the ſoldiers; in ſhort, for all that is neceſſary for preſerving order and diſcipline, and every thing contributing to the ſecurity of the troops: the diſtreſs of the enemy, and the glory of the ſovereign, ſhould be provided for without waiting for the event; for at that time confuſion and diſorder would prove more fatal than even the battle.

In the treatiſe written by Santa-Cruz, upon the diſpoſitions before and after a battle, may be ſeen a long detail of the precautions depending upon genius, and of thoſe which are regulated by circumſtances.

The general's poſt during the action ought to be, according to Vigetius, on the right wing, between the cavalry and the infantry. Onozander fixes it upon ſome height, and Santa-Cruz towards the centre, in the front of the ſecond line. Titus Livius and Polybius have obſerved, that the poſts of Scipio and Hannibal were always in thoſe parts which were leaſt expoſed; becauſe, as obſerved by Onozander, a general who runs into danger is a raſh man, fuller of preſumption than courage: neither is daringneſs, adds his commentator after Plato, always a ſign of courage; beſides, a man who is really brave, is never daring but when it is abſolutely neceſſary. Æneas, all valiant as Homer has painted him, did not judge it proper to wait for Antilochus, who had joined Menelaus, with whom he was fighting.

A general ſhould not always ſuppoſe that what particularly ſtrikes him is right; he ſhould reaſon calmly upon the probability of it, in order to come to a greater degree of certainty with regard to the practicability: he ought alſo, ſays Vigetius, to be acquainted with the nature of the enemy, and the characters of his generals, whether they are prudent or raſh, daring or timid; whether they fight upon principles or at hazard: in effect, a general ought to be earlier or later in making an attack, in proportion to the raſhneſs of the enemy. If, ſays M. de Montécuculli, any ſign of fear or confuſion is perceived among the enemy, which will be known when the ranks are diſordered, when the troops mix together in the intervals, when the colours wave about, and the pikes ſhake all at the ſame time, then he ſhould charge and purſue the enemy without giving him time for recollection: ſome dragoons, light cavalry, platoons, ſome looſe troops, ſhould be ſent forward; who, whilſt the army advances in order of battle, will go before to ſeize ſome poſts into which the enemy muſt fall. A general alſo ought, ſays Vigetius, to ſound the ſpirit of his ſoldiers, and obſerve whether they have a firmer countenance than the enemy. It is dangerous to lead an army on to action that is not thoroughly determined to do its duty. "Battles," ſays Vigetius elſewhere, "are generally won by a ſmall number of men." The great myſtery conſiſts in the general's knowing how to chooſe them, to poſt them well, conformable to his plan, and the ſervices required of them.

I cannot aſſign the reaſon, ſays he, why particular bodies fight better againſt other particular ones, or why thoſe who have beat bodies ſtronger than themſelves, have in their turn been often beaten by thoſe that were weaker? It is undoubtedly owing to want of confidence; becauſe the place of action has been different; or from other circumſtances which cannot be laid hold of, but on the very inſtant. The ſituation of the mind is ſhown in the countenance of the ſoldiers; it is declared in their diſcourſe, and by the moſt trifling of their actions. The general ſhould conſult them; he ought even to go farther; the beſt countenance is not always a ſign of the firmeſt courage. Cowardice often conceals itſelf under the maſk of intrepidity; but ſoon as the action begins, the veil falls off, and the coward ſhows himſelf, notwithſtanding all his endeavours to the contrary. Neither at this time ſhould a proper degree of fear be thought blameable; nature muſt be allowed to ſhrink in that awful and uncertain ſituation: the coward gives himſelf up to his fears; the bully ſeeks in vain to diſſemble them; and the raſh man, who can neither diſtinguiſh between danger and ſafety, is ſenſible of both; the real ſoldier is always modeſt, and contented with having done his duty. A good general turns every thing, even want of ſtrength, to advantage. Hannibal, at the battle of Cannæ, poſted his beſt troops upon the wings, that the centre, which was compoſed of thoſe on whom he had the leaſt dependence, might be the ſooner broke, in order to give the wings an opportunity of ſurrounding the Romans.

It alſo requires a very ſtrict examination in a general, in order to be thoroughly maſter of the circumſtances on which he ſhould regulate his diſpoſitions;

and he will alſo find it ſometimes neceſſary to make ſome change in his original intentions. It is always proper that the corps of reſerve ſhould be compoſed of veterans, and even of part of the flower of the army; for ſhould the army happen to be broke, this reſerve alone may probably give a new face to the action: it was this method which Hannibal purſued at the battle of Zama; where Scipio, after having defeated the troops which preſented themſelves to him, was aſtoniſhed to find he had a new army to fight with. At the battle of Fontenoy, the houſhold troops placed in reſerve, with ſome brigades of infantry, determined the ſucceſs of that day. Nevertheleſs, on ſome occaſions this diſpoſition may prove diſadvantageous; ſuch, for inſtance, where it would be neceſſary to preſent a large front to the enemy, or where it is neceſſary to prevent his getting poſſeſſion of a paſs or a defile; where a general finds himſelf too inferior, and where there are alſo poſts to be defended.

It would be unneceſſary to repeat every thing mentioned by Vigetius, relative to the precautions neceſſary to be taken before a battle; time, and the difference of weapons, have greatly altered diſpoſitions: fire-arms, which are now made uſe of inſtead of darts and ſlings; the bayonet, inſtead of the pike, have contracted the intervals which muſt neceſſarily be left between every ſoldier.

The emperor Leo carries his ſpeculations ſtill farther; he exhorts a general to continue the action with the enemy, according to circumſtances of times, ſeaſons, and conſtitutions: in effect, there is no degree of equality between an army fatigued by a long march, and an army which, although inferior, has been at reſt. Soldiers tranſported from one climate to another, are no longer the ſame; the ſouthern people, naturally weak, are much more ſo in a northern country; and the northern people ſicken in a more temperate climate. This truth has been often confirmed by the experience of almoſt every nation; particularly by the French in many of their wars in Italy; and laſtly, in their campaigns in Bohemia.

It is upon theſe circumſtances, and upon many others alſo, which it would be too tedious to particulariſe, that a general ſhould regulate the diſpoſitions for a battle. Vigetius mentions only ſeven different methods, which may be nearly reduced to three: "The firſt method of ranging an army in order of battle is," according to him, "the long ſquare; the ſecond, by marching obliquely with the right to the enemy's left; the third, by beginning the action with the left againſt the enemy's right; the fourth, by puſhing on the wings againſt thoſe of the enemy, when the armies come near each other, leaving the centre by the way (which was Hannibal's diſpoſition at Cannæ), and by trying immediately to break through the enemy's wings contrary to his expectation." The fifth is like the fourth, or rather the correction of it; becauſe by means of it the centre is concealed, and covered by the archers and light-armed troops. "The ſixth reſembles the ſecond; when the army in order of battle draws near to that of the enemy, and with the right attacks his left briſkly, where the action is briſkly maintained with the beſt troops, by keeping the reſt of the army at a diſtance from the enemy's right, and diſpoſed long-wiſe like a javelin that preſents its point. The ſeventh is, when the army can form with one wing to the ſea, a river, a lake, a moraſs, or an hollow; and that the general reinforces with the beſt troops the wing that is not ſupported."

The chevalier de Folard and M. de Puyſégur have themſelves alſo conceived particular diſpoſitions; which, however ſuppoſitions, ſtill ſhow the greatneſs of their genius, and give great perſpicuity to thoſe principles they have eſtabliſhed in their works; and although it may never happen that every circumſtance which they have ſuppoſed ſhould actually meet together, there are nevertheleſs caſes where there may be found a very near reſemblance of them, and where their imaginary diſpoſitions may be put in execution. But even ſhould theſe ſuppoſitions have no other advantage than that of exerciſing the genius of an officer, who takes pleaſure in his buſineſs, to infuſe into him that ſpirit of contrivance, ſo neceſſary for one who is placed at the head of an army, and the facility of readily applying rules to circumſtances, and theory to practice, they well deſerve the praiſes of poſterity.

The order and diſpoſition of troops for action depend entirely upon the general, who knows how to profit by circumſtances; the juſt execution of them depends upon the capacity of the general officers. The general cannot be every where, or ſee every thing; he is obliged to rely upon the underſtanding of thoſe who command under him for the juſt execution of his orders; the general officers ſhould know how to vary them, in proportion as circumſtances, and the ſituation of the enemy changes. They ſhould have an exactneſs and quickneſs of eye, both to oppoſe and profit by them; and, as M. de Puyſégur obſerves, the diſpoſition of the troops being once regulated by that of the enemy, by the ſituation of the country, and the general orders that have been delivered, the only part the general can have in the action, lies in thoſe places where he is within reach of giving orders himſelf.

M. de Montécuculli with great reaſon obſerves, that there cannot be too many officers in an army on the day of battle, in order to ſupply the places of thoſe who are killed: but can a man poſſeſſed of any degree of humanity approve of what he adds, that this number ſhould be increaſed in time of war, and reduced in time of peace? What a proſpect for a ſoldier, who, after having laviſhed his blood for the ſafety of his country, and the glory of his prince, ſees himſelf expoſed to the fate of Beliſarius! Whatever were the virtues of his maſter Juſtinian, can any one, without indignation, ſee this general, after having overcome the Perſians, reunited Africa to the empire, puniſhed the Vandals, driven the Goths out of Italy, ravaged Aſſyria, ſcattered at a diſtance from both empires that throng of barbarians by which they were over-run, and preſerved the throne, and the life of the emperor; upon the bare ſuſpicion, or rather under the pretence of a conſpiracy, deprived of ſight, and reduced to beg alms of paſſengers, in the ſtreets of that city which he had ſo often ſaved?

It has been already ſeen, that the diſpoſitions in a mountainous country change according to the ſituation of the ground. Vigetius repeats, ſpeaking of a field of battle, what has been ſo often eſtabliſhed in the foregoing ſections, that an open country is always moſt advantageous for an army that is ſtrongeſt in cavalry;

valry; and that an encloſed ſpot, divided by ditches and marſhes, covered with mountains and woods, is moſt convenient for infantry. In this laſt, the knowledge of the country, the art, the ability of the general, and the underſtanding of the general officers under his orders, ſooner aſcertain the ſucceſs, than a ſuperiority of troops in an open country, which preſents little or no variety of ground, and which allows the greateſt part, or indeed the whole, of the troops to act; the ſuperiority in troops is attended with great advantage, provided alſo the diſpoſition is good.

The different diſpoſition for troops are ſo many, the circumſtances differ ſo greatly, that were it even poſſible to connect in one body only, all the battles which have been fought ſince the time mankind reſolved to regulate their properties by the law of the ſtrongeſt, the number of contrivances which remained to be collected, would be greater in number than thoſe which have been executed. It is impoſſible to give a detail of every thing; every particular ſpot, and the diſpoſition proper for it, every country, and all the circumſtances that may oblige theſe diſpoſitions to vary, muſt be deſcribed. Thoſe now going to be mentioned, are only with a view of giving the rules, and of more clearly demonſtrating thoſe precepts which lead to the knowledge of all others.

Disp. I. Let two armies of equal force be ſuppoſed, in an open country divided by a river, conſiſting of 57 battalions and 72 ſquadrons each, cavalry, huſſars, and dragoons. The two armies are on the ſame ſide, the right of the one, and the left of the other, to the river. The left of the army whoſe right is to the river is unſupported; and that whoſe left is ſupported, has a wood on its right. By this diſpoſition may be ſeen the neceſſity of covering the wing of the army A, that is expoſed.

The army I, whoſe right and left are ſupported, is formed upon two lines, and preſents the ſame front as the army A, with a reſerve in the rear. The following is therefore thought to be nearly the diſpoſition which ſhould be made by the general commanding the army whoſe left is unſupported. It therefore ſeems, that in order for a ſafe diſpoſition, the firſt line ought to conſiſt of 20 battalions, with intervals of about three toiſes between each battalion; 12 ſquadrons on the right, with their proper intervals; four battalions on the right of the cavalry, 10 pieces of cannon, and a battalion in column cloſe to the river; 12 ſquadrons on the left of the firſt line, with their proper intervals; 16 battalions in the ſecond line, 300 paces diſtance from the firſt; 11 ſquadrons on its right, placed behind the intervals of thoſe in the firſt line; and on their right, ſix ſquadrons of dragoons next the river, in order to ſuſtain the infantry and cannon covering the right; 11 ſquadrons on the left, placed in the ſame manner as thoſe on the right; 10 pieces of cannon, ſupported by a battalion in column, between the infantry and the cavalry of the right; 10 others, ſupported alſo by a battalion between the infantry and the cavalry of the left; four battalions in the rear of the ſecond line on the left, with orders to tranſport itſelf obliquely, or ſideways, as ſoon as the army moves to attack that which is drawn up againſt it; 12 ſquadrons of cavalry in the rear of the firſt line upon the left, to poſt themſelves obliquely upon the flank, at 100 paces diſtance from the firſt ſquadron on the left, next to the four battalions and the cannon; the reſerve, conſiſting of 10 battalions and eight ſquadrons of dragoons, in the third line upon the left flank, ſo that it may fall into the firſt line as ſoon as the ſquadrons of cavalry, which were in the rear of thoſe of the firſt line, ſhall be poſted obliquely: in this poſition, the army will move forward, the right never quitting the banks of the river.

If the enemy's army ſhould advance, the diſpoſition of the army A will become ſtill better, becauſe the army I will quit the ſupport it had on its right; but if, on the contrary, it remains in its poſt, in order to keep this ſupport, then the 10 battalions of the reſerve, followed by the eight ſquadron of dragoons, will join the four which ſupport the flanks of the cavalry which is poſted obliquely. When marching, this line poſted ſideways ſhould proceed obliquely; and when the cannon ſhall be near enough to cannonade with effect, it ſhould make ſeveral diſcharges, in order to break and beat down the entrenchments, or felled trees, which the enemy may have made, and alſo to deſtroy their diſpoſition. As ſoon as the army A ſhall be near enough to cannonade the army I with ſucceſs, it muſt halt, and amuſe it with a continual fire of the cannon. The principal attack ought to be made at the wood by the 14 battalions: in order to give more ſtrength and certainty to this attack, ſix other battalions, with 10 pieces of cannon, ſhould be detached to it from the ſecond line, always keeping up a fire from the front. If during this attack, it is perceived that the enemy weakens his line, in order to carry aſſiſtance to the wood that is attacked, then the centre and the right of the army ſhould march up, and charge him briſkly. The troops who cannonade the wood ought not to advance, but ſhould only keep the troops poſted in it at bay; becauſe that part which the enemy has weakened will then become the principal attack: it is probable, that the enemy having weakened his front, will certainly be broke. If the enemy ſhould not weaken his front, and the attack of the wood ſhould ſucceed, as ſoon as the enemy is driven out of it, the troops which attacked it ſhould take the enemy in flank; then the body of the army, by advancing, ought to determine an affair already half gained. If by the intelligence the general hath received, and the number which he knows the enemy's army to conſiſt of, and which he ſees before him, he judges the wood is filled with infantry, and that conſequently the attack of it will be attended with difficulty, he muſt attack on the ſide of the river, by marching by degrees from the right, as if to ſuſtain the left. In order for the greater certainty of ſucceeding in this attack, he ſhould reinforce the five battalions upon the right with ſome others from the ſecond line: the left ſhould continue in the poſition already mentioned, to keep back the enemy. If it ſhould happen that the enemy, ſeeing his left attacked, cauſes the troops to leave the wood in order to replace thoſe of the centre, which he cauſed to march to the aſſiſtance of the left, the 14 battalions which are poſted ſideways, ought briſkly to attack the wood ſuſtained by dragoons. Theſe laſt ſhould poſt themſelves upon the left flank of the infantry in order to cover it; and as ſoon as it ſhall be within 60 paces of the

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the enemy, it ſhould march up to him with bayonets fixed; and the dragoons ought to attack him in flank, at the time the infantry does the ſame in head. The wood is all this while ſuppoſed to be practicable for the dragoons on horſeback; but in caſe it ſhould not be ſo, they muſt diſmount, the infantry being ſufficiently ſupported by the 12 ſquadrons of cavalry, which are placed ſidewiſe.

The general may with eaſe, eſpecially in an open country, attack the enemy's whole army together; but this may be attended with great danger, and if the whole front of the firſt line is broken, there will not be much difficulty in breaking the ſecond: whereas, by attacking the enemy's army in one or two parts, if one of theſe attacks ſucceeds, the battle is won; becauſe the troops who are victorious, take the enemy in flank, at the ſame time that he is attacked in head by the reſt of the army. In caſe it ſhould not ſucceed, the troops who made the attack can retreat, protected by the whole army, which hath not at all ſuffered.

The general ſhould, as much as poſſible, conceal the motions he intends making from the enemy; conſequently, the five battalions and 10 pieces of cannon which ſupport the right of the army next the river, ought to march in the rear of the ſquadrons of the firſt line, the infantry with their arms ſecured, and not range themſelves in the order of battle intended, till the two armies are ready to march to charge each other. It is the ſame with regard to the ſquadrons of cavalry, which ſhould be poſted behind thoſe of the firſt line, to execute the deſign already laid down. See Plate CCXCIV.

Disp. II. If the two armies are not ſupported either on their right or their left, the ſame poſition ſhould ſubſiſt that hath already been eſtabliſhed for the cavalry, which is in the rear of that belonging to the firſt line, except that it ſhould be diſtributed on the right and the left. If there is not cavalry ſufficient, huſſars muſt be ſubſtituted in its place; but if there ſhould be cavalry enough, it muſt be uſed on this occaſion; becauſe cavalry being a greater body, its charge is heavier, and it alſo makes a greater impreſſion upon other cavalry oppoſed to it, provided they execute their order with great quickneſs. This cavalry or huſſars, which are poſted ſideways, ſhould not quit their poſt, but wait the ſucceſs of the attack. If the enemy is repulſed, they muſt then fall upon his flanks, and by a briſk and vigorous charge endeavour to envolve the ſecond line in the confuſion of the firſt; they will be followed by part of the wing of cavalry that is victorious, in order to give a greater force to the attack of the ſecond line, taking as much care as poſſible not to leave any body of cavalry upon the wing of infantry that is in a condition of protecting it. After theſe two lines of cavalry have been broken and purſued, half of the victorious line ſhould remain in order of battle; and, by a motion to the right from the left, take the enemy's infantry in flank, at the ſame time that it is attacked in head by the infantry of the army. The ſecond line ſhould then move into the place of the firſt, in order to be near enough to aſſiſt it in caſe the enemy's infantry ſhould ſtand its ground firmly; but it is probable, that being deprived of its cavalry, it will neither have the ſame firmneſs, nor the ſame ſpirit, as if it was ſupported, eſpecially when it is attacked on every ſide.

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The cavalry and the huſſars who purſue the beaten wing ſhould not expoſe themſelves too much, or break their order in the purſuit, for fear the enemy's huſſars which are behind ſhould fall upon and beat them by attacking them on all ſides; which may very probably happen, if they do not take care to keep in order of battle; which ſhould at leaſt be attended to by the cavalry. After the huſſars have purſued the enemy's cavalry ſo long as to entirely diſorder them, they ſhould return and take their former poſts, in order to march from thence to whatever place they may be ſerviceable. Although it may appear ſomething hard to make the huſſars return, there is nothing ſo difficult but what may be accompliſhed, when order and diſcipline are firmly eſtabliſhed, and when an officer has the art of making himſelf obeyed.

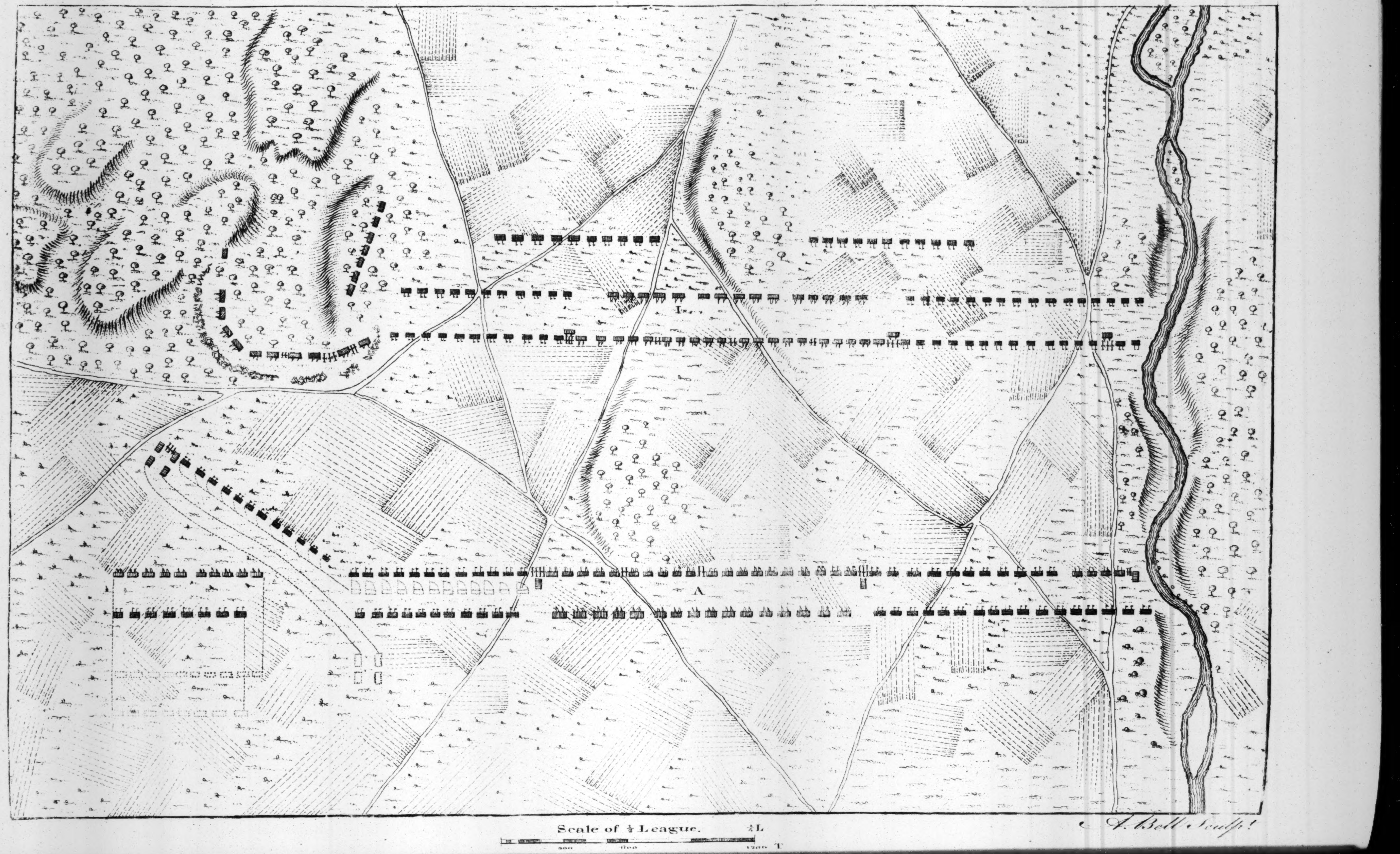
At the battle of Cannæ, the Carthagenian army, ſuperior to that of the Romans, having broke through them, one part continued the purſuit, and the other fell upon the rear and the flanks of their infantry; at the ſame time the Carthagenian infantry charged that of the Romans in all parts, which decided the victory. Thus Hannibal owed his victory partly to his ſuperiority in cavalry, and to his attack upon the flanks. The Numidians, who were upon the right wing of the Carthagenian army, and who fought nearly in the ſame manner as the huſſars, performed on this occaſion the ſame ſervice as the huſſars would certainly do in the diſpoſition now before us; ſo true it is, that infantry, deſtitute of its cavalry, hath no longer the ſame firmneſs, nor the ſame ſpirit; and if it is alſo attacked in head by infantry, it cannot avoid being beat. The principal attention of a general, ſays M. de Montécuculli, ought to be to ſecure the flanks; experience having taught, that when the wings of cavalry are broke, the infantry is eaſily ſurrounded, and hath no longer the means, nor even the courage of defending itſelf. The reader may ſee the principles he lays down upon that ſubject. It is ſeen by the example of the battle of Cannæ, what uſe the cavalry ought to be put to, particularly in an open country where it can eaſily act. What advantage may not be expected from it, when an army of Romans, 80,000 ſtrong in infantry, and 6000 horſe, was overcome by the Carthagenians, weaker by the half in infantry, but which derived its principal ſtrength from 10,000 cavalry, all veterans, and well diſciplined.

It is the manner of drawing up troops, their order and diſcipline, and not numbers, by which battles are won; it is very rare that the whole can be employed. During the late wars on the continent, ſcarcely the half have been engaged in all the battles which were gained.

But if the wing of cavalry is beat, it ought to retreat with as much order as poſſible. The cavalry, or huſſars, that are poſted ſidewiſe, ſhould always continue in the ſame place; there is no reaſon to fear that the enemy will advance briſkly to the purſuit; becauſe he will be taken in flank by the body that is poſted ſidewiſe; a circumſtance which ought not only to abate the eagerneſs of the conquerors, but alſo animate the conquered. By this manner of acting they gain time to paſs through the intervals of the ſecond line, and to rally in the rear of it, which they can perform with the

WAR.

Plan of an Order of Battle 1st. Diſpoſition.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A
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A. Bell Sculp.

3 MA 53

greater eaſe, as they are neither purſued or moleſted, at leaſt but very ſlightly.

In order to prevent the inconveniences that may ariſe if the huſſars in charging the firſt line of the enemy in flank are charged by the ſecond, it is neceſſary to detach inſtantly from the reſerve a body of dragoons ſufficient to fill up the intervals of the huſſars, which will form a full line without taking up more ground: this can be ſo much better effected, as there would be no ground on the other ſide of the troops who are poſted ſidewiſe, and that, beſides, theſe troops would be at too great a diſtance from the main body of the army.

Again, without cauſing them to fill up the intervals of the huſſars, they may be placed in a ſecond line behind them; and when the huſſars attack the flank of the enemy's wing, the dragoons will take their place, in order to keep back the enemy's ſecond line. This method hath the ſame effect, and is performed with leſs difficulty. It is almoſt evident, that the ſecond line will not dare advance to protect the firſt for fear of being charged in flank by the dragoons, but that on the contrary it will be obliged to retreat.

This diſpoſition, the performance of which appears very difficult, is not in reality ſo, if the general hath taken the neceſſary meaſures, and if his troops are well diſciplined, and know how to move with order and exactneſs. Even when this motion is not performed with all the exactneſs poſſible, it can never be dangerous, becauſe the front of the two lines will not be deſtroyed, and becauſe it is alſo made upon the rear; and that if the dragoons and huſſars are attacked and beat in marching up, their defeat cannot be any way prejudicial to the main body of the army. When the field of battle is in an open country, all the troops generally come down, eſpecially when there is no obſtacle to prevent them.

On theſe occaſions, it is requiſite that the diſpoſition of the troops ſhould be ſtrong in every part; there ſhould always be a reſerve, whether of infantry or dragoons, in order to be ready to aſſiſt the troops which have ſuffered.

If it is poſſible, in an open country, to find any hollow to ſupport the right, and a village to ſupport the left, the general ſhould make choice of that ſituation, ſuppoſing his intention is to accept, and not offer battle. If he deſigns to give battle, it would be unneceſſary to take this poſition, becauſe he muſt quit it in order to attack the enemy: but if circumſtances require his accepting it, he muſt ſeize this poſt, and place infantry and cannon in the village, and ſtation other infantry in the rear to ſupport that which is in the village.

As to the diſpoſition for the order of battle, eſpecially for the front of the line, it muſt be regulated by the ground, by the diſpoſition the enemy has taken, by the troops that can moſt eaſily act, and by thoſe that the enemy can oppoſe to them.

If the enemy has pitched upon a field of battle, and the general would attack him in it, he ſhould keep his whole front employed; but ſhould make his chief efforts on one or two parts, upon the wings, or at the centre. This was the method practiſed by marſhal Saxe in all his battles: when he accepted battle, as he was obliged to do at Fontenoy in 1745, he was in expectation that the oppoſite army would attack him on one ſide ſooner than another; in this ſituation the diſpoſitions ſhould be properly regulated, the poſts intrenched and occupied, the cannon diſtributed, and troops placed in the rear of each poſt to ſuſtain thoſe which are in it: victory ſhould then be expected from the capacity of the commanders, the firmneſs of the troops, and the aſſiſtance that is properly given them. But when a general gives battle, he may attack either the right, the left, or the centre, always conforming to the ſituation of the ground, and the field of battle which the enemy has choſen, which cannot be aſcertained but by a thorough knowledge of the country.

It is dangerous to attack the whole front of the oppoſite army with equal vivacity, becauſe, if the attack does not ſucceed, the troops are diſheartened, and are witneſſes of each other's defeat. If the firſt line is repulſed, the ſecond is ſeldom of any great uſe; whereas, by only employing the whole front of the enemy, and making a ſtrong attack upon one or two parts, and it is ſucceſsful, the troops can take the enemy in flank; and thoſe which amuſed his front will then attack him briſkly, and prevent him ſending aſſiſtance to the troops that are beat. If the general does not ſucceed in the firſt attack, he can try it again with greater force, by cauſing the troops of the ſecond line to march, as was done at the battle of Lafeldt fought in 1747: the French troops being repulſed four times, M. Saxe ſent them a reinforcement; theſe truops being united, carried the village at the fifth attack, which determined the fate of the battle.

In a plain but incloſed country, a general can attack only part of an army. Antiquity furniſhes many examples of this. Epaminondas, at the battle of Leuctra, attacked only the right of the Lacedemonian army, with a large column of infantry that formed his left; cauſing the right to be ſupported, and making the left march, the whole army, according to the opinion of the chevalier de Folard, wheeled. The battle of Mantinæa, won by the ſame general, is alſo of the ſame nature; with this exception, that it was the centre of the Lacedemonian army that was attacked. Theſe examples are only propoſed as what may poſſibly happen, but which it would be dangerous to imitate on every occaſion, and which ſhould be purſued in circumſtances only where a general expects great advantage from them.

As the cavalry can eaſily act in an open country, and be of great aſſiſtance to the infantry, all poſſible means ſhould be uſed to contribute to the ſucceſs of their attack; they ſhould always be ſupported by troops in their rear. Cavalry is of great uſe, particularly where the two armies, from the ſituation of the country, find no obſtacle to prevent their joining; and if the cavalry, as M. de Puyſégur obſerves, is beat, even when the infantry of the ſame army is victorious, the beſt thing that can afterwards happen to it is, to retire in good order.

The ground ſo often varies, that even in an open country there are unevenneſſes, thickets, moraſſes, and hollows; in each of theſe ſituations the diſpoſitions ſhould be changed. If theſe thickets happen to be in the line of cavalry, and it can act there, (for if it cannot, it would be a very great fault to place it in them) it ſhould be intermixed with platoons of infantry, ob-

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ſerving alſo not to take them from the main body of the army, but from the reſerve, in order not to diminiſh the ſtrength of the front; which ſhould never be done on any occaſion whatever, unleſs part of the army, either by its own or the enemy's poſition, cannot act offenſively, by reaſon of ſome moraſs, hollow, or any other obſtacle that the enemy may have placed before him: if, nevertheleſs, a general can take an advantageous poſition, by cauſing theſe thickets or theſe hedges to be occupied by infantry, he ſhould give it the preference, to enable the cavalry to act with the greater facility.

There is great care neceſſary, in fortifying a place, to get poſſeſſion of the moſt advantageous parts, whether by fortifying that which overlooks the plain, or by levelling that which might command the fortifications; ſo as, in a polygon, every baſtion, and all the out-works, flank and protect each other: in like manner troops drawn out in order of battle ought mutually to protect and ſupport one another. Nothing ſhould be omitted, nothing neglected; advantages in appearance trifling, often become deciſive.

The diſpoſitions vary not only according to the ſituation of the ground, but alſo according to the general's views. Some draw up the battalions without intervals, or like a wall; others, with ſmall intervals; others leave the diſtance of half a battalion between each; and others, in purſuance of the chevalier de Folard's method, place them in columns.

The firſt diſpoſition is without doubt formidable, as to infantry; but, as it has been already remarked, it is defective with regard to cavalry. In the third, the interval of half a battalion is too wide: it would require an immenſe tract of ground; beſides, the battalions would not be near enough to have it in their power to protect each other. The ſecond ſeems better, becauſe the front is not ſo large, the battalions are more within reach of aſſiſting each other, and have only the diſtance neceſſary to prevent their mixing confuſedly together. The fourth is undoubtedly very good; but can a general promiſe himſelf, that the ſoldiers can always march at an equal pace together, and without ſtopping? The fire of the column is continual, it defends itſelf on all ſides; but its oblique fire does not do much execution, and there are ſituations and ſpots where this poſition in column would be faulty. When it cannot approach the enemy, and is alſo expoſed to his cannon, this diſpoſition would be dangerous; becauſe it is certain that cannon plays with much greater advantage upon depth, than upon breadth: beſides, not being able to get near the enemy, there are only the heads of the columns able to fire, and the reſt remains inactive, expoſed to the cannon. The poſition of the column is therefore only very good, when it can get up to the enemy and charge him.

The marſhal de Puyſégur aſſerts, that an army in an open country, formed in two lines, the firſt of which is without intervals, ought of courſe to beat an army that is formed with intervals.

The reaſon he gives for it is ſenſible: it being certain, that a full line keeps itſelf much cloſer in marching; and that, charging the firſt line of the army that has intervals, it ought to have broke through it before the ſecond line, which is 150 toiſes or 300 paces behind, can have time to come up to its aſſiſtance; which might very well happen, and examples of it may alſo be cited. But could not there be another diſpoſition oppoſed to this diſpoſition in wall, keeping the neceſſary intervals, not only capable of reſiſting it, but alſo ſtronger, whether by the poſition and arrangement of troops, whether by the ready aſſiſtance they can give each other, without being confuſed in their motions?

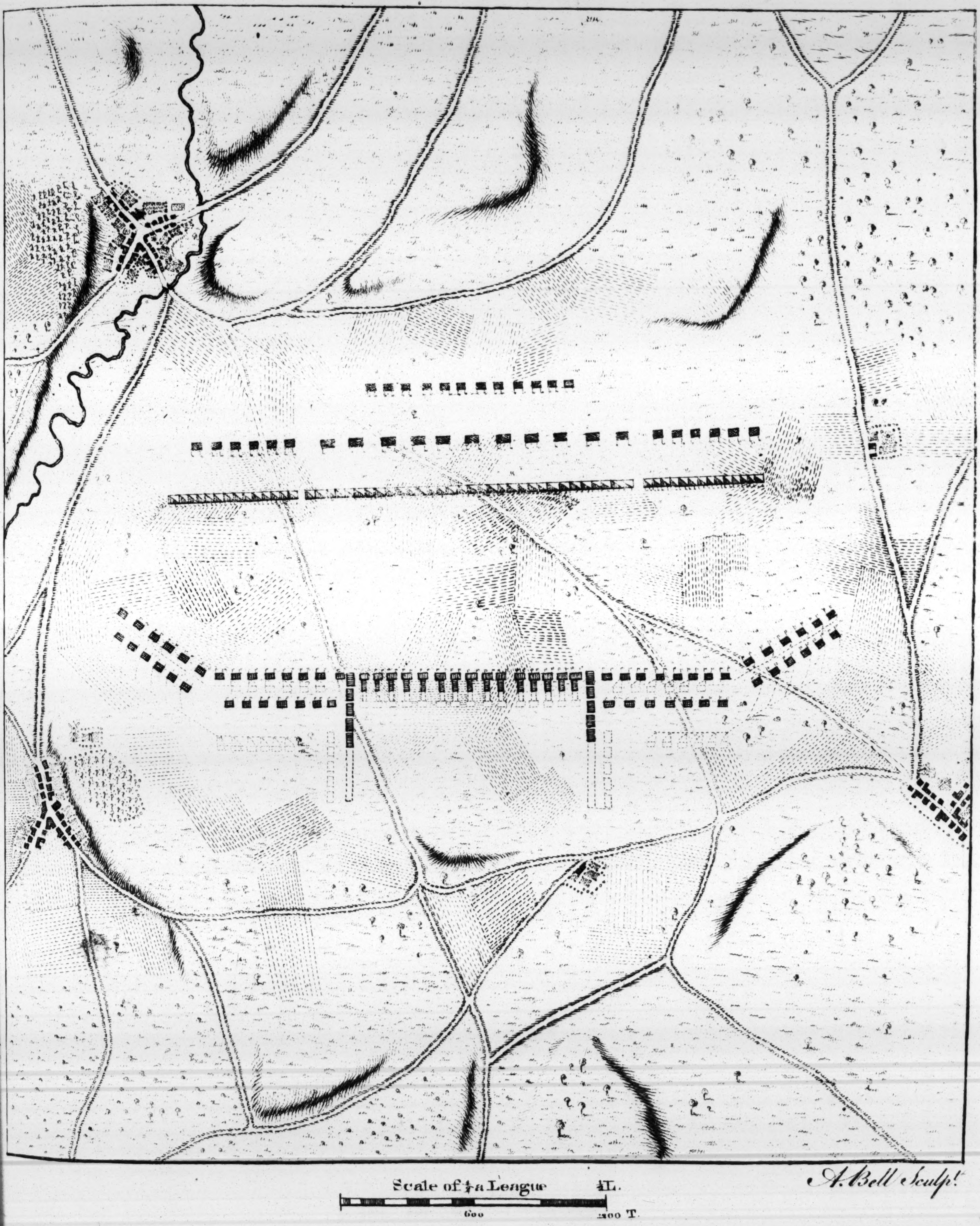
Let two armies be ſuppoſed in a plain country, without ſupport to the wings of either ſide, or without any obſtacle that may prevent their getting up to each other. The enemy's army, as hath already been ſaid, is in two lines; the firſt of which is formed in wall, both infantry and cavalry; the ſecond is formed with large intervals, and a body of huſſars in the rear. The army to be oppoſed to it is of equal force, and conſiſts of 40 battalions and 54 ſquadrons, cavalry, huſſars, and dragoons. The following ſeems to be nearly the manner in which it ought to act againſt the enemy, who is ſuppoſed to be drawn up in wall.

The firſt line of infantry compoſed of 15 battalions, has the diſtance of three toiſes between each battalion, and the diſtance of half a battalion between each brigade, eight ſquadrons on the right, and as many on the left, with their proper intervals: 15 battalions in the ſecond line, 200 paces diſtant from the firſt, ſeven ſquadrons on the right, and the like number on the left, in the rear of the intervals of thoſe of the firſt line, ſupporting the infantry of the ſecond; 10 battalions in reſerve in two columns, one of which in the rear of the ſquadrons on the right of the ſecond line, and the other of the ſame force poſted in the ſame manner on the left; 12 ſquadrons of dragoons in the rear of the ſecond line, half on the right, half on the left; and 12 ſquadrons of cavalry, or huſſars if there is not cavalry, in the rear of thoſe of the firſt line.

By this diſpoſition, the army appears to be ranged in two lines, with a reſerve, and will leave no room for the enemy to doubt of the motions it may make in marching: this diſpoſition will undoubtedly have that effect, and does not appear very formidable; but as ſoon as the two armies begin to move forward, the ſecond line of infantry muſt advance as unperceived as poſſible, forming itſelf in columns by battalions, each of which, with its head to a battalion of the firſt line, will form as many T's. The 10 battalions in reſerve, which form two columns of five battalions each, will march and fill up the ſpace on the right and left, between the infantry and cavalry. The cavalry, or huſſars, which are in the rear of the firſt line, one by a motion to the right, the other by a motion to the left, will poſt themſelves ſidewiſe, at 100 paces from the wings of the army; the dragoons muſt poſt themſelves in the rear of them in a ſecond line. This will be performed much eaſier marching, becauſe it is not complicated; it is alſo performed in the rear, and the front of the firſt line is not put into diſorder; and conſequently, the enemy will not perceive it ſoon enough to change his poſition, and oppoſe the diſpoſition which is preſented to him. This firſt line, by this diſpoſition, forming as many columns as there are battalions, of courſe ought to break through the enemy's army which is in wall; but not above four deep, becauſe the impreſſion of a column ought to be much ſtronger than that of a battalion four or ſix deep. See Plate CCXCV.

WAR.

Plan of an Order of Battle IInd. Diſpoſition.


Scale of ½ a League ½L.
600
1200 T.

A. Bell Sculp^t.

3 MA 53

Offenſive Operations.

Suppoſing the wings of each T to give way, the battalions which penetrate there will find themſelves between two columns hedged in with bayonets; the 10 battalions in reſerve, which, according to this diſpoſition, ought to join the right and the left of the infantry, ſhould of courſe ſeparate the two wings of the infantry, which are on the outſide of the diſpoſition in columns. Four battalions ſhould remain in purſuit of them, and the two laſt take the line in flank, at the ſame time that it is attacked in head. The cavalry ſhould charge the line which is in wall, with great vigour; and the ſecond line ſhould follow it very cloſe, but in good order: the cavalry, or huſſars, which are poſted ſideways, will attack it in flank, and the dragoons muſt remain in their poſt, in order to keep back the enemy's ſecond line.

Whatever diſpoſitions are made in the drawing up of an army, they ſhould always have ſome object. A general ſhould foreſee all that may be done by the enemy, whoſe diſpoſition he ſhould always ſuppoſe to be a good one, and to which he ſhould oppoſe one at leaſt as ſtrong, and always better; if poſſible, he ſhould particularly conceal from him the motions he intends making, or diſguiſe them from him in ſuch a manner, that he ſhall not have time to oppoſe them, at leaſt not readily enough: neither ſhould a general be ſo near as to give the enemy an opportunity of diſcovering and profiting by the method he intends following.

The diſpoſition of an army in wall is good; but in general, only ſo with reſpect to infantry, becauſe that body acting by itſelf requires but very little ground to retreat, or preſent itſelf to the enemy, or to make a motion to the right or to the left. But this ſame diſpoſition is defective, and even hurtful for cavalry, unleſs there is a moral certainty of its getting the better: but as, with regard to war, a moral certainty would be a real preſumption, this diſpoſition of cavalry in wall would be dangerous, becauſe it may be broke. If that which is oppoſed to it marches up to it reſolutely without confuſion, and without being afraid of that maſs of cavalry, and charges it the firſt, ſword in hand, how can it retire in order if it is broke, being as much ſtraitened in its retreat as in its diſpoſition? All the ſquadrons filling up the ground, it will neither be able to make any evolution, or to act; and if it retreats through the large intervals of the ſecond line, it will carry it away with it in its flight: were there even ſix lines behind it, they would all be carried away, the ſecond by the firſt, the third by the ſecond, and ſo on with the others.

It is true that it may give the firſt charge, and conſequently make thoſe ſquadrons which have intervals give way; but as theſe laſt have more ground to act on, they can retreat with greater eaſe than thoſe who have none, by paſſing through the intervals of the ſecond line, which is not to be done by a line that hath no interval. They can rally in the rear, while the ſecond will charge the line that is without interval, and which is already diſunited by its firſt attack; even when theſe two lines are beaten, they can retire with greater eaſe, each ſquadron having ground enough to act upon. They will never be ſo much diſordered as the line which has no interval, which cannot eſcape being cut in pieces if broke, or which can only find its ſafety in flight; whereas, thoſe that have intervals can retire one after another, and in a ſoldier-like manner, ſuſtaining each other.

Beſides, in order to prevent the impetuoſity of this cavalry in wall, it appears that nothing is to be done but to poſt huſſars, if there is not a ſufficiency of horſe, behind the ſquadrons of the firſt line, who, when the two armies begin to move forward in order to charge, will place themſelves on the right and the left ſidewiſe, 100 paces diſtant from the firſt lines of cavalry: by this poſition, they will be able to take the enemy's line in flank, whenever it comes to attack the cavalry. If a part of this line perceiving this motion, divides into two, one part to attack the line that has intervals, and the other the huſſars, it is ſo much ſtrength loſt; conſequently, the line with proper intervals has fewer troops to fight, and may expect to break them by giving the firſt charge. If the huſſars ſhould be beat, it is of no great conſequence, the defeat of thoſe troops never deciding the ſucceſs of the battle: it is the body of the army the enemy muſt break, and not two regiments of huſſars, which retreat with great eaſe from before cavalry, and rally and return to the attack as readily as they retired. But if, inſtead of huſſars, cavalry can be poſted there, the enemy's line, which is divided into two, will find itſelf obliged to fight upon equal terms: the certainty of ſucceſs depends upon the quickneſs with which the enemy is attacked; and the more ſo, as he will be obliged to make a motion in the preſence of troops already poſted and ready to charge. If this line without intervals advances, without ſhowing any attention to the huſſars, in order to charge the cavalry, the huſſars, at leaſt a great part of them, ought to fall upon the flanks; and the dragoons, which are in the rear of them in reſerve, ſhould take their place, to keep back the enemy's ſecond line, and to prevent the huſſars from being taken in the rear.

Theſe two diſpoſitions are ideal. A general ſeldom chooſes to fight upon a ſpot where the wings are void of ſupport; and prevents the enemy, as much as poſſible, from getting poſſeſſion of an advantageous poſt, or at leaſt does not attack him when he cannot prevent him doing it, eſpecially if the ground which he occupies is every where expoſed: there are, nevertheleſs, circumſtances where a general is obliged to fight, although not in a poſt ſtrong by ſituation. By the two diſpoſitions juſt now deſcribed, the order which would be moſt proper to be preſerved for covering the wings, which may be expoſed by the ſituation of the ground, has been endeavoured to be ſhown; it has been ſeen of what conſequence it is for a general to know, and to ſecure all the heights, moraſſes, hollows, and every obſtacle he may meet with. On occaſions ſo important, a general ſhould take the ſame precautions that he would uſe under the cannon of a place, if he found heights that overlooked the works; in which caſe he would not fail of conſtructing others more advanced, to prevent the enemy from getting there, and retarding their approaches.

If the duke of Savoy, at the battle of Marſaille, gained in 1698 by the French army, commanded by M. de Catinat, had been poſſeſſed of the heights of Pioſaca, the two wings of that prince's army would have been ſupported; inſtead of which, his left wing was expoſed. M. de Catinat, profiting from this fault, extended his right to the foot of thoſe heights, of which he poſſeſſed himſelf, and out-ſtretched the enemy's left: it was from theſe heights that the diſorder in the duke of Savoy's army commenced; it ſoon communicated to the whole front, and got poſſeſſion of the whole army: ſo true it is, that the moſt trifling object, being neglected, changes the order of things; that the leaſt fault becomes eſſential; that confidence in the number and in the courage of the troops is often dangerous; and that having a contemptible opinion of an enemy is always fatal. The enemy, although inferior in troops, will ſoon attain a degree of ſuperiority, if he has the advantage of ground.

In a battle it is impoſſible that the two armies ſhould be equally well poſted. That which is attacked, by taking a good poſition, and there making up by the aſſiſtance of art what is wanting in ſituation, may maintain itſelf it that poſt, and defend itſelf in it obſtinately. On the contrary, the army that would attack, can, in approaching to the enemy, profit only of the advantage the country offers him; and by the diſpoſition of his troops, make up for the badneſs of the ground, and attack the enemy although advantageouſly poſted: it is on ſuch an occaſion, that a general's capacity opens itſelf, and ſhows the great man; whether by properly attacking the enemy in the weakeſt part, by employing his whole front, and by preventing him from ſending aſſiſtance to the troops attacked with force and vigour; whether by poſting his own troops after ſuch a manner, that notwithſtanding their facing the enemy in a diſadvantageous poſt, they can be neither ſurrounded or flanked. It ſhould always be conſtrued into a fault, when the enemy has time given him to poſt himſelf advantageouſly. It is neceſſary for a general to be beforehand with the enemy in poſſeſſing himſelf of the poſt which the enemy had reſolved to take; not in order to wait for him and receive battle in it, unleſs it ſhould be impregnable; but he ſhould ſeize on it, to prevent the enemy's taking it, and attack him either on his march, or in ſome ſituation leſs ſtrong, which he can neither have perfectly examined, nor had time to fortify. [This muſt be underſtood in relation to offenſive war; for in defenſive war, a general muſt carefully avoid fighting, and be contented with guarding his country, covering his towns and magazines, in taking ſuch camps as are ſtrongeſt by their ſituation, and in joining the aſſiſtance of art to nature.]

In offenſive war, a general muſt act in ſuch a manner, as to be beforehand with the enemy in all his deſigns, in his marches, in the poſts he would take; and ſuppoſe he hath had time to poſſeſs himſelf of a good ſituation, he muſt not have time given him to fortify himſelf in it, and to render it difficult to be forced.

But a general, whether acting on the offenſive or the defenſive, ought always to be watchful; ſleep is dangerous to him, with whom the ſafety of the army and the ſecurity of the ſtate are entruſted. A dream ſent by Jupiter to Agamemnon, in Homer, told him, that a general who preſided at ſo many councils, who had ſuch numbers under his command, and who was loaded with ſo many cares, ſhould not ſleep the night out.

Armies can engage in ſo many different poſitions, that it is impoſible to particulariſe all of them. In the beginning of this ſection two armies have been preſented in an open country, without any ſupport to to their wing: two others have afterwards been poſted, one of which is upon a ſpot advantageouſly ſituated, its two wings covered; the other hath only its right wing ſupported, and its left expoſed. It has been endeavoured to give to that, whoſe left wing is unſupported, the greateſt ſtrength in its whole front that is poſſible, and by the diſpoſition of the left wing it is both ſtrong and ſecure; but there are ſuch a variety of ſpots where two armies may meet, that it will ſuffice to know in general the advantages they may derive from their ſituation.

A general may cut off the communication of any aſſiſtances the enemy would ſend to the troops which are vigorouſly and briſkly attacked, by employing his whole front with a few troops; but they muſt be ſupported, and not expoſed to the danger of being cut off.

It is always a great fault to give battle on a diſadvantageous ſpot; and if circumſtances do ſometimes require fighting, the general ſhould, as much as poſſible, contrive that the cavalry be not expoſed to the cannon; but ſhould at the ſame time take care that it doth not quit the ſupport which it gives to the infantry, which cannot be done unleſs it is covered by a bank, or by hedges, and which, nevertheleſs, ſhould not prevent its marching on the firſt order.

A general ſhould, as much as poſſible, prevent the enemy from getting poſſeſſion of any poſt, however trifling, and ſhould prevent alſo his overlooking him. But if the enemy ſhould get the poſſeſſion of ſuch a poſt, he ſhould at leaſt prevent him from fortifying himſelf in it; he may have ſpies on whom he can depend, to penetrate into his deſigns; he ſhould alſo have advanced detachments, who, by inceſſantly obſerving the enemy, may give intelligence of all his motions.

An officer's negligence is more dangerous than his inability. The deſire of acquiring honour gives activity; but it is the love of his profeſſion that gives him the penetration neceſſary for ſearching into the moſt ſecret deſigns.

Disp. III. This third diſpoſition is very different from the two which precede it. The enemy's army is ſuppoſed to be advantageouſly poſted; it hath a hollow on its right, through which run the waters of an impaſſable moraſs, forming a rivulet. Its left is ſupported by a large town, croſſed by a rivulet. In the centre is an height, capable of containing 12 battalions; in the front of it is a plain of 700 or 800 toiſes, which extends from its left to the cavalry on its right. Oppoſite to this cavalry the plain grows narrower, by reaſon of an height which reaches to the rivulet, and which the cavalry could not occupy, becauſe the enemy hath taken poſſeſſion of it during the night. The town is entrenched, and filled with infantry and artillery; 16 battalions in two lines are poſted next the town, in order to ſuſtain the troops that are in it. Behind the town there are three bridges upon the rivulet: in the front of the town, on the other ſide of the rivulet, are poſted four battalions and five pieces of cannon, in order to flank the troops intending to attack the town: theſe four battalions are ſuſtained by eight ſquadrons of dragoons. The centre of the army conſiſts of 20 battalions in the firſt line, and as many in the ſecond; eight of which are

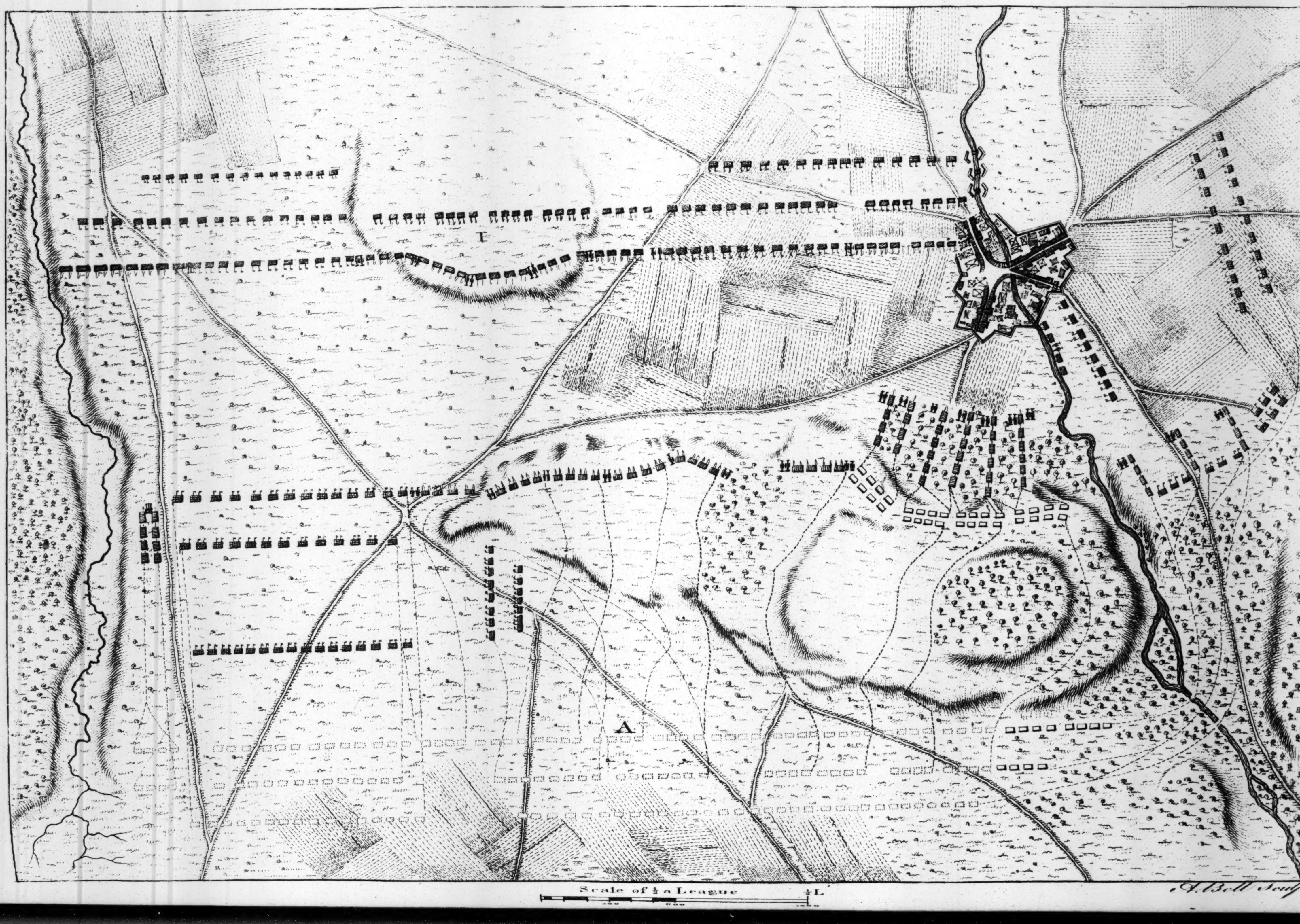
next

3 MA 53

Plate CCXCVI.

WAR.

Plan of an Order of Battle III^{d}. Diſpoſition.


I
A
Scale of ½ a League
½ L
300
600
A. Bell Sculp.

next to the moraſs, ſuſtained by ſix ſquadrons of dragoons; 12 ſquadrons in the firſt line, and 12 in the ſecond. The cavalry on the right conſiſts of 11 ſquadrons in the firſt line, and 11 in the ſecond. Thirty ſquadrons of huſſars, diſtributed half on the right, and half on the left, and the whole front of the army lined with artillery.

The army A, which was encamped a quarter of a league from the height by which it is ſeparated from the enemy, began its march at dark; it halted at the foot of the height, and ſent ſome detachments of infantry to take poſſeſſion of the ſummit of it. The army I, made the above-mentioned diſpoſitions, becauſe the army A was too near to be able to avoid a battle. The army I, is compoſed of 78 battalions and 90 ſquadrons: theſe two armies are nearly of equal ſtrength.

The left of the army A, hath a fine plain before it, extending from the moraſs to that part where the height commences. In that place are poſted eight battalions, in two columns of four battalions each, next the moraſs, with 10 pieces of cannon between the two columns: there are 14 battalions in the firſt line, and 13 in the ſecond; four battalions towards the height, and next the cavalry. Sixteen battalions occupy the height as far as the ſmall wood; four battalions occupy the other ſide of the wood, and 32 battalions upon two lines very cloſe together; 12 battalions behind the height next the rivulet; 12 ſquadrons of horſe, and 20 of huſſars, who have orders to paſs three bridges, thrown over the rivulet, and attack the town with three columns of four battalions each, ſuſtained by the 12 ſquadrons of horſe, and the 20 of dragoons. In the rear of the cavalry upon the left, are poſted 16 ſquadrons of dragoons at a little diſtance, with intervals; ſo that, if the enemy ſhould attack this left and beat it, the cavalry may eaſily retire through the intervals of the dragoons, to give them the greater facility of acting, and turn their defeat into an almoſt certain victory. Fifteen ſquadrons of horſe are poſted behind the height, with their right toward the height, and their left toward the camp, in order to take the enemy in flank, whilſt he is employed in purſuing the cavalry of the left, which he has beaten. The chief object of the attack ſhould be the town, although the moſt difficult. If it is forced, the enemy will be beat without reſource: becauſe the infantry who has driven him from that poſt, will attack him in the rear; at the ſame time that the infantry which remained on the height will come down from it, and join, either to attack, or at leaſt to employ the enemy upon the height, and by that attack prevent him from ſending aſſiſtance to the troops already driven from the town and put to flight: the cavalry upon the left will advance at the ſame time to ſupport the infantry, and, if neceſſary, to charge the enemy's cavalry.

The 32 battalions which are upon the height in two lines, will be divided into ſix columns, of which four of ſix battalions will be employed in attacking the town, the laſt battalion of every column excepted; which muſt remain at the entrance of the wood, with four columns of four battalions upon the left, in order to ſuſtain the infantry attacking the town, and to keep back the enemy's cavalry upon the left. They will deſcend from the height under the protection of the wood by which it is covered, and which ends at about 400 toiſes from the town. Theſe troops will be followed by artillery, which muſt be poſted between the columns; they muſt halt on leaving the wood, and will begin by making a continual fire of cannon upon the town and the cavalry: during this fire of the artillery, the 12 battalions on the other ſide of the rivulet ought to attack the four battalions and the eight ſquadrons of dragoons belonging to the enemy; and when they have forced them to give way, they will amuſe them by a conſtant fire of muſquetry. When the artillery ſhall have played long enough to have broken down the enemy's entrenchments, and deſtroyed the order of the troops, the four columns, formed of 20 battalions, will march up, and with their bayonets endeavour to penetrate at ſome part; the 12 battalions on the other ſide of the rivulet will charge at the ſame time; the two columns of four battalions each, as well as the four laſt battalions belonging to the columns which attack the town, will remain at the entrance of the wood with the artillery, in order to keep back the enemy's infantry and cavalry which was next the town. If any one of the columns can penetrate as far as the bridge that is in the town, it will take poſſeſſion of it, as well as of the market-place; the others following it will take poſſeſſion of the hedges and gardens. One column only will be ſufficient to ſecure the banks of the rivulet, and take poſſeſſion of the bridges. As ſoon as the bridges are free from the enemy, the 12 ſquadrons of horſe and the 20 of huſſars will paſs and attack every thing they find to oppoſe them; then the left ought to advance: the battalions which have remained upon the heights ſhould come down from them, and all together attack the front of the army, whoſe left wing is already broken and taken in flank.

But if the enemy, after having examined the diſpoſition of the army A, imagining that the principal attack will be directed againſt the town, inſtead of remaining in his firſt diſpoſition, changes it entirely, and cauſes a part of his ſecond line of infantry to march to the town; and if he ſtrengthens his right by the cavalry of the left, (a ſpot more favourable for cavalry than infantry), the attack of the town will then become impracticable, becauſe of the great ſuperiority of the troops defending it; therefore, it would be uſeleſs to preſiſt in it; but his right ſhould be vigorouſly and briſkly attacked. It is true, that it is reinforced by the cavalry from the left; but as the ground between the height and the eight battalions which are next the moraſs, can contain but 12 ſquadrons, thoſe which the enemy hath drawn from the left can only be poſted behind the height or in the third line; if they are behind the height, nothing can prevent their being attacked: but ſuppoſing the firſt line broken, it ſhould not be too warmly purſued, for fear of ſeparating, and being taken in flank by the cavalry behind the height. The 16 ſquadrons of dragoons which are behind, ought to remain in that ſituation; the 15 ſquadrons of horſe, which are with their right to the height, and their left to the old camp, ought to take the place of thoſe who have attacked the enemy; and then the 20 battalions which are upon the height, will come down into the plain and attack the enemy's infantry, at the ſame time that the 15 ſquadrons of cavalry and the 16 of dragoons attack the cavalry which is poſted behind the height. If they ſucceed in beating it, or whether the enemy ſend aſſiſtance or not, if he ſends aſſiſtance, he will weaken his left, and then the 44 battalions, who till this time have remained inactive, may come down from the height and attack the town, not ſo much with a deſign of forcing it, as to oblige the enemy not to take any troops from it; if no aſſiſtance is ſent to the right wing, it will be undoubtedly beaten, being attacked by forces ſo greatly ſupperior to it: the whole of the cavalry being thus put to flight, the moſt prudent part the enemy can take is, to endeavour to paſs the rivulet by the three bridges behind the town, and by ſo doing ſecure himſelf from farther inſult: if the enemy does this, the 12 battalions, the 12 ſquadrons of horſe, and the 20 of dragoons, will retire by the ſame road they marched up, and they will be in ſecurity as ſoon as they are in the wood: beſides, a beaten army is ſeldom to be feared; therefore, they may retire unmoleſted, and in order.

But if it happens that the enemy, without changing his poſition, is not to be forced in any of theſe attacks, the general had better retire to the height, where there will be no danger of the enemy's endeavouring to attack him: but if he ſhould attempt the attack of the left wing of the army A, it muſt be reinforced by all the cavalry that can be employed without cauſing confuſion, and two brigades of infantry ſhould be joined to the two which are next the moraſs. See Plate CCXCVI.

Disp. IV. The fourth dipoſition is ſuppoſed in a country mixed with thickets and plains. The enemy's army hath its right to ſome montains, and its left to a river; in about a third part of the length of his front, there is a village a little behind its right. His diſpoſition is, four battalions and ſix pieces of cannon upon an height which overlooks the plain, to which is alſo added the cavalry of the right. Behind are two paſſes entrenched and guarded by four battalions; upon the heights of theſe paſſes there are four more, to prevent the enemy penetrating at the flank. There are eight ſquadrons in the firſt line, four battalions poſted at the village, and 12 in it with cannon: 16 battalions on the left of the village, 14 ſquadrons and four battalions next the river. The ſecond line conſiſts of 11 ſquadrons upon the right, eight battalions behind the village, in order to carry timely aſſiſtance to it; 12 battalions in the rear of the 16 of the firſt line; 15 ſquadrons and four battalions to the river. The reſerve conſiſts of 18 ſquadrons of dragoons next the mountains, (in order to diſmount and be within reach of aſſiſting the battalions guarding the paſſes), and of 24 ſquadrons of huſſars on the left next the river. An iſland is ſuppoſed a little in the front of the firſt line: in this iſland is placed two battalions and ſix pieces of cannon. A ſtone bridge is alſo ſuppoſed between the two lines, behind which is poſted two battalions, to ſupport thoſe in the iſland, and to facilitate their retreat. It ſeems impoſſible to attack an army thus ſituated; all the troops are a mutual ſupport to each other: the flanks are ſecured and well guarded; artillery is planted along the whole front; and the paſſes are entrenched, and troops poſted in them.

In the front of the enemy's army is a large plain, which runs from the mountains as far as the river; but the largeneſs of it is broke into by ſome thickets, where nevertheleſs cavalry may act: in order to attack this army, thus advantageouſly poſted, a diſpoſition muſt be made, entirely different from that which it is in. If the village, which is entrenched and well furniſhed with troops and artillery, is attacked, the forcing it will be doubtful: but ſuppoſing it ſhould be forced, it will be without loſing a great number of men; which ſhould be avoided, becauſe it is the duty of a general to ſpare the blood of his ſoldiers as much as poſſible, and even, if practicable, to employ but few of his troops againſt a greater number of the enemy's. If the paſſes only are attacked in order to take the enemy in flank, it is very certain he can ſend aſſiſtance to it without weakening his front, having it in his power to cauſe the eight battalions in reſerve behind the village, to march there, and to cauſe the 18 ſquadrons of dragoons to diſmount. If only the left wing next the river is attacked, it is true that attack is more practicable, there being no obſtacle or entrenchment to prevent coming up with the enemy: but ſtill there is but one wing beaten; and that, by falling back upon the troops in the village, can retreat by the mountains of which the enemy is maſter. There is great reaſon to imagine it will be beat; but the general muſt endeavour to reap as much profit from that victory as he can: it is therefore thought, that, not to loſe the fruit of it, the enemy ſhould be attacked on the left wing, from the centre to within about 200 toiſes of the river, at the ſame time that the entrenched paſſes are attacked. During theſe two attacks, a briſk cannonade ſhould be kept up upon the village, the infantry and cavalry upon the right, the infantry that is poſted in the iſland, and that which is next the river: by theſe two attacks the enemy's front and right wing will be equally annoyed; he will not know where to ſend aſſiſtance, and in that ſtate of uncertainty may probably ſend it to a part where the danger is not ſo preſſing. But ſuppoſe he ſhould act in the moſt proper and prudent manner, as it ſhould always be imagined he will, the aſſiſtance which he will ſend to that part, cannot be effected without unfurniſhing or weakening ſome other: if he ſtrengthens the paſſes and the heights of the eight battalions behind the village, they perhaps will not be forced; but he will ſcarcely venture to take any troops from the village, in order to ſend them to the aſſiſtance of the front that is attacked. But if he ſhould unfurniſh the village, it muſt then be attacked, and that vigorouſly; which may be the eaſier done, as it hath been for ſome time cannonaded, and conſequently the earth hath been tumbled down, and openings made, at leaſt large enough for the infantry to enter it: this attack will not at all prevent that at the front from going on.

In order to execute the attack upon the enemy's army, it is imagined the troops ought to be diſtributed after the following manner: all the infantry ſhould be placed in the firſt line, excepting that of the reſerve, which ſhould conſiſt of 20 battalions; the ſecond line ſhould conſiſt of the cavalry; and the third ſhould be formed of the dragoons and huſſars. The 20 battalions on the left, forming five brigades, ſhould remain in order of battle at the coming out of the thickets, with artillery diſtributed between the intervals of each brigade; the 28 battalions, after making ſeven brigades

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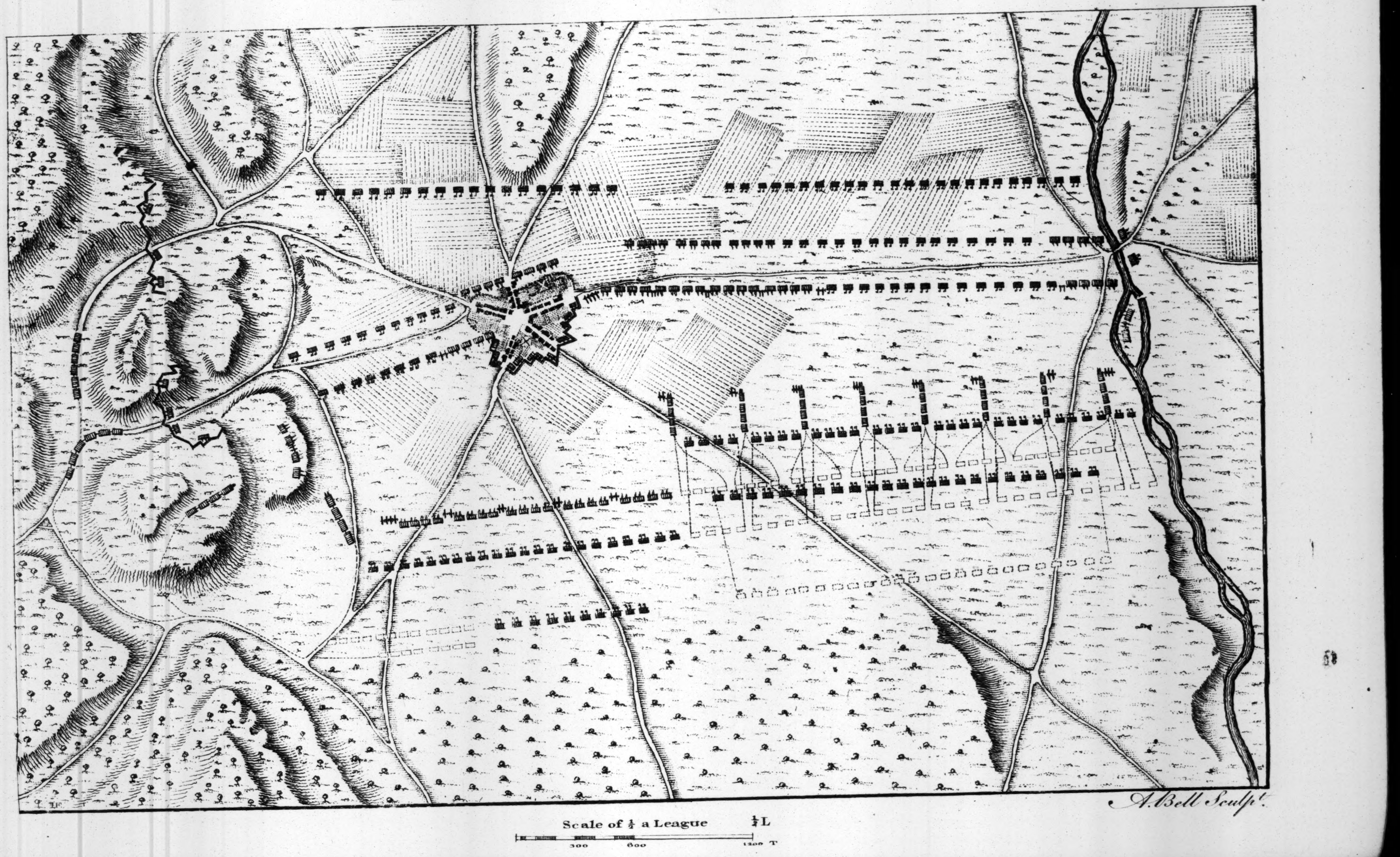
Plate CCXCVII.

WAR.

Plan of an Order of Battle IV.th Difpofition.


Scale of ½ a League
½ L
300
600
1200 T

A. Bell Sculp.t

Offenſive Operations.

gades as ſoon as they come out of the thickets, will form in column: then the 24 ſquadrons which are in the rear of the infantry formed in column, will poſt themſelves, four ſquadrons in the intervals of each brigade. The brigade ſupporting the right flank will advance on the ſide of the river: and then the ſeven columns and the 24 ſquadrons will march up to the enemy and attack him with their bayonets, without loſing time in firing. As ſoon as the columns have broken or ſtaggered the enemy's firſt line, the cavalry will fall furiouſly upon them, ſword in hand; a part of the dragoons and huſſars ſhould follow, in order to be within diſtance of ſuſtaining the troops who have attacked, or to join themſelves to the cavalry who have broken in among the enemy: it ſhould be obſerved, that as ſoon as the huſſars are engaged and purſuing the enemy, the cavalry ſhould rally in order to ſuſtain them, or to flank the infantry which may ſtill make reſiſtance. The brigade of infantry which ſupported the right, followed by the ſeven ſquadrons, ſhould attack the four battalions on the left of the firſt line, and the ſeven ſquadrons will take them in flank; which they can with the greater eaſe effect, as the cavalry hath been put to flight. The ſeventh column ſhould, with four ſquadrons, attack the four battalions of the ſecond line, at the ſame time that this attack is executed from the front as far as the river; 16 battalions of the 20 in reſerve, ſhould attack the paſſes, and alſo the heights; the remaining four will march under cover of the mountains, ſuſtained by a brigade of infantry and eight ſquadrons, in order to attack the cavalry on the right; thus of the whole front of the enemy's army, there will remain only the village that hath not been attacked, unleſs there hath been ſuch a number of troops drawn from it, as to render the carrying of it not difficult. It is to be ſuppoſed that one of theſe attacks will ſucceed; that made by the columns ſooner than the reſt: the diſpoſition of columns intermixed with cavalry is very formidable, becauſe each body is ſupported without confuſion: beſides, it is to be ſuppoſed that a column four battalions in depth, and from 18 to 20 men in front, ought to break through a line that is only four deep, and which being once penetrated, the cavalry will find no difficulty in breaking through it. See Plate CCXCVII.

The movement of the infantry to form itſelf in column, and the evolutions of the cavalry to fill up the intervals of each column, ought to be performed with great quickneſs, and near enough to the enemy to ſurpriſe him, but not at ſuch a diſtance as to give him time to remedy it.

The nature of the ground, which is continually changing, cannot be followed through all its various ſhapes; the author hath therefore endeavoured to form his diſpoſitions in thoſe ſituations which moſt ordinarily occur, in order that theſe general diſpoſitions may be aſſiſtant to the ideas in more particular and critical ſituations. Mountainous countries have not been mentioned, becauſe it is very rare that they preſent an opportunity of coming to a general action: the affairs which happen among them are generally with regard to ſome poſt, which can never decide the fate of an army, however briſk they may be. The four diſpoſitions now mentioned, are ideal; and although the propriety of them may be defended, it would be very imprudent to anſwer for their ſucceſs; becauſe with regard to the buſineſs of the war, the whole depends upon circumſtances, and the leaſt accident often renders a diſpoſition, ſeemingly the beſt, the moſt prejudicial that can be taken. A motion of the enemy's troops ill conducted by their commanders, too much ſloth or too much eagerneſs in the execution of orders, an accidental word falling from the mouth either of an officer or a ſoldier, and which is always increaſed when told again, may occaſion the defeat of an army, however well diſpoſed or advantageouſly ſituated. The epithet of "beſt" ſhould be given to that general who commits the feweſt faults; for there is no man who can flatter himſelf with having committed none: it is impoſſible for a general to ſee every thing himſelf, or to remedy any unforeſeen accident that may happen, if he is not aſſiſted by his general officers, who ſee things which it is impoſſible he can: they ought not only to be the means of putting his orders in execution; but even, in certain circumſtances, they ſhould prevent them, and make the ſame diſpoſitions which the general ought to make, and would certainly order, was he in their ſituation.

EXPLANATION of PLATES.

Plate CCLXXXVIII. a, The army formed in order of battle, ready to march. b, The park of artillery, where the baggage belonging to the army, and their eſcorts, alſo are aſſembled. c, March of the cavalry, to form the column on the right. d, March of the cavalry, to form the column on the left. e, March of the infantry, to form in three columns. f, March of the artillery and baggage, to form in a column. g, Parties of huſſars, covering the flanks of the army, and forming the rear-guards of the column, when the army hath paſſed. h, Bridges and fords, diſcovered by the advanced detachments, who have marked the route of the army. i, Bridges built by the ſame detachments. k, Front and rear-guards of the columns drawn from the troops of which the columns are formed. l, Parties of huſſars, marching upon the flanks of the army. m, Parties of huſſars marching at the head of the army, to ſcour the country through which the army is to paſs, and alſo to examine the toutes marked by the advanced detachments.

Plate CCLXXXIX. A, The poſition of the army, before it begins the march. B, Parties of huſſars forming the advanced-guard of the army. C, Parties of infantry of the advanced-guards of the columns. D, The infantry of the army forming the head of the columns. E, The artillery, and waggons belonging to the artillery. F, Battalions of artillery. G, The cavalry. H, The baggage of the army. I, The eſcort of the baggage. K, Parties of huſſars. L, Parties of dragoons. M, The infantry of the reſerve, forming the rear-guard of the army. N, Platoons of infantry marching upon the heights, to cover the flanks of the columns. O, Villages in front of the camp the army is to occupy, and of which the light infantry have taken poſſeſſion. P, The artillery and baggage, with their eſcorts in the front of the camp.

Plate CCXC. A, The army formed in order

of battle. B, The cavalry, which hath marched ſome paces in advance, in order to make room for the infantry. C, The infantry, which, by facing to the right, forms the column upon the right. D, The infantry, which, by facing to the left, forms the column upon the left. E, Bodies of infantry, which are to march at the head of the columns of cavalry. F, The park of artillery, where the baggage belonging to the army, and the eſcorts, alſo are aſſembled. G, The march of the infantry, forming in columns. H, The march of the cavalry, forming in column. I, The march of the artillery and baggage with their eſcorts, forming in column. K, The army in march. L, Huſſars of the advanced-guard keeping the roads, marked out by the detachments ſent on before. M, Infantry, forming the advanced-guard of the columns. N, Small parties of infantry, marching upon the flanks of the columns. O, Parties of huſſars, marching upon the flanks of the army. P, Infantry of the reſerve forming the rear-guard of the army.

Plate CCXCI. A, The camp of the main body of the army. B, An advanced camp, compoſed of dragoons and huſſars, in order to cover the right of the army, to guard the paſſes by which the enemy might make incurſions upon the flanks and rear of the army, moleſt the convoys, and cut off the communications. C, Villages and bridges, guarded by the light infantry. D, Poſts of diſmounted dragoons in the front of their camp. E, Poſts of dragoons on horſeback, to ſecure the communication between their camp and that of the main body of the army. F, Bridges built, to keep up the communication between the grand and the advanced camp. G, Bridges and villages guarded by detachments of infantry. H, Grand guards of horſe. I, Guards of infantry. K, Bridge, village, and mill, guarded by the infantry belonging to the army. L, Camp of dragoons and huſſars covering the left of the army, and ſupporting the light infantry. M, Villages and bridges guarded by the light infantry. N, Poſts of diſmounted dragoons in the front and on the flanks of their camp. O, Poſts of dragoons on horſeback. P, Poſts and detachments of huſſars, to patrole in the front and upon the flanks of the army, and their camp.

Plate CCXCII. A, The army encamped behind its entrenchments. B, The camp of the troops of the reſerve. C, Camp of the dragoons, to ſecure the rear of the army. D, Camp of huſſars, to cover the ground upon the right of the army. E, Villages and redoubts guarded by the light infantry, to ſecure the camp of the huſſars. F, Bridges built to ſecure the communication of the army with the ground upon the right, and to favour the retreat of the troops poſted on the oppoſite ſide. G, Brigades of artillery diſtributed upon the flanks, and along the whole front of the army. H, The park of artillery. I, A bridge entrenched, to ſecure the communication between the army and the ground upon the left. K, Villages and farm-houſes, guarded by detachments of huſſars and light infantry, to patrole in the front of the army.

Plate CCXCIII. fig. 1. A, The camp of the army, divided into three parts, for the defence of the river. B, The camp of the light horſe, light infantry, and dragoons upon the wings of the army. C, Caſtle and village, guarded by light infantry. D, A town occupied by the infantry belonging to the army. E, Bridge broken down. F, Iſlands occupied by infantry. G, Poſts of infantry diſtributed along the ſide of the river. H, Batteries eſtabliſhed along the ſide of the river. I, Poſts of cavalry, to keep up the communication between the camps. K, Bridges conſtructed to preſerve the communication of the iſlands. L, Bridges conſtructed for the communication of the camps.

Plate CCXCIII. fig. 2. A, Bridges of boats. B, Redoubts which cover the bridges. C, A battery, under cover of which the infantry work at the conſtruction of the redoubts. D, A battery to prevent the enemy from annoying the army on its march. E, The march of the army. F, The artillery diſtributed among the brigades of infantry. G, Infantry, forming in columns to open on the oppoſite ſide through the intervals of the redoubts. H, March of the columns into the front of the redoubts, who halt in order to give time for a part of the cavalry to form upon its flanks. I, A battery erected to facilitate the forming of the cavalry. K, Cavalry, which, in gaining the oppoſite ſhore, forms in order of battle, and poſts itſelf upon the flanks of the infantry. L, Eight battalions in column upon the right wing of the army, to go and examine the village, and attack the enemy in it, in caſe he ſhould be poſſeſſed of it. M, Huſſars and dragoons, who have taken poſſeſſion of the height which is on the left wing of the army. N, A brigade of infantry poſted next the height, covering the left wing of the cavalry. O, The diſpoſition of the army marching up to the enemy.

Part III. Of the PETITE GUERRE.

The Petite Guerre conſiſts in the manœuvres of the Partiſan in ſecret marches, occupying, defending, or attacking poſts, reconnoitring countries or the enemy, placing of ambuſcades, &c.

Sect. I. *Of the Qualifications of a Partiſan, and the Nature of his Corps.*

They generally call every officer a partiſan who is deſtined to go at the head of a detachment, whether draughted from the body of the army, or of a party which he belongs to, and for that reaſon has no other name than that of a partiſan.

Of all military employments, there is none which require more extraordinary qualities than that of the partiſan.

A good partiſan ought to have an imagination fertile in projects, ſchemes, and reſources; a penetrating ſpirit, capable of combining the whole circumſtances of an action; a heart intrepid againſt every appearance of danger; a ſteady countenance, always aſſured, and which no ſigns of diſquiet can alter; a happy memory, that can call every one by his name; a diſpoſition alert, robuſt, and indefatigable, to carry him through every thing, and give a ſoul to the whole; a piercing rapid eye, which inſtantly catches faults or advantages, obſtacles and dangers of ſituation, of country, and every object as it paſſes; his ſentiments ſuch, as to fix the reſpect, confidence, and attachment of the whole corps. Without theſe diſpoſitions, it is impoſſible to ſucceed.

A partiſan ought to underſtand Latin, German, and French, to converſe with all nations. He ought to have a perfect knowledge of the ſervice, eſpecially light troops, without being ignorant of the enemy's. He ſhould have the exacteſt map of the theatre of the war, examine it well, and become perfect maſter of it. It would be very advantageous to have ſome good geographers under his command, capable of drawing plans, routes of armies, ſituation of camps, and wherever they may have occaſion to reconnoitre.

He ought to ſpare nothing to be aſſured by his ſpies of the march, force, deſigns, and poſition of the enemy.

As chief, he owes the example of an irreproachable conduct to his corps, circumſpect in his cares like the affection of a parent, by which he will inſpire reſpect, love, zeal, and vigilance, and gain the hearts of the whole to his ſervice. It is extremely dangerous for ſuch an officer to contract the leaſt attachment to women, wine, or riches. The firſt makes him neglect his duty, and frequently occaſions the moſt ruinous treacheries: the ſecond leads to dangerous indiſcretions, and is ſure to draw down contempt: the third leads to guilt, and deſtroys all ſentiments of honour. The partiſan muſt be content without the delicacies of the table, as he may be often expoſed to want proviſion; his bed the ſame with the mens, a cloak and ſtraw, never ſtripping but to change linen. Nothing animates ſoldiers ſo much as the preſence and vigilance of a commanding officer ſharing with them the fatigues of the ſervice: the officers follow his example; the men are aſſured, encouraged, and content.

To form a Corps capable of carrying on the Petite Guerre to advantage, prudence requires that it ſhould conſiſt of 1000 men at leaſt; without which a partiſan cannot expect to ſupport the fatigues of a campaign, and ſeize the moſt important occaſions that every where offer, and which a too great inferiority muſt make him forego.

It is no leſs important that this corps ſhould be compoſed of infantry and cavalry; and as it is inconteſtible that the cavalry ought to be the moſt active in carrying on the Petite Guerre, it were to be wiſhed that they were likewiſe the ſtrongeſt, ſo as to have 600 cavalry and 400 infantry in a corps of 1000 men, making four companies of infantry and 12 troops of cavalry.

Each company of infantry to conſiſt of one captain, one firſt and two ſecond lieutenants, four ſerjeants, and 96 men, including four corporals, four lance-corporals, and two drummers. Each troop of cavalry to conſiſt of one captain, one firſt and one ſecond lieutenant, a quarter-maſter, two ſerjeants, and 48 horſemen, including four corporals, a trumpeter and farrier.

The commanding officer ſhould have the naming of the officers of this corps, or at leaſt have liberty to reject ſuch as he is convinced are not qualified for ſuch ſervice, as every officer who may be ambitious to ſerve in the corps, though poſſeſſed of great military merit, may not have the talents requiſite for the duties of the partiſan.

To ſupport the honour of this corps upon a ſolid and reſpectable footing, the ſtricteſt ſubordination muſt extend from the chief to all the officers, and the moſt rigid diſcipline inſpire vigilance, patience, bravery, and love of glory to the whole corps.

As to the other corps of partiſans formed of one or more detachments, drawn from the different regiments of the army, and compoſed with a view to ſome particular expedition, their ſtrength and quality is regulated by the circumſtances of the affair they undertake, and are more or leſs numerous according to the exigency of the projected ſcheme. It is of the utmoſt importance for the officer that commands, to have the chooſing his men and officers whom he knows to be fitteſt for his enterpriſe, and thereby preventing many difficulties, contradictions, and dangers, which jealouſy and diſtruſt always occaſion among ſtrangers.

No recruit for the corps of a partiſan, either cavalry or infantry, ſhould exceed 30 years of age; but the younger they are, if they can carry arms, ſo much the better for ſuch a ſervice, to which youth are particularly inclined, and recruits may be met with every where; but when the neceſſities of war do not oblige officers to accept of indifferent men, they cannot ſerve the corps more eſſentially than in the chooſing good recruits. We learn from Vegetius, that the beſt ſervice is to be expected from men brought up to ſevere labour, and expoſed to the injuries of the weather; men brought up in eaſe and plenty cannot endure fatigue and want, and they who have taſted feweſt of the ſweets of life are the leaſt ſubject to the fear of death. In the choice of recruits for the cavalry, it were not unworthy the attention of officers to prefer men that are lovers of horſes, and to recruit chiefly in thoſe countries where ſuch are moſtly to be expected.

As for arms, the firelock and bayonet is ſufficient for a foot ſoldier; but in the corps of the partiſan, barrels of 36 inches, with a long bayonet, but to have the caliber the ſame with the reſt of the army, which, for the ſake of having ammunition made up to ſuit the whole, ought to be invariably the ſame; and for the more convenient method of carrying their ammunition, the German manner, of having their cartridges placed horizontal, and covered with wax cloth, is preferable to our wooden blocks. A helmet likewiſe is preferable to our hats, as the ſword is almoſt the only thing to be dreaded from the enemy's cavalry. Four ſpades, and four pick-axes ſhould be given to each company of infantry.

The preſent manner of equipping the light dragoons is ſo perfect, it is unneceſſary to ſay any thing on that head; but no white horſe, ſtone-horſe, or mare, ſhould be ſuffered in the corps of the partiſan, as the leaſt neighing or perceivable colour may make enterpriſes fail. No horſe ſhould be mounted for ſervice till ſix years old. The ſize of the light dragoons is very proper for the partiſan; and while they have firm ground to act upon, and plenty of forage, none can excel them; but when they come among moraſſes, and feel the ſeverity of want, perhaps the Hungarian huſſars may be found more equal to the duty: poſſibly, therefore, in forming the corps of the partiſan, 200 horſe, ſuch as are bred in the mountains of Wales or Scotland, mounted by the lighteſt men, might be found of good ſervice.

The principal attention of an officer of cavalry ſhould be, to ſee that the men feed and dreſs their horſes well, Hay, ſtraw, and oats, are their common food: too much hay is not good; but when they find wheat-ſtraw newly threſhed, they may give them more of it, as it is excellent nouriſhment. During the whole campaign they ſhould have dry food only, as green weakens them.

When the exigency of the ſervice requires the horſes to be kept ſaddled day and night, every horſeman ſhould ſeize ſome moment to turn the ſaddle-cloth, which greatly comforts a horſe, keeps him at eaſe, and leſs apt to gall; and care ſhould be taken to keep the cloth ſoft, and clean from ſweat and duſt.

SECT. II. *Of Poſts, &c. and the different Works with which they may be fortified.*

POSTS are generally ſuch places as bodies of troops can fix in when detached from the army, to cover and ſecure the frontiers; and upon the vigilance and reſiſtance of the parties that are detached there, depends the ſafety of the army. Whatever the abilities of a general may be, it is ſcarce poſſible that he can have an eye to every detail that contributes to their defence; it is ſufficient if he knows that the guards are properly placed, and the line that they make properly eſtabliſhed. It is then the buſineſs of the particular officers who command them, to make the beſt diſpoſition for a vigorous defence, and anſwering the views of the general.

An officer who is detached to a poſt, is either to relieve a party, or take poſſeſſion for the firſt time. In the firſt caſe, if the guard which he relieves happens to be intrenched, as ſoon as he arrives at the poſt, and has taken his inſtructions from the officer who commands, he ſhould prepare himſelf for his defence, as ſhall be mentioned in that article. In the ſecond, if an officer who is detached is to intrench himſelf, he muſt examine if the place is advantageous for the execution of his projects, the defence of his people, and the ſecuring a retreat.

He muſt conſult, 1ſt, Whether the ſituation be convenient for ſending parties to diſcover the enemy; whether to give intelligence of their ſituation and march, or to diſturb and ſurpriſe them. 2d, If it has ſome natural defence on its front or flanks, ſuch as a river, rivulet, moraſs, or ſmall wood that can be eaſily penetrated. 3d, If he can preſerve his communication with the army, and if there are ſome covered places to favour his retreat. 4th, If he can diſcover all the approaches; becauſe if the enemy can come within a ſmall diſtance of the poſt without being ſeen, he will place himſelf under cover there, and reſt while the beſieged are obliged to remain continually under arms, and will watch the moment for making an attack. If then he finds hollow roads, clumps of wood, or any place where the enemy can ſecure himſelf in the neighbourhood of his poſt, he muſt fill them up, or guard them with detachments of ſix or ſeven men. 5th, He muſt take care not to be commanded by any neighbouring heights, or muſt prevent the enemy from profiting by that advantage; becauſe if they can take his ſoldiers in the rear, it will be impoſſible for them to defend themſelves. You will ſee afterwards how to ward off this inconvenience, when you cannot prevent being expoſed to theſe heights. 6th, The extent of the work muſt be proportioned to the number of men that are to defend it. Good ſenſe and numberleſs examples prove, that too large intrenchments (ſuch as are commonly conſtructed) can only be defended by conſiderable bodies. Exceſſes of this kind are extremely reprehenſible; and it were much more eligible to give in to the oppoſite, by making them ſmaller. 7th, He ſhould take care to have all the parts of his intrenchment nearly of an equal ſtrength, ſo as to be able to make an equal reſiſtance every where; and laſtly, he will take care to fulfil exactly the intention of the general in poſting a guard in that place.

There are ſome places ſo advantageouſly poſted by nature, that though they are not fortified, they may in a ſhort time, and with little charge, be made ſo ſtrong, that it will require as much art to beſiege them as many others that are perfect fortifications; ſuch as iſlands, peninſulas, and places ſeated on eminences of difficult acceſs, or in moraſſes.

If the poſt is in a level country, or upon a height that may be ſurrounded, as happens almoſt always to ſmall detachments, they ſhould conſtruct a redoubt or ſmall ſquare fort, compoſed of a parapet with its banquette and ditch.

Plate CCXCVIII.

The ground being choſen, you muſt trace a ſtraight line AE, (fig. 1.) and raiſe the perpendicular BC, as directed in practical geometry; obſerving to give to each of theſe lines which mark the interior ſide of the parapet but two toiſes, or two and a half for 30 men, four toiſes for 50, and eight for 100; which will leave a ſpace of two feet at leaſt againſt the parapet for each man.

Having traced the two firſt lines A, B, you muſt put the cord over the picket C of the perpendicular B, and with the ſame length trace the arch D, then put the cord over the picket E of the line A, and trace the arch F. The point where the arches interſect each other, is the point to end the lines EH and CG. Theſe four lines mark the interior ſide of the parapet.

Then trace four other lines at the diſtance of two or three feet parallel to the firſt, as I, L, M, N, to mark the ſize of the banquette, which ſhould be greater or leſs according to the number of ſoldiers you would place in a file. Then trace a third parallel ſquare on the outſide of the firſt, as O, P, Q, R, to mark the exterior ſide of the parapet, and to determine its thickneſs, which is uſually eight or nine feet, or 18 if it is to reſiſt cannon, which you ſhould always be prepared to do.

Then trace a fourth and laſt ſquare, ST VX, to determine the width of the ditch, which is the ſame or two feet more than the thickneſs of the parapet; leaving a picquet planted at all the angles, as likewiſe at the lines already traced, ſo as not to loſe the points from whence the lines were drawn.

While you are employed with two or three men in tracing, five or ſix men ſhould be ordered to cut down the trees that are in the neighbourhood of the poſt, not only to open the approaches, but to ſerve for conſtructing the intrenchments. The ſmalleſt branches ſerve to make faſcines, which are a ſort of faggots about ſix feet long, two feet thick, and of the ſame ſize all over, tied in the middle and at the two ends, to ſerve for ſupporting the earth, which would tumble down without that ſupport. The middling branches

ſerve

3 MA 53

WAR.

Plate CCXCVIII.

Fig. 1.

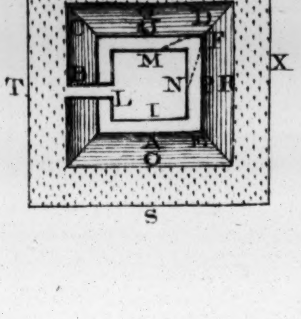

V
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Fig. 2.

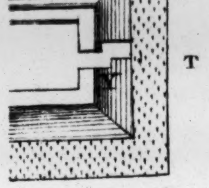

Fig. 4.

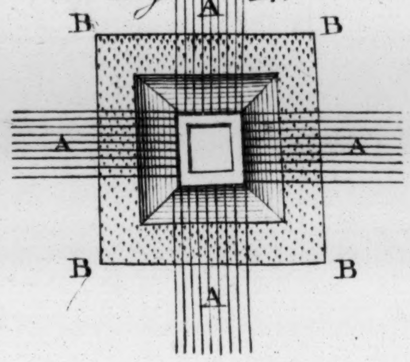

Fig. 6.

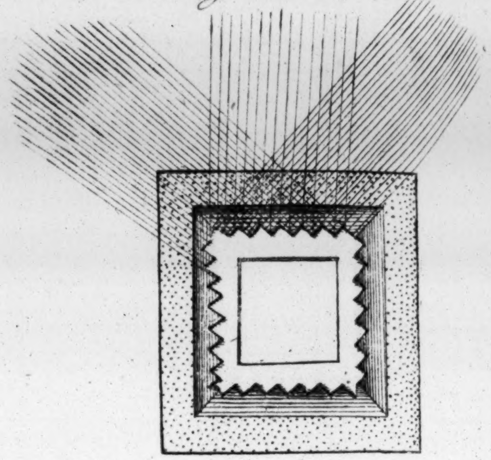

Fig. 3.

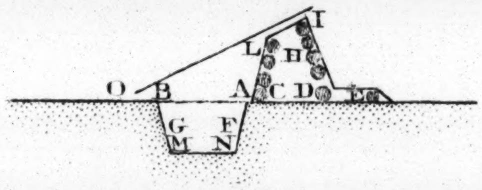
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Fig. 5.

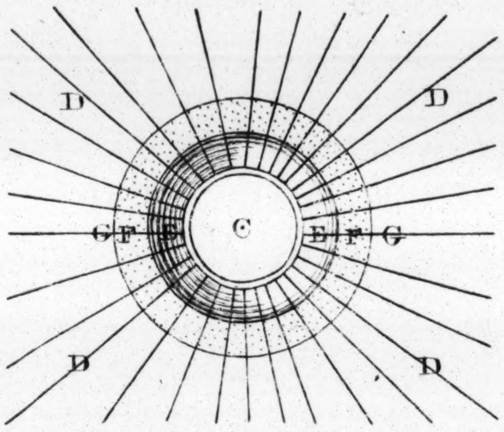
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Fig. 7.

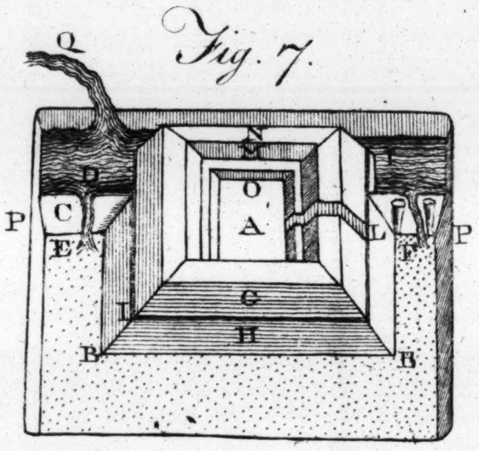
Q
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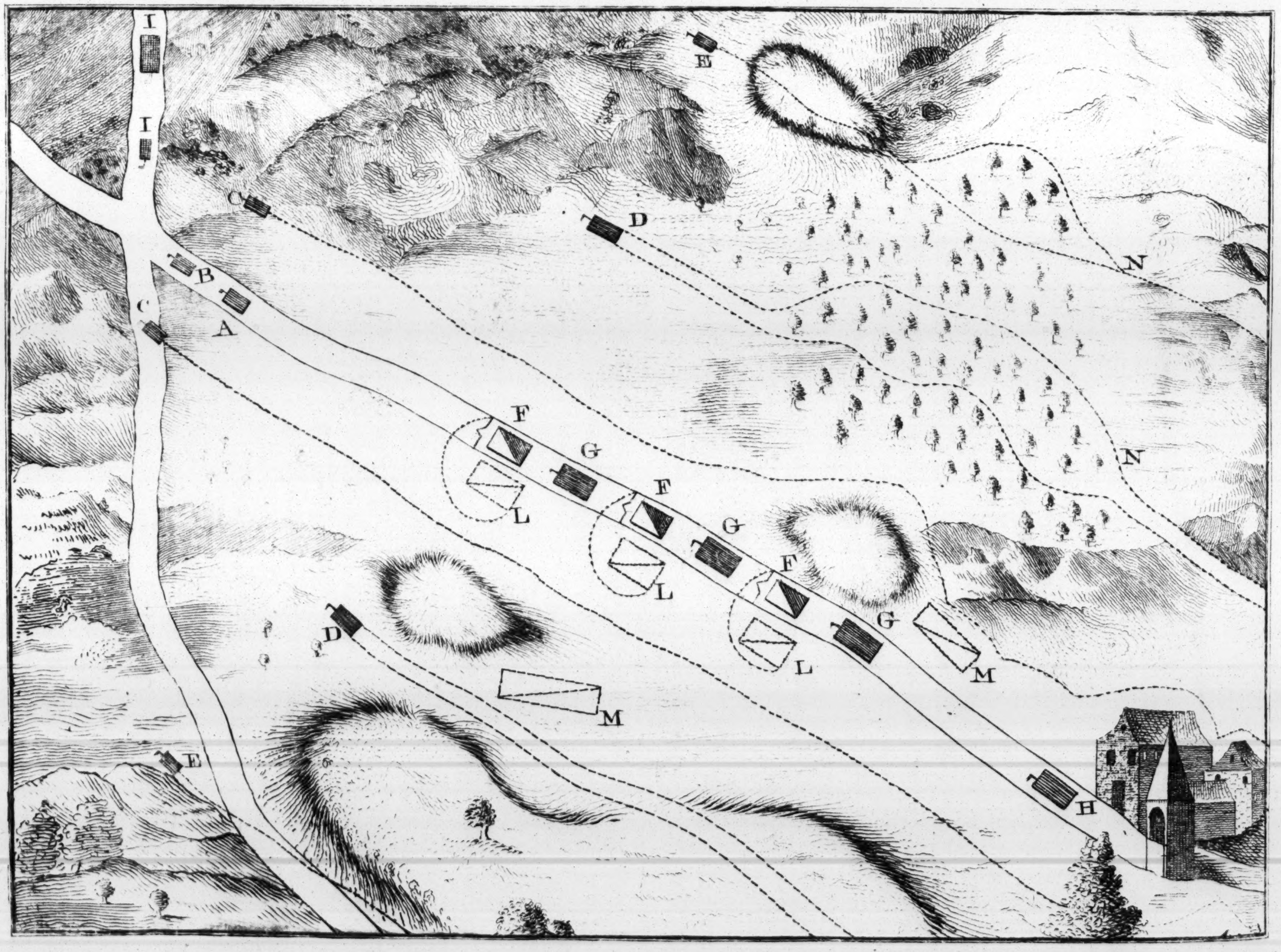
Fig. 8.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A Bell Sculp.

ſerve to make pickets proper for mixing with the faſcines, and fixing them in the ground, or one above another to raiſe the parapet. The trunks to which the large branches are left, ſerve to increaſe the ſtrength of a poſt, as ſhall be mentioned afterwards.

Having traced all in the manner directed, fix a row of faſcines upon the ſmall ſquare ILMN, to ſupport the earth of the banquette; then fix a ſecond row upon the ſquare ABGH, to ſupport the interior ſide of the parapet; then a third row on the third ſquare OPQR, to ſupport the exterior ſide of the parapet. You ſhould obſerve in the beginning to picquet the faſcines, to leave a paſſage of three feet PB, on the ſide leaſt expoſed to the enemy, to ſerve for an entry to the redoubt; but if this paſſage can be taken in a ſtraight line, it ſhould be made like a mortoiſe, as you ſee at Y, fig. 2.

After having picketed the three rows of faſcines as directed, you muſt dig the ditch AB, as in the profile fig. 3. a foot diſtant from the exterior ſide of the parapet. This diſtance or breadth is called *berme*, and ſerves to ſupport the earth, or receive what falls from the parapet by the enemy's cannon. This *berme* is more or leſs according to the ſolidity of the earth; the earth to be thrown into the intervals C, D, E, marked for the parapet and banquette, taking care to make the men tread it well down, and obſerving to leave a *talus* or *ſlope* on the two ſides of the ditch FG, more or leſs, according to the conſiſtence of the earth, ſo that it may not tumble down. The ſlope F, which is on the ſide of the redoubt, is called, *the ſcarp;* and the oppoſite ſlope which is next the country, is called *the counterſcarp*. Care muſt be taken, in picketing the faſcines with which the parapet is raiſed, to bring them nearer one another by degrees in raiſing it as at H, ſo as to leave the ſame ſlope on each ſide. The diſtance DE mark the banquette; the diſtance DC the thickneſs of the parapet at the bottom; the diſtance IL the thickneſs of the parapet at the top; MN the width of the ditch at bottom; AB the width of the ditch at top.

If the ground is level, the banquette of this work muſt be raiſed two feet; but in low places two banquettes are neceſſary, the one above the other like ſteps: but if this banquette is raiſed on account of ſome neighbouring heights from whence you may be taken in the rear, the parapet muſt be raiſed to ſuch a height, that the enemy's ſhot can no longer plunge down upon you. A ſlope muſt be left on the top of the parapet, as IL, ſo that the ſoldiers may ſee round the poſt, and fire eaſily towards the country at O.

Though the ſquare form of a redoubt which we have given the method of conſtructing, is almoſt the only one uſed in the field, yet it has its faults, which ought to make it be rejected, at leaſt for thoſe poſts which ought to defend the environs equally. Experience ſhows us that we ought never to depend on the oblique firing of muſquetry, as the ſoldiers almoſt always fire right forwards, as at A, fig. 4. and often even without taking aim. This being the caſe, there are large ſpaces oppoſite to the angles of the redoubt at B that are not defended, and where we may ſay that the enemy remains in ſafety. The chevalier Clairac propoſes an excellent method to prevent this inconvenience, by conſtructing the interior edge of the parapet, like the edge of a ſaw, in form of ſmall redans, to hold a man or two in each ſide, fig. 6. which by the croſs fire takes the enemy on the two flanks, ſo that there are no approaches but what are defended; but the conſtruction of this redoubt is too tedious and complex to be executed by ſmall detachments.

The ſame author prefers conſtructing circular redoubts as at C, fig. 5. becauſe all the points of the circumference being equally diſpoſed, the ſoldier poſts himſelf indifferently over all; and the exterior ſpaces D which are defended, varying every moment, the enemy is nowhere in ſafety.

The circular redoubt then is the moſt perfect that can be conſtructed: but where a road or the edge of a river is to be defended, the ſquare, or long, or triangular redoubt is preferable, becauſe they ought to oppoſe the faces of the intrenchment as parallel as poſſible to the places they are to fire at, obſerving always to round the angles.

Plate CCXCVIII. fig. 5.

To trace a circular redoubt, after fixing the central point of the poſt, let a picket be fixed in that point, and draw from it as center the circle EE, with a length of cord in proportion to the number of the party, to mark the interior ſide of the parapet; then trace another within the firſt, at the diſtance already given, to mark the banquette; then trace a third FF, to mark the exterior edge of the parapet; then trace a fourth GG, to mark the width of the ditch; which being done, picket the faſcines, and make them take the bend of the circle, finiſhing as in a ſquare redoubt.

If an officer is poſted with a detachment on a paſſage or before a bridge, in a defile, or oppoſite to a ford, he may make a parapet either bending or ſtraight, with a banquette or ditch which ſhould ſhut up the whole entry; or he may make a redan, which is a work with two faces, and in ſuch a ſituation ſhould be made with a re-entrant angle, (that is, the angle pointing from the enemy); taking care, when he is to guard a ford, to conſtruct it ſo near the river that the enemy cannot have room to form after they have paſſed. A deep ditch may be dug oppoſite to the ford, into which they ſhould let the water of the river paſs; they may likewiſe make the banks ſteep; throw trees acroſs, and ſcatter chauſſe-traps, which are inſtruments of iron with four ſpikes, made ſo as to have always one point erect.

The ſtrength of a redoubt or any other work may be augmented by blocking up the paſſages that lead to it; in a mountainous country, by cutting large ditches perpendicularly down, acroſs the roads; by placing carts above one another in the defiles, with ſome ſoldiers behind them; and by throwing, wherever it is neceſſary, large branches of trees half buried in the ground: taking care not to break the way by which you muſt retire, ſo as to prevent your making a retreat; but on the contrary to leave an eaſy paſſage made in form of a draw-bridge, or any other way defended by ſeven or eight ſoldiers.

If detached into a level country, very deep ditches ſhould be dug in the avenues and approaches of the poſt; or deep pits covered over with ſmall branches and a little earth over them; taking care to ſcatter the earth that is dug out all round, ſo that the enemy may not be able to diſcover whereabout they are; and chauſſe-traps may likewiſe be ſcattered in the avenues and

Petite Guerre.

and on the glacis. Laſtly, they may plant pickets all round the poſt near to one another, inclining a little outwards, ſix feet out of the ground, and the points made ſharp after being drove.

But the moſt formidable obſtacle, and which is preferred by Monſieur Folard, is to ſhut up the defiles, to block up the roads, ſurrounding the poſt with felled trees, and ſinking their trunks three or four feet deep in the earth, which muſt be dug on purpoſe, leaving a number of large branches on them, which muſt be ſharpened at the ends, and the leaves taken away, and placed as near to one another as poſſible, ſo that the branches may mix, and taking care that they incline towards the enemy. Two or three rows may be made in this manner; but they ſhould be at leaſt two toiſes diſtant from each other, that the enemy may not burn them all at once, to approach the intrenchments. M. Saxe in his Reveries ſays, that redoubts are proportionably advantageous as they take leſs time in conſtructing, and are proper for numberleſs circumſtances, where one often may ſerve to ſtop an army in a cloſe country, hinder them from troubling you on a critical march, or to occupy a large ſpace of country when you have but few troops.

Intrenchments are ſometimes made with felled trees alone, when there is no deſign, or time is wanting to raiſe an intrenchment of earth. The trunks ſhould be placed towards you, and very cloſe upon one another, with the branches ſharpened and pointing to the enemy. This makes a very formidable parapet, when rounded ſo as to prevent the enemy getting ſight of your people. There is no need to mention large works, which require engineers to conſtruct, and great bodies to defend them; but a redoubt, ſuch as A, fig. 7. may be ſtrengthened by filling the ditch with water, by turning a rivulet, or cutting a river or pond. If the ground is uneven, ſo that the water cannot be put equally in all parts of the ditch, dams ſhould be left in digging at C; or little traverſes of earth to form banks proper for keeping the water in the upper part of the ditch D, from whence it may be let run into the lower E. Theſe banks ſhould have but half a foot in thickneſs at the height D, which ſhould be raiſed ſharp; but a good deal more muſt be left below at E, by ſloping the two ſides pretty much. Dams likewiſe are made of planks or boards, as at F; but they muſt be ſtrong, and ſupported by large ſtakes, ſo that the body of water above may not overturn them; and then they are reckoned preferable to thoſe that are of earth.

Particular Explanation of Fig. 7. A, The ground within the redoubt. B, The bottom of the ditch. C, D, E, Dam of earth. F, Dam of planks, boards, or faſcines. G, Upper part of the redoubt conſtructed of faſcines, and the earth dug out of the ditch. H, The lower part of the redoubt dug in the earth. I, The berme or ſpace left at the bottom of the parapet to ſupport the earth. L, The entry of the redoubt. M, The inſide of the parapet. N, The upper part of the parapet. O, The banquette. P, The glacis. Q, Rivulet from whence water may be let into the ditch of the redoubt.

But it is not only with the works already mentioned that an officer may fortify a poſt; there are likewiſe an infinity of ways to ſtop an enemy, to tire him, and even to repulſe him, which it is neceſſary that he ſhould not be ignorant of.

All the ſchemes for oppoſing the enemy, of which we have given a detail, ſerve only to add to the exterior ſtrength of poſts; there are others which have ſome natural fortifications, ſuch as churches, church-yards, mills, or farm-houſes, &c. An officer who is ſent to a poſt of this kind, which is detached from other buildings, ought to obſerve, before he begins to work, to make the inhabitants go out, and the magiſtrates of the neareſt place to receive and lodge them. You ſhould then intrench the houſe with a turning parapet, if you have people enough to defend it; but if you have only a few, you ſhould make a breaſt-work of felled trees round the houſe, eſpecially oppoſite to the angles, to prevent the enemy from undermining it. You muſt likewiſe take off the tiles and ſlates, leſt the enemy get up by ladders and cruſh your people that are within. If the houſe is covered with thatch, it ſhould be pulled off and burnt, as well as every thing combuſtible that can be found in the neighbourhood, leſt the enemy make uſe of it againſt the houſe.

Though the houſe is ſurrounded with a parapet of felled trees, you ſhould not fail to pierce the walls with loop-holes, about a foot from the ground, ſo as to diſcover the enemies legs, that they may not get footing on the outſide. Theſe loop-holes ſhould be four inches wide, and three feet diſtant from one another; and a little ditch ſhould be made a foot and a half from the wall within the houſe, to place the ſoldiers in who are to defend it. Other loop-holes ſhould likewiſe be pierced ſeven or eight feet from the ground, oppoſite to the interſtices of the lower ones, and of the ſame width, placing the ſoldiers that are to defend them upon tables, planks, or ladders; and taking care to pierce a greater number oppoſite to the avenues, before, and at the ſides of the gate, and the angles of the houſe, becauſe theſe are the places where the enemy uſually makes his greateſt efforts. If the houſe has an inner-court, the walls ſhould be pierced which incloſe it, ſo as to fire upon the enemy after he has made himſelf maſter of it.

If there are ſeveral gates, they ſhould all be blocked up except one to be left for an entrance to the poſt, which ſhould be made ſo as to admit but one man at a time.

If there are low windows which are not grated, they ſhould be ſhut up with dung, planks, ſtones, earth or trees. If there are any out-houſes, ſuch as ſtables, cellars, &c. ſeveral trees ſhould be buried up to the branches before them, to prevent the enemy from forming, if they are about to penetrate into the houſe; and one or two trees ſhould be put three or four feet within the entry, to prevent the enemy from penetrating right forward.

If there is a broad ſtaircaſe for going up to the firſt floor, it ſhould be broke down, or blocked up with ſtones or caſks filled with earth. If it is a winding ſtair, the wall ſhould be pierced in different places with loop-holes, to fire upon the enemy that are already entered, keeping ladders for yourſelves to get up to the firſt floor, which ſhould have the boards pierced with a number of holes about four inches diameter, to fire down upon the enemy, obſerving to pierce them only where there are no trees below, but to have a greater number over the door and other weak places which the enemy can force.

Loop-holes ſhould be pierced breaſt-high in the wall of the firſt floor, with about ten inches opening, and oppoſite to the interſtices of thoſe immediately below. If there are not people enough to defend the windows of the firſt floor, they ſhould be barricadoed, to prevent the enemy from firing upon thoſe within; and a large opening ſhould be made in the pavement oppoſite to each window a little longer than the width of the window, which is to ſerve by way of ditch, into which you may tumble thoſe who penetrate that way.

The ſame way may be done with the ſecond and third floors, ſo that there may be an equal reſiſtance over all; but inſtead of piercing loop-holes in the higheſt floor, the tiles and ſlates being taken away, the wall may be taken down to breaſt-high for the men to fire over, the ſtones kept to throw upon the enemy, and the rafters to throw upon the ladders which happen to be placed againſt the houſe. A poſt intrenched in this manner may reſiſt a great while, and even tire out the beſiegers if defended by reſolute men.

Captain d'Enfernay of a French regiment, with a company of volunteers, in the campaign of 1748, took poſt in the church of Bevera, two miles from Ventimiglia. It is detached from other buildings, and he fortified it with a parapet and ditch full of water; but his intrenchment was commanded by ſome houſes in the village, ſo that the enemy could fire down upon his party. He remedied this defect by covering the commanded part with a kind of blind made with rafters, leaning one end on the wall of the church, and the other upon poſts raiſed a foot higher than the top of the parapet, which left room to fire through. This blind, covered with faſcines and earth, prevented the enemy's fire from piercing, and did not prevent his firing upon them, ſo that they durſt not attack him.

This example is mentioned to ſhew how to ſecure a poſt that is commanded by a height. When there is no redoubt or intrenchments of earth, the interior ſide of the parapet which is commanded ſhould be raiſed, or a ſort of penthouſe ſhould be made with rafters, placed perpendicularly againſt the inner ſide of the parapet, upon which planks or faſcines are nailed, taking care to leave room between the bottom of the penthouſe and the top of the parapet for the men to fire through.

If an officer has not time to oppoſe all the ſchemes which have been mentioned to the enemy, when the general wants to make a forage, and throws infantry into the houſe to form a line, he ſhould immediately place a couple of trees acroſs before the door, pierce the boards, ſhut the windows, and prepare for his defence; which gives time to the foragers to retire, and the ſupporting parties to advance.

SECT. III. *Of the manner of fortifying Villages.*

THE manner of intrenching which has been mentioned, is only for poſts that are detached from any building; but if an officer has a village to defend, he may cut out a much harder piece of work for the enemy. When we ſpeak of intrenching a village, it is meant only of ſuch as have the houſes collected, and ſometimes ſurrounded with a wall. An officer detached to a poſt of this nature, ought to go ſeveral times round it, and obſerve the adjacent houſes before he begins to intrench, and cauſe loop-holes to be pierced in them: the entries of thoſe that have paſſages leading to the country ſhould be blocked up with trees; and if he has time, he ſhould make a good parapet of felled trees, and intrench the entries of the ſtreets.

An officer who would fortify a poſt of ſome extent, ought to make a kind of plan of the village, and the intrenchments which he intends, which will often furniſh ideas of defence, which eſcape on viewing the country. A ſtreet is to be defended, like a ford or bridge, with a redan, deſcribed above, or with a ſimple parapet in a ſemicircle with a ditch; making loop-holes in the houſes at the entrance, and deep ditches acroſs the ſtreets, with chauſſe-traps thrown into the bottom of them. The ſtreets ſhould be blocked up with trees, carts, and caſks; you ſhould likewiſe open ſeveral paſſages in the back parts of the houſes, to keep up a communication with the different ſtreets: but above all, if you have but few men, the middle of every open place or ſquare muſt be filled with felled trees, to prevent the enemy from forming if he penetrates.

As cannon or fire are moſt to be dreaded in the defence of a village, an officer ought to break up the roads by which cannon can paſs, which is an eaſy matter in a mountainous country; but if the village happens to be in a plain, large ditches ſhould be cut acroſs the avenues, at every little interval placing trees acroſs that take up the whole breadth. If there is time, the joiſts of the houſes ſhould be propped up with trunks of trees, or large pieces of wood put up like bricklayers horſes, to prevent their tumbling down and cruſhing the beſieged. The beſt ſecurity againſt fire, is to burn all the materials that an enemy can make uſe of for that purpoſe; but if there is a quantity of wood, ſtraw, or hay, the general ſhould be aſked whether he chooſes to have it burnt, or carried off to ſupply the army.

Another eſſential thing for an officer to attend to who is detached to a village, is to ſecure his retreat in caſe he is forced at the entry of the ſtreet, or in his firſt intrenchments; he ſhould therefore chooſe a church or large houſe ſeparate from the reſt, after having diſlodged the inhabitants. When ſoldiers who defend a poſt know that they have a place to retreat to, they do not think of ſurrendering while they ſee themſelves in a ſtate of obtaining an honourable capitulation. But if the houſes of a village are ſcattered, and there are gardens or courts in the centre, they muſt be content with intrenching a ſingle houſe, church, or church-yard, where they may be covered with an intrenchment of earth, and employ all the ſchemes already given in the preceding ſection.

If the works with which poſts, eſpecially villages, are fortified, were to be executed by the ſoldiers of the detachments, who ought never to be fatigued, it would be too laborious and tedious; therefore an officer ſhould cauſe a number of peaſants, by the appointment of the magiſtrates, to work alone, or jointly with a third of the party, while two thirds remain under arms to prevent ſurpriſes. The ſoldiers and peaſants ſhould be relieved every three hours by freſh men, taking care that they have no concealed arms, and work without interruption until the work is completed.

SECT. IV. *Of going on Detachments and ſecret Marches.*

DETACHMENTS are particular bodies of ſoldiers detached from a greater body, to guard a poſt, or to go on an expedition.

When an officer is ordered on a detachment, he ſhould provide himſelf with a cord regularly divided, in caſe he has occaſion to entrench; and be at the parade by times, to get information from the brigade-major, whether he is deſtined to relieve a detachment, or to occupy a poſt for the firſt time. If to relieve a party, he is only to know where the guide is who is to conduct him; the guide is a ſoldier ſent by the officer who is to be relieved, as orderly-man to the major-general, who by having been at the poſt before can lead a new detachment to it.

If it is a poſt that is to be occupied for the firſt time, the officer is to aſk the brigade-major for inſtructions relating to its defence; which being got, he muſt inſpect his party, and take care that every ſoldier is properly equipped; his firelock loaded, freſh primed, and a good flint well fixed; his cartouch-box filled with cartridges; and that he carries proviſion for 24 hours, which is the time that detachments commonly continue, and are not allowed to go away to eat. Care muſt be taken to have ſpades, pick-axes, hatchets and wood-bills, one or two of each kind; and if any thing is wanting, to apply to the brigade-major for it, that they may have every thing neceſſary for entrenching.

One general rule in military projects that depend upon us alone, ſhould be to omit nothing that can inſure the ſucceſs of our deſign; but to that which depends on the enemy, to truſt ſomething to hazard.

When an officer has inſpected his party, he ought to get information from his guide, whether the way is broad or narrow, open or incloſed; if the enemy's poſts are near; if they go on patroles, or ſee their parties in the day; and laſtly, if he is to paſs mills, farms, manors, &c. and from theſe informations take the neceſſary precautions for his march.

Secret marches are ſuch as are to be made unknown to the enemy, to reconnoitre, to ſurpriſe, or to croſs a country which they occupy. It is here that a commander has need of all his prudence to ſucceed and not to be betrayed. Before he ſets out, he ought ſecretly to have procured the beſt information of the different routes that can be taken; the ſituation of the enemy's poſts that are to be avoided; and the kind of country that is to be paſſed over. For better precaution it will be advantageous for the commanding officer to be provided with a plan in the manner to be explained in the following ſection (fig. 2.); and likewiſe to take along with him one or two ſure intelligent guides.

Plate CCXCIX.

Plate CCXCIX.

When the whole are ready to march, the advanced guard A, (fig. 8) which ſhould conſiſt of cavalry only, ſhould ſet out. It is ſurpriſing that all the authors who have wrote on this part of the art of war, have neglected to ſhow ſufficient attention to ſo eſſential a point: the greateſt part are ſilent, and the reſt paſſing ſlightly over the different duties of this corps, are content that it ſhould be compoſed of infantry; though, on the leaſt reflection, in the moſt ordinary caſes of a ſecret march, reaſon muſt determine that none but cavalry ought to be placed there, whether it be to ſtop paſſengers who may diſcover your route, or ſuddenly to attack an advanced guard of the enemy whom they meet face to face, or to harraſs their corps in order to gain time for your own to form: it is inconteſtable, that for all theſe purpoſes, cavalry has greatly the advantage of infantry; who are by no means capable of running here and there to ſeize paſſengers, or of pouring ſuddenly on an advanced guard of the enemy; or of reſiſting their cavalry a moment in caſe of a ſudden rencounter, when they muſt expect to be thrown down and trod under the horſes feet, and the corps attacked before the commanding officer has had a moment to prepare for his defence.

As examples ſerve beſt to illuſtrate opinions that have been ſeldom declared, the ſpirited behaviour of Cornet Nangle of the 15th regiment of light dragoons merits our particular notice, and will ſerve as a proof of the great advantage of having the advanced guard of cavalry. In the campaign of 1761, when the French army under the command of Marſhal Broglio and the prince of Soubiſe were retiring towards Hoxter, where they paſſed the Weſer, Prince Ferdinand followed cloſe after them for ſeveral days, and on the evening before they gained the paſs over the river, one of Prince Ferdinand's German aid-de-camps deſired the grenadiers and Highlanders who were in front, to puſh on and take ſome of the enemy's baggage, which was a little way before them and but weakly guarded. They were immediately formed, and marched in a hurry over a plain with a thick wood in front, which they were told was clear, and had got within 400 paces of the enemy's baggage, when ſeveral ſquadrons of French dragoons ruſhed ſuddenly out upon them from the ſkirts of the wood upon both flanks, and were hewing them down without mercy, when Cornet Nangle with an advanced guard of twenty men coming up the hill got ſight of the attack, and inſtantly ruſhing on, charged the French cavalry, who, ſtartled at the briſkneſs of an attack which they were not expecting, immediately reined back; when the reſt of the regiment getting in view, came on; and attacking the French, drove them off, having killed and wounded a few, and taken ſome priſoners. The determined bravery of this young officer with his twenty men ſaved a great number of the grenadiers and Highlanders from being cut to pieces, and ſhows what may be effected by the ſudden attack of an advanced guard of cavalry.

An advanced guard by night ſhould be of double the force of one by day. In an open country, it is a matter of indifference at what diſtance they advance, provided they keep in view of the commanding officer, who ſhould continually obſerve them: but in covered places, and in the darkneſs of the night, they ſhould not be more than 50 paces diſtant.

This advanced guard ſhould have an advanced corporal B, with ſix horſemen divided into three pairs; one in the centre B, the two others out of the road on the right and left at CC, to examine as wide as poſſible, ſilently and attentively ſearching all hollow and covered places, taking care that there is nobody lying on the ground, or hid in dry ditches, behind trees or buſhes. At the ſame diſtance of 50 paces upon the flanks of the corps, ſhould march two wings D D, conſiſting of eight or twelve horſemen, each according to the ſtrength of the corps, led by a non-commiſſioned officer. They can harraſs an enemy who may happen to ruſh ſuddenly out of ambuſcade, and give time to the corps to form. Each wing to detach two men E E, keeping 50 paces wide from the others, and preſerving the ſame route as exactly as the face of the country will permit. At the entrance of the wood NN, the horſemen ſhould ſpread, and cloſe again at coming out, and do the ſame at meeting any little hills, to examine them on both ſides. When they perceive any traces of a party, they ſhould immediately communicate it from one to another, till it comes to the commanding officer.

The advanced guard ought to march ſlowly, and the commanding officer at the head of the corps ſhould follow at the ſame rate, ſo that the rear of the detachment may not be obliged to gallop. As the rear-guard H is only eſtabliſhed for form, there is no need of its being numerous. The officers and quarter-maſters ſhould be careful to keep the men from ſleeping, as a horſe is eaſily hurt under the irregular motions of a ſleeping rider, which retards the march. The whole corps ſhould be forbid to ſmoke or ſpeak; and if any one is obliged to cough or ſpit, let him cover his mouth ſo as to make no noiſe.

When the corps is numerous, the cavalry ſhould march by ſquadrons, the infantry by platoons, to follow alternately, ſo that each platoon of infantry FFF may march at the head of a ſquadron of cavalry GGG; which diſpoſition will preſerve the whole at an equal pace, and keep them readier to form in caſe of meeting the enemy, or being ſuddenly attacked, as we are about to mention.

When the advanced guard perceives an enemy at a diſtance, whether it is day or night, they ſhould not purſue them for fear of falling ſtupidly into ſome ambuſcade, if it is not in a country that has been well examined; but if they meet them ſuddenly face to face, as may happen at the entrance of a hollow way I, opening obliquely upon yours, then your advanced guard, without deliberating about their ſtrength, ſhould inſtantly ruſh upon them. This manœuvre cannot fail againſt infantry, and gives a great advantage in a rencounter with the cavalry; but if your advanced guard falls back, they expoſe the whole body to be defeated with them.

When the commanding officer ſees the action of his advanced guard, he will inſtantly turn the infantry on the ſide of the road moſt proper to protect them from the enemy's cavalry, and will form them quickly at the ſide LLL, or on ſome neighbouring height MM. If it is day, they ought to face the cavalry, ſtooping down till the inſtant of the attack, while the firſt ſquadron advances to ſuſtain the advanced guard. If the enemy appear deſirous to renew the charge, and obſtinate in diſputing the paſſage, you may make uſe of a feint, and by falling back bring them oppoſite to your infantry, who will have them in the flank, and by a well-placed fire put them inſtantly in diſorder. Your cavalry profiting by this, muſt immediately face about, and fall upon them with all poſſible violence; which cannot fail to complete their defeat.

All villages, hamlets, and houſes, ſhould be avoided, eſpecially by night (which is the moſt common time for the partiſan), to avoid being diſcovered by the barking of dogs, or being ſeen by peaſants who can inform the enemy. You will ſee equally how dangerous it is to keep the great roads by day, or to croſs places that are too open in an enemy's country.

If you cannot avoid paſſing through a village, it ſhould be done in a hurry, marching confuſedly, very cloſe, and filling up the whole breadth; by which you will conceal your ſtrength from the peaſants; ſome officers ſhould remain at coming in, and in the rear, till the whole are paſſed, taking care that no one ſtops or withdraws. The ſame care ſhould be taken at every road that opens upon your route. At the approach of every place that is covered or hollow, ſuch as houſe, wood, gully, &c. they ſhould halt till it is well examined, and continue attentive in paſſing it.

At the paſſage of defiles, bridges, or fords, the advanced guard ſhould ſtop at 100 paces, and form till the whole corps is paſſed and in order. The ancients employed dogs to diſcover the enemy in ambuſcade; but it will be well to diſtruſt ſuch ſpies, and to ſuffer none with the corps, as there is nothing more dangerous; their diſpoſition leading them to bark at meeting the leaſt animal, will furniſh the enemy with a thouſand opportunities of obſerving you, before you can know where they are.

You ſhould always detain the guides that were taken at ſetting out; but if neceſſity requires another, the quarter-maſter ſhould go and take one without making a noiſe, and lead him a round-about way, that none of the peaſants may diſcover either your party or route. If any of the party diſcover paſſengers in ſight of the march, they ſhould be ſtopped and brought to the corps, and care taken to prevent their eſcape.

The party ſhould never refreſh in a village, but in a wood by day, and open country by night, cauſing every neceſſary to be brought them from places in the neighbourhood, which ought to be received from the peaſants at a diſtance, ſo that they can neither diſcover the number nor quality of your corps. During the whole time of ſtopping, you ſhould not be ſparing of centries, and have always ſix horſemen ready to ſecure any perſon by whom you imagine you are perceived; when their number becomes conſiderable, they ſhould be tied together, and great care taken that none eſcape till the ſtroke is ſtruck. The officers ſhould be equally attentive that no ſoldier gets out of ſight; and if they meet a deſerter from the enemy, he ſhould be conducted immediately to the corps, and then to the army, under the care of a non-commiſſioned officer.

When neceſſity obliges you to ſtop in the neighbourhood of ſome farm or hamlet, you muſt take poſſeſſion of it, and carry off the farmer or chief of the place at going away, threatning to kill him and ſet his houſe on fire if any one ſtir from the place before he is releaſed. Every horſeman ſhould take care to have a ſpare fore ſhoe, and a peck of oats.

The beſt ſeaſon for ſecret marches is the cold time of winter, when neither peaſants nor their dogs ſtir abroad, and the enemy are quiet, only thinking how to preſerve themſelves from the cold, which your people get the better of by marching. When you find yourſelf in the night in ſome ſtony place near a poſt of the enemy, and you are afraid of their hearing the noiſe of your horſes feet, it may be deadened by ſtretching the mens cloaks on the ground, which was an expedient of great uſe to Mr Jeney in Italy.

If an officer of the infantry marches a detachment to relieve a poſt at a diſtance, he ſhould not mount his horſe till out of ſight of the camp, and ſhould diſmount on coming in ſight of the poſt; but if it is only about a league diſtant from the army, and near the enemy, it is better to go on foot, ſo as to be leſs encumbered in caſe of engaging with any parties of the enemy. The men ſhould not be preſſed too much for fear of lagging in the rear, but ſhould march cloſe without ſtopping, and in as many files as the roads will permit, keeping profound ſilence, that they may hear any orders that are given.

An officer who marches at the head of a party ought to keep exact order and profound ſilence, that they may be in a ſtate to execute whatever he may order for their defence; but in giving his orders, he ſhould take care to do it with a firm and determined countenance, ſo as to make the ſoldiers think that he is ſure of what he is about, and that nothing better can be done. When the men ſee their officer heſitating, or varying in his orders, they imagine he does not know what to do; and ſeeing him diſordered, they become ſo. It is upon ſuch occaſions that an officer ſhould be ſteady to reſtrain his party, and make them inſtantly obey. The danger is greater on a march than in an attack. Here the ſoldiers have their arms in their hands; and, ſeeing the enemy before them, are ready to engage. It is otherwiſe on a march; they are leſs upon their guard, and have not their arms in readineſs: then, ſays Vegetius, an attack confounds them, an ambuſcade diſorders them. An officer ought therefore to take every precaution in examining by his advanced guard, all places that may conceal any of the enemy.

As it is difficult, or rather impoſſible, to examine all the villages where it is neceſſary to paſs, and where the inhabitants are often to be dreaded more than the enemy, an officer had better avoid them if poſſible, by making a circuit at ſome diſtance, and coming to the road afterwards. The moſt experienced ſoldiers ſhould be employed to make diſcoveries, with orders not to ſtop to drink or amuſe themſelves, to talk with the peaſants, or loſe ſight of the detachment; but to ſtop every perſon that would paſs before them, and come quickly to tell the commanding officer what they have perceived.

But as the greateſt precaution cannot prevent an officer on a march from being attacked, it is neceſſary, as ſoon as he perceives the enemy, to obſerve if the party is ſuperior to his detachment; whether it conſiſts of cavalry or infantry, or both together. If it is cavalry, and ſuperior, there is no neceſſity for being diſcouraged; but on the contrary he ſhould profit by every advantage that offers, by gliding into land that is furrowed, uneven, cut, and difficult or inacceſſible to cavalry; or if the country is incloſed, he ſhould line the hedges, and cheer up his ſoldiers by ſome encouraging language, while he diſpatches a truſty fellow with advice of his ſituation to the general. If the enemy march up to him in this ſituation, he muſt do all that he can to ſuſtain the attack, by ordering his party not to preſs upon one another, to keep up their fire, and not to diſcharge their pieces till they are at the muzzles.

Every country preſents ſome natural fortifications which, however deſpicable they may ſeem to be, there are brave people who have defended them with extraordinary valour. The duke de Rohan in his memoirs makes mention of ſeven ſoldiers in a wretched cottage of earth near Carlet, who ſtopped the army of the Marſhal de Themines for two days, though of 7000 foot and 500 horſe.

When you have the advantage of rocks or other obſtacles to the acting of cavalry, continue the route as near as poſſible, keeping the party cloſe, and always ready to receive the enemy. If the number of the enemy's cavalry do not exceed your party, you may continue your route; and keeping your men cloſe together and prepared, they will not venture to attack you. If the men could be depended on, and you could ſcatter them ſo as to leave no particular object for a body of cavalry to charge, they would have a ſtill greater advantage; but this manœuvre is only for a ſmall detachment, and would require particular inſtruction for the execution of it, which is impracticable with an occaſional detachment.

If an officer ſees no means of poſſeſſing an advantageous poſt, or of getting to the poſt he was detached to, he can do nothing better than to retreat to the camp, along ſome river or wood, to prevent being broken: but if he is ſo cloſely purſued that he cannot avoid being beat or taken, there is no better manœuvre to imitate than that of the Barbets (A); who ſcatter themſelves, and retire from tree to tree, from rock to rock, and deſtroy a party, who can neither beat them, nor take one of them.

The moment of taking poſſeſſion of a poſt is the moſt critical that a detachment can have; officers have been frequently attacked at the very time they thought they had nothing to do but quietly take the neceſſary meaſures for remaining in ſafety.

If the party which arrives at a poſt is to relieve another, the officer that is to be relieved gets under arms as ſoon as his ſentries give notice of the approach of the relief. The detachment being known, they are premitted to enter and occupy the poſt in the room of thoſe that are to depart; at the ſame time, the corporals go to relieve the ſentries, and the officers and ſerjeants give the counter-ſign, with the detail of all that is to be done at the poſt by day or night. He ought likewiſe to get information from the officer he relieves, if the enemy make incurſions in the neighbourhood; if their guards are diſtant, whether cavalry or infantry, and whereabouts placed. After theſe precautions, let him guard againſt his poſt being ſurpriſed.

The ſentries being relieved, the officer that is to go out muſt form his detachment, and return to camp with

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(A) They are peaſants ſubject to the king of Sardinia, who abandon their dwellings when the enemy take poſſeſſion, and are formed into bodies to defend the Alps which are in his dominions.

with the ſame precautions as in coming. The new detachment remain under arms till the other is gone 50 paces; then the officer is to make them lay down their arms againſt the parapet, putting their havreſacks againſt the gun-locks, to prevent duſt from ſpoiling them, or the dew of the night from wetting the powder. In an open country without fortification, the men muſt not go to any diſtance from their arms when they lay them down in the day, and keep them between their knees when they ſit round their fires in the night, with the locks inward, to prevent accidents.

SECT. V. *Of Reconnoitring.*

Parties ordered to reconnoitre, are to obſerve the country or the enemy; to remark the routes, conveniences and inconveniences of the firſt; the poſition, march, or forces of the ſecond. In either caſe, they ſhould have an expert geographer, capable of taking plans readily: he ſhould be the beſt mounted of the whole, in caſe the enemy happen to ſcatter the eſcort, that he may ſave himſelf more eaſily with his works and ideas.

All parties that go for reconnoitring only, ought to be but few in number. They ſhould never conſiſt of more than 12 or 20 men. An officer, be his rank what it will, cannot decline going with ſo few people under his orders; the honour is amply made up by the importance of the expedition, frequently of the moſt intereſting conſequence, and the propereſt to recommend the prudence, bravery, and addreſs of any officer that has the fortune to ſucceed.

It muſt be evident that the ſucceſs of ſuch a commiſſion depends upon ſecrecy, and that it is impoſſible to fulfil the intention without keeping out of ſight of the enemy. It is inconteſtable, that a numerous party cannot glide along ſo imperceptibly as a ſmall handful of men. As theſe detachments muſt finiſh their courſe quickly, it is neceſſary that they ſhould conſiſt of cavalry only; but if they are to go far, they may increaſe each with 30 foot, to remain in ambuſh about half way, in a wood or covered place, with whom the cavalry can leave their proviſion they brought with them.

An officer charged to reconnoitre in front, ſhould take his inſtructions in writing, and ſet out at ſuch time as to arrive at the place proper for beginning his obſervations at day-break. Every time that he has occaſion to ſtop, the party ſhould face toward the enemy, and ſend a non-commiſſioned officer with two horſemen to run over the neighbouring heights, and cloſely examine the environs. When near the enemy, avoid ſtopping in a village.

The officer, and geographer who is ſuppoſed to be preſent, ſhould remark every intereſting particular: The heights, woods, ponds, moraſſes, rivulets, rivers, fords, bridges, roads, croſſings, difficult and dangerous paſſages, by-ways, meadows, fields, heaths, gullies, hills and mountains; the diſtance and ſtrength of villages, hamlets, houſes, farms, and mills; what ſovereign the country belongs to, and what are its productions.

If the enemy comes in ſight, the officer ſhould quickly aſſemble his party, though his reconnoitring be not finiſhed, and let him retire to his infantry, if he placed any; but if not let him gain ſome other place that he has choſen for a retreat. After being refreſhed, let him go back with the cavalry to finiſh the reconnoitring; but if he was obliged to return quite to the poſt, he ſhould not go back till next day. Mid-day is the time of being leaſt incommoded, as detachments are leſs frequent at that hour. The commanding officer ought always to avoid coming to blows, even though he thinks himſelf ſecure of ſucceſs, unleſs he happen to be on his return, and near to his poſt, ſo that he foreſees the grand guard, hearing the firing, cannot fail to run to his aſſiſtance. If obliged to engage with a party who are cutting off your retreat, and that no other means is left of turning them, you muſt riſk all without heſitating, by ruſhing on, and try to ſave the geographer with the fruits of his commiſſion, eſpecially if the reconnoitring was of importance to the general of the army, and merits the ſacrificing a dozen men, which they can eaſily retrieve on another occaſion.

When they go to have news of the enemy, they ought to approach as near as poſſible, but cautiouſly: day-break is not the time proper for ſuch a purpoſe, becauſe at that time the enemy ſend their different parties and patroles to make diſcoveries; you ſhould therefore prevent them by approaching in the night. You may eaſily reconnoitre their poſition and extent by their fires, which they never extinguiſh at the head of the guards and piquets; and you may eaſily remark if they are about to change their poſition, by hearing a more than ordinary noiſe; beſides, as it is eaſy to approach by night, you may diſcover a number of things by the light of the fires.

The officer and geographer muſt take care to remark every thing, and let nothing eſcape their memory; but the beſt time for the geographer is by day in the mountainous country, where they may ſlip along from one mountain to another, from mid-day till three o'clock, which is the moſt favourable time to ſhun parties, who ſeldom ſtir from the army at that time of the day. They muſt ſtop all who paſs in ſight of the party, and releaſe none till the retreat is ſecure.

A partiſan ought not to neglect to reconnoitre every place round his poſt for two or three leagues, or farther, if it is poſſible on the ſide of the enemy; and for that purpoſe, employ the method of Mr Jeney for getting intelligence without approaching, and taking plans and obſervations: ſo that if the enemy come to poſſeſs the country, you may have every neceſſary inſtruction for making approaches to ſurpriſe them, without having recourſe to the peaſants.

During the campaigns that Mr Jeney made, he often examined the enemy's poſts without approaching, in the following manner, which he recommends as infallible, he having always ſucceeded.

Plate CCXCIX.

I ſuppoſe myſelf, ſays he, with my party at Soeſt in Weſtphalia A, (fig. 2.) and the enemy poſted at Bervick B, two leagues from me. To know the ſituation of this place without ſtirring from Soeſt, I take the map of the country; and from Soeſt as centre, I draw a circle whoſe circumference paſſes half a league beyond Bervick. I draw a circle of the ſame ſize upon a leaf of paper, to make my plan as in (fig. 2.), and then place Soeſt in the centre A; and I mark all the villages which I find in the map near the circumference, upon my plan, with the diſtances and bearings as they are repreſented in the map, making uſe of a pencil to mark the places DDD, ſo as to correct the errors more eaſily which the map may have led me to make.

Having thus formed my plan, with a ſcale of two leagues (which is the diſtance I ſuppoſe Bervick), I go to the burgomaſter of the town of Soeſt, where I cauſe ſome of the moſt intelligent inhabitants to come, ſpeaking to them freely, and openly induce them to communicate all the information I have occaſion for.

The better to conceal my deſigns, I begin my reconnoitring by Brokhuſen, a village diſtant from the enemy. I aſk the diſtance from Soeſt to Brokhuſen; if they ſay it is ſeven quarters of a league, I correct the diſtance of my plan which made it two leagues: then I inform myſelf of all that is to be found ou the road from Soeſt to Brokhuſen; chappels, houſes, woods, fields, orchards, rivers, rivulets, bridges, mills, &c. If they ſay that at a half league from Soeſt they paſs the village of Hinderking, I mark that place upon my plan. I aſk if the road from Soeſt to Hinderking is croſſed by any other road; if there is any moraſs or heath; if the road is incloſed, paved, or ſtraight; if there is any bridge to paſs, and at what diſtance. I take care to mark every thing in my plan, forgetting nothing, even to mills, buſhes, gibbets, gullies, fords, and every thing that can be got from their informations; which will probably be perfect, becauſe one always knows more than another. I continue my queſtions from Hinderking to Brokhuſen; and advancing by little and little, obſerve the ſame method on the roads of the other villages round, marked DDD. In this manner I cannot fail to acquire an entire knowledge of all the places; beſides, I find myſelf imperceptibly inſtructed in the poſition of the enemy, by ſeeing the different routes by which I can approach moſt ſecretly.

It is plain that ſuch a plan muſt be very uſeful to regulate ſecret expeditions. It is chiefly uſeful, not to ſay neceſſary, for a commander of a party, who can give more ample and preciſe inſtructions to his officers, by accompanying them with a copy of the routes marked out, which they can conſult even in the night, if it happens to be clear; by which they will be guarded againſt being deceived by ignorant or treacherous guides, which occaſion the miſtakes of ſo many who go unprovided with ſuch helps.

There is ſtill another means to ſecure a reconnoitring party; which is, to compoſe them of people who ſpeak the language of the enemy, and give them ſurtouts of the colour of a regiment of the enemy, and cockades the ſame. This ſcheme may be carried ſo far as to line the ſurtouts with the colour of another regiment of the enemy, provided that by turning the ſurtouts, they appear to be a different corps, and deceive guards, ſpies, and peaſants, and confound their reports.

An officer who goes to reconnoitre a poſt which he intends to attack, ſhould ſet out the beginning of a dark night, and give particular inſtructions upon the ſubject to thoſe he takes with him to aſſiſt in making diſcoveries: ſuch as examining the places by which they paſs, to approach the poſt; ſounding with long ſticks if there are any traps or covered ditches into which they can tumble; to leave branches of trees with their leaves on, to ſerve for a mark where they find any, againſt they come to make the attack; to obſerve exactly where the ſentries are poſted, and how many there are of them, and how far diſtant from one another; to advance even to the ditch of the entrenchment, and ſound with a ſtick or plummet to know the depth of the water; to examine if the poſt is fraiſed or paliſſadoed, made with earth or faſcines, or covered with maſonry; in which laſt caſe, they muſt obſerve its height, to proportion the ladders accordingly. They ought likewiſe to know how many men are to defend it; in what they are negligent; if they are near aſſiſtance, and have cannon. It is on all theſe heads you can go and examine yourſelf, or be informed by the reports of deſerters or peaſants, ſo that you may form your ſcheme of an attack. If you are only inſtructed by information of others, be careful how you believe people too readily who may wiſh to betray you, or come only in hope of a recompence. They ſhould be queſtioned ſeparately, writing down what they ſay; and by comparing their informations, judge of what is true or falſe.

SECT. VI. *Of the Defence of Poſts.*

When a partiſan has taken every precaution that prudence ſuggeſts in reconnoitring a place where he would fix a poſt, he is to take poſſeſſion in the following manner. The infantry remain under arms in the middle of the place, the cavalry to patrole without, while the commanding officer, eſcorted by a dozen horſemen, goes to examine the environs to make his arrangements; having ſent ſeveral ſmall detachments before, to cover him in time of reconnoitring.

Having remarked the places proper for his guard, defence, and retreat, as well as the dangerous ones by which the enemy can make approaches ſecretly to ſurpriſe him, he ſhould chooſe the moſt convenient in the front of his poſt to fix his grand guard D, Plate CCXCIX. (fig. 1.) which muſt face the enemy. He muſt mark the heights for this guard to place their vedettes EEEE, and regulate the number according to the exigences of the ſituation. In a covered country you muſt not be ſparing of them, and muſt reinforce every guard. At 50 paces before the front of the grand guard, a ſubaltern or non-commiſſioned officer with eight horſemen ſhould be always ready to ſet out at K, to go and reconnoitre, when the vedettes have obſerved any party.

The grand guard being fixed, you ſhould form another in the middle of the village, called the *ordinary guard*, compoſed of cavalry and infantry, placing ſentries at the entries, and vedettes all round; the laſt at ſuch diſtance as to ſee one another. A picquet ſhould likewiſe be fixed before the quarters of the commanding officer, which ſhould be near the ordinary guard and the whole corps. In the day, half the cavalry of the picquet muſt keep their horſes bridled and ready to mount; but if the enemy is near, they muſt remain on horſeback, the other half to unbridle till the hour of relief.

According to the arrangement we have given for compoſing the corps of a partiſan, the grand guard may conſiſt of a captain, a firſt and ſecond lieutenant, a quarter-maſter, two ſerjeants, four corporals, a trumpeter, farrier, and 52 private horſemen. The ordi-

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ordinary guard to have cavalry equal to the grand guard, with a captain, a firſt and ſecond lieutenant of infantry, two ſerjeants, and 60 men, including four corporals, two lance-corporals, and a drummer: the piquet to conſiſt of the ſame number of cavalry and infantry as the ordinary guard.

If there is any dangerous place capable of covering the approaches of the enemy in the environs of the poſt, and out of the circuit of the patroles, there ſhould be a guard placed there, more or leſs ſtrong according to the importance of the place, and care ſhould be taken to preſerve the communication. The guards and picquets being placed, the detachment that was ſent out on the roads muſt be called in, and then go to work to lodge the party in the gardens that open upon the country, and the commanding officer's quarters; beating down hedges, filling up ditches, and levelling a piece of ground large enough to draw up the whole corps. The horſes to be put under cover in barns contiguous to the gardens; but in caſe there are no barns, they may ſubſtitute ſheds open on one ſide, that the horſes may go out altogether in caſe of an alarm.

The officers ſhould occupy the houſes in the neighbourhood of the ſheds, and one of each company remain day and night with the company, to prevent any of the men from entering the village without leave, upon any pretence. The commanding officer muſt acquaint the officers of his having choſe the place M for the rendezvous in caſe of a retreat; which ought to be at ſome diſtance from the village, and on the ſide he judges moſt convenient for retiring to the army. At ſun-ſet the grand guard to return to the poſt and join the picquet, the one half of each to mount alternately till day-break, and then the grand guard to return to the place they poſſeſſed the day before. The ſentries and vedettes ſhould be doubled, and all the paſſages ſhut up with waggons placed in two rows, except one for ſallying out at, in caſe of a retreat, made wide enough for the paſſage of the patroles or the whole cavalry.

The corporals of the ordinary guard ſhould lead the relief of the vedettes every hour, ſetting off together; but when they come to the paſſage of the poſt A, (fig. 1.) they muſt ſeparate into two parties, the one to the right to relieve the vedettes BBB, the other to the left for the vedettes CCC; then each of them with the parties they have relieved ſhould go on at their head a quarter of a league, by the two routes pointed out in the plan, to examine the environs, ſuppoſing an hour to each. Beſides this reconnoitring, the captain of the grand guard ſhould ſend two patroles in the night. To fill up the intervals, they ſhould ſet one about half an hour after the corporals, and make the ſame round. At returning to the poſt, the corporals to make their report to the officer of the ordinary guard; the conductors of the patroles to the captain of the grand guard.

Plate CCXCIX.

A little before ſun-riſe or ſun-ſet, a grand patrole detached from the corps ſhould be ſent under the conduct of an officer to ſearch the whole environs of the poſt minutely, eſpecially the dangerous places, becauſe at theſe times the enemy are moſt likely to attempt a ſurpriſe. If the patroles diſcover them, they will be in a ſtate to repulſe them, or at leaſt to harraſs them till the commanding officer, upon the firſt notice, draws up the whole corps. The officers ſhould take great care to inſtruct the ſentries in their duty, explaining it to them every time of their mounting, and forbid them to ſmoke, as the leaſt fire can be eaſily perceived in the dark, and ſerve to direct the approaches of the enemy. No ſentry to move more than 50 paces to the right, and as many to the left of his poſt; and let the weather be ever ſo bad, he muſt not get under cover. No one to be allowed to go out of the poſt without leave of the commanding officer; and to prevent deſertion or marauding, the ſentries and vedettes muſt be charged to let no ſoldier paſs.

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The vedettes muſt ſtop all paſſengers, and take them next to the ſentry, who muſt call a corporal to conduct them to the commanding officer. If there are a great number paſſing at once, the vedette at the challenge muſt haſten to ſtop them at 100 paces, till the officer has ſent to reconnoitre them; but if he finds them to be a party of the enemy, he muſt fire upon them and retire. At the firſt alarm, the grand guard and piquet ought to mount, and each of them to detach a ſubaltern officer immediately at the head of the beſt mounted horſemen, to go quickly to encounter the enemy. The reſt of the grand guard and cavalry of the piquet to follow immediately, led by their captains to ſuſtain the firſt detachments, to repulſe or keep back the enemy as long as it is poſſible, and give time to the commanding officer to form the whole corps.

If the commanding officer obſerves that the enemy are of no very extraordinary force, he muſt without heſitating put himſelf at the head of his cavalry, and inſtantly charge them, pouring upon them with his whole force, which is the beſt way to ſucceed; and in the mean time, the infantry ſhould form to ſuſtain the cavalry. One eſſential circumſtance ſhould not be forgot here, which is, that at the going of the detachments of the grand guard and piquet, all the infantry of the piquet ſhould march immediately to the place appointed for the rendezvous in caſe of a retreat, and a ſtrong detachment of cavalry ſhould follow to occupy the place. If it is at the entrance of a wood or ſome covered place which the enemy may occupy, and thereby cut off your retreat, you muſt prevent it by fixing the infantry of the piquet in the poſt, to remain day and night, with a lieutenant at the head of 20 horſemen to clear round it. If the enemy is too ſuperior, and appears to form an attack on that ſide, the commanding officer ſhould get there before with all his force to oppoſe them, till all his detachments join, and then regulate his retreat, as will be ſeen in the ſection of the Retreat.

To be better ſecured in a poſt which you expect to remain in for ſome time, and where you find that the enemy will not fail to diſturb you, it will be proper immediately to employ ſome of your people with the peaſants, to form ſome intrenchments in a hurry in the moſt dangerous places, to have breaſt-works of felled trees in the woods; herſes placed in the fords; pits dug at the entries and plains without defence; ſo that the cavalry coming full ſpeed to charge you, may tumble in. If there happen to be a bridge either in the front or on the flanks of the poſt, as at N, by which the enemy can facilitate their approach or retreat, it muſt be inſtantly deſtroyed, unleſs you find it may be of uſe, and neceſſary to fix a good guard on it.

To regulate the attack and defence moſt advantageouſly, you ſhould take care to obſerve the places by which the enemy can approach, and form a plan of operations for cutting off, or taking in flank the different routes which he can attempt. You ſhould inform your officers, and not fail to hearken to the advice of thoſe, whoſe talents, genius, and experience, render them competent judges of your deſigns. Theſe arrangements will be of great uſe in ſurpriſing the enemy's parties, who will come from time to time to reconnoitre the poſt. If the enemy approaches in the night, take care how you attack him; you cannot reconnoitre his force, and you ought to ſuppoſe that he is informed of yours.

Do not ſuffer any ſuſpected woman to approach the ſoldiers; their viſits are dangerous in debauching your people, and the enemy frequently employ them to diſcover your ſtrength. Let no deſerter ſtop in your poſt; and if he comes in the night, keep him till daybreak is near, and then ſend him to the army. Every party that approaches your poſt will profeſs belonging to you; but if they are not provided with a proper paſſport from the general, or if you do not know any of the officers, truſt neither to their word nor uniform; deſire them politely to return the way they came, telling them, that if they do not, you will treat them as enemies; and take care that your party remain under arms till they are out of ſight of all your guards.

Even if it is another party of your army approaching your poſt, as ſoon as you are acquainted with it, you ought to reconnoitre them, and follow or receive them with all the attention which war requires.

When a partiſan has taken all theſe precautions, he may reckon himſelf ſecure of never being ſurpriſed. If in a country the moſt expoſed, or the moſt covered, by executing every point of the ſervice as has been mentioned, the enemy cannot approach your poſt nearer than a quarter of a league without your being informed by the noiſe of the vedettes and patroles, who cover your poſt day and night more than a quarter of a league round, which is ſufficient to guard againſt ſurpriſe, five minutes being ſufficient to form, and ten being ſtill left to deliberate upon the part that is to be taken, whether to attack, defend, or retire.

When a partiſan happens to eſtabliſh his poſt in an enemy's country, it is then his duty to take care of the ſubſiſtence of his corps, and to take every proper meaſure to provide his people with neceſſaries: for which reaſon he ſhould ſend ſome parties as far as poſſible towards the enemy, to ſummon the chiefs of the villages to deliver forage and proviſions in proportion to their abilities, taking care to be ſparing of the neareſt places, and more particularly of the poſt itſelf, which ought not to be touched but in the greateſt extremity. A partiſan cannot be too diligent in giving the general an account of his poſition, projects, ſucceſs, and all his operations, and therefore will take care to preſerve his communication with the army.

Theſe inſtructions may ſerve for the corps of a partiſan according to the propoſed arrangements; but partiſans of leſs force muſt regulate their precautions according to their ſtrength; and detachments of 30, 50, or 100 men, will ſeek to poſt themſelves in redoubts proportioned to their number, or in mills, farms, hamlets, detached houſes, churches, church-yards, &c. obſerving that the more a poſt is extended, the more care and fatigue it requires.

The principal object for an officer that is detached, ſays Monſieur Vauban, is to foreſee every troubleſome event. The want of exactneſs, and the ſmalleſt relaxation in the ſervice of out-poſts, may have the moſt fatal conſequences; and hiſtory furniſhes a thouſand examples of camps being ſurpriſed, and armies cut in pieces, by the negligence of detachments that ought to have watched for their preſervation.

The manner of relieving detached poſts has been mentioned; but if an officer is detached to a mill or houſe, let him draw up his party about 15 or 20 paces from the poſt, and ſend a ſerjeant or corporal with five or ſix men to ſearch the chambers, cellars, and barns: which being done, the ſentries muſt be placed, the poſt taken poſſeſſion of, the arms ranged ſo that every one can find his own without confuſion, and the inhabitants lodged in ſome other houſe; and then entrench himſelf according to the rules given.

If an officer is to fix in a village where it is difficult to examine every place where the enemy may lie in ambuſh, he ſhould ſend for the magiſtrates to come and ſpeak with him, while his party remain drawn up at the end of the village, that they may declare if they know whether there are any of the enemy's parties, ſuſpected perſons, or concealed arms in the place; which being done, the ſentries are to be placed, and the party to take poſſeſſion; putting ſmall detachments of five or ſix men, more or leſs, according to the ſtrength of the party, at the avenues; and examining the church, or any detached houſe, to make the principal poſt in caſe the advanced poſts are forced. The men beſt acquainted with the duty ſhould be planted on the moſt expoſed and diſtant places, ſo as to ſee all the approaches; and ſometimes in trees, that they may ſee at a diſtance, and remain concealed from the enemy.

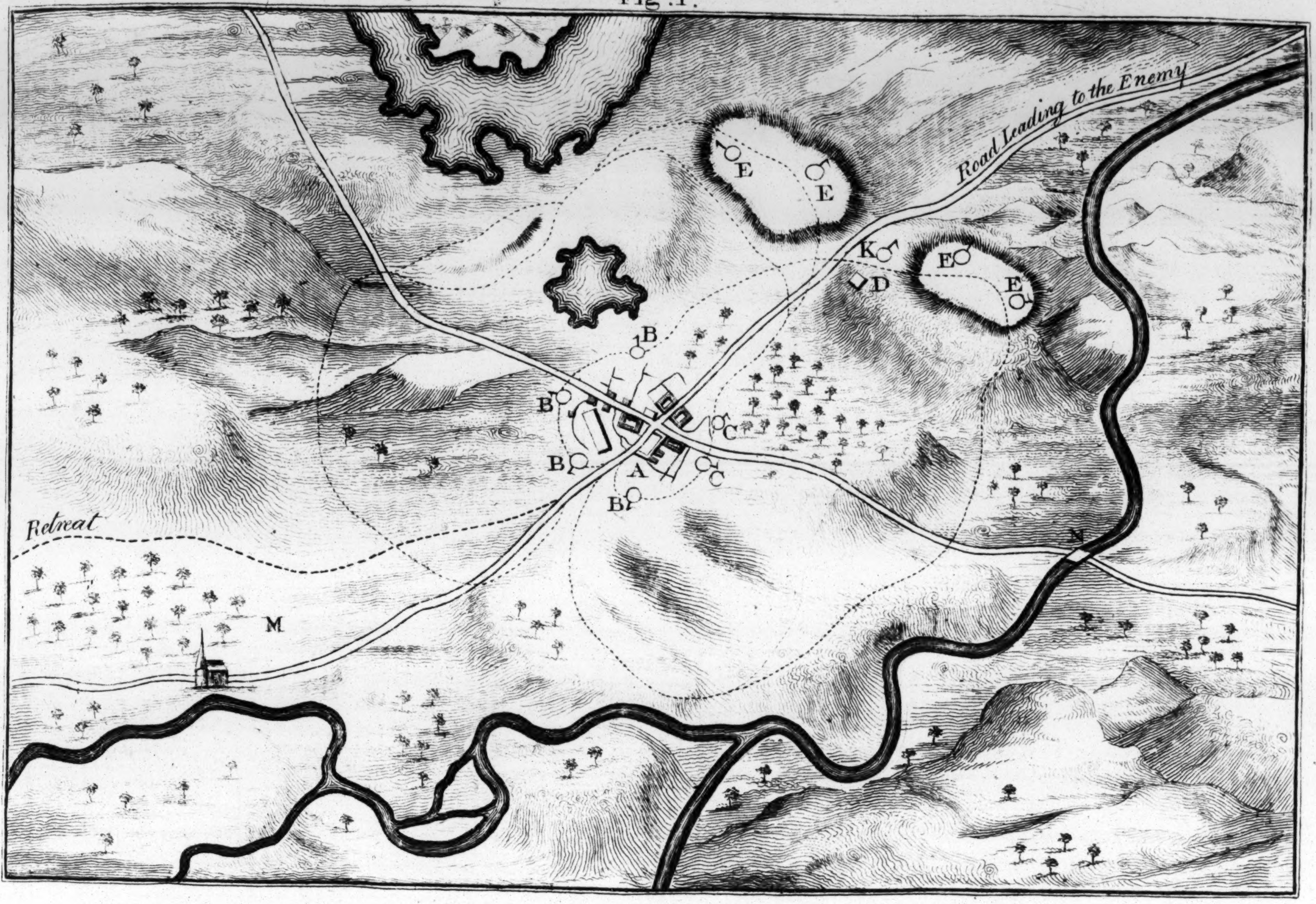
If he finds any place near him where the enemy can lie concealed, he ſhould place a corporal with ſix or ſeven men there, with orders to fall back upon his poſt if attacked, or remain till they find themſelves diſengaged. The ſoldiers of this leſſer poſt ſhould take care to make no fires, becauſe it would ſerve for a guide to the enemy to avoid them when they want to fall upon the principal poſt; but fires may be lighted in the places where they have no guards, to make the enemy think they have them every where, at the ſame time placing ſoldiers in ambuſh where there are none lighted. This ſcheme may ſerve for all poſts in a level country, where two or three ſoldiers ſhould be kept going all night to ſtir up the fires.

The exterior arrangements being made, and ſentries placed on the avenues, bridges, and ſteeples, the works for fortifying the poſt ſhould be marked out, and executed by the workmen, and the magiſtrates ordered to ſend ſtraw to the neareſt houſes for lodging the ſoldiers, who muſt never abſent themſelves. The officer muſt always be in readineſs to go where his preſence may be wanted, and make his ſerjeants and corporals frequently go the rounds.

Monſieur Vauban ſays, that if an officer is to remain but four hours in a poſt, he ought to intrench; and he ſhould

WAR. Plate CCXCIX.

Fig. 1.


Road Leading to the Enemy
E
E
K
D
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Retreat
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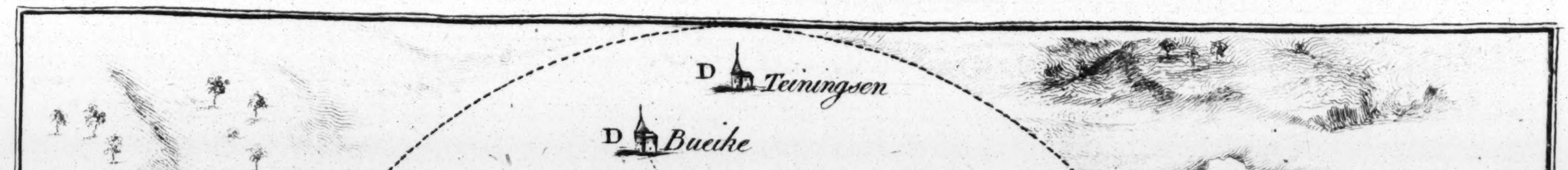
D Teiningsen
D Bueike
D Berlingsen
Rupelo
Vestnnen D
Bergede
D
Meyercke D
Sceevanemuhl
A
SOEST
Soesterbeck Rivulet
Neuhus D
Opmunde
C
Hinderking
B
Bervick
Heringen
D Altengesek
Toningsen
D
Krevinckel
Landscron
Asche River
Brokhusen
D
D Ostinghausen
Ostingen

A Bell Sculp.

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ſhould cauſe the works which are to be conſtructed to be well executed, ſo as to defend every place where the enemy can come. Monſieur Folard gives an excellent maxim, to attack an imaginary poſt, that we may be able to defend a real one. And the Baron de Travers ſays, that with regard to the ſtrength and means of reſiſtance in poſts, they ſhould be in proportion to the force the enemy can bring againſt them. If to paſs only ſome hours in a poſt, it is a good way to make a parapet of felled trees; or if it is in a village, to intrench a detached houſe.

The way to guard againſt being ſurpriſed, betrayed, or made priſoner, is to take precautions againſt all that the enemy can undertake; and whatever diſtance he may be at, we ought not to found our ſecurity on probabilities, but extend them even to poſſibilities. Neither ſtranger nor ſoldier of any other party ſhould be admitted into the poſt; and the roll ſhould be called three or four times a-day, that the men may not abſent themſelves: he ſhould likewiſe examine the ſentries, to ſee whether they are acquainted with the detail of their duty, and ſhould ſhow them how to defend themſelves in caſe of being attacked; obſerving to them, that if the enemy make ſuch a manœuvre, they ſhould oppoſe ſuch another; if they try this ſcheme, to reſiſt with that, and deceive them at every ſtep. He may make ſome of them try to ſcale the intrenchment, to ſhow the difficulty of mounting it; and by exerciſing them in this manner, he will prepare them to reſiſt the enemy; it will flatter their vanity, and give them a confidence in him. But let him take care not to be too familiar, leſt in a briſk attack he orders ſomething not to their mind, when, inſtead of obeying, they will reſiſt his orders, and mutiny: but when he has ſhown his ſoldiers the advantage of a party that are entrenched, over thoſe who are expoſed in the attack, he muſt take care to preſerve ſubordination, and not allow himſelf to fall into the ſnares of the enemy.

An hour or two before day, the men ſhould be kept alert, ſitting on the banquette near their arms; and the patroles ſent at that time, rather than in the night, to march ſlowly, to liſten attentively, and examine every place round the poſt where a man can conceal himſelf.

It frequently happens that two armies are encamped oppoſite to one another, and have ſeveral poſts on the ſame line, and two patroles meet in the night. As it is impoſſible to diſtinguiſh whether they are friends or enemies, they who firſt diſcover the others, ſhould conceal themſelves on the ſides of the road, behind buſhes, or in a ditch, to examine if they are ſtronger; and in that caſe to let them paſs in ſilence, and return another way to the poſt to tell what they have ſeen: but if they find them weaker, he who commands the patrole ſhould make the ſignal which is ordered for the patroles of the night, which is commonly a ſtroke or two on the cartouch-box or butt-end of the firelock, which is anſwered by an appointed number; but a word is the ſafeſt. If the patrole does not anſwer, they ſhould advance upon them with fixed bayonets, fire upon them if they ſee them retiring, and make them ſurrender. In the war of 1745 in Italy, there were old ſoldiers who uſed to beg for this employment, and took pleaſure in it.

If detached oppoſite to the enemy, it is to be preſumed that you may be attacked: therefore ſmall detachments ſhould be advanced between the ſentries in the night, about 30 or 40 paces from the poſt, with their bellies on the ground, in theſe places where they imagine the enemy may come; with orders to thoſe who command theſe detachments, to make a ſoldier reconnoitre any parties that are ſeen, ſo as not to confound their own patroles with the enemy's parties, and to retire to the poſt on the firſt firing.

In villages there ſhould be great care taken of ſuſpected perſons, or of the peaſants revolting; and for this purpoſe, you ſhould make the magiſtrates order two peaſants, the beſt known in the place, to be put on duty with the ſentries of the party, at the paſſages left in intrenching. Theſe peaſants, whom the magiſtrates muſt cauſe to be relieved every two hours, ſhould be charged to recollect all who paſs out or in of the village; and both one and the other muſt be told, that they ſhall be anſwerable for all the accidents that may happen from the treachery or negligence of thoſe ſentries who have let enemies in diſguiſe enter the village.

They muſt likewiſe order the ſoldiers who guard the intrenchments, to let no peaſant approach, and to ſhut up the paſſages with two trees acroſs in the night, and not to open them till day, except for the paſſing of the patroles. They muſt examine with iron ſpits, or their ſwords, all carts that paſs loaded with hay, ſtraw, or caſks, or any thing that can conceal men, arms, or ammunition.

The inhabitants ſhould be prevented from making proceſſions, holding fairs or markets; becauſe under favour of theſe aſſemblies the enemy may often enter and ſeize poſts.

An officer cannot watch too carefully to prevent ſchemes that may be contrived againſt him; and the attempt on Briſac, in the month of November 1704, is ſo much to the purpoſe, that it ought not to be paſſed in ſilence. The governor of Fribourg having formed the deſign of ſurpriſing Briſac, ſet out in the night of the 9th or 10th of November, with 2000 men, and a great number of waggons loaded with arms, grenades, pitch, &c. and ſome choſen ſoldiers: all theſe waggons were drove by officers diſguiſed like waggoners, and were covered with perches, which had hay placed over them, ſo that they appeared like waggons loaded with hay coming in contribution. They arrived at the new gate by eight o'clock in the morning, under the favour of a thick fog: three waggons entered the town, two full of men, and one with arms, when an Iriſhman, an overſeer of workmen, obſerving 30 men near the gate, who, though they had the dreſs, had not the manner of peaſants; he aſked them what they were, and why they did not go to work like other people. Upon their not anſwering, and appearing confounded, he ſtruck ſome of them with his cane; upon which the diſguiſed officers run to the arms which were in the waggon next them, and fired 15 or 20 ſhot at him within half a dozen paces, without wounding him. The Iriſhman leaped into the ditch, where they likewiſe fired ſeveral uſeleſs ſhot at him, while he called *To arms, to arms*, with all his might.

At this noiſe, the guards of the half-moon and the gate run to arms, and would have pulled up the drawbridge, but were prevented by the waggons which the enemy had placed upon it. The officers and ſoldiers who were in the waggons, ruſhed out with their arms, and having joined the reſt, attacked the guard commanded by a captain of grenadiers; but being repulſed, and five of them killed, the reſt were diſmayed. and fled either into the town, or out into the country, The captain of the guard made the firſt gate, which was a grate, to be ſhut, acroſs which the enemy, who were upon the bridge, fired at all who appeared; and having left the half of his guard, he mounted the rampart with the other half, and continued firing upon the enemy. A lieutenant who commanded 12 men of the advanced guard, was attacked at the ſame time by an officer who preſented a piſtol to his breaſt; but ſnatching it from him, he fired it at him, and killed him: this lieutenant defended himſelf to the end of the action; but having received ſeveral wounds, he died that day.

Upon hearing the noiſe of the ſurpriſe, the commanding officer of the place diſtributed his garriſon to their proper poſts: and having made every diſpoſition neceſſary for his defence, the enemy ſaw that their deſign had failed, and retired in diſorder, leaving a number of waggons behind them, and more than 40 ſoldiers who were killed or wounded. Such was the enterpriſe on Briſac, which failed by a trifling accident.

Another example will prove how neceſſary it is for officers in detached poſts to take every precaution. Captain Vedel being detached to a village, where the curate of the pariſh had obtained leave from the commanding officer in the country to make a proceſſion of the penitents of a neighbouring convent to a chapel in the village which he named, alleging that it was an annual cuſtom: but captain Vedel, aſtoniſhed to ſee ſuch a numerous proceſſion compoſed of the peaſants, called to arms, and having drawn up his party of 50 men, diſconcerted their ſcheme. Many of the penitets whom he ſtopped, were found armed with piſtols and ſwords; with which he acquainted the commanding officer, who immediately cauſed the curate and ſeveral of the penitents to be hanged.

This example, and many others which might be cited, ſhow that an officer who commands in a poſt cannot be too much on his guard to prevent his falling into the ſnares which the enemy prepare for him, as the ſeizing of a poſt, of however little importance it may ſeem, may be attended with the moſt troubleſome conſequences.

Henry IV. of France loſt Amiens in Picardy by a waggoner letting fall a ſack of nuts as if by accident; and when the ſoldiers of the guard were picking them up, the Spaniards, who had diſguiſed themſelves like peaſants on purpoſe, ruſhed out of a houſe near the gate where they had been in ambuſh, put them to the ſword, and carried the town.

Theſe inſtances, with many that could be mentioned, ſhow that we cannot be too diſtruſtful of the numberleſs ways there are of being ſurpriſed. If peaſants come to viſit their friends or relations in the village, the ſentries ſhould ſtop them, and acquaint their officer, who ſhould not allow them to enter till the magiſtrates, curate, or reſponſible inhabitants, anſwer for them; and this permiſſion to be granted only on working days, and not on Sundays or feſtivals, on account of their being unemployed theſe days.

In an enemy's country, the inhabitants are always ready to revolt and betray; therefore the commanding officer ought to take one or two of the magiſtrates children, or three or four of the moſt conſiderable families of the village, and keep them in the principal poſt as a pledge of the fidelity of the inhabitants. The children (to whom they ſhould take care to do no manner of hurt) ſhould only be kept half a day each, and changed for ſome others. The commanding officer ſhould forbid the inhabitants to aſſemble in taverns or public walks, or any place whatever, and cauſe theſe orders to be fixed up at the door of the church. If they are ſeen to ſtop and converſe. at coming out of church, or in the market-place, let the patroles oblige them to retire. The tavern-keepers and all the inhabitants muſt be forbid to receive any ſtranger without acquainting the commanding officer. None to be permitted to ſtir abroad after retreat beating, on pain of being killed by the ſentries who ſee them, or ſtopped and conducted to dungeons by the patroles; who ought to march ſlowly, ſtop from time to time to hearken if they hear any noiſe, go over all the quarters that are marked out to them, and give an account of any thing they have diſcovered that can cauſe any alarm in the poſt.

If fire breaks out any where, or the inhabitants quarrelling among themſelves, an officer ſhould take care how he ſends a party to their aſſiſtance, becauſe theſe are frequently ſnares of the enemy to divide the ſtrength of a detachment on purpoſe to attack them; he ſhould therefore ring the alarm bell, make all the different poſts get under arms, and order thoſe who command them, to make the ſoldiers remain armed againſt the parapet, ſo as to obſerve what paſſes without the village. The ſoldiers of the principal poſt ſhould likewiſe get under arms, and the officer detach four or five men with a ſerjeant or corporal to part the fray, or ſet the inhabitants to work in extinguiſhing the fire.

As all the neceſſary precautions for the ſafety of a poſt are too many to have them executed by giving them verbally, the commanding officer ſhould give his orders in writing, and have them fixed up in all the leſſer poſts. One thing to which officers who are detached to a village ſhould give particular attention, is, not to vex the inhabitants by making them furniſh too much: whatever they are allowed by the general to exact, ſuch as firing, forage, candle, &c. for the guards, ſhould be demanded in proportion to the abilities of the inhabitants; and an officer cannot be too delicate in preſerving the character of a gentleman in ordering contributions, and preſerving the inhabitants from being robbed, or treated ill by the ſoldiers.

It is not ſufficient for the preſervation of a poſt, to raiſe intrenchments, nor to take every precaution againſt being ſurpriſed. As the enemy muſt attack with a ſuperior force, your diſpoſitions muſt be made in ſuch a manner as not to confuſe one another, and every one being properly placed, contributes to the common ſafety.

If it is a redoubt, or other intrenchment of earth that is to be defended, ſeven or eight trees with their branches ſhould be kept in reſerve, to throw into the breaches the enemy may make, and the parapet kept well lined with men, who ought not to fire till the enemy are on the glacis. They ſhould be provided with grenades to throw in the midſt of the enemy who have jumped into the ditch, nay even aſhes or quick-lime, whoſe burning duſt cannot fail to blind the enemy, ſhould be had if poſſible. If the ſtrength of your detachment will admit of it, eight or ten ſoldiers ſhould be placed in the ditch (on the oppoſite ſide from the enemy), ſo divided as to take the enemy on the flanks, who have jumped into the ditch. This kind of ſally, by running round upon the right and left at the ſame time, muſt aſtoniſh an enemy who could not dream of being attacked.

If there are heights from whence the enemy can cruſh your people with ſtones, they muſt be occupied with eight or ten men covered with a breaſt-work, to prevent the enemy from poſſeſſing them, or guard againſt them, as has been formerly directed.

In the defence of houſes, mills, &c. as well as regular fortifications, the men ſhould be made acquainted with the different manœuvres they may employ for their defence; without which they do not foreſee the intentions of their officer, and may counteract one another by their being in diſorder.

The obſtinate defence of a poſt is the action where an officer detached ſingly can acquire the greateſt glory; the reſiſtance not proceeding from the number of ſoldiers deſtined to defend it, but from the talents of the officer who commands. It is in him that the ſtrength of the intrenchment lies; and if he joins to determined bravery the abilities neceſſary on theſe occaſions, and can perſuade his ſoldiers that the lot the enemy prepares for them is a thouſand times worſe than death, he may be ſaid in ſome ſort to have rendered his poſt impregnable.

When an officer who is poſted in a redoubt is attacked by the enemy, he needs not to be employed in firing himſelf, but in ſeeing that the ſoldiers do their duty, and do not throw away their fire in the air. If he ſees their ardour ſlacken in the rage of the attack, he muſt encourage them; if he ſees the enemy making greater progreſs on one ſide than the other, he muſt weaken one to ſupport the other: this movement may be dangerous, and it were better to have a ſmall reſerve in caſe of need; but an officer with a ſmall detachment that can ſcarcely line in the parapet, cannot ſpare men for a reſerve, but muſt employ every means they have been preparing for their defence, as directed above.

In the defence of detached buildings, there are ſo many different retreats, that it becomes an ardous taſk to ſucceed in an attack, when brave people are to defend them. They have the loop-holes on the ground floor to defend, when beat from the intrenchments without, and may reſiſt great numbers, by retiring gradually to the different floors of the houſe, where they ſhould have large buckets of water provided to throw upon the enemy, which, though it may appear trifling, is one of the moſt diſagreeable that can be oppoſed to the aſſailants; for at the ſame time that it wets their powder, arms, and cloaths, it hinders them from ſeeing what is doing above, prevents every ſcheme for ſetting fire to the houſe, and may oblige them to deſiſt from the attack.

The Chevalier Folard in 1705 had a ſmall country-houſe near Breſcia to defend with four companies of grenadiers, againſt the choſen troops of Prince Eugene's army, who were obliged to retire after penetrating into the court.

The prince of Wirtemburg, ſays Monſieur Folard, believing that there were ſucccours coming to us, imagined that if he could get poſſeſſion of a pigeon-houſe, from whence a very hot fire was kept up, the poſt would ſoon ſurrender: he therefore cauſed it to be attacked; and our ſoldiers having taken away the door to light a fire within, the officer who commanded below being wounded, and not able to reſiſt the firing which was levelled through the door-way, was made priſoner. There were ſeven grenadiers on the top of the pigeon-houſe, who were ſummoned to ſurrender, but who thought themſelves too well poſted to ſubmit ſo ſoon: they therefore replied that they would not yield till the pears were ripe, as they were capable enough of holding their poſt; and accordingly kept a conſtant fire upon the enemy, till the prince of Wirtemberg retired, and left the place covered with dead.

Having formerly obſerved that the defence of a poſt does not depend upon the ſoldiers who are deſtined for that ſervice, but upon the officer who commands, the following example may ſerve to confirm the obſervation, and will at the ſame time ſhow the utility of having ſtones collected to throw over upon the enemy, as formerly recommended.

In the month of September 1761, captain-lieutenant Alexander Campbell of the 88th regiment, with 100 men under his command, was pitched on to defend the remarkable poſt near Caſſel in Heſſe, called the *Hercules*. Monſieur Roziere the celebrated partizan and engineer of Marſhal Broglio's army, with 600 infantry and four ſquadrons of cavalry, arrived in the neighbourhood of the poſt the morning of the 22d; and having beat a parley, ſurrounded and carried off the two men who were ſent out to receive the meſſage. After having examined them ſeparately, he cauſed a detachment, under cover of his muſquetry from a hill that was oppoſite to the principal paſſage, to advance and mount the ſtair, three men abreaſt; which they did ſo ſlowly and without any interruption, that the whole ſtair of about 100 ſteps was full of men, when Captain Campbell (who had made an excellent diſpoſition for the defence of all the parts of his poſt), having ſome choſen men at each ſide of him, waited to receive thoſe who advanced firſt upon their bayonets, and firing at the ſame time, gave the ſignal for the reſt to throw over large ſtones which he had collected and diſpoſed for that purpoſe; which made ſuch havoc, that Monſieur Roziere, ſtartled at the unexpected reception, and deſpairing of ſucceſs, wiſhed to get his party off. Captain Campbell ſeeing the deſtruction of the enemy without a man of his being hurt, and that he could renew the reception as often as they chooſe to repeat the attempt, was elated with his ſucceſs and encouraging his men, when he happened to move from the wall that covered him, and received a muſket ſhot from the oppoſite hill, which entered a little below the left temple and came out at the ſame diſtance below the right; upon which he fell, and the party beat the chamade and ſurrendered. After two hours poſſeſſion the French retired, carrying off the priſoners, and leaving Captain Campbell, whom they thought

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thought dead, to be ſaved by our troops, who ſoon took poſſeſſion again, and ſent him to be recovered, and to diſplay new merits in his profeſſion.

Vegetius very particularly recomends the collecting of ſtones to throw over the walls, and it is certain that nothing better can be done againſt an eſcalade; though they ſhould have ſome long forked ſticks to paſs through the loop-holes and overſet the ladders, while they ſhower down tiles, ſlates, ſtones, aſhes, and lime, as well as the rafters from above.

If the enemy take cannon to force the poſt, it does not appear how it can be reſiſted, unleſs the houſe is low, and they cannot range round the entrenchments, as every ſhot can make a large opening in bad built houſes, and may cruſh the beſieged. The only means then to ſhun being maſſacred is to capitulate, or to ruſh out briſkly upon the enemy when they leaſt expect it. The firſt is not reſolved upon but when the honours of war can be obtained, which is to march out with drums beating to return to the army with a proper eſcort. But if this capitulation cannot be obtained, the beſieged having nothing left conſiſtent with true bravery, but to ruſh out ſword in hand, and cut their way through the enemy. The neceſſity of conquering changes the brave man into the determined ſoldier, which gives him the means of retiring to the army or ſome neighbouring poſt.

It was by a manœuvre of this kind that Marſhal Saxe ſaved himſelf at Chrachnitz, a village in Poland, where a party of 800 horſe had a deſign to carry him off with 10 men that were his attendants. The marſhal, after having reſiſted a long time in the chambers of the inn where he was, and ſeeing he could hold out no longer, ruſhed out upon them in the night ſword in hand, fell upon one of the guard who did not expect it, run him through the body, and retired to Sandomir where he had a Saxon garriſon.

If a poſt is to be abandoned when it can be no longer held, and you are going to make the ſally, you ſhould continue to fire with ſpirit, taking away barricadoes from the door through which your are to paſs with as little noiſe as poſſible. When they are aſſembled, the whole party ſhould go out cloſe together, ruſhing with their bayonets to the place the officer thinks the leaſt guarded. You ought never, ſays Mr Folard, to wait for day to execute theſe ſallies, which cannot ſucceed but in a dark night, by which you eaſily conceal from the enemy the road you have taken; for which reaſon you ſhould not fire, but open to yourſelves a paſſage ſword in hand, leſt the enemy come where they hear the noiſe.

The Baron de Travers ſays, that not to be met by the enemy we ſhould take the contrary way to that he expects us to take, and which it appears we ought to take: a ſmall party can hide themſelves every where, and as it is not common to ſearch places on the enemy's ſide, there they are moſt ſecure, and may paſs the day, to take another road under favour of the night.

Officers ſhould be attentive to diſtinguiſh between the true and falſe attacks, and not deſpair when beat from their firſt entrenchments. The defence of poſts is ſo eaſy, that it is ſurpriſing they do not hold out longer than they commonly do. There wants only reſolution and vigilance, taking every advantage of the ground, and perſuading the ſoldiers that nothing but the moſt manifeſt baſeneſs can let the enemy penetrate. The example of Cremona, ſurpriſed by Prince Eugene in 1702, will remain a proof to poſterity of what determined bravery can do; and ſhow, that though an enemy is maſter of half the ramparts, and part of the town, he is not maſter of the whole.

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Prince Eugene having formed the deſign of ſurpriſing this town, which was defended by a garriſon of French and Iriſh, got ſome thouſand Auſtrian ſoldiers admitted at a ſecret paſſage by a prieſt. Theſe troops ſeized the two gates, and a great part of the town; the garriſon buried in ſleep were waked by the aſſault, and obliged to fight in their ſhirts; but by the excellent manœuvres of the officers, and reſolute bravery of the men, they repulſed the Imperialiſts from ſquare to ſquare, from ſtreet to ſtreet, and obliged Prince Eugene to abandon the part of the town and ramparts of which he had been in poſſeſſion.

What then can be the reaſon they do not defend poſts and villages as well now-a-days, eſpecially when they have ſecured a retreat fit for making a good defence, or obtaining an honourable capitulation? It ſeems to proceed from their not applying enough to know the cauſes of the misfortunes they fall into, and being unacquainted with what has happened to thoſe who have gone before. The people who attack have nothing ſupernatural in them, and are not different from thoſe who are attacked.

Poſts have often reſiſted the firſt and greateſt efforts of the aſſailants, and have yielded or been abandoned to ſubſequent attacks, though much leſs ſpirited. How comes this? It is owing to an officer's not daring to abandon his poſt at the firſt attack: he repulſes the enemy, becauſe if forced they will be put to the ſword with their whole party; but when the enemy comes back, he thinks he has nothing to reproach himſelf with, having defended it for ſome time, ſo retires, or ſurrenders. Since he could repulſe the enemy when in good order and quite freſh, how much more eaſy and leſs to be dreaded when they return harraſſed with fatigue?

Is not the great cauſe of miſconduct among military men the want of encouragement to excite emulation? An officer who is not protected, who is never ſure of the leaſt favour, neglects himſelf, and takes leſs trouble to acquire glory, rarely heard of, though merited by the braveſt actions, than to enjoy the tranquillity of an ordinary reputation.

It is not expected that an officer who is placed in a poſt ſhould ſeek to engage; but that he ſhould ſteadily reſiſt when he is preſſed, and die rather than abandon his entrenchment.

Hiſtorians have been very ſilent about poſts being well defended; though the leſſons to be drawn from them may be more generally inſtructive, and as agreeable to read, as thoſe left us of the beſt fortified places of a ſtate. We are aſtoniſhed at the account of 100,000 men periſhing before Oſtend in 1604, and their general, the Archduke Albert, with the ruins of his army, not making himſelf maſter of it, till after a three years ſiege: nor is our wonder leſs, to ſee Charles the XII. of Sweden, in the year 1713, with ſeven or eight officers and ſome domeſtics, defend himſelf in a houſe of wood near Bender, againſt 20,000 Turks and Tartars.

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Several hiſtorians mention the defence of this houſe becauſe it was done by a crowned head; but brave actions, whoever are the authors, ſhould never be buried in oblivion, as they excite emulation, and are full of inſtruction.

Sect. VII. *Of the Attack of Poſts.*

Although the taking of a poſt is always difficult when you have to do with people who know how to defend it, nevertheleſs you may ſucceed in attacking them by ſurpriſe and ſtratagem. We ought never to form a ſcheme for an attack upon ſimple ſpeculation, becauſe from reaſoning we often think things are feaſible, which we find impoſſible in the execution. When you intend to undertake an action of this kind, you ought to form a juſt idea of it, by examining all the branches ſeparately, and the different means you can uſe, ſo that, by comparing them together, you may ſee if they concur, and anſwer to the general purpoſe; and laſtly, you are to take ſuch meaſures as may in a manner render you certain of ſucceſs before you begin.

As it is not the practice of the army to chooſe a particular officer for the attack of an entrenched poſt if he does not offer himſelf, ſo an officer ſhould not embark in ſuch an enterpriſe, without having examined the means of ſucceeding, and being capable of ſhowing the general a plan of what he has projected, to ſee if he will conſent to the execution of it. If the general approves the plan, he muſt beg leave to go to reconnoitre the poſt with a man or two, that he may take his meaſures more juſtly for the execution of it.

When he has been to reconnoitre, as is directed in a former ſection, and has got every neceſſary information, he ſhould go to give the general an account of his diſcoveries, and receive his laſt orders for the attack, for the ſoldiers of his party, and for thoſe who are to march to ſuſtain him.

The choice of men that are to go upon the attack of a poſt, is ſo much the more eſſential, as the ſucceſs of the enterpriſe depends on it. None but volunteers of determined bravery ought to be taken, men who are not ſtupid, and have no colds upon them; becauſe he who does not attend to the orders of his officer, runs on with blind zeal; and he who coughs or ſpits, may diſcover the party to the enemy's ſentries, and cauſe the beſt concerted ſcheme to fail. As to thoſe who are to ſupport them, they may be taken according to their rank in the guard or detachment, as the general judges proper.

The diſpoſition for an attack muſt depend on the diſcoveries that are made, ſo as not to be obliged to return in the midſt of the execution. The men being choſen, they muſt be inſpected, to ſee that nothing is wanted which can contribute to their ſucceſs; becauſe, if the poſt is fortified with an entrenchment of earth or faſcines, the two firſt ranks ſhould be provided with ſpades and pick-axes beſide their arms; if fraiſed or paliſadoed, they muſt likewiſe have hatchets; and if covered with maſonry, they muſt have ladders.

The men ſhould be in their waiſtcoats, to be leſs conſtrained. If they propoſe to make one or two true, and as many falſe attacks, ſo many platoons muſt be formed of the choſen party, as they are to make true ones, and the ſuſtaining party to make the falſe attacks, ſo as to divide the enemy and ſhare their fire. A man muſt be placed at the head of each platoon, who is capable of commanding them, and, if poſſible, the ſame who had been employed before to make diſcoveries, as he may more eaſily guide the diviſion. The orders which ſhould be given to thoſe leaders, are to march together to the place where they are to ſeparate, and then each to go to the ſpot which is appointed for them, in the neighbourhood of the poſt, and wait there, with their bellies on the ground, for the ſignal to jump into the ditch and ſcale the poſt.

If you are to be conducted by ſpies or guides, they ſhould be examined about every thing that can be of uſe, before they are employed, eſpecially about the road by which they propoſe to conduct you. The reaſon of this is, becauſe we often ſee ſimple people, animated with the hope of gain, imagine they can eaſily lead a party, when they have only a great deal of good-will; but if you find in thoſe who offer all the neceſſary qualities, you muſt immediately ſecure them to you as much as poſſible, by making them dread the deſtruction of their houſes, and pillaging their goods, if they lead the party into a ſnare; you may likewiſe aſk their wives and children as pledges of their fidelity, and, the moment of ſetting out, place them between the corporals of the firſt rank, tied with a ſmall chain; which precaution is the more eſſential, as traitors have often been known, on pretence of conducting a party to ſeize a poſt, to have led them where they have had their throats cut in the middle of the night, and have diſappeared at the very moment of its execution. If you make your guides hope for a recompence proportioned to their ſervices on one ſide, on the other you muſt make them fear the cruelleſt puniſhment if they do amiſs.

The night being the moſt proper time to march to the attack of a poſt, you ſhould ſet out ſoon enough to be ready to make the attack an hour or two before day. Care muſt be taken that it is not moon-light when you propoſe making the attack; the ſoldiers ought to march two and two, with the leaſt noiſe poſſible, eſpecially when paſſing between the enemy's ſentries: you muſt likewiſe recommend to them, neither to ſpeak, ſpit, or ſmoke. The detachments muſt get as oppoſite as poſſible to the ſalient angles of the entrenchment, as it is probable that they will be the leaſt defended by the enemy's muſketry. If a patrole of the enemy comes while you are on your march, or ambuſhed in the environs, you need not be alarmed, nor make the leaſt motion which may make the enterpriſe fail, but remain concealed in the profoundeſt ſilence, that the patroles may paſs without perceiving any thing, and afterwards purſue your deſign.

If the poſt which you want to carry is a redoubt with a dry ditch and parapet of earth, your two firſt ranks muſt have ſpades and pick-axes, with their arms flung, and, on the ſignal being given, jump into the ditch together; becauſe it ought to be a general maxim in attacking a poſt, to ſtrike all at once. When the firſt rank have jumped down, the ſecond muſt ſtop a moment, that they may not fall upon the ſhoulders or bayonets of the firſt. The two firſt ranks having got into the ditch, they ſhould immediately run to ſap the angles of the ſcarp and the parapet of the redoubt, to facilitate the mounting of the reſt of the party; the leaders of each diviſion ſhould obſerve at the ſame time, that the ſoldiers who remain armed with their firelocks, and who have likewiſe leaped into the ditch, do not interrupt thoſe who are demoliſhing the ſcarp of the redoubt, but protect them by preſenting their bayonets to the right and left, and be ready to repulſe any of the enemy that happen to be placed in the ditch.

If the parapet is fraiſed, they ſhould break as many of the fraiſes with hatchets as is neceſſary to let the men paſs. When the breach is made, the workers ſhould drop their working tools; and taking their arms from the ſlings, mount up with fixed bayonets, and ruſh upon the enemy huzzaing.

When you march to attack a redoubt or ſuch poſt, where the enemy have a connection with more conſiderable poſts, the commanding officer ſhould charge on that ſide, ſo as to cut off the communication. People who ſee themſelves briſkly attacked without hope of ſuccour or retreat, will very ſoon beg for quarter.

When the ſcarps and parapets are of ſtone, they can only be carried by ſcaling; but you may ſucceed by being briſk in ſurrounding and ſuſtaining the attack. An officer who is to attack a poſt of this kind, ſhould take care that his ladders are rather too long than too ſhort, and to give them in charge only to the ſtouteſt of the detachment. The ſoldiers ſhould carry theſe ladders with the left arm paſſed through the ſecond ſtep, taking care to hold them upright at their ſides, and very ſhort below, that they may not diſlocate their ſhoulders in leaping into the ditch.

The firſt ranks of each diviſion provided with ladders, ſhould ſet out with the reſt at the ſignal, marching reſolutely with their firelocks ſlung at their backs to jump into the ditch. When they are arrived, they ſhould apply their ladders againſt the parapet, obſerving to place them towards the ſalient angles rather than the middle of the curtain, becauſe the enemy have leſs force there. They muſt take care to place the ladders within a foot of each other, and not to give them too much nor too little ſlope, that they may not be overturned or broken with the weight of ſoldiers mounting upon them.

The ladders being applied, they who have carried them, and they who come after, ſhould mount up and ruſh upon the enemy ſword in hand. If he who goes firſt happens to be overturned, the next ſhould take care not to be drawn down by his comrade; but on the contrary, help him to paſs between two ladders, and immediately mount himſelf, ſo as not to give the enemy time to load his piece.

As the ſoldiers who mount the firſt may be eaſily tumbled over, and their fall may cauſe the attack to fail, it would perhaps be right to protect their breaſts with the fore-parts of light cuiraſſes; becauſe if they can penetrate, the reſt may eaſily follow.

The ſucceſs of an attack by ſcaling is infallible, if they mount the four ſides at once, and take care to ſhower a number of grenades among the enemy, eſpecially when ſupported by ſome grenadiers and piquets, who ſhare the attention and fire of the enemy.

During the ſiege of Caſſel, under the Count de la Lippe, in the campaign of 1762, a young engineer undertook to carry one of the outworks with a much ſmaller detachment than one which had been repulſed; and ſucceeded with eaſe, from the uſe of grenades; which is a proof that grenades ought not to be neglected, either in the attack or defence of poſts,

If the ditch of a poſt is filled with water, and but middle-deep, that ſhould not hinder you from jumping into the ditch to attack, in the manner that has been mentioned; but if there is a greater quantity, and you cannot paſs, the ſoldiers of each platoon ſhould carry faſcines, or faggots of ſmall branches well bound, and made as large as poſſible, to fill up the ditch, and make a kind of ford, ſo as to get at the parapet, either to demoliſh or ſcale it.

Many ways of filling up the ditch, recommended by different authors, might be mentioned; but the faſcines are preferable to them all, as the ſoldiers can eaſily carry them before them, march quicker, and make uſe of them as a defence againſt muſketry, and, reaching them from hand to hand, ſoon make a ford.

If the approaches of the poſt are defended by chevaux de friſe, the firſt and ſecond rank of each platoon muſt break them down with hatchets; or with iron graplings tied to ropes, they may pull them to them, and ſeparate them. If it is a breaſt-work of felled trees, you muſt have faſcines thrown againſt the points, or upon the branches, upon which the ſoldiers can eaſily paſs. If there are two or three rows, you may burn them with dry faſcines lighted at one end, and thrown in the middle row. In caſe of trying this laſt ſcheme, the ſoldiers muſt retire to a little diſtance after throwing the faſcines, that the enemy may not ſee to fire at them by the light of the fire, but place themſelves ſo that they can fire upon any who may attempt to extinguiſh it. If there are chauſſe-traps, they muſt be ſwept away, by dragging a tree or two over the ground where they are ſcattered.

In the attack of detached buildings, you muſt ſeize the approaches, and ſtrive to ſcale them; to get on the top, and cruſh the people who are below, with the tiles or ſlates; but if the enemy has uncovered the houſe, you muſt throw as many grenades as you can in at the windows and doors; or dry faſcines, with lighted faggots dipped in roſin; or fire-balls, to endeavour to ſet fire to them, and ſmoke them out. If the weather is windy, you ſhould profit by it to ſet fire to the houſe, and try to ſhut up the loop-holes which the enemy have pierced near the ground, with bags of earth, ſo as to ſap the corners. If you have ſome cannon, you may ſhorten the ceremony, by planting them againſt the angles of the poſt. If you have none, you may ſucceſsfully ſuſpend a large beam by a rope, to three bars placed in a triangle, in imitation of the Roman battering ram: this beam puſhed violently againſt the walls, will ſoon make a breach; but you muſt obſerve, in ſuſpending it, to do it in a dark night, ſo that the enemy cannot prevent it by firing at the ſoldiers who are employed in the work. If it it glorious to get out with honour on ſuch an attack, it is no leſs ſo, to make it ſo as to coſt but few people. The blood of the ſoldiers is precious, and cannot be too much prized, and an able chief will neglect no means that can contribute to their preſervation. The comparing of two examples will ſhow the importance of what is advanced.

During the two ſieges of Barcelona, by Monſieur de Vendome in 1697, and Monſieur de Berwick in 1713. The firſt of theſe generals cauſed the convent of Capuchins, ſituated out of the place, to be attacked ſword in hand by ſeveral detachments of infantry, and carried it in three hours, with the loſs of 1700 men. Marſhal Berwick cauſed the ſame convent to be attacked in the year 1713. They were equally entrenched, and reckoning to make him pay as dear as Monſieur de Vendome had done; but this general having opened a ſort of trench before the convent, they not expecting to be attacked in form, ſurrendered at diſcretion, after having held it 24 hours. The reader is left to judge which example to follow.

You ſhould prepare for the attack of a village, or ſuch like poſt of large extent, as has been directed in the ſection for detached poſts: but as theſe ſort of attacks are always more difficult than others, on account of the multiplicity of ſchemes they have to encounter at every ſtep, an officer ſhould not march there till he is acquainted with the ſtrength of the entrenchments; the ſituation of the ſmaller poſts; the obſtacles to be met with in every ſtreet or ſquare; and even what terms the inhabitants are on with the ſoldiers of the garriſon.

If an officer takes his information from country people, he ſhould inquire in ſuch a ſeemingly careleſs manner, that they may not diſcover his deſign to the enemy, and they take meaſures to prevent them: he muſt likewiſe endeavour to be well aſſured of the reports of the peaſants, by comparing them with thoſe of the deſerters, and with what he has diſcovered himſelf. When he is well informed of the ſituation of the enemy, he ſhould then make his diſpoſitions for the attack, and obſerve to mention to thoſe who are to command the different platoons, all that they ought to do, either in real or falſe attacks. The real attacks ſhould be made in places that appear inacceſſible, becauſe the enemy, truſting to the difficulty of acceſs, are always leſs guarded there. He may likewiſe attack the houſes ſituated at the entrance of ſtreets, becauſe when they are once gained, it is eaſy to pierce the walls that ſeparate the houſes, from whence they can eaſily cruſh the enemy with ſtones, and force them to fly to their laſt entrenchment.

In an enemy's country whom you would not ſpare, it is eaſy, by ſetting fire to the four corners of the village, to force the beſieged to ſurrender; but, beſides its being inhuman to uſe means which tend to the devaſtation of a country, it is very dangerous to drive the inhabitants to deſpair, becauſe they then fly into the woods, gather in parties, ſcatter themſelves every where, murder the ſoldiers who ſtray, aſſaſſinate the ſutlers, hinder every peaſant from carrying proviſions to camp, and may deſtroy an army.

While the aſſailants have penetrated into the village, the commanders of each diviſion ought to take care to leave ſmall detachments at all the churches and ſquares they find; to ſtand firm and ſuſtain the main body in caſe they are repulſed. You muſt watch very carefully that the ſoldiers do not withdraw to pillage the houſes of the inhabitants, as whole detachments have been driven from towns and villages where they had penetrated, from having neglected this precaution.

Three days after the ſurpriſe of Cremona in 1702, ſome Germans were found in the cellars, where they had got drunk, and were aſtoniſhed when they were told that they muſt quit theſe agreeable retreats. An officer who would ſhun a diſorder ſo fatal, ſhould forbid his ſoldiers to ſtir from his party on pain of death; and by placing a ſerjeant in the rear of each diviſion, take care that no one falls behind.

If you find cavalry drawn up in the ſquares or open places, the aſſailants ſhould remain firm at the entrance of the ſtreets that meet there, while ſome go up to the houſes that are at the corners, and fire upon them from the windows: if this cauſes any diſorder among them, they ſhould be charged wiht fixed bayonets to make them ſurrender. If the interior part of the village is defended with cannon, you ſhould march quickly to the place where they are, and take them, or nail them up, or turn them againſt the enemy or principal poſt of the village.

Polybius, in his ſeventh book, gives an account of an attack full of inſtruction for military men. The blockade of Sardis by Antiochus the Great, had laſted two years, when Lagoras of Crete, a man of extenſive knowledge in war, put an end to it in the following manner. He conſidered that the ſtrongeſt places are often taken with the greateſt eaſe, from the negligence of the beſieged, who, truſting to the natural or artificial fortifications of their town, are at no pains to guard it. He knew likewiſe that towns are often taken at the ſtrongeſt places, from their being perſuaded that the enemy will not attempt to attack them there. Upon theſe conſiderations, though he knew that Sardis was looked on as a place that could not be taken by aſſault, and that hunger only could make them open their gates, yet he hoped to ſucceed. The greatneſs of the difficulties only increaſed his zeal to contrive a means of carrying the town.

Having perceived that a part of the wall which joined the citadel to the town was not guarded, he formed the deſign of ſurpriſing it at that place: he obſerved that this wall was built on the top of a rock which was extremely high and ſteep, at the foot of which, as into an abyſs, the people of the town threw down the carcaſſes or their dead horſes and other beaſts of burden; at which place great numbers of vultures and other carnivorous birds aſſembled daily to feed; and after having filled themſelves, they never failed to reſt upon the top of the rock or wall, which made our Cretan imagine that this place was neglected, and without any guard upon it.

On this thought, he went to the place at night, and examined with care how he could approach it, and where he ought to place his ladders. Having found a proper place for his purpoſe, he acquainted the king with his diſcovery and deſign; and the king, delighted with the project, adviſed Lagoras to purſue it, and granted him two other officers whom he aſked for, and who appeared to him to have all the neceſſary qualities for aſſiſting him in his ſcheme.

The three having conſulted together, they only waited one night, at the end of which there was no moon; which being come, they choſe 15 of the ſtouteſt and braveſt men of the army to carry the ladders, to ſcale the walls, and run the ſame riſk that they did. They likewiſe took 30 others to place in ambuſh in the ditch, and to aſſiſt thoſe who ſcaled the wall to break down a gate into which they were to enter.

The king was to make 2000 men follow them, and favour the enterpriſe by marching the reſt of the army to the oppoſite ſide of the town. Every thing being prepared for the execution, Lagoras and his people approached ſoftly with their ladders; and having ſcaled the rock, they came to the gate which was near them, and having broke it, let in the 2000 men, who cut the throats of all they met, and ſet fire to the houſes, ſo that the town was pillaged and ruined in an inſtant.

Young officers who read this account, ought to reflect on this attack. The attention of Lagoras, who went himſelf to examine the places proper for fixing the ladders; his diſcernment in the choice of the officers and ſoldiers who were to ſupport him; and the harmony of the whole means that were employed on the occaſion, afford very excellent leſſons for any officer who may attempt ſuch an attack.

SECT. VIII. *Of Surpriſes and Stratagems for ſeizing Poſts.*

All the environs that have any relation to the place the enemy occupies muſt be known; on what ſide lie the avenues, moraſſes, rivers, bridges, heights, woods, and all covered places that are in the neighbourhood, without which it is ſcarce poſſible to regulate approaches prudently. It is equally neceſſary to know nearly the number and kind of troops with which he poſſeſſes the poſt, that you may not attack him with inſufficient force. It is likewiſe neceſſary to know if the enemy is careful or remiſs in carrying on his duty. The knowledge of theſe circumſtances contributes infinitely to form a project of ſurpriſe well, and to conduct the whole expertly.

As to the manner of ſurpriſing a poſt, it is impoſſible to eſtabliſh certain rules on the ſubject; becauſe, among a thouſand means which chance offers, there are rarely two alike. The quickneſs of a concealed march upon a diſtant poſt negligently guarded; a thick fog which prevents being ſeen; a river where there is a ford the enemy is ignorant of; an aqueduct; a ſubterranean paſſage; a hollow road which is not guarded; a frozen rivulet; a blocked up paſſage; a ſecret correſpondence; a fair or market day, and diſguiſes of every kind, are the different ſtratagems that may be uſed as occaſion offers, and by which we may promiſe ourſelves ſucceſs though they have been frequently employed.

It muſt be obſerved, that there are ſtratagems with which it is impoſſible to ſucceed without a proper force to ſuſtain them. A town or village, for example, where we are introduced by a ſecret correſpondence, cannot be carried without being well ſeconded. The only means of managing the ſurpriſe of poſts well, is to have for a maxim to divide your force inſtantly, to ſeize the caſtle, church, church-yard, or public ſquares. It has been ſaid, that troops ſo divided can act but weakly, and run a riſk of being defeated ſeparately. But by making as many detachments as the enemy has poſts, in the diſmay cauſed by ſurpriſe, it is eaſy to carry theſe poſts before they who defend them have time to diſpute them or even look round them. The enemy being likewiſe obliged to divide, and not knowing what ſide to prefer, there is almoſt a moral certainty, that, ſtupified with the noiſe which they hear all round, they are ready to let their arms drop out of their hands: beſide, the horrors of a dark night, and the dread that cannot fail to ſeize a party who are ſurpriſed, repreſent objects much greater than what they are, ſo that they imagine they have to do with a whole army.

The bad ſucceſs of the affair at Cremona makes nothing againſt this opinion. If inſtead of ſtopping to make priſoners, a detachment had gone directly to the citadel, which ſhould be the way in all theſe kind of actions, it would have been impoſſible for theſe brave officers who drove out the Imperialiſts, to have made ſo glorious a defence.

M. de Schower did otherwiſe when he ſurpriſed Benevar in Spain in 1708, and did not fail. He learnt that the Spaniards neglected the guard of an old caſtle which was at the entrance of the place; and marching in the night he took it, and detached ſeveral parties to attack the town. Surpriſed with ſuch a viſit, they ſought for ſafety in flight, and ran to take ſhelter in the citadel, but were ſcarcely entered when they were made priſoners. The enemy did not think of the attack being begun where they were ſtrongeſt; but it is the beſt way, as it is to be preſumed they have divided their forces to be able to defend every where.

M. Menard, in his hiſtory of Niſmes, gives an account of the ſurpriſe of that town, which merits our attention. Nicholas Calviere, called captain St Coſme, having reſolved to make himſelf maſter of this place, engaged a miller whoſe mill was ſituated within the walls, at the ſide of the gate, to file the bars of a grate which ſhut up the entry of an aqueduct through which the water paſſed into the town, for ſeveral nights to put wax on the filed places to conceal them in the day, and to receive 100 men armed into his mill, while a conſiderable body of cavalry and infantry ſhould arrive from different places to ſuſtain the enterpriſe.

The day for the execution of his project being fixed for the 16th of November 1569, and proper orders given for the rendezvous of the troops, St Coſme came out of the mill with his party at three o'clock in the morning, and advancing to the guard at the gate, put them to the ſword, and opening the gate let in 200 horſemen, with each a foot ſoldier behind him. Theſe troops having entered the town, formed ſeveral detachments immediately: one of which went to block up the citadel; while the reſt, ſcattering over the ſquares of the place, and ſounding their trumpets inſtantly, made themſelves maſters of the town.

There are a number of circumſtances mentioned in this ſurpriſe, which convey a great deal of uſeful inſtruction. Captain St Coſme knew how to profit by the negligence of the governor, who omitted to guard the entrance of the aqueduct; to make a proper choice of cavalry for advancing ſo readily with the infantry from different quarters; the juſtneſs of the orders given the troops, which brought them 15 leagues from Niſmes at the hour and place appointed for the rendezvous; the precaution with which he inveſted the citadel, to prevent his having to do with the garriſon in the ſtreets; his attention in dividing his troops into the different quarters of the town, and making them ſound their trumpets, that the inhabitants might imagine they were very numerous.

There are inſtances of ſurpriſes ſucceeding from ſingular addreſs. Captain Brachia, wanting to make himſelf maſter of a tower in the territory of Amberſa, cauſed one of his ſoldiers to diſguiſe himſelf like a woman, and gave him a baſket in his hand with a ſickle. This man ſo diſguiſed ran as faſt as he could to the tower, pretending to have fled from a party of the enemy: the guard let him enter and mount a ladder to the top of the tower to ſhow the ſentry where the enemy was; but he was ſcarcely got up, when he clove the ſentry's head with the ſickle, ſeized his arms, and obliged thoſe who were below to abandon the poſt.

The active corps of the partiſan, without truſting to the ſtratagems that others have ſucceeded by, muſt find other reſources than thoſe againſt which people are ſo prepared now-a-days; and as the ſurpriſing of the enemy is the great buſineſs of the partiſan in carrying on the Petite Guerre, he muſt ſee what can be effected by his hardineſs and activity.

The expedient which appears to be the moſt proper for an officer who has 400 infantry under his command, and is certain that the garriſon is only 200, (for ſurpriſes ſhould be always attempted with a double force) is to chooſe very bad weather; the ſtrong winds, for example, and fogs in winter; or the ſtorms and tempeſts in ſummer, when, after exceſſive heats, violent winds riſe ſuddenly, and agitate the air.

When you have meditated ſuch a ſcheme, then is the time to put a part of your infantry in covered waggons, which ſhould be kept ready for the purpoſe. The whole party ought to be provided with dog-ſkin covers for their gun-locks and cartouch-boxes, to take off readily when there is occaſion; and the reſt of the infantry to be mounted behind part of the cavalry. Both parties to aſſemble at ſome place a league diſtant from that which you would ſurpriſe, and there to ſtop; when, if you ſee the bad weather diſſipating, you muſt retire till another occaſion. If you renew it ten times, you need not deſpair; a ſtrong place deſerves this trouble; the blow is too honourable and too important to loſe courage, and ſucceſs will overpay every fatigue.

But on the contrary, if the ſtorm forms, and the wind increaſes, direct your approaches in ſuch a manner, that you may always have the wind on your back; becauſe if you have it in your face, the enemy's ſentries can look forward and diſcover you; and likewiſe if it is in your face, your horſes cannot be made to advance without a great deal of trouble. Theſe precautions being taken, you advance more quickly as the ſtorm increaſes, the horſes and waggons going with great ſpeed before the wind. You need be in no uneaſineſs about the enemy's ſentries ſeeing you, or hearing the noiſe of your march; becauſe the ſeverity of the weather obliges them to enter their boxes, and turn their backs to the wind, to ſave their eyes from the duſt and ſharpneſs of the air.

At 300 paces from the place, the foot and part of the cavalry ſhould diſmount and fix their bayonets, the reſt of the cavalry to remain with the waggons near ſome trees or houſes, the waggons turned for a retreat. Divide your infantry into five detachments, and inſtantly run at a great rate, keeping your men as cloſe as poſſible, and paſſing the barrier and gates, ſeize all the ſentries and the guard without firing or making the leaſt noiſe, which may be executed with an extreme quickneſs, to be acquired by practice. While the firſt detachment ſeize the gate and all the ſentries of its environs, the reſt muſt run rapidly into the town. One muſt go quickly to ſeize the main guard; another to ſeize the governor or commanding officer; the fourth, which ſhould be the ſtrongeſt, ſhould fly to the caſerns or mens barracks, to ſeize their arms; the fifth to remain in the ſtreet near the gate for a corps de reſerve.

Every detachment muſt be conducted by priſoners made at entering; and orders ſent with all ſpeed, to cauſe half the cavalry to advance and patrole the ſtreets, as the infantry get forward.

As this kind of ſurpriſe can ſucceed only under favour of a ſtorm, which rarely continues any time, it is evident that the march and execution muſt be conducted with inexpreſſible ſwiftneſs, and the orders be perfectly underſtood. It is true, that rain is inconvenient for the infantry, whoſe feet ſlip on clay-ground; but they muſt do their beſt, and frequently it is found that the roads which are moſt uſed are not therefore the moſt ſlippery.

If it happens that you are perceived in taking poſſeſſion of the gate, and they take the alarm, you muſt quickly divide your party into two wings, mounting them on the rampart, the one to the right, the other to the left; and ſeizing the loaded cannon, turn them upon the town; and at the ſame time ſummon the garriſon to ſurrender. If you happen to fail, and are obliged to retire, you do not riſk much, as they will not care to moleſt your retreat.

There may be a reluctance in attempting ſuch a ſurpriſe; it may appear to be hazardous and raſh, and a conduct too nice not to deſpair of ſucceſs: but Mr Jeney ſays that experience convinces him of the validity of the means propoſed, and relates what happened to him upon two occaſions, to prove that the cold eaſt winds or ſtorms are the moſt proper times for attempting ſurpriſes.

Being at the head of 30 huſſars, ſays he, and willing to ſhun a ſtorm which was gathering behind us, I puſhed to get to a place which was well fortified and occupied by a numerous garriſon: the wind was ſtrong, and I paſſed the barriere and all the gates with my horſes, which made a great noiſe, without any ſentry either ſeeing or hearing; and though I called to the firſt guard to declare myſelf, no one perceived me. I croſſed the whole town without ſeeing a ſoul in the ſtreet; and hurrying to an inn in the other ſuburbs, I went out at the gallop, and ſaw only the ſentry at the laſt barriere, to whom I anſwered without our comprehending one another; nevertheleſs the rain had not begun to fall, but the wind was violent. I experienced the ſame during the winter, when the eaſt wind was very proper to facilitate the ſurpriſe of a fortified town or poſt. On Chriſtmas night 1757, I paſſed through the country of Hanover with 80 horſe between two guards of the enemy without being perceived. I marched over the middle of a plain when the night was clear, with a violent eaſt wind, which prevented any ſentry from turning his head to look at me, and I went quietly to carry off horſes in the rear of their army. The following night at my return, I paſſed two different poſts of our army; the one guarded by a party of huſſars, the other by a regiment of dragoons, without being ſeen but by one ſentry in the middle of the dragoon poſt, who durſt not challenge, becauſe it was no longer time, having paſſed the firſt guards.

You may likewiſe take the advantage of bad weather to ſcale all ſorts of poſts ſurrounded with walls, as towns, abbeys, caſtles, &c. to do which, you muſt approach in the dark, and ſeize the moment of a great ſquall, or when a cold eaſt wind obliges the garriſon to take ſhelter from the rigour of the ſeaſon: then there is no one upon the ramparts, and the ſentries turn their back to the wind, or remain in their boxes, while your people are warm with marching, and animated with the hopes of ſucceſs. You need not be apprehenſive of the enemy ſeeing you if you advance on the ſide next the wind to place your ladders, becauſe the ſentries will cover their faces, and bend down their heads to ſave them from cold.

The time of a thick fog is not leſs favourable for approaching and forcing an entrenched poſt. When the fog is low, the infantry ſhould creep on all fours, the better to conceal them from the enemy's ſentries. Theſe ſort of ſurpriſes are the leaſt dangerous, you run ſcarcely any riſk; but if you cauſe ſome falſe attacks, the garriſon will not fail to run to arms, and ſometimes make you pay dear for failing.

When you would ſurpriſe the enemy in a village, farm, monaſtery, or ſome place detached from the army, you ſhould divide your party into two bodies, each compoſed of cavalry and infantry; the one to take the enemy in the rear, the other in front, taking care to cauſe ſome waggons to follow, which may carry off the wounded in caſe of need. You muſt calculate exactly the time it will take the firſt detachment to go round the enemy. The two commanders ſhould agree on a word for rallying, and the time of making the attack, which ſhould be in the night, eſpecially if the poſt is ſo diſtant from the army that they can receive no aſſiſtance; for in that caſe the time is favourable till day-break. They muſt regulate their departure according to the diſtance they have to go; and the detachment which goes round the enemy, ought to take no more infantry than can be carried behind the horſemen. This detachment having got round, ſhould form about a quarter of a league from the poſt, and 100 paces out of the road.

When the other detachment has arrived within a quarter of a league of the poſt, your cavalry ſhould form out of the road with the waggons and drums near them, who are not to advance till ten minutes after the departure of the infantry, who muſt advance towards the fires of the enemy, ſtooping as much as poſſible. They muſt take care to conceal themſelves from patroles, as has been directed; and when they ſee them paſſed or entered the poſt, the infantry muſt hurry on to gain the village, and clear the entry by which the cavalry muſt paſs, in caſe it has been barricadoed with waggons. You muſt run rapidly to the place where you ſee the fires lighted, and make as many detachments as you ſee fires, in order to ſurpriſe the whole at once.

The cavalry who followed ſlowly, muſt inſtantly join to the noiſe of your arms and cries their trumpets and drums, advancing with all ſpeed, and leaving only a non-commiſſioned officer with ſome horſemen near the waggons. The detachment, which is advanced on the other ſide of the village to turn the enemy, on hearing the alarm, muſt immediately advance, ſounding trumpets, beating drums, and attacking all who would ſave themſelves on that ſide. You may rely on it as certain, that the enemy, ſeeing all his guards ſurrounded by your infantry ſcattered in the village, and hearing the march of different bodies of foot and horſe who arrive on all ſides, will not delay to ſurrender, or ſeek to ſave himſelf by a diſorderly flight; it will be eaſy then for your cavalry to fall upon the flying, and ſtop them. The party ſhould be forbid to purſue the enemy more than a quarter of a league in the night; but no purſuit at all ſhould be attempted, if it is in an incloſed country.

The poſt being taken, the booty and priſoners ſhould be ſent off immediately under the care of the infantry, putting the wounded in waggons, or on the horſes that are taken, the cavalry making both the front and rear-guard, and taking care to have the laſt the ſtrongeſt. When the enemy's poſt is ten leagues or more diſtant from yours, it is certain that they will have leſs diſtruſt, and be more eaſily ſurpriſed. In that caſe the infantry, with a lieutenant and 20 horſemen, ſhould ſtop at half way, concealed in a wood or farm, keeping conſtant guard.

The commanding officer ſhould leave this place at the head of the reſt of the cavalry; and if he finds that he cannot arrive that night, he muſt cauſe them to carry refreſhments. He muſt likewiſe take an intelligent guide from thence, to whom he muſt not communicate his deſign, till they have gone ſome way on the road towards the enemy. He muſt accompany his declaration with promiſes and threats, aſſuring him that he will generouſly reward his zeal and fidelity; but will kill him or ſet his village on fire if he attempts to deceive or run away.

At ſome little diſtance from the place, you muſt quit the road on the right or left, and be conducted to another, which leads to ſome height the moſt convenient for paſſing a league on one ſide of the enemy's poſt. In bad winter weather you need not keep at ſuch a diſtance, becauſe there is leſs riſk of meeting any one in the country.

When you get as far as the poſt, you muſt move obliquely to the road which leads from the enemy's army, and by which you muſt advance to attack the poſt. If it happens, that for want of roads the guide muſt conduct you over fields and meadows, it is of little conſequence, provided that the route is conformable to the deſign.

A genius for war has ſometimes puſhed boldneſs ſo far, as to ſurpriſe the wings of an army, encamped in a level country, on a plain uncovered on all ſides. This ſort of ſurpriſe is a temerity that is ſcarce to be imitated. The danger is great; and the retreat of ſo ſmall a corps as that of a partiſan, runs always the riſk of a total defeat, unleſs it happens in the middle of a dark night, which can conceal your approach or your flight: but it likewiſe expoſes you to take ſome very dangerous ſteps in the dark; to wander from your route, and

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Fig. 1.

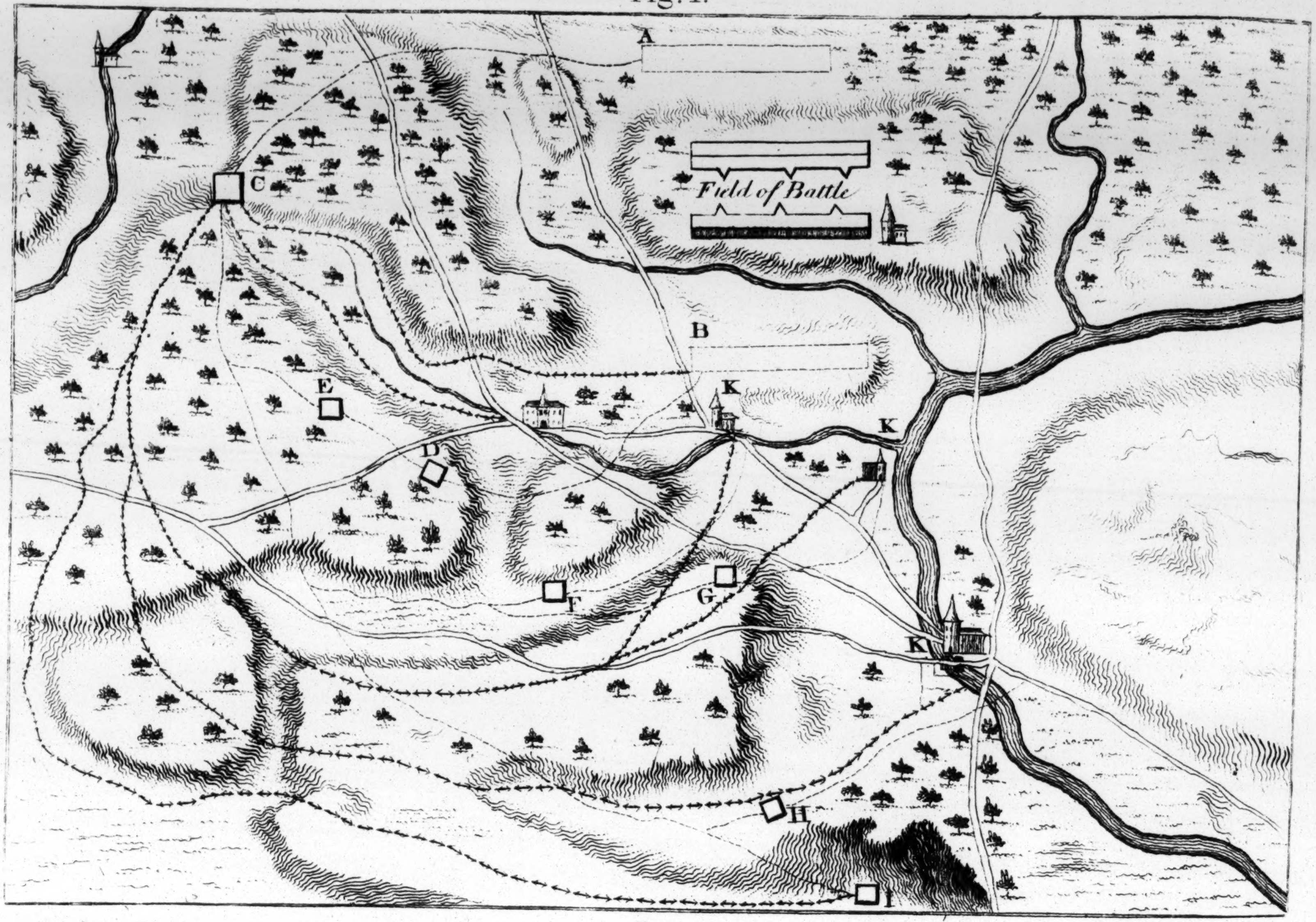
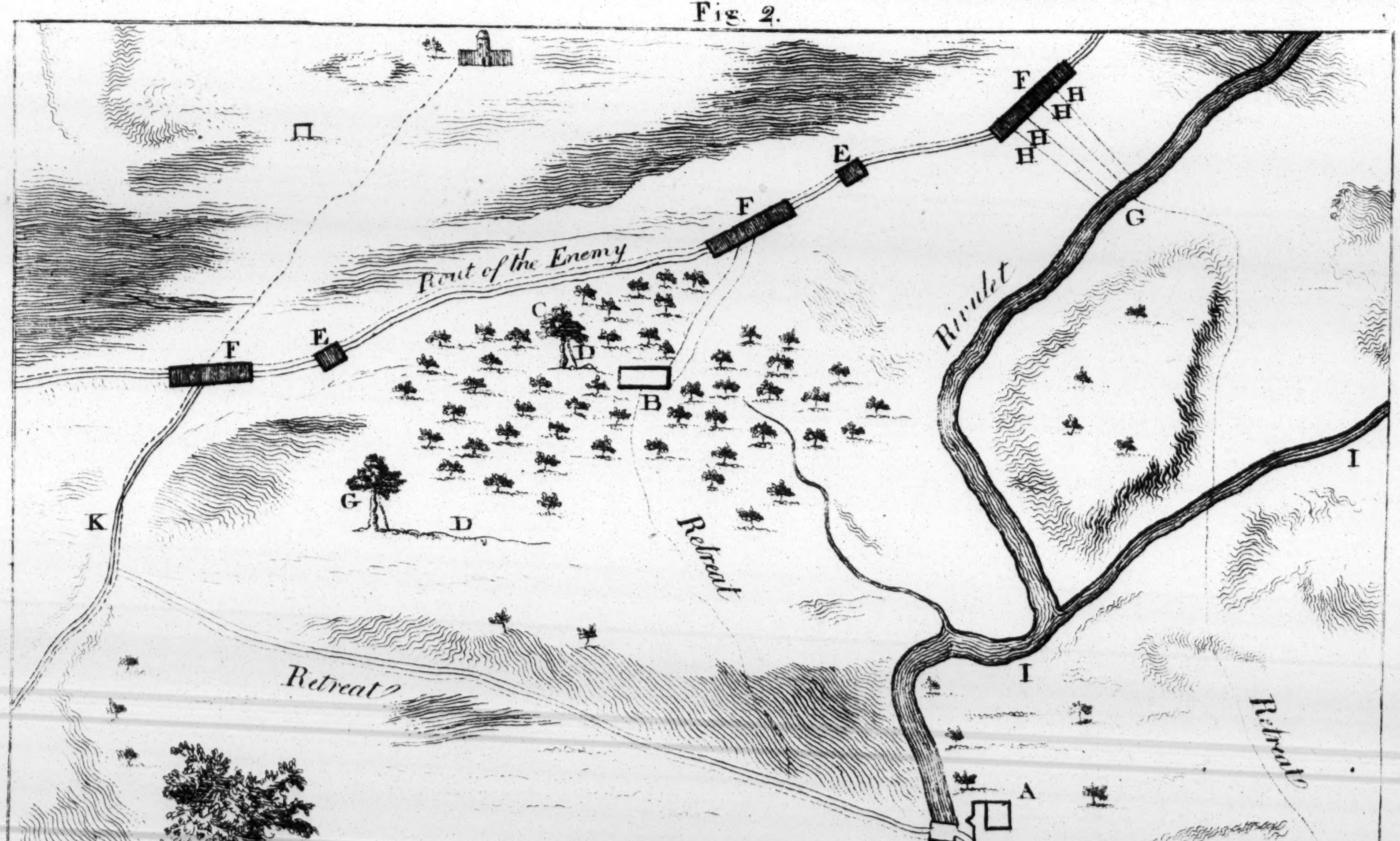

A
Field of Battle
C
B
E
K
K
D
G
F
K
H
I

Fig. 2.


F
H
H
H
H
E
F
G
Rout of the Enemy
Rivulet
C
F
E
D
B
I
G
D
K
Retreat
I
Retreat
Retreat
A

J. Bell Sculp.

and to diſperſe your people: for which reaſons ſuch attempts are never adviſeable,

The caſe is very different when the enemy's camp extends into a mountainous country, covered with woods to ſecure your retreat; for then, with the aſſiſtance of a good guide gained by money or promiſes, you may be conducted in the night into woods, and ſecure your approaches by gullies and bye-ways.

You muſt take great care, in coming out of the wood, that you do not come upon ſome poſt in the front of the wing you want to ſurpriſe; becauſe, in that caſe, you muſt leave a detachment of infantry at the paſſage. While your cavalry advance to get round their advanced poſt, another detachment of cavalry and infantry muſt place themſelves oppoſite to the flanks of the poſt. You muſt then fall briſkly upon the wing of the camp with cavalry alone, and at the ſame inſtant the detachment left on the flanks muſt attack the poſt with the infantry ſtooping as they advance; and in the attack, both ſhould ſet up a moſt frightful cry to alarm the whole army.

As it is certain that the piquet of the army will not delay to run to their aſſiſtance, you muſt inſtantly ſeize and carry off whomſoever you meet, officers, ſoldiers, or their horſes, and every thing you can take away, making haſte to regain the paſſage. The cavalry ſhould go firſt with the booty and priſoners, the infantry making the rear-guard till they are out of the wood, and then take the front. You muſt endeavour to make at leaſt half the retreat that night, and be ſure that the enemy does not follow you in the night, leſt you be taken in flank.

There is no time more precious for a partiſan, or that merits ſo much attention, as that of a battle, when every one is attentive to the great firing which they hear on all ſides; to the manœuvres of the armies that are engaging; to the deciſion of an affair of the greateſt importance, upon which the fate of each depends. It is then that he can employ his ſkill to the greateſt advantage; ſtrike the ſevereſt blow that is poſſible; cauſe the ruin of the enemy; pillage the quarters of their generals; carry off their equipages; defeat their guards; ſet fire to their camp, and ſpread an alarm over all, which may contribute to the defeat of an army.

But meaſures muſt be taken to execute ſo great, ſo brilliant a project, with ſucceſs; and it ſhould not be engaged in, till after having prudently regulated the deſign on three principal circumſtances, viz. the ſituation of the enemy's camp; the means of approaching it; and the hour of engaging. When the enemy's camp is in the middle of a great plain, or on a height with an extenſive view on all ſides, it is certain that one cannot approach without being ſeen at a diſtance: and in that caſe, prudence will put a ſtop to zeal, and prevent raſhneſs from attempting impoſſibilities; but when their poſition extends over a country covered with mountains, woods, or villages, the occaſion is more favourable, and may almoſt inſure ſucceſs.

It is then very advantageous for a partiſan to be perfectly acquainted with the ſituation of places that are in front of his army; eſpecially when he foreſees that the enemy will ſooner or later come to encamp there. What aſſiſtance would it not give for the direction of his project, if he knew how to take a plan of that part of the country which he propoſes to invade, before-hand? Then, without the weak and dangerous aſſiſtance of ſpies and deſerters, he can by his own proper knowledge think of every means for executing a deſign, which ought to be regulated and conducted with impenetrable ſecrecy.

When he perceives by the motions of the armies that they are on the eve of an action, he muſt not delay to acquaint the general with his project. If he conſents, he will regulate the reſt, and the time of departure, according to the advices which he receives.

As theſe ſort of expeditions cannot be made but by long circuits, they muſt take the time neceſſary for the march. In the campaign of 1757, the duke of Richlieu cauſed his army to advance near Zell to attack our army; and ſent a partiſan with 100 horſe to the rear of the camp the day before, who, having made a march of 22 leagues, arrived without any accident: but the prudence of the prince of Brunſwick defeated his deſign, and left him to admire his retreat; nevertheleſs, they picked up ſome ſtragglers, horſes, and waggons.

Among the meaſures that ought to be taken to ſecure the blow, and ſtrike it more effectually, it ſhould not be forgot to diſtribute cockades like the enemy's to all the cavalry; and to give a ſtick of ſix feet long to 20 of each detachment, with a bit of torch fixed on the end, and covered with a little dry ſtraw or hemp, to kindle inſtantly.

The whole party to ſet out from the camp A, (fig. 1.) marching under the conduct of a good guide by covered ways, at a diſtance from the enemy. Being come to the place C, which ought to be in the environs, and as high as the field of battle, the infantry ſhould be concealed out of the road far from the ſight of paſſengers. This muſt be the centre of correſpondence with the army; the rendezvous of the booty; and ſupport the retreat of all the cavalry, of which there ſhould be as many detachments formed as you purpoſe to make attacks. We ſhall ſuppoſe ſix of a hundred men each, and they muſt go ſecretly by particular routes to their reſpective poſt E, D, F, G, H, I. Neither trouble nor expence ſhould be ſpared to procure good guides. Each detachment ſhould lie in ambuſh half a league, if neceſſary, from the object of the attack, BKKKK.

Plate. CCC

The noiſe of the muſketry of the armies to be the ſignal for their irruption; and then bravery, intrepidity, and courage, will give wings to your people. The ſecond detachment D will glance imperceptibly between the villages, and fall like thunder upon the camp B; and while 80 attack all whom they meet, the other 20 ſhould light their torches at the fires that are to be found every where, and ſpread the flames rapidly to the ſtraw of the tents. As they cannot fail to have the piquet of the camp ſoon at their heels, they muſt ſtrike their blow with all poſſible quickneſs without ſtoping to plunder; being content with the glory of having excited a general alarm, capable of confounding the whole army, and contributing to the gaining of a battle.

At the ſame time that the detachment D attacks the camp B, the others E, F, G, H, muſt with equal violence attack the villages K, K, K, K, which they have in front, doing the ſame the firſt did in camp, except that they may plunder every thing which they can eaſily carry off of the generals equipages, with which theſe villages are commonly filled; ſeizing the beſt horſes, hamſtringing others with the ſtroke of a ſword, and ſetting fire to all the places which contain the enemy's baggage. Each detachment ſhould cauſe ſome horſemen to advance beyond the village, to obſerve the motion of the troops that will not fail to run to their aſſiſtance. As ſoon as they perceive them, they muſt make their retreat as faſt as poſſible by the routes which the commanding officer has premeditated, and which are propoſed to be repreſented by the coarſer hatched lines. The ſixth detachment I, in ambuſh on the ſide of the road leading from the camp, ſhould remain there, to ſeize all the enemy who think of ſaving themſelves by flight.

There is no danger to be apprehended in theſe expeditions, during the critical inſtant while the armies are engaged, and all the troops a great way in the front of the camp; you meet none but ſutlers, ſervants, lame people, and ſome piquet guards ſcattered here and there, whom you may eaſily defeat as they advance. The commanding officer ought to have an eye over all; and as ſoon as he perceives ſome bodies of troops advancing upon him, he ought to retreat quickly, and at leaſt gain the entrance of the wood.

Each detachment having rejoined the infantry, muſt there wait the fate of the battle; ſo that if it is decided in favour of their army, they may ſpeedily regain the propereſt places for harraſſing the enemy on his retreat. Theſe moments are the more favourable, as diſorder, dread, and noiſe, render all defence impracticable. But all theſe ſort of ſurpriſes require places proper to cover approaches and retreats.

Having mentioned the neceſſity of a partiſan's being maſter of the languages, and the advantage deriving from addreſs in carrying a poſt by ſurpriſe, the following inſtance may ſerve as an illuſtration of it.

In the campaign of 1760, that excellent general and true genius of a partiſan, the prince of Brunſwick, was ſituated at ſome diſtance from Zerenberg, at that time in the poſſeſſion of the French; and being informed by two Hanoverian officers, who had been in the town diſguiſed like peaſants, that the garriſon were very remiſs in their duty, truſting to the vicinity of their army, and the diſtance of ours, the prince was reſolved to ſurpriſe them; and after appointing a corps to ſuſtain him, he advanced in the night with Major Maclean of the 88th regiment; and 200 Highlanders, with bayonets fixed and their arms not loaded, followed at a little diſtance. Upon the firſt ſentry's challenging, the prince anſwered in French, and the ſentry ſeeing but two perſons advancing, (whom he believed to be French,) he had no diſtruſt; ſo that the major getting up to him, ſtabbed him, and prevented his giving the alarm. The Highlanders immediately ruſhing in, attacked the guard with their bayonets, and carried the town, having killed or taken the whole garriſon of 800 men.

The French officer who commanded at that time in Zerenberg concerted a ſcheme for being amply revenged, which failed only by a moſt trivial accident. When almoſt every houſe in Bremen was filled with corn, being the grand magazine and grand hoſpital of our army, this officer held a ſecret correſpondence in the town, which informed him of the ſtate of the garriſon, and that there was a general order to let couriers going to the army paſs out at all hours. He diſpatched about 20 huſſars to ſcamper over the country, who were all that were heard of his party, while he marched 15000 infantry from Duſſeldorp to Bremen (about 200 miles), concealing them in woods by day, and marching in the night. He arrived at the gate at the appointed hour; when a perſon on horſeback blowing a horn came along the ſtreet, and deſired to paſs out to the army. The officer of the guard had the keys, and happened to be out of the way; and while a meſſenger went for him, the people without growing impatient, began to break down the outer barrier, which made the ſentry fire at the place where he heard the noiſe; and the guard taking the alarm, got upon the rampart, and likewiſe fired at the ſame place: upon which the pretended courier galloped back; and the French, believing that they were diſcovered, relinquiſhed their ſcheme, and retired.

This example proves that no diſtance is a ſecurity from ſurpriſes, and that very conſiderable parties may paſs over a great extent of country without being diſcovered. The following inſtance of that preſence of mind ſo much the happineſs of all who poſſeſs it, and more particularly of a military man ſo expoſed to ſurpriſes, deſerves to be recorded.

In the month of February 1761, when Prince Ferdinand beat up the quarters of the French, they were obliged to retire a great way without being able to reſiſt: However, when they came to collect their force, and to recoil upon our army, Sir William Erſkine with the 15th regiment of light dragoons was in a village in our front. In a very foggy morning, ſoon after the patroles reported that all was well, Sir William was alarmed by his vedettes having ſeen a great body of cavalry coming to ſurpriſe him. He inſtantly mounted his horſe, and ſallied out at the head of the piquet of 50 men, leaving orders for the regiment to follow as faſt as they could mount, without beating a drum or making any noiſe. He attacked their advance-guard in the curſory manner of the light cavalry, and continued to do ſo, while his men were joining him by tens and twenties and the French cavalry forming to reſiſt an attack, till he collected the whole, and then retired, the ſurgeon of the regiment (Mr Elliot) having in the mean time carried off the baggage.

Strokes of this kind diſplay a ſuperiority of genius, and to that alone was the preſervation of the regiment owing. Had a drum beat to arms, the enemy muſt have known that they were unprepared, and probably would have ruſhed in and deſtroyed them; but the attack convinced them that they were diſcovered, and made them think only of their own preſervation.

Among many inſtances in the courſe of the war, the ſucceſs of this officer on another occaſion, where he diſplayed the moſt ſingular addreſs, likewiſe merits our attention. After a repulſe, and a march of 72 miles in one day, when the men were fatigued and ſcarcely a horſe able to trot, he ſaw a regiment of French infantry drawn up with a moraſs in their rear. He left his own corps, and advancing to the French, deſired to ſpeak with the commanding officer, whom he entreated to ſurrender to prevent their being cut to pieces by a large body of cavalry that were advancing. The French officer deſired leave to conſult with his officers, which having done, they refuſed to ſubmit; but upon Sir William telling them that their blood muſt be on their own heads, and turning to move off to his own corps, they called to him, and laying down their arms ſurrendered to his harraſſed troops.

Such ſtratagems overleap the bounds of inſtruction, and no author will preſume to propoſe them for imitation. Here was the reaching out the hand to fortune which Vigetius recommends: but there are few who have the requiſite talents from nature; and we may as properly ſay of the ſoldier as of the poet, *naſcitur non fit*.

To ſurpriſe and carry off ſome general officer, or other conſiderable perſon in ſome diſtant place in the rear of the enemy's army, you ſhould take only a detachment of 12 horſemen, known to be worthy the confidence of the commanding officer, and who you can depend upon will not deſert to betray you. Each horſeman ſhould have a double ſurtout with the two ſides like two different regiments of the enemy; ſo that, being perceived under one colour, they may quickly turn them, and appear again under another. This diſguiſe will hinder the country people from making a juſt report, and agreeing in the route the party have taken. They muſt take great care to keep at a diſtance from all roads, and not to ſtop but under cover. The quarter-maſter muſt take care to procure refreſhments from ſome place in the neighbourhood, where they muſt pay ready money, and not fail to do ſo till the blow is ſtruck.

Sect. IX. *Of Ambuſcades from the Partiſan.*

An ambuſcade may be formed in any place covered by art or nature in which a party may be concealed to ſurpriſe the enemy in paſſing; and the proper uſe of them is, of all the ſtratagems in war, the beſt calculated to diſplay the genius, ſkill, ſpirit, and addreſs of a partiſan. They are eaſily carried into execution in woods, buildings, and hollow places; but require a more fertile imagination, and greater trouble, in a level country. Both ought to be regulated by the knowledge of the enemy's march, and the extraordinary means that may be employed to ſurpriſe them.

When a partiſan has information that can be depended on of the march of ſome part of the enemy; whether a convoy of artillery, baggage, or proviſions; a body of recruits, or horſes to remount the cavalry; an eſcort of a general officer going to rejoin, or reconnoitre ſome country; he ought to apply directly to procure a ſufficient knowledge of the route that the enemy is to take, the ſituation of the places he is to paſs, and of the poſt he goes to. The better to cover his deſign, he muſt get information of the roads that lead to oppoſite places, which he muſt pretend to be attentive about, as has been mentioned in the ſection of Reconnoitring.

Having perfectly concerted his plan, he ſhould ſet out at the head of his detachment if poſſible, and leaving his poſt on the ſide oppoſite to his true route, the better to conceal his deſign. If the place where he intends to plant his ambuſcade is not diſtant, he ſhould come into his true route about half way, and there place half his infantry in ambuſh to favour his retreat. But when the country where he propoſes going is diſtant, and the march requires at leaſt two nights, he muſt conduct his party by meandring from wood to wood, if there are any. He muſt not forget to provide neceſſary refreſhments for the day, which muſt be paſſed in ſome concealed place where he may not be perceived, and muſt cauſe three rations of oats to be carried for each horſe.

The firſt night you muſt make to ſome wood or other place proper for paſſing the day near ſome rivulet, and, if poſſible, on the road of your retreat to leave a part of your infantry in ambuſh, in caſe there is no other water to paſs till you come to the place of your principal ambuſcade; for when there is ſtill a river or canal to paſs you muſt conduct the infantry to the paſſage, and chooſe the moſt convenient place to fix them in ambuſcade.

If there is no bridge or ford, the cavalry muſt ſwim over, in which we ſuppoſe the horſes are practiſed. When there is a ford, half the infantry ſhould paſs behind the cavalry, to go along with them. In caſe there is a bridge to paſs near the village, the officer who is left in this poſt with ſome infantry, ſhould be enjoined to allow no one peaſant or ſoldier to leave the place; and for greater ſecurity, a ſmall detachment of cavalry ſhould remain with him, to ſtop any who may attempt to run away before the return of the whole corps, who ought not to delay long. If the enemy come in the interval to attack the bridge, it muſt be defended till the return of the party, that their retreat may not be cut off.

The following caſe will prove its importance. The Count Eſterhaſy being detached with 300 cavalry to levy contributions in the environs of Straſbourg, left a lieutenant with 30 men to guard the bridge at Wolfſheim: the lieutenant, from ſome motive or other, quitted his poſt, when, happily for the detachment, chance brought Mr Jeney there with 10 chaſſeurs; and he was ſcarcely arrived, when he ſaw three large parties of French huſſars advancing to take poſſeſſion of the paſſage. He had only time to throw himſelf with his ſmall party in a hurry into a mill that ſeemed to command the bridge, and having made loop-holes through the wall, he kept ſuch a conſtant and deadly fire, that he diſputed the paſſage till Count Eſterhaſy's detachment, hearing the noiſe of the muſketry, came almoſt a league, ſurpriſed the enemy in the rear, and in five minutes took 80 horſes and ſeveral priſoners.

Every precaution being taken to guard the bridge, the commanding officer ſhould be diligent to arrive at the place of ambuſcade two hours before the enemy is to paſs, and place the ambuſcade on the ſide he would retire to; never on the other ſide, if poſſible, leſt the advanced guard happen to diſcover you, and oblige you to repaſs in ſight of the corps, who, ſeeing your ſtrength, may ruſh upon you and drive you back.

Plate CCC.

The infantry A (fig. 2.) ought to be ambuſhed at leaſt 600 paces behind the cavalry B, ſo that if they are purſued, they can fall back to A, and both afterwards to the guard at the bridge, or to the infantry that are in ambuſh at half way.

If the ambuſcade is placed in a wood, an intelligent non-commiſſioned officer ſhould be choſen to get upon a high tree C, from whence he can ſee the march of the enemy, and give notice of the moſt eſſential circumſtances. There are three: the firſt is, the ſeeing the advanced guard; the ſecond is, the approach of the corps; and the third is, the time when their front is advanced as far as the ambuſcade B: for which the commanding officer ſhould inſtruct the obſerver what ſignals he is to make from the top of the tree, to communicate the neceſſary information without ſpeaking, which may be done by the means of a ſmall cord D, of a brown or green colour, ſo as to be leaſt perceivable. Let this cord be placed as in the plan, ſo that no branch interrupt it, with one end in the hand of the obſerver, and the other in the commanding officer's in the ambuſcade B.

As ſoon as the advanced guard appears, the obſerver muſt pull the cord, and the commanding officer cauſe the party to mount and remain in deep ſilence. If by a ſtratagem, which is frequently practiſed for particular reaſons, the advanced guard is immediately followed by the corps, which may eaſily be known by their being more numerous than ordinary, and not followed by any other corps, that you may not be deceived by the enemy, the cord ſhould be drawn a ſecond time, and a third time when their front is advanced as high as the ambuſcade; upon which you muſt ruſh out, and pour furiouſly upon the flank of their centre in the following manner.

If the advanced guard E is formed only of an ordinary number, they ſhould be let paſs; and at the approach of the principal party or convoy F, the chief to be informed by the ſecond pulling of the cord. At the moment the head of the convoy ſhall be advanced as high as B, the cord muſt be pulled the third and laſt time; at which ſignal the whole party muſt ruſh out without being perceived, and ſuddenly attack the centre upon the flank, engaging only with their ſwords, and making ſuch a noiſe as to prevent the enemy from hearing the orders of their officers. They muſt diſarm all whom their bravery or chance throws in their way, taking care not to ſcatter or purſue too far, unleſs you are ſure that they are ſo far from their army or other parties that they cannot be aſſiſted; for in either of theſe caſes, they will not fail to run at the noiſe, and diſturb your retreat.

In all ſecret expeditions you ought to be extremely circumſpect that you may not be ſeen or betrayed. If the advanced guard diſcovers you before the blow is ſtruck, abandon the enterpriſe immediately, and retire. When your guide, or ſome one of your party deſerts, and you cannot catch them, think immediately of retreating, or placing your ambuſcade ſomewhere elſe; therefore, to prevent ſuch a misfortune, the officers ſhould be charged to examine frequently if they have all their people.

You ſhould never form an ambuſcade for cutting off the enemy's retreat, as this manœuvre will give him an idea of rallying, and attacking you in deſpair; but the caſe is different when you are well informed that you run no riſk in ſtopping his whole force, either from the nature of the defile where they cannot form, or from the ſmallneſs of the number which cannot reſiſt.

It is equally difficult and dangerous to form ſeveral ambuſcades at once; the more are formed, the more they are expoſed to be diſcovered, and leſs in a ſtate to unite for a retreat: but we except when they are to be employed to ſeize foragers; for then it is very proper to form ſeveral, and to diſpoſe them in ſuch a manner that the ſentries can ſee from one to another. Theſe diſpoſitions being made, they who chance to be next the foragers muſt ſtrike the blow, while the others march to ſecure the retreat of their companions, as ſoon as they perceive it.

In all ambuſcades, no ſentries ſhould be placed but officers, or non-commiſſioned officers. On downs, behind mountains, or in gullies, the ſentries ſhould lie with their bellies on the ground, and their feet towards the ambuſcade, the body covered with a grey or green cloak, according to the colour of the ground, with their heads a little raiſed, and wrapped in a handkerchief of a ſtraw-green colour, or white in time of ſnow, ſo as not to be perceived. The number of ſentries cannot be determined; but ſhould be diſpoſed ſo as to watch on all ſides of the ambuſcade, and ſtop every one who from ignorance approaches too near. The ſentries ſhould give notice of what they diſcover by geſtures, to which all the officers ſhould be very attentive.

In countries where there are no woods, vineyards, or hedges, you may place an ambuſcade in a field of hemp or corn, or ſome ſort of grain, provided it be high enough to cover you, at leaſt with the help of art. When the ſtalk of the corn, &c. is not high enough, you muſt get ſome of the infantry to work with ſpades and pick-axes, which they muſt have brought along with them.

Plate CCCI.

The commanding officer muſt mark out the ground A (fig. 1.) which they are to prepare for an ambuſcade, entering at the ſide B, and raiſing in the front and at the two flanks a kind of parapet C, made with an inſenſible ſlope outwards, covered with corn raiſed from the ſurface of the ambuſcade in form of ſquare turfs of a foot thick D. They ſhould be ranged and placed one againſt the other till they have gained ſix feet and a half. If the grain is not more than three feet high, it is plain, that forming the ſlope imperceptibly to a foot and a half high, with the earth dug of the ſame depth, the grain which borders the ambuſcade will be ſix feet and a half from the bottom, reckoning the thickneſs of the turf, which ſerves to ſhow that ſuch a work ought not to be declined in arable ground ſo eaſily worked. When the ſoldiers have finiſhed the work, a ſubaltern officer muſt lead them back to the place deſtined for the infantry.

The ambuſcade being thus made at 100 paces from the road where the enemy are to paſs, they ſhould lead the horſes into it one after another by the bridle, ſo as not to enlarge the entry: the horſemen to range themſelves ſtanding, and holding the bridles in their hands, with the reins ſlackened on the horſes necks. The officers ſhould be continually employed in viſiting the party, and waking thoſe who ſleep; and be equally careful to deface all traces of the entry, that none may appear near the ambuſcade.

Plate CCC

Ambuſcades may be placed advantageouſly in hollow roads when they open obliquely behind that of the enemy, as the road K (fig. 2.) which enters by an acute angle upon the route F of the enemy; nor is there greater difficulty in concealing themſelves in the gullies of ſome rivulet G, when the borders are of a ſufficient height, or have ſhrubs that run parallel with the road of the enemy. It is extremely dangerous to fix there when the road of the enemy approaches towards, or croſſes too near, the ambuſcade, as they cannot fail to diſcover it.

As theſe gullies are not very large, it is neceſſary to have a number of ways to ruſh out quickly on the enemy: We ſuppoſe four, H, H, H, H, by which the cavalry can dart out ſuddenly upon the enemy at F.

It will be proper, before the placing the party, to cauſe the rivulet to be cut ſomewhat higher, to give it a new courſe I, ſo that the horſes feet may be dry in the gullies, and make leſs noiſe; and the ſhorter way they have to go, they will more certainly ſucceed. The commanding officer will not fail to diſpoſe them in ſuch manner, that the whole can ruſh out at once by the four paſſages, and pour in great numbers upon the flank of the enemy.

In ſuch ſort of ambuſcades, the commanding officer ſhould himſelf be the ſentry, leaning upon the edge, and covering himſelf ſo that he may ſee every thing without being perceived.

Plate CCCI. In deſerted villages they may fix an ambuſcade in the gardens G (fig. 1.) or in the barns H. The doors fronting the enemy muſt be ſhut up, and the paſſages which are marked by ſmall dots made uſe of; for it is a general rule in all ambuſcades, to ſally forth in ſuch manner as to take the enemy obliquely behind their front.

You ought never to employ infantry in the ambuſcades we have been deſcribing, where the cavalry act, unleſs to favour their retreat: but when you go at hazard, ſeeking to draw the enemy into an ambuſcade, then the infantry ſhould have their turn. Neither woods, villages, nor any places which are much covered, are proper for them; however unſkilled an enemy may be, he will not follow a party on the ſkirts of a foreſt, or in the neighbourhood of ſome covered place: for which reaſon there are no places fitter for ſucceeding with ambuſcades of infantry, than heaths, hilly countries, hollow roads, corn-fields, ditches at the ſide of great cauſeways; provided always, that you do not plant them on roads that lead to your army, for then the enemy will take care how he purſues you too far.

When you would place an ambuſcade on a heath, or in a country full of little hills, your infantry muſt lie down with their bellies on the ground. If there is ſome water near them, it may ſuggeſt to them to wet their cloaths and cover them with duſt, to give them the colour of the ground: but that this party ſo laid on the ground may not be cruſhed or trod upon by the enemy's horſe when hurried along with violence, they muſt preſerve the flank of the ambuſcade I, next the enemy, with a bar K, which may be made in a hurry with ſome ſtakes drove in the ground, at ten feet from one another, and above five or ſix feet high, held together by croſs pieces tied above five feet from the ground, which can be eaſily done in the neighbourhood of a wood. The time for the infantry to fire, is when the enemy's cavalry L, paſſing before the front, ſtretch their flank the whole length of the ambuſcade; then your cavalry M, muſt quickly face about and attack the enemy. Their defeat will be ſo much the more certain, as the fire of your infantry happens to have driven their ſquadrons into confuſion.

To ambuſh in the ditch of a great cauſeway, you muſt chooſe the deepeſt place, and at the edge of a corn-field which is pretty high, and there place your people ſitting or kneeling. You ſhould collect as many ſmall round buſhes as poſſible, which are to be found in plenty in the country, which ſhould be planted, as if naturally, along the ſide of the road in front of your party, and beyond the ambuſcade on the ſide you expect the enemy, and here and there ſo open, that the enemy being accuſtomed to them may paſs without diſtruſt. You ſhould then make the corn lean over to cover the ambuſcade; but if there is none near enough the ditch, you muſt have as many ſquares cut in the manner directed above, as will cover the edge of the ditch. Some of the corn ſo tranſplanted ſhould be beat down, but to appear as if done by hail or wind.

Mr Jeney ambuſhed in this manner with fifty men, when under the command of Captain Palaſti, who advanced with his cavalry upon the cauſeway leading to Straſbourg; and as ſoon as he was perceived, 400 Bavarian dragoons advanced to attack him: he wheeled about, and the dragoons believing themſelves maſters of the booty, did not fail to purſue, and arrived before the ambuſcade without ſuſpecting. Mr Jeney let their front paſs, and fired ſuch a deadly fire upon their centre, that he brought to the ground 17 killed or wounded: at the ſame time, the cavalry who pretended to fly, faced about and attacked the enemy; and would have completed their defeat, if it had not been for the great ſupport of cavalry and infantry hurrying out of Straſbourg to ſuſtain the dragoons; nevertheleſs he carried off more than 50 horſes.

An officer having placed his infantry in ambuſcade, ought to ſend on the cavalry at day-break, a non-commiſſioned officer with ſix of the beſt mounted horſemen making the advanced guard: they ſhould advance as far before the party as the commanding officer can ſee. At ſight of the enemy, they ſhould begin to retire ſlowly without flying, at leaſt till the enemy comes to purſue with keenneſs: in that caſe, the advanced guard makes the rear guard, and may drop a few ſhot at the enemy, to harraſs them and draw them on, or make pretended delays to excite them to purſue, till they fall by degrees into the ambuſcade.

When you cannot place your infantry in ambuſh without having a village between them and the enemy, the cavalry ſhould not be ſent beyond the village, becauſe the enemy will never expoſe themſelves to croſs it in following your party, for fear of falling into ſome ſnare: but inſtead of going beyond it, your cavalry ſhould enter the village, and demand refreſhment for 50 men, if the party are 100; then make three or four peaſants carry orders to the magiſtrates of the villages that are towards the enemy, to come to you, and regulate the delivery of waggons and forage, or ſome other pretence. As the peaſants will not fail to acquaint the enemy, and to deſcribe your ſtrength and ſituation according to what they have heard, the enemy will certainly come with ſuperior force; and that they may come more ſpeedily, they will bring no infantry.

As ſoon as the peaſants are gone, you muſt be careful to let none of the inhabitants leave the place, and ſend continually ſome ſtrong patroles to the rear on the road of your retreat, and eſpecially to the paſſages by which they can cut off your communication with the ambuſcade. Every horſeman holding his horſe by the bridle muſt be ready to mount, ſo that upon the enemy's appearing, you may retire quickly from the village, and fall back one after another upon your ambuſcade.

When a partiſan has no infantry, he may form an ambuſcade with cavalry, which ſhould be as near as poſſible to the enemy. In the night, he ſhould ſend out two or three waggons covered with white linen, that they may be ſeen at a diſtance: care muſt be taken that the harneſs be in good order, ſo that no troubleſome accident happen by the want of attention to it. Each carriage to have four horſes mounted by two dragoons diſguiſed like waggoners, with their arms in the hands of two or four comerades concealed in each waggon, ſo that they may repulſe any patrole they chance to fall in with.

The waggons ſhould go ſlowly on ſome road parallel to the front of the enemy, and paſſing at ſome diſtance from their poſt (for it is not neceſſary that they paſs through them), and regulate their march ſo, that they may be within half a league of the ambuſcade at day-break, and readily perceived by the enemy; then let them ſtop while one mounts a tree or ſome height to ſee round them. When they perceive the patrole of the enemy, they muſt move off, for the others will not fail to follow; but if the enemy appears not to be inclined to follow, which the non-commiſſioned officer muſt attend to, and make one of the drivers ſtop, as if ſomething were the matter with his waggon, which will draw them on till they fall into the ambuſcade.

Among the thouſand opportunities that the different marches of the enemy offer for ambuſcades, there is non more proper than the retreat of an army which decamps to fall back. When a partiſan happens to get information of it on the eve by good ſpies, he ought to ſet out immediately with his whole party, making ſuch a round as has been drawn in fig. 1. leaving his infantry in ambuſcade at half-way.

Plate CCCI.

The cavalry muſt be diligent to arrive at the place of ambuſcade by day-break, which ought to be placed on the route that the enemy is to take, and two or three leagues in the rear of his camp.

To be more ſecure of his retreat, he ſhould leave two or three detachments of cavalry between him and his infantry, at a good diſtance from one another; the remainder to line the road in ſeveral ranks parallel to it, and 300 or 400 paces behind one another, concealed from the view of paſſengers by the favour of hollows, woods, or hills.

The firſt line being near the road muſt take care of ſutlers, equipages, &c. which are the forerunners of an army, and the firſt to decamp when they are retiring. When they ſecure ſome waggons or mules, the firſt detachment ſhould paſs them to the ſecond, and ſo on till they come to the infantry.

You muſt haſten to carry off what you can for a full quarter of an hour; after which you muſt preſs your retreat, expecting that the alarm will ſoon paſs to the army, and the light troops be inſtantly at your heels.

SECT. X. *Of the Retreat.*

EVERY march in withdrawing from the enemy is called a *retreat*. That which is done in ſight of the enemy, who purſues with a ſuperior force, makes the preſent ſubject; and is, with reaſon, looked upon as the glory of the profeſſion. It is a manœuvre the moſt delicate, and the propereſt to diſplay the prudence, genius, courage, and addreſs of an officer who commands.

The ſucceſs of the retreat depends upon the knowledge of the country that is to be paſſed over, and the goodneſs of the diſpoſition that is made for the troops to defend themſelves. The firſt offers advantages, and contributes greatly to the ſeizing them; the ſecond reſtrains the ardour of the enemy, and keeps up the force of a party to its higheſt pitch. Both deſerve to be ſtudied.

1ſt, Every officer who commands a detachment ought to apply himſelf carefully to reconnoitre every ſtep he takes, and examine perfectly every route that can conduct him from one place to another; he ſhould obſerve attentively all the ſtratagems that can be employed for ambuſhing infantry, or poſting cavalry; the courſe of rivers, their bridges and fords; the roads moſt covered with woods, hills, gullies, and villages; and in a word, he ſhould know all the advantages, as well as the dangers that lie in his way. It will be eaſy for him to acquire a knowlege of all this, if he will uſe the method recommended in a former ſection. With the aſſiſtance of ſuch a plan as is there deſcribed, he may regulate his retreat with eaſe, and put it in practice to advantage, profiting by every means proper for his defence, or ſurprizing the enemy.

2dly, The diſpoſitions that ought to be made for a party, to ſuſtain their retreat in the face of the enemy, depend upon the number and kind of troops in both corps; for they muſt be varied according as they happen to be of cavalry or infantry united, or of either ſingly.

Every forced retreat in conſequence of an unfortunate action, would be almoſt impracticable, if it were not premeditated before you come in preſence of the enemy, or when you are obliged to fly by unknown routes. That which can be made in a fog, or in the night, is eaſieſt, when your rear is ſecured, as you can ſlip out of ſight of the enemy without any difficulty, and they will be afraid of following you for fear of being ſurpriſed in the dark: we ſhall only therefore ſpeak of that which is to be made in open day, and under the fire of the enemy.

To conduct it properly, you muſt abſolutely know the ſtrength of the enemy; for it is ſhameful to be the dupe of a falſe alarm, and to retreat precipitately from an ill-founded fear at the approach of an inferior enemy. You muſt therefore be convinced of his great ſuperiority, and know what his party conſiſts of.

If they come with a ſtrong cavalry, united to a more numerous infantry than yours, you muſt immediately render their acting uſeleſs, by hurrying your infantry as quick as poſſible to retreat to the firſt place where they can lie in ambuſh, and ſerve the cavalry advantageouſly, if they can draw on thoſe of the enemy, as has been ſaid in ſpeaking of ambuſcades.

Plate CCC

To conceal from the enemy, and favour the departure of your infantry, you ſhould cauſe your cavalry to advance, and pretend as if they were going to attack the enemy A, (fig. 2.) your party forming into two diviſions B and C, each drawn up in two lines, the ſecond double the firſt, and diſpoſed as in the plan.

WAR. Plate CCCI.

Fig. 1.

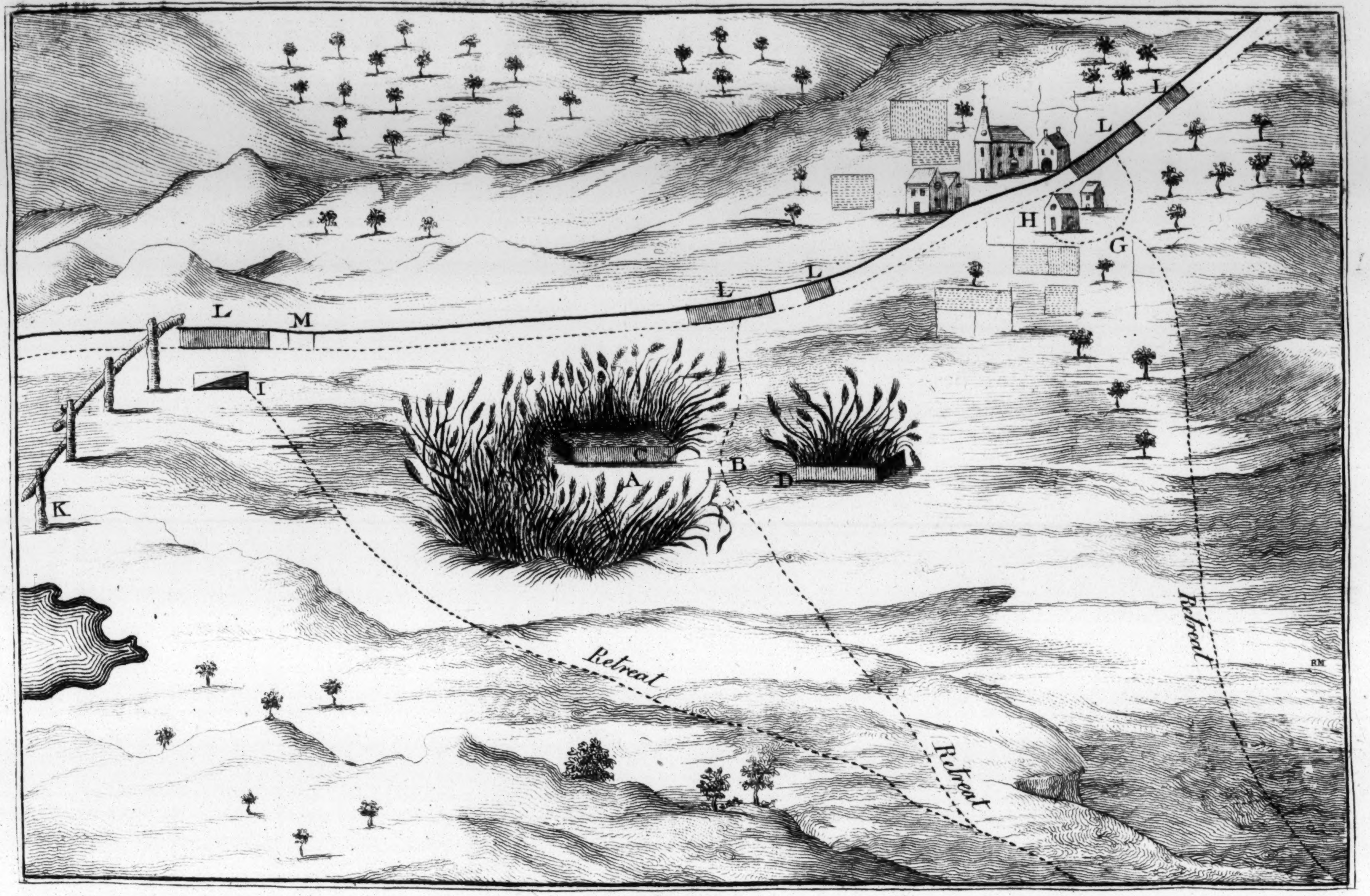

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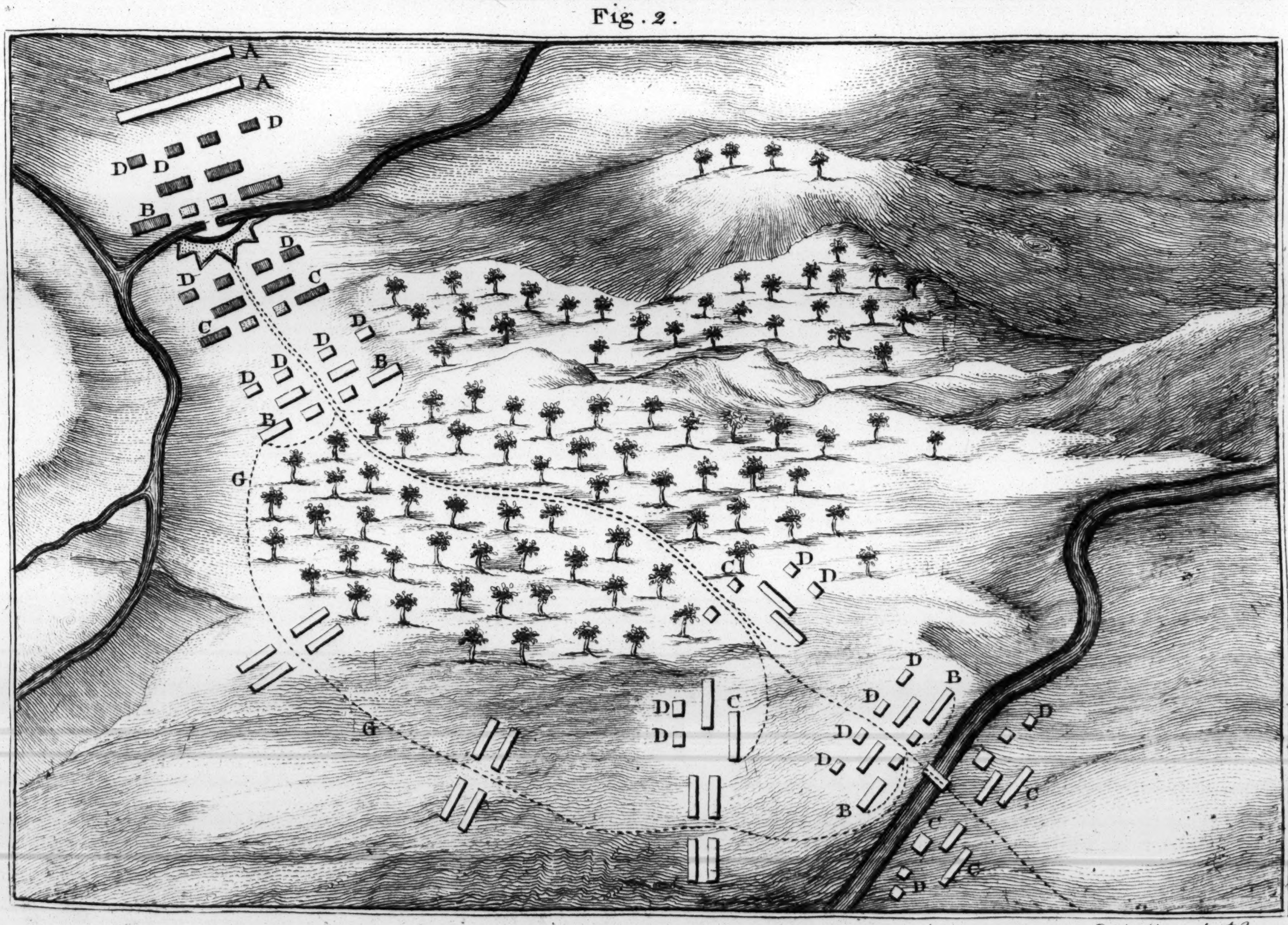
Fig. 2.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A Bell sculp.

3 MA 53

The diſivſion C is to retire firſt 100 or 200 paces, and then fronting the enemy divide into two wings, leaving an interval for the paſſage of the diviſion B, who, in retiring, muſt leave a rear-guard at 50 paces, which muſt be divided into ſeveral parties D, to ſcamper about the enemy's front; and in caſe they appear deſirous to attack you, your ſmall parties muſt keep a conſtant fire, particularly on the ſides that advance the moſt; and continue this manœuvre till they have joined the diviſion C, which ſhould immediately detach ſome ſmall parties of the beſt mounted to ſerve for a rear-guard, and to harraſs the enemy, till the diviſion B is drawn up 100 paces in the rear, and divided into wings, leaving an interval for the diviſion C to paſs through in its turn; and continue to manœuvre it in this manner, till you draw the enemy's cavalry under the fire of your infantry.

When the force of the enemy conſiſts of cavalry alone, your infantry (marked in the plan by dotted right angles) ſhould retire jointly with the cavalry, at leaſt if the country does not expoſe you to be ſurrounded by ſome covered place; becauſe in that caſe your infantry ſhould go and occupy that place, and form an ambuſcade.

The reſt of the infantry ſhould place themſelves in the ſecond line of each diviſion. If the enemy approaches the firſt line too near, they ſhould fall lightly back upon the two wings of the ſecond, opening the centre quickly for the infantry to fire upon the enemy in platoons, at the ſame time that your cavalry detach ſeveral ſmall parties to advance briſkly to prevent the enemy's forming, who were thrown into confuſion by the fire of the infantry. The diviſion which retires will force its march, and go to a greater or leſs diſtance according to the purſuit of the enemy. The ſuſtaining diviſion muſt fall back afterwards till it has paſſed between the wings of the ſecond diviſion, who muſt then make the manœuvre of the firſt, continuing it alternately till the enemy deſiſts from the purſuit.

To facilitate the retreat of the infantry, and gain ſome way on the enemy, many have been of opinion that they ought to tranſport them in waggons. But when the enemy is at our heels, the time is very ill employed in collecting carriages and harnaſſing them: thoſe moments are too precious; and ſhould be employed in cauſing the infantry to move off quickly, by which they will not be expoſed to a train of waggons taken in haſte, which may ſoon break, or be put out of order, and may ſtop the whole line; which not only retards the infantry, but likewiſe the cavalry, when they find the route they were to have taken blocked up with broked carriages.

The caſe is different when the enemy is at ſome diſtance, or that you have already got ſome way before him; then, if a waggon breaks, it may be thrown immediately out of the road, and each horſe of the carriage may carry two ſoldiers, or be diſtributed to other carriages. If many are broke, a part of the men ſhould run on foot for ſome time till they are tired, and then they may change with ſome of the ſtouteſt, who may afterwards change with others, according to neceſſity or the poſſibility of the caſe.

When there happens to be a wood in your rear, you need not enter it if the enemy follows you cloſe, and is prevented by your ſtrength: it is better to coaſt along it by the route marked G, for fear of his coming round you; but if you cannot avoid croſſing it, the diviſion C ſhould paſs quickly, and at getting out face to the two flanks of the wood. The diviſion B is to remain at the entrance of it, till they judge that the diviſion C is ſufficiently advanced, and then fall back, leaving the infantry for a rear-guard during the whole paſſage through the wood; at which time the whole ſhould reſume their firſt diſpoſition.

In all defiles, and paſſages of bridges, the ſame manœuvre ſhould be uſed as for woods: but the firſt diviſion having paſſed, they ſhould form facing the enemy; and the infantry likewiſe draw up on the other ſide, upon the edge of the river.

When the country through which you are to retire happens to be mountainous, the diviſion which falls back ſhould guard the heights by ſmall detached parties, or, if poſſible, guard them themſelves.

A body of cavalry retreating without infantry, ought to form in three lines at 200 paces behind one another; the two laſt extending their front, that they may appear more numerous, and draw up on the two ſides out of the road. The firſt line being attacked, the ſecond is to ſuſtain it, the third to wait the retreat of the firſt, and to ſuſtain the ſecond, and continue to do ſo alternately.

If the enemy ſeem to quit the purſuit, the whole corps muſt reſume the order of an ordinary march; with this precaution, that the rear-guard be reinforced, and the advanced guard weakened.

As to the retreat of a ſmall detachment of cavalry, ſuch as go to reconnoitre the enemy, to diſcover their march, to carry off ſome officer, or for ſome other commiſſion, as they are not unmerous enough to ſkirmiſh and retreat by rule, they have but two ways to chooſe; either to fly, or break through the enemy. They ought to determine for the laſt, when their retreat is cut off on all ſides, ſo that they have no other way to eſcape but by cutting their way through the enemy ſword in hand; but flight is always leſs hazardous when it is practicable.

If the officer is certain of the fidelity of his men, and their attachment to him; and ſees that they cannot get out of ſight of the enemy, but are ready to fall into their hands; he ought to try one means ſtill, which has been known frequently to ſucceed. He ſhould diſperſe his party by two and two, by the favour of the firſt covered place, where they may be at liberty to take ſo many different routes. It is evident that two men may wind from right to left, and eſcape more eaſily than a party of 12 or 20, who cannot move ſo freely.

Mr Jeney made uſe of ſuch an expedient ſucceſsfully in Italy, when the Spaniards having advice of his detachment having ſlipped to the rear of their army, they cut off his retreat on all ſides. The whole party being diſperſed, he took two huſſars with him, and was followed ſo cloſe, that every inſtant he thought he muſt be taken; however, he ſaved himſelf by croſſing a marſhy pond. The enemy ran to turn him, but he got ſo far before them, that they could not take him. He got ſafe to his poſt, and in three days the whole detachment met without the loſs of a man; which will prove, that in ſuch a ſituation we need not deſpair, and that in extreme neceſſity the paſſage of a river or moraſs ought not to be declined.

PART IV. Of SIEGES.

SECT. I. *Of Attack.*

§ 1. *Maxims or principles to be obſerved in the attack of places.*

1. THE approaches ought to be made, without being ſeen from the town, either directly, obliquely, or in flank.

2. No more works ſhould be made than are neceſſary for approaching the place without being ſeen; that is, the beſiegers ought to carry on their approaches the ſhorteſt way poſſible, conſiſtent with being covered againſt the enemy's fire.

3. All the parts of the trenches ſhould mutually ſupport each other, and thoſe which are fartheſt advanced ought not to be diſtant from thoſe which are to defend them, above 120 or 130 fathoms, that is above muſket-ſhot.

4. The parallels or places of arms the moſt diſtant from the town, ought to have a greater extent than thoſe which are neareſt, that the beſiegers may be able to take the enemy in flank, ſhould they reſolve to attack the neareſt parallels.

5. The trench ſhould be opened or begun as near as poſſible to the place, without expoſing the troops too much, in order to accelerate and diminiſh the operations of the ſiege.

There is no ſuch thing as giving any exact rule in regard to the diſtance which ought to be obſerved upon opening the trenches. On level ground, this diſtance may be 800 or 900 fathoms; but if there ſhould be a hollow way in the neighbourhood of the place, the beſiegers are to take advantage of it, and open the trenches nearer. In general, they are to regulate themſelves upon this head according to the nature of the ground, more or leſs favourable to the opening of the trenches.—We ſhall ſuppoſe, in the preſent work, that the opening ought to be made within 800 fathoms of the covert-way; the firſt parallel within 300 fathoms, the ſecond within 150, and the third at the foot of the glacis.

6. Care ſhould be taken to join the attacks; that is, they ought to have communications, to the end that they may be able to ſupport each other.

7. Never to advance a work, unleſs it be well ſupported; and for this reaſon, in the interval between the ſecond and third place of arms, the beſiegers ſhould make, on both ſides of the trenches, ſmaller places of arms, extending 40 or 50 fathoms in length, parallel to the others, and conſtructed in the ſame manner, which will ſerve to lodge the ſoldiers in, who are to protect the works deſigned to reach the third place of arms.

8. Obſerve to place the batteries of cannon in the continuations of the faces of the pieces attacked, in order to ſilence their fire; and to the end that the approaches being protected, may advance with greater ſafety and expedition.

9. For this reaſon the beſiegers ſhould always embrace the whole front attacked, in order to have as much ſpace as is requiſite to plant the batteries on the produced faces of the works attacked.

10. Do not begin the attack with works that lie cloſe to one another, or with rentrant angles, which would expoſe the attack to the croſs-fire of the enemy.

§ 2. *Of inveſting.*

THE firſt operation of a ſiege is inveſting. The body of troops inveſting a town ought at leaſt to be as ſtrong again as the garriſon; they are to divide themſelves into ſeveral parties, in order to take poſſeſſion of all the avenues leading to the place. By day they ſhould keep themſelves out of the reach of cannon-ſhot; but as ſoon as it is duſk they muſt approach much nearer, the better to be able to ſupport each other, and to ſtrengthen the town.

The inveſting is generally made by cavalry; but when the country is cut with ravins or hollow ways, or when there are woods in the neighbourhood of the place, then there muſt be likewiſe a body of infantry to guard all the avenues, and even to ſtop up, by a kind of retrenchments, ſuch as might be the eaſieſt to penetrate.

A few days after the inveſting, the army arrives, and is diſpoſed round the town, according to the ground taken up by the line of circumvallation, and aſſigned by the engineer who has the direction of the ſiege. As ſoon as the place is inveſted, they begin to trace the line of circumvallation, and afterwards they ſet about its conſtruction.

§ 3. *To trace out the line of circumvallation.*

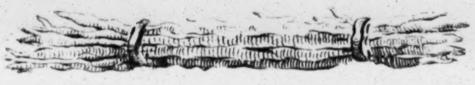
BEFORE a general begins the attack of a place, he muſt endeavour to have as exact a plan of it as poſſible, by which he forms a deſign of the circumvallation and the attacks. The plan is rectified after the inveſting as much as the vicinity of the enemy will permit; and thereby he may correct the deſign traced at firſt, as far as there may be occaſion for correction. It is upon ſuch a plan, ſo rectified, that we ſuppoſe a general to proceed. We ſhall therefore begin with explaining or tracing the operations of the ſiege on paper; after which we ſhall give the manner of tranſferring them to the ground. We ſhall exhibit the progreſs of theſe operations from the inveſting to the taking of the place, in the order they are really executed. The line of circumvallation being a fortification intended againſt the enemy from without, who ſhould attempt to ſuccour the town, its defences ought to be directed againſt that enemy; that is, they ought to be oppoſite to the town; and the beſieging army ſhould, as we have already obſerved, be encamped behind that line, that is, between it and the town. The camp ſhould be, as much as poſſible, without the reach of cannon-ſhot: therefore, as the line of circumvallation ſhould be at a greater diſtance from the place than the camp, the reaſon is ſtill ſtronger for its being alſo out of the reach of the cannon-ſhot; which, whether fired horizontally, or at an angle of 10 or 12 degrees, may be reckoned about 1200 fathoms. As the rear of the camp ſhould not be incommoded by the cannon, this part ought to be above 1200 fathoms diſtant from the place; and we ſhall ſuppoſe that the diſtance ought to be

3 MA 53

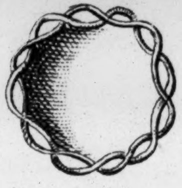
WAR.

Attack of Fortified Places.

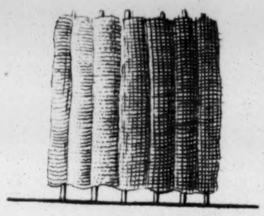
Fascine.



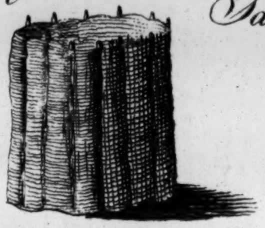
Plan of the Gabion.



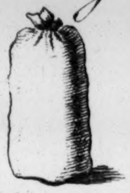
Elevation of the Gabion.



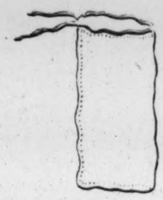
Gabion.



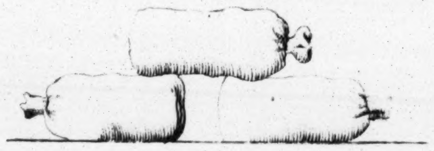
Sand Bag.



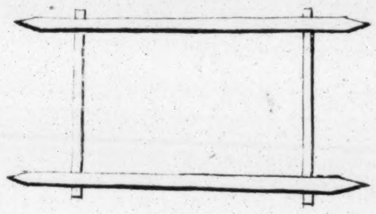
Empty Sand Bag



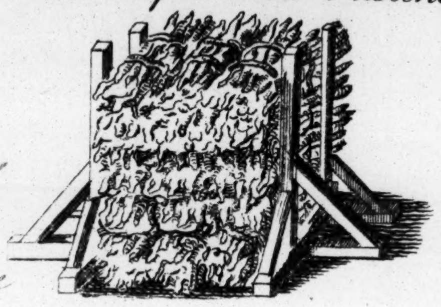
Manner of laying the Sand Bags on the Parapet of the Places of Arms, to serve for a shelter in firing.



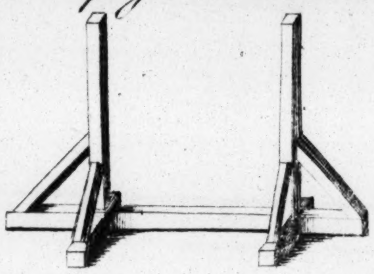
Blind.



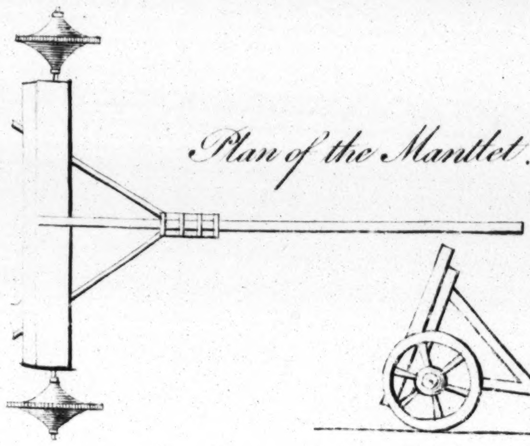
Chandeliers filled with Fascines.



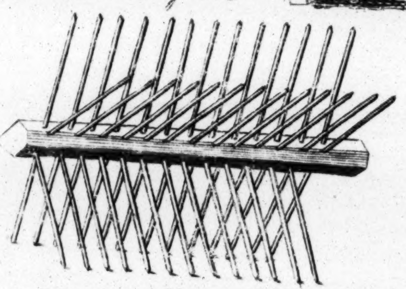
Empty Chandelier.



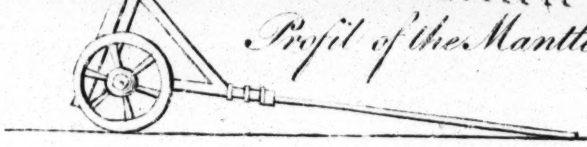
Plan of the Mantlet.



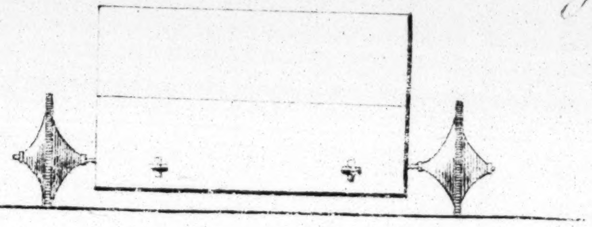
Chevaux de frise



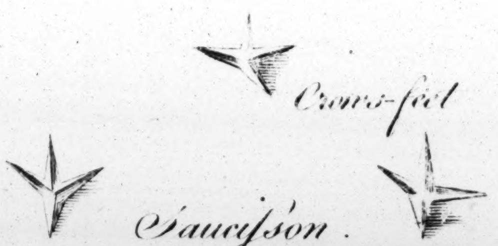
Profil of the Mantlet.



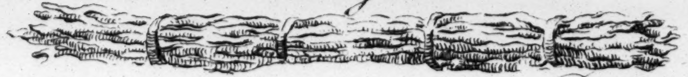
View of the Mantlet towards the Enemy.



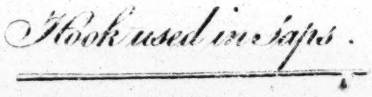
Crows-feet



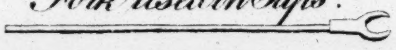
Saucisson.



Hook used in saps.



Fork used in Saps.



Scale of two Fathoms.

1 2 3 4 5 6 12 Feet.

Part of a Line of Circumvallation.

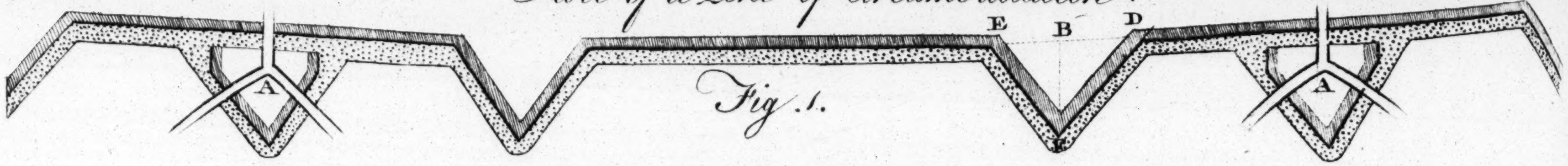
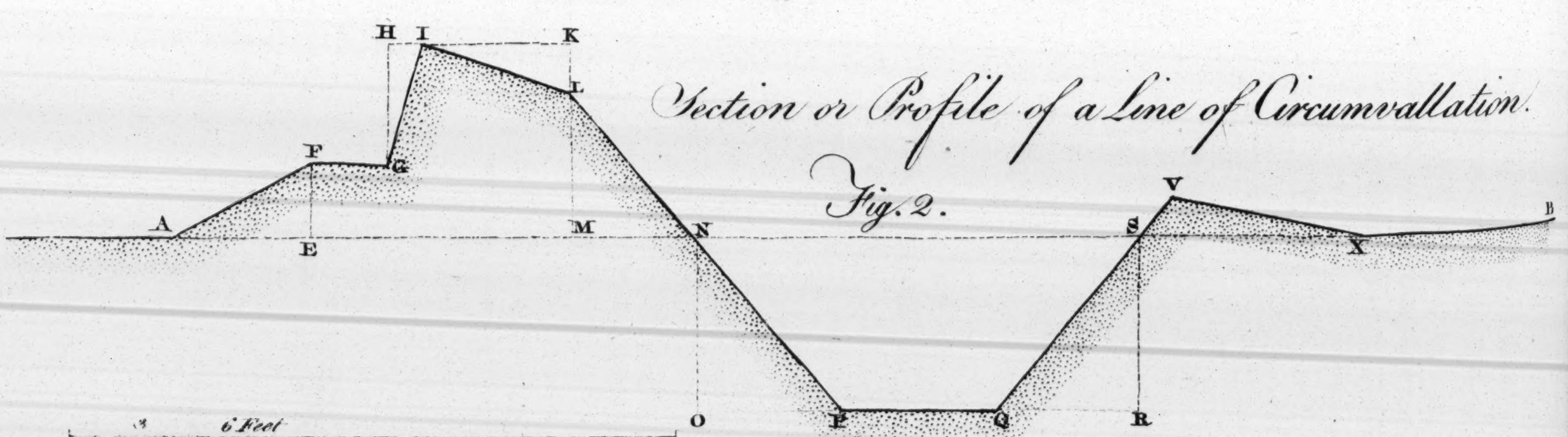


Fig. 1.

10 20 30 60 120 Fathom.

Section or Profile of a Line of Circumvallation.

Fig. 2.



3 6 Feet 2 3 4 Fathom

A Bell Sculp.

be fixed at 1400 fathoms from the covert-way. The depth of the camp may be eſtimated at about 30 fathoms. From the front of the line of circumvallation there ſhould be a ſpace of 120 fathoms, to draw up the army in battalia behind the circumvallation; which ſpace added to 30 fathoms, ſuppoſed for the depth of the camp, gives 150 fathoms; and this, added to the diſtance from the covert-way to the rear of the camp, gives 1550 fathoms for the diſtance from the circumvallation to the covert-way.

This being laid down, if the place be a regular octagon, fortified according to M. Vauban's firſt method *, the radius thereof will be 234 fathoms. This diſtance being added to the 1550 fathoms, then we ſhall have 1784. Or we may make it a round number by adding 16 fathoms, which are here of no manner of conſequence; and we ſhall have 1800 fathoms for the diſtance from the centre of the place to the line of circumvallation.

* See Fortification.

The radius of the circumvallation being thus ſettled, from the centre of the place, with the diſtance of 1800 fathoms, you are to deſcribe the circumference of a circle round the place. The diameter being 3600 fathoms, the circumference will then take 11314; then take the diſtance of 120 fathoms, which you are to carry to the circumference above deſcribed. This diſtance will be in this example 93 times, and ſomething over, which differs very little from 120 fathoms; ſo that you may look upon the polygon of this circumvallation as a polygon of 94 ſides, of 120 fathoms each.

Plate CCCII. fig. 1.

The polygon of the circumvallation being traced, take on each of the extremities of its ſides the lines BD and BE, each of 15 fathoms; and from the points D and E, taken for the centre and diſtance of 25 fathoms, deſcribe two arcs which cut one another at the point F; from whence draw the lines FD, FE, for the faces of the redans of the line of circumvallation: thus it is we call the ſaliant parts EFD of this line, which ſerve to flank it.

Perform the ſame operation on every ſide of the circumvallation, and then you will have its principal line traced.

The parapet within muſt be ſix or eight feet deep; and without make a ditch parallel to all its parts, three or four fathoms in breadth. The parapet of the circumvallation will be ſeven feet and a half high, and the depth of the ditch equal to the height of the parapet.

We have repreſented only part of the circumvallation in this figure; we ſhould have had occaſion for a very large plate to repreſent it entire, and in its juſt proportions.

To make the profile of the circumvallation, let AB be the line level with the country, and CD the ſcale of the profile. Let A be the ſide of the town, and B that of the country; take AE, of ſix feet; from the point E, raiſe the perpendicular EF, of three feet, and draw the line AF, which will be the talus of the banquette.

Draw FG parallel to AB, three feet from F to G, and the line FG will be the breadth of the banquette. On the point G raiſe the perpendicular GH, upon the line FG, four feet and a half.

Draw from the point H, HK, parallel to AB.

Make HK ſeven feet and a half, HI a foot and a half, draw GI, which will be the inſide of the parapet of circumvallation.

Draw from the point K, on the line AB, the perpendicular KM; take KL a foot and a half, and draw IL, which will be the upper part of the parapet of the line of circumvallation. Take MN five feet, and from the point N draw the perpendicular NO, and ſet off ſeven feet and a half from N to O. Draw OR parallel to AB, three fathoms or 18 feet from O to R; produce the line LN to P, and LP will be the ſcarp, or the outſide of the parapet of the line of circumvallation. From the point R raiſe RS, perpendicular to OR, or parallel to ON. Make QR equal to OP, and draw QS, which produce beyond S three feet to V; then take SX ſix feet, and draw VX, and the profile of the circumvallation will be completed.

This kind of glacis, VX, will ſerve to raiſe the enemy, and to expoſe them more to the fire of the line, ſhould they attempt to make themſelves maſters of it, and to cover the parapet of the circumvallation, in the ſame manner almoſt as the glacis of a place covers the top of the rampart.

The dimenſions above given may vary a little without inconvenience; but it would be to no manner of uſe to make the lines ſtronger; only you may reduce the ditch to ten or twelve feet in breadth at the top, and five or ſix feet in depth. A ditch of leſs breadth and depth, beſides its not allowing ground enough to form a good parapet, would have the inconvenience of being too eaſy to paſs over by the enemy.

The lines may be fraiſed; which is done when they are to laſt for ſome time, and the neighbouring country furniſhes wood enough for the purpoſe.

Sometimes a fore-ditch is dug before the lines, 12 or 15 feet in breadth at the top, and ſix or ſeven feet deep; it is made about 12 or 15 fathoms from the ditch of the line. The deſign of it is to ſtop the enemy when they attempt to attack the lines, and to make them loſe both time and men in paſſing over it. As it is expoſed to the fire of the lines, the time the enemy muſt neceſſarily ſpend in croſſing will of courſe occaſion their loſing a great many men; and beſides, the paſſage itſelf may throw them into ſuch diſorder, as ſhall prevent their attacking ſo advantageouſly as they would otherwiſe do, were it not for this obſtruction.

Notwithſtanding theſe advantages, M. Vauban diſapproved of this fore-ditch, from a notion that if the enemy can get there, they are covered againſt the fire of the circumvallation: and he condemns it expreſsly in his Memoirs. But, with due deference to this great man, it ſeems that the engineers have not been all of his opinion upon this matter; and though it be true that the fore-ditch ſerves as a cover to the enemy when they are in it, yet it retards their march, and keeps them longer expoſed to the fire of the lines. Accordingly fore-ditches have been made to lines on different occaſions, ſince the death of marſhal Vauban, particularly at Philipſburg. Between this fore-ditch and the ditch of circumvallation, at the ſiege of Philipſburg, in order to ſtrengthen the defence of the circumvallation, there were likewiſe dug wells, which were ranged chequerwiſe, of about nine feet diameter at the mouth, and ſix or ſeven feet deep. They

Of Sieges.

They were ſituated near to each other, to prevent the enemy from paſſing eaſily through the intervening ſpaces. The ground they occupied would have been extremely difficult for the enemy to paſs; they would have retarded his march; and the fire of the lines, which entirely commanded the paſſage, would, without doubt, have killed a great many men. The Spaniards practiſed ſomething of this kind at the ſiege of Arras in 1654. Before the circumvallation, they dug a number of holes two feet diameter, and a foot and a half deep; in which they faſtened ſtakes that were capable of greatly obſtructing the paſſage of the cavalry. See Plate CCCIII.

A line of circumvallation requires a ſtrong army to defend it. We have found the circumference of the line which we have been now tracing, namely, of 94 ſides, each of 120 fathoms, to be 11280 fathoms; out of this number the gorges of the redans are to be deducted, but then their faces are to be added. The gorges have 30 fathoms; and the two faces which have 50, give an overplus of 20 fathoms on each redan; that is, to the number above mentioned of 11280 fathoms, add as many times 20 as there are redans, in order to have the entire circumference of the circumvallation. This circumference has 95 redans; therefore we muſt add 94 times 20, or 1880, which will make 13160 fathoms for the whole circumference. This number being divided by 2282 (which is the number of fathoms contained in a French league) gives about five leagues and a half. Now it is clear, that ſo great an extent of ground requires a very numerous army to guard it. We may make a calculation pretty near, by ſuppoſing that every ſoldier drawn up in a line occupies a ſpace of three feet, that is, half a fathom; that the ſoldiers are four deep; and that the army is drawn up in two lines, which will give eight ranks of ſoldiers. Each rank containing 26320 ſoldiers, the circumference of the circumvallation being 13160 fathoms, the eight ranks will therefore make 210560 men.

To theſe we ſhould likewiſe add about 12000 or 15000 men for the works of the attack, which would form an army of about 225000 men. And as it is not cuſtomary, at leaſt in Europe, to ſend ſuch ſtrong armies into the field, from thence it follows that the circumvallations, and the lines in general, when they are of a very great extent, are extremely difficult to guard. And indeed the moſt celebrated generals have been divided in their opinions upon this ſubject. They all agree that there are certain caſes in which they may be of ſome advantage, eſpecially when they are of a narrower compaſs, and the deſign of them is to ſtop up the entrance of a country of a ſmall extent; but if they are very large, it is extremely difficult to defend them when attacked by a ſkilful enemy.

It was heretofore the cuſtom to add great outworks to the lines, ſuch as horn and crown works, tenailles, &c. All the circumvallations of the towns that were beſieged during the wars between Spain and Holland, under the princes of Orange, were remarkable for this ſort of works. Theſe have been ſince laid aſide, becauſe we find that even a line, with its ſimple redans, is very difficult to guard; and ſuch a number of outworks does but increaſe its circumference. The modern lines have only a few ſmall half-moons A, before the gates of the circumvallation, placed like thoſe of the towns, againſt the middle of the curtains; the entrance is ſhut up by wooden barriers, and ſometimes by chevaux-de-frize, and other contrivances, which will hinder the paſſage from being eaſily forced.

Plate CCCII. fig. 1.

The lines having very little elevation, ſtand in no need of baſtions to be flanked in all their parts, like thoſe in the circuit of a town. Redans, which are of more ſimple and expeditious conſtruction, are ſufficient. The angle they make with the curtain is always very obtuſe, to the end that the ſoldier being placed on the face of the redan, may be the better able to defend its approach. It is cuſtomary, indeed, to make baſtions in thoſe parts, where the lines form ſuch angles as could not be ſufficiently defended by redans. Yet, whenever it may be judged neceſſary, the line of circumvallation may be fortified with baſtions. The greateſt part of the lines at the ſiege of Philipſburg was flanked in this manner, as may be ſeen in Plate CCCIII. The baſtions increaſe the circumference of the circumvallation; and probably the reaſon why they were uſed at the ſiege of Philipſburg, was becauſe the circumvallation was of a very ſmall extent.

At the point of the redans, batteries are erected to fire the cannon a barbette over the parapet; and the ſame is practiſed wherever the cannon are placed on the line of circumvallation.

A computation is generally made of the time requiſite for making the lines, which is very neceſſary, in order to determine what day the trenches may be opened; this being ſeldom done till the line of circumvallation is completed. Such a line as that we have been ſpeaking of is, according to marſhal Vauban, a work of nine or ten days. When the ditch is narrower, and not ſo deep, it is made with greater expedition.

The calculation of the time requiſite for conſtructing the lines, is made by meaſuring the excavation of the ground, of which they are to be formed, by the fathom; or, which amounts to the ſame, by meaſuring by the fathom a ſpace of ſix feet of the length of the line, and computing the time a man will take up in doing it. As the like ſpace is given to each of the workmen, the line is made nearly within the time that one ſingle workman would be about the ſpace aſſigned him.

Experience ſhows us, that a workman, in digging of earth of ordinary conſiſtence, may, in a day's labour, dig about the third of a cubic fathom, that is, he may dig ſuch a cube in three days; which will ſerve to determine pretty nearly the time of the conſtruction of the lines, relatively to their aſſigned dimenſions.

From what we have been ſaying, it follows, that when we know the circumference of the lines, we know likewiſe the number of workmen to be employed therein, reckoning one man to each fathom in length.

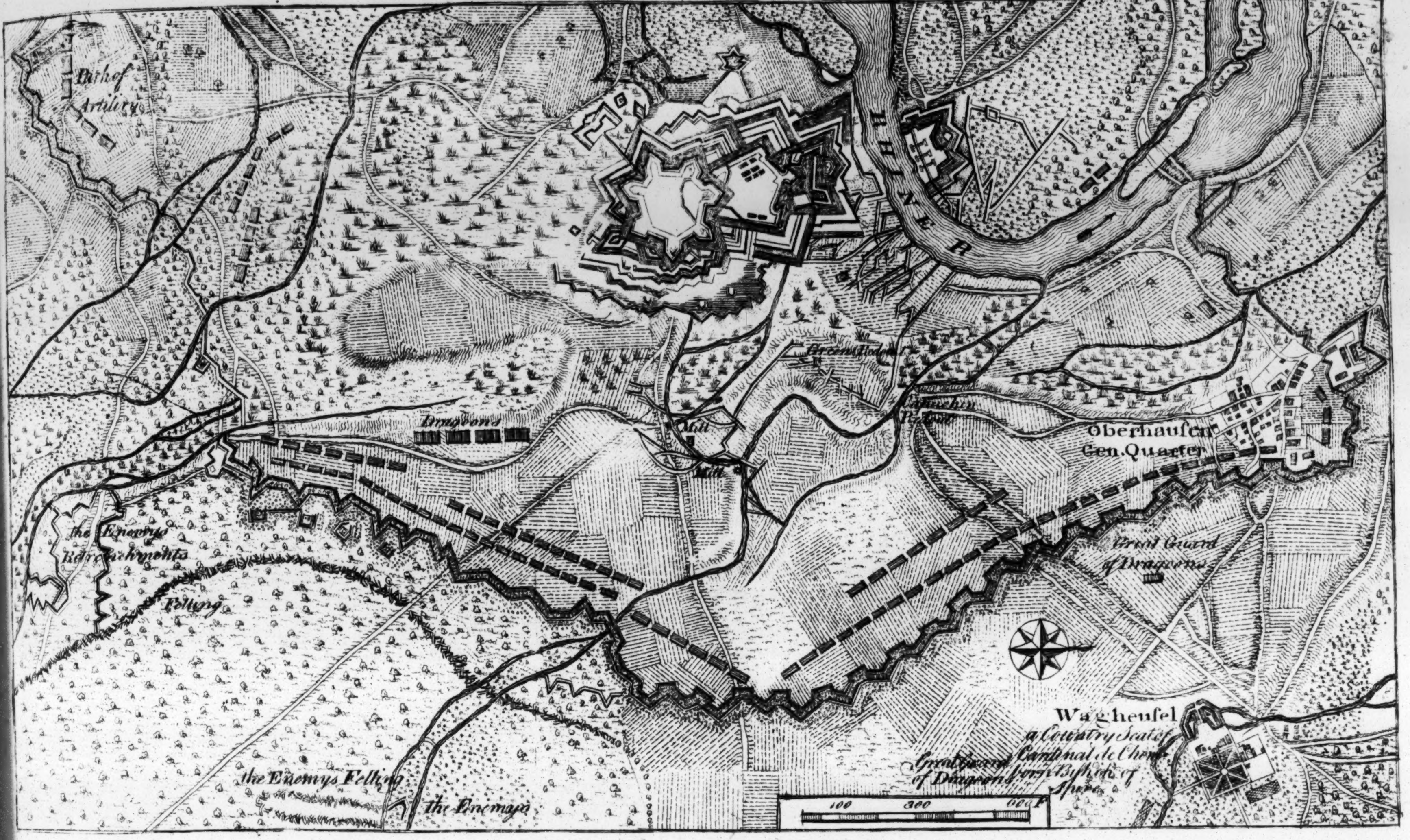
The workmen employed in the conſtruction of lines are generally peaſants, who are ordered for this purpoſe from the neighbourhood, and who, according to M. Vauban, ſhould have a double allowance of bread given them, that is, one ration more than is allowed to the common ſoldier. It is not uſual to give them any thing elſe.

When there is no poſſibility of getting peaſants to work on the lines, then the troops are to do it: no

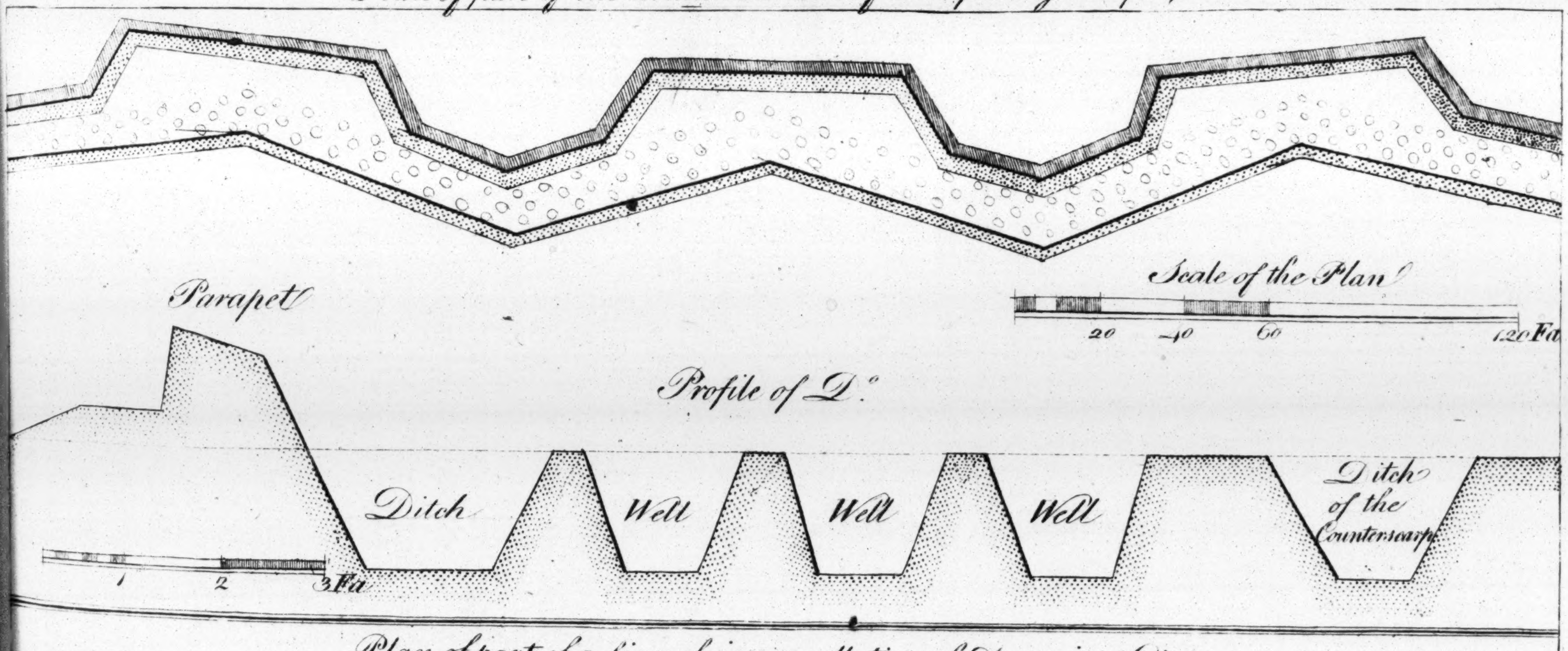
part

WAR.

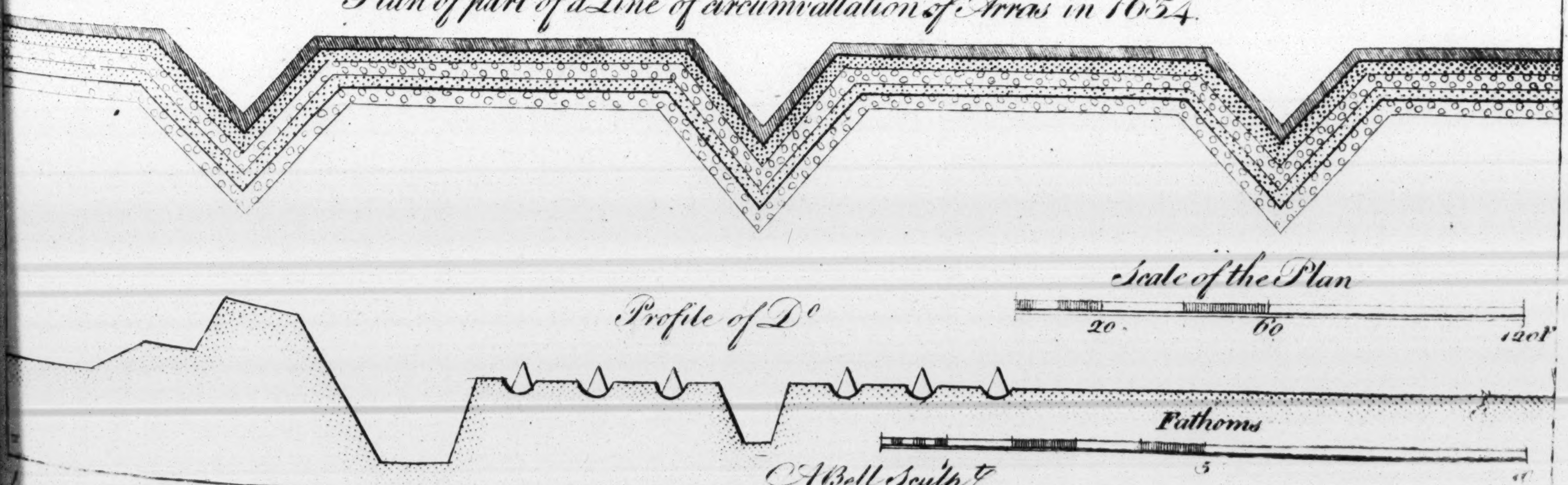
Plan of the Circumvallation and Attacks of PHILIPSBURG in 1734. Plate CCCIII.


Path of Artillery
Rhine R
Dragoons
Mill
Oberhauſen
Gen. Quarter
Great Guard of Dragoons
the Enemys Retrenchments
Felling
the Enemys Felling
the Enemy
Wagheuſel
a Country Seat of Cardinal de Chenborn Bishop of Spire
Great Guard of Dragoons
100
300
600 F

Plan of part of the circumvallation of Philipsburg in 1734.


Scale of the Plan
20
40
60
120 Ft
Parapet
Profile of D°
Ditch
Well
Well
Well
Ditch of the Counterscarp
1
2
3 Fa

Plan of part of a Line of circumvallation of Arras in 1654.


Scale of the Plan
20
60
120 F
Profile of D°
Fathoms
5
10

C. Bell Sculp.^t

3 MA 53

part of the army is exempt from this duty ; horſe and foot muſt ſerve alike.

Hitherto we have ſuppoſed that the circumvallation was regular ; but even were it irregular, the conſtruction of it would differ very little from that which we have juſt now given.

A general ought to poſſeſs himſelf of all places from whence the lines may be commanded, when it is poſſible to do it without carrying the circumvallation to too great a diſtance ; and that he ſhould take all advantages ariſing from the nature of the ground, as precipices, eminences, rivers, brooks, moraſſes, and, generally ſpeaking, whatever is capable of rendering the camp of difficult acceſs. If there are any woods or buſhes within its incloſure, it will be right to cover it in thoſe parts by felling the trees, and therewith making a proper fence.

The tracing of the lines admits of no manner of difficulty, if you have a good map of the adjacent country ; ſince you have only to bring the ſeveral parts of the line nearly within 1800 fathoms of the centre of the place, and to take care that there ſhall be about 120 fathoms from the point of one redan to another.

Nor is there any difficulty in transferring this line to the ground ; the operation is too eaſy to thoſe who know a little of practical geometry, to loſe any time in explaining it here.

§ 4. *Of the Park of Artillery.*

The park of artillery is the place which contains the cannon, bombs, powder, and in general all military implements and machines, that have any relation to the artillery.

This park ſhould be placed where there is leaſt danger of being inſulted by the enemy, It ought to be without the reach of cannon-ſhot, and incloſed within a particular ſpot, which ſhould be fortified alſo by a line, conſiſting of a ditch and a parapet, flanked with redans in the ſame manner as the circumvallation. Nothing ſhould be neglected that is capable of ſecuring it either from the attacks of the enemy, or from any other poſſible damage.

There are ſeveral parks uſed in a ſiege ; the great one, which is ſimply called the park, and is that of which we have been ſpeaking, ſerves as a general magazine for all the artillery. The little parks are more within reach of the enemy's attacks, and contain the ſtores and ammunition neceſſary for daily uſe; for which reaſon they are ſupplied every day. They are diſtributed in places where they may be as ſafe as poſſible ; and there are as many in number as there are attacks.

§ 5. *Of the Line of Countervallation.*

The intent of this line is to ſecure the beſiegers againſt any attempt from the garriſon. It is never made but when the garriſon is numerous enough to diſturb the beſieging army.

It is conſtructed in the rear of the camp in the ſame manner, and purſuant to the ſame rules, as the circumvallation. The whole difference is, that as it is made to oppoſe a far leſs conſiderable body of troops than that which may attack the circumvallation, the parapet need not be ſo thick, neither need the ditch be ſo wide nor ſo deep. The thickneſs of the parapet may be only ſix feet, and the ditch no more than eight feet wide at the top, and five deep. The redans are conſtructed in the ſame manner as in the circumvallation ; and a view of the figure * will ſufficiently point out whatever relates to this line.

* Plate CCCIV. fig. 1.

§ 6. *Of the Trenches and Parallels.*

While the line of circumvallation is finiſhing, all the materials neceſſary for the conſtruction of the trenches are got ready, and the engineer, who has the direction of the ſiege, examines on the ſpot the moſt proper place for the attacks, and the figure they ought to have ; and of theſe he makes a particular plan.

In regard to this ſubject, there are a great many things to obſerve. We have ſuppoſed that the place is regularly fortified, and on level ground ; ſo that here it is indifferent on which ſide the attack is begun. It is ſufficient to explain the rules that are to be there obſerved ; and afterwards to apply them to irregular towns, and to uneven grounds. Let C (fig. 2.) be the place beſieged, and A and B the baſtions attacked. Begin with indefinitely producing towards the field the capitals of theſe two baſtions ; in like manner produce the capital of the half-moon oppoſite the curtain between theſe two baſtions ; ſet off 800 fathoms from the ſaliant angles D and E of the covert-way to F and G. This done, take DH, and EI of 300 fathoms ; and from the centre C, with the radus CH or CI, deſcribe an arc, which produce beyond the points H and I ; and on this arc HI conſtruct the firſt parallel. Then on the ſame lines, DF, EG, take the points M and N 140 fathoms diſtant from the points H and I ; and through theſe points, deſcribe from the centre C another arc, on which the ſecond parallel is conſtructed. This ſecond arc will cut the produced capital of the half-moon, in the point L, which is to be obſerved, in order to begin from hence a trench, which ſhall extend to the ſaliant angle of the covert-way before this half-moon. Laſtly, through the points O and P, the diſtance of 20 or 25 fathoms from the angles D and E, deſcribe from the centre C, a third arc, on which the third parallel is conſtructed.

Plate CCCIV.

Terminate the firſt parallel by producing the faces *a b*, *a b* of the half-moons 1 and 2, collateral to the baſtions A and B ; but extend the parallel 15 or 20 fathoms beyond the interſection of this prolongation. The ſecond parallel will be leſs extended than the firſt, by about 30 fathoms on each ſide ; and the third alſo leſs extended than the ſecond, by about 30 fathoms on each ſide.

This being done, you have a ſketch of the trenches, and the places of arms. The buſineſs now is to trace the trenches, or approaches, without being ſeen or enfiladed.

Take a long ruler, and lay it on the point G, ſo that it ſhall make, with the produced capital EG of the baſtion B, an angle EGS, whoſe ſide GS being produced, ſhall meet no part of the covert-way, and ſhall be diſtant about 10 or 12 fathoms from the angles to which it approaches neareſt, and this in order that the trench towards the ſide GS may not be enfiladed from any part of the covert-way.

Take GS of an arbitrary extent, as of 200 or 220 fathoms, and put the ruler on the point S, ſo that it ſhall make, with GS, an angle GST, the producing of which on the ſide ST, ſhall not fall on any part of the covert-way, and it will be 10 or 12 fathoms diſtant from the moſt ſaliant parts. Terminate this ſide in T, and there make alſo a new angle STI, whoſe ſide TI ſhould terminate at the point I, where it meets the firſt parallel. Perform the like operation on FH, and it will give you the outline of the trenches as far as the firſt parallel.

At this part of the trenches you may make a greater number of turnings; you may likewiſe carry it in a direct line to the firſt parallel. The moſt important article is, to take care not to let it be enfiladed from any part of the covert-way; and the fewer angles and turnings it makes, the quicker it is conſtructed, which in transferring it to the ground is worthy of great attention. Mind alſo, that its extremity, I, does not fall far from the point where the produced capital of the baſtion meets the firſt parallel.

By the ſame method trace the trenches between the firſt and ſecond parallel, as may be ſeen in the figure; but as this part is nearer the place than the former, in order to avoid being raked, it muſt have a greater number of angles. All its ſides ought to cut the prolongment of the capital of the baſtion B, as appears by the figure. In like manner trace the trenches betwixt the ſecond and third place of arms, by making as frequent turnings on the produced capital of the baſtion B, as ſhall be neceſſary, in order to its defiling from the covert-way. By the ſame method trace the trenches on the capital of the baſtion A; trace alſo a trench on the produced capital of the half-moon, between the ſecond and third parallel, to reach the flanked angle of its covert-way.

When the garriſon happens to be ſtrong and enterpriſing, it will be proper, between the ſecond and third parallel, to make parts of trenches U, U, &c. parallel to the places of arms; they are to be 30 or 40 fathoms long, and to communicate with the trench, as may be ſeen in the figure. Theſe parts of the parallels are what we have diſtinguiſhed by the name of *half parallels*, or *places of arms*. Now to trace the whole trenches and the places of arms, of which we have been only giving a ſketch or outline, you are, at the diſtance of 12 feet, to draw parallel to the line we have been tracing, which expreſſes the trenches, and in like manner to that which expreſſeth the parallels or places of arms.

At every angle of the trenches obſerve to produce the part of the trenches in thoſe places, ſo that this prolongation ſhall cover that part of the trenches which it terminates.

This will be illuſtrated by an example.

Plate CCCV. fig. 1.

Let ABCDFGMQ be a part of the trenches, and let AB be one of the ſides oppoſite to the enemy; produce AB, ſo that BE ſhall be five or ſix fathoms; and in FG, take alſo five or ſix fathoms from I to L, which will give the end of the trench BELI, the uſe of which is to cover the *boyau* or branch IOMG, whereby the enemy will not know the place where it falls into the trench AB, and to make room for withdrawing thoſe who are in this part of the trenches, and that the paſſage may be free at all the angles. In like manner produce the ſide GM, from M to N, and the ſide IC, from O to P, and you will have the end of the trench MNOP, which will cover the branch DCOQ. Do the ſame at all the angles of the trench.

The parapet of the trench being made to cover it, the parapet ought to change ſides alternately. If, for inſtance, AE, in the preceding figure, is towards the place, it is evident that the ſide GN will be towards it alſo, and likewiſe the ſide CD; and therefore the parapet of the trench is ſucceſſively conſtructed from the right ſide to the left, and from the left to the right. In the plans of attacks, the ſide of the parapet of the trench, as alſo that of the parallels, are diſtinguiſhed by a ſtronger line than any of the reſt; but the latter admits of no difficulty, becauſe we may eaſily conceive, that being parallel to the place, its parapet muſt neceſſarily be on the ſide that faces it. Care has been likewiſe taken to expreſs, as we have already mentioned, in the figure, the parapet of the branches, by a ſtronger line than the other lines of the attacks. The ſide of the trench oppoſite to the parapet, is called the *reverſe of the trench*.

What we have been mentioning is ſufficient to trace the trenches upon the plan of a regular place on even ground. In order to give all that can be ſaid relating to this ſubject on paper, there remains only to add a word or two of their depth, and of their parapet.

The trenches are generally no more than three feet deep; and their parapet, beginning from the bottom of the trench, is ſix feet and a half high, or thereabouts. The parallels have a parapet like the trench, and of the ſame height; but as they are intended for firing over, they are made with a kind of banquette, as may be ſeen Plate CCCV. fig. 3. to raiſe the ſoldier, to the end that he may fire over the parapet. On the parapet of the places of arms, are put baſkets, faſcines, or ſandbags, ranged in ſuch a manner that the troops may be able to fire without being too much ſeen by the enemy. The third parallel, or place of arms, is generally wider than the reſt. Sometimes the inſide of its parapet is likewiſe made with ſteps or banquettes, to the end that the ſoldiers may conveniently paſs over it in caſe of an attack. The fourth figure of the ſame plate ſhews the profile thereof.

There will never be any great difficulty in tracing the attacks, even of an irregular town, and upon uneven ground, from an exact plan, by obſerving the method we have made uſe of to make its parts defile properly.

But the difficulty is to transfer the works from the plan to the field, and to direct the attacks of an irregular fortification on irregular ground. By irregular ground we underſtand that which does not permit an army to extend itſelf on every ſide; which is cut by moraſſes, or ſubject to be laid under water by the town; or, in a word, which has only ſome parts fit for continuing the trenches. Here it is that the knowledge of an able and experienced engineer is requiſite, in order to obviate the inconveniences of ſuch a ſpot; a thing that can be done but imperfectly upon paper. Yet to convey ſome idea of the manner of proceeding, we ſhall here transfer the above traced attacks to the ground; but to ſuch ground as hath been already mentioned, equally acceſſible in every part. Before it is done, we muſt from all the angles of the branches of the trench, upon the plan, draw perpendiculars to the produced capitals; obſerving the diſtance of each

Of Sieges.

of theſe perpendiculars and their length. It is evident, that if the capitals were marked on the ground, and it was poſſible to perform the operations there with any convenience, the trench might be traced with all eaſe; becauſe by ſtretching a cord ſucceſſively from the extremity of one perpendicular to another, you would have the firſt trace, or the zig-zag, of the trench: but nothing can be traced on the ground; for the operation is to be performed by night, in order to conceal the knowledge of it from the enemy, who will be very little diſpoſed to let the beſiegers carry on ſuch an operation unmoleſted. The following is a method that may be made uſe of.

The engineer may walk about in the day-time, at a ſufficient diſtance from the place to be without the reach of muſket-ſhot. It is not uſual to fire cannon againſt a ſingle man, becauſe the ſhot is very uncertain, eſpecially againſt a perſon who does not ſtand ſtill for any time; therefore, without any great danger, he may only keep himſelf out of muſket-ſhot. It is eaſy to diſcover the flanked angle of the baſtions againſt which he wants to direct the attacks, and the ſaliant angle of the covert-way oppoſite to them: which gives two points, and theſe the direction or the prolongation of the capitals of thoſe baſtions. Conſequently he has only to plant ſome pickets on the direction of theſe points, in order to have the prolongation of the capitals of the baſtions. Theſe pickets can only be put out of the reach of muſket-ſhot; but by day-light he may obſerve ſomething of the ground lying in the direction of theſe pickets, and he may afterwards reconnoitre it in the evening, in order to place pickets there alſo.

In this manner he may have the prolongation of the capitals pretty exact.

In order to conduct the trench by theſe capitals, the following method has been pointed out by marſhal Vauban.

Examine upon the plan of the attacks what diſtance there is from the beginning of the trench to the firſt perpendicular; meaſure this perpendicular and the ſide or part of the branch correſponding to it; take cords of equal length with theſe lines, and faſten the extremities of the two cords, one repreſenting the length of the line of direction, and the other that of the branch which makes an angle with it, to a picket at the point of the produced capital where the trench begins, and make two men walk, each of them holding one end of theſe cords, viz. one in a direct line towards the place, the other alſo advancing towards the place and walking along-ſide of the former. When the firſt comes to the fartheſt diſtance betwixt the opening of the trench and the firſt perpendicular, he muſt plant a picket on this point, to which he is to faſten the cord which expreſſes the perpendicular. He muſt take the other end of this perpendicular, and afterwards turn off to the right or to the left, according to the ſide where the perpendicular ought to be, till the part of the cord expreſſing the perpendicular is well ſtretched, and joined to that end of the cord of the trench carried by the other man: at their meeting they are to plant a picket, by means of which the triangle, thus transferred to the ground, will be like that which was taken upon the plan; and this part will be traced on the ground in the ſame manner as on the plan.

You may have as many cords as there are windings or turnings in the trench, and you may trace every part of them in the manner above laid down, at leaſt in the beginning, and when the trench is yet at a diſtance from the place.

Plate CCCIV.

Let the trenches be traced upon the plan, (fig. 2.) in the manner already ſhown, and let C be the place againſt which you are to direct the attacks, transferring the plan to the ground: let BG be likewiſe equal to the line of direction of the plan; you are to plant along this line a ſufficient number of pickets, with burning matches tied to them, in order to diſcover them the more eaſily.

To begin the tracing of the trenches, tie to the picket G a cord of the length GS, and to the ſame picket another cord of the length GX: let there be two men, and each take an end of theſe two cords, and let them walk, the one at a venture towards S, and the other directly to X towards the place along the line of direction BG; and having reached the end of his cord, let him faſten it with a picket, after having drawn it very ſtraight; and to this picket let him tie one of the ends of the cord, which is to mark the perpendicular XS. Let him take the other end, and walk towards S till his cord XS is ſtretched very tight, and then let him join the man who holds the end of the cord GS, and let them faſten a picket in S, where both the cords join. Let them afterwards take away the cord XS, the perpendicular which is of no uſe, and the cord GS which remains will mark the real tracing of the trenches. In order to have the line ST, you come to the picket X; to which you tie a cord of the length of XY, and another to the picket S of the length of ST. Let two men, as before, take each an end of theſe two cords, and let them walk, the firſt who holds the end of the cord XY, directly towards Y, and the other who holds the end of the cord ST, obliquely towards T: he who holds the cord XY, having reached Y at the end of his cord, ſhall place a picket there; to which let him tie the end of the cord of the perpendicular YT, and let him walk towards T, holding the end of this cord, till he meets or joins the man who holds the end of the cord ST; and at the point T of their meeting, let them place a picket, to which let them tie the end T of the cord ST. After this take away the cord of the perpendicular, and thus continue the ſame operation as long as you pleaſe, or are able, in order to trace all the other turnings or windings of the trenches.

This whole operation ſuppoſeth that you know exactly the diſtance of the point G, the extremity of the line of direction to the top E of the ſaliant angle of the covert-way. To find this diſtance, many ways may be learnt from trigonometry; but you may make uſe of the following, which is pointed out by marſhal Vauban, and is the moſt ſimple.

Plate CCCV.

Let A (fig. 5.) be the vertex of the ſaliant angle of the covert-way, and AB the line of direction of the trench whoſe length you want to take. At the point B, draw BC perpendicular to AB, to which give what meaſure you pleaſe, as 80 or 100 fathoms, and at the point C, draw CD perpendicular to BC; divide BC into ſeveral equal parts, as four, ſix, or eight, and place pickets in each of theſe diviſions. Walk along CD, and look out for a point on this line, which ſhall be in the direction of A, and of one of the pickets of BC. Suppoſe that BC is divided into four parts, and that G, which is the picket of the third diviſion, is in the direction of the point E of the line DC, and at the vertex A of the ſaliant angle of the covert-way, you have the two ſimilar triangles BGA, GCE. Therefore, as BG, the baſe of the former, is three times GC, the baſe of the ſecond, it follows that CE is the third of AB, and that thrice CE will give the length AB. If GC was only the fourth part of BG, CE would be only the fourth part of AB, &c.

When once you have found out by this, or ſuch other methods as you may make uſe of, the length of the line of direction EG, (Plate CCCIV. fig. 2.) you will be always able to know the diſtance that remains to the ſaliant angle of the covert-way, and to the points I, N, P, through which the parallels or places of arms are to paſs. Theſe points being determined, it would be an eaſy matter from geometry to find out a method of deſcribing the parallels that are to paſs through them, if their ſituation admitted the engineers to perform the operation quietly by day-light; but they are to be traced in the dark, and under the fire of the place; ſo that there is no other way to trace them than by approximation, that is, to move as nearly parallel to the circuit of the place as you can by your judgment; and to plant pickets, with cords tied to them at proper intervals, the whole length of the line. But you can trace with cords only the firſt parallel; for the others are too near the place to be able to perform this operation: you are therefore to proceed in tracing them almoſt in the ſame manner, as we ſhall obſerve when ſpeaking of the ſap, to which they belong, and which are carried on by that method.

§ 7. *Obſervations on the propereſt part for making the the attacks.*

WHILE the lines are perfecting, the neceſſary materials are to be got ready for the conſtruction and operations of the attacks. The materials conſiſt of faſcines, pickets three feet long and about an inch or two in diameter, gabions, and pickets for gabions. There muſt likewiſe be a proviſion of the ſeveral inſtruments or tools neceſſary for theſe operations.

The engineer, who has the direction of the ſiege, will likewiſe make uſe of this time to examine into the parts moſt convenient for carrying on the attacks, and where they will be moſt ſimple and expeditious. There are few fortreſſes in Europe of which plans are not to be had; but as it is preſumed that the enemy hath increaſed the fortifications of a town which is threatened with a ſiege, care ſhould be taken to get intelligence thereof from ſome ſkilful perſon that has been in the place, and made all the obſervations poſſible in regard to the works lately raiſed, without giving any ſuſpicions of his intentions. The danger of ſuch an undertaking is very well known, ſo that the perſon employed cannot be too cautious in keeping himſelf concealed.

While the circumvallation is making, the engineers may at a diſtance, or, as we have already obſerved, out of muſket-ſhot, examine ſome part of the outworks; and afterwards, from the report of the perſon ſent into the place, and from what they know themſelves, they may ſettle with the general the propereſt and fitteſt place for carrying on the attacks. On this occaſion there are many things to be obſerved, as well with regard to the ground as to the fortifications; but in a work of this nature, it is ſufficient to conſider the points of moſt importance.

Firſt of all, the nature of the ground about the place muſt be well obſerved, Whether there are any ditches or hollow ways, that may ſerve as a cover to guards of horſe and foot againſt the cannon of the place; whether there are any parts that command the town, and may ſerve for the erecting of batteries; and whether the ground is fit for the works. The moſt favourable circumſtance is to find a ſoil eaſy to dig; then the works advance with eaſe and leſs loſs, becauſe the ſoldier is ſoon under cover, and the cannon does not do half the miſchief as in ſtony places, where it makes the ſhivers fly about, which wound a great many men; and beſides, inſtead of ſinking as in a good ſoil, it makes a number of rebounds, which greatly obſtruct the progreſs of the works. If the ground about the place is a pure rock, or a moraſs, then the operations are ſtill more difficult; beſides, there will be occaſion for a vaſt quantity of faſcines, ſand-bags, wool-packs, &c. and the workmen are in much greater danger.

The rivers which run through the town, or in the neighbourhood, do likewiſe deſerve conſideration; for they ſeparate the attacks, and it may happen by ſome ſtoppage of the water, or other accident, that the bridges of communication being broke down, the ſeparation of the attacks will expoſe the army of the beſiegers to be defeated, by which means the place may be relieved. It is proper alſo to inquire, whether thoſe rivers are not ſubject to inundations, which if they were to happen during the ſiege, and to break in upon the attacks, would oblige the beſiegers to abandon the trenches, and to raiſe the ſiege. In a word, whether the town can command any quantity of water ſo as to make an inundation round the place, and to lay the ground appointed for the attacks under water. All theſe points, and a great many others which we do not mention, deſerve the moſt ſerious attention. On the chooſing a proper ground for the attacks the ſucceſs of the ſiege generally depends; for which reaſon the engineers and the generals, who are particularly concerned in this choice, ſpare no pains to obviate every inconvenience that the beſieged may make uſe of to retard the progreſs of the works. All that the enemy can do ought to be foreſeen, in order to prevent or remedy it effectually.

After chooſing the propereſt ground for the attacks, a general is to conſider the front which is leaſt fortified and leaſt covered with outworks. All other things being the ſame, it is evident, that the fewer outworks there are, the eaſier will be the attack. But if the place is ſituated in a moraſs, or upon an eminence, then he is ſtraitened by the ground; for let the outworks of the acceſſible ſide of the place be what they will, it muſt neceſſarily be attacked on that ſide. If the town is ſituated on the bank of a great river, as Mezieres, Namur, Thionville, Straſburg, Philipſburg, &c. which occupy only one ſide of it, and maintain the other by little forts; then it is moſt advantageous to attack that ſide next the river above or below, flanking the right or left of the trench with the bank of the river, and carrying another trench on
the

Plate CCCIV.

the oppoſite bank, with an intent to take poſſeſſion of thoſe works, and to occupy a proper ſituation for placing reverſe batteries oppoſite the grand attacks. In a word, the whole choice of the attacks conſiſts in finding out the propereſt ground, and the weakeſt ſide; but as it is to be preſumed that the enemy are acquainted with the nature of the ground about the place, and therefore have taken care to fortify more exactly thoſe parts which are moſt favourable to an attack, the beſiegers ſhould not heſitate to make their approaches on that ſide; where, by the ſituation of the ground, they may gain, what the increaſe of the fortifications might otherwiſe make them loſe.

But in regard to places ſurrounded with moraſſes, it is to be obſerved, that ſome of thoſe which are looked upon as inacceſſible, may happen to be otherwiſe; and that an exact knowledge of their ſituation will greatly facilitate the taking of the place, by carrying on the approaches on that ſide which there is reaſon to think is leſs fortified, as the enemy judged it more difficult to attack.

§ 8. *Of opening the trenches.*

Every thing being ready for opening the trenches, the ground pitched upon, the attacks ſettled and drawn upon a plan, and ſtores or magazines of all the materials neceſſary on the occaſion being within reach of the place where the pioneers propoſe to work; the general having alſo ſettled the round of duty for the guard of the trenches, both of horſe and foot, as likewiſe the number of horſe for bringing the faſcines, with the number of pioneers and troops to ſupport them; and the chief director of the engineers having acquainted the reſt of the corps with his plan of attack, and the manner they are to act; in a word, every thing being ready for execution, the troops deſigned for the ſervice of the firſt night being prepared and drawn up in battalia at the place of rendezvous, and the pioneers provided with faſcines, pickets, ſhovels, and pick-axes; in the duſk of the evening they all begin to advance, every ſoldier being obliged to carry a faſcine, together with his arms, in order to reach the place deſigned for opening the trenches. The guard of horſe march at the ſame time to their aſſigned poſts, to the right and left of the attacks, ready to ſupport the troops for the guard of the trenches in caſe of any ſally from the enemy. All this is to be done with the greateſt ſilence poſſible, and nothing ſhould be neglected to conceal the deſign from the enemy.

The pioneers are, according to marſhal Vauban, divided into brigades of 50 men each, commanded by a captain, a lieutenant, and two ſerjeants. They advance four or ſix abreaſt, near the place where the trenches are to be opened; after which the reſt of the troops that are to ſupport them, being come up, the engineers charged with the tracing of the trenches, and who are to place the pioneers, make them come forward where the opening is to commence, while the battalions that ſupport them are drawn up to the right and left in the places aſſigned them, where they unload their faſcines, and ſilently wait for further orders. In the mean while the engineers trace the branches of the trenches, as we have already obſerved; the director places the firſt cord (fig. 2.) from G to S, or traces the line GS, and the other engineers afterwards trace the other branches from S to T, and from T to I. The ſame is done on the other ſide of the attack. The tracing of theſe two parts is done at the ſame time; they likewiſe begin to trace the firſt parallel this very day, and the work is advanced as faſt as poſſible.

Plate CCCIV.

As much work is undertaken as the pioneers can be expected to perform this firſt night: and in proportion as the tracing goes on, the engineers place the pioneers, making them file off one by one, each carrying his faſcine under the right arm if the place is on the right, or under the left if it is on the left, to the end that by the poſition of their faſcines, which they lay on the ground along the tracing, and on the ſame ſide as they carry them, they may be enabled to diſtinguiſh the ſide of the place, that is, the ſide towards which they ought to throw up the ground in order to cover the trench from the fire of the town. As faſt as they are placed, they are ordered ſilence, and made to lie down with their face on the faſcines, and not to begin to work till commanded. The whole operation begins at the ſame time, that they may advance equally. When every thing is ready, and the pioneers are all placed along the tracing which is purpoſed to be made this firſt night, orders are again given for them to work; and then they all ſet about it with all the diligence poſſible till day-light, that they may be covered againſt the fire of the place, which is ſtill very dangerous, in the morning, conſidering that the trench has not had time as yet to be rendered ſo perfect as it ought. The troops that are to ſupport the pioneers, are put under cover on the back of that part of the trench which is finiſhed; that is, on the border of the trench oppoſite to that on which its parapet is raiſed; they are made to lie on their faces; after which the pioneers, who have been upon duty in the night, begin to file off, and others fill up their places.

It is very difficult this firſt day to render the trench as complete as it ſhould be; but no pains are ſpared to make it as complete as poſſible.

As the deſign cannot be now concealed from the enemy, the guard mounts the next day with drum beating about noon; and care is taken to continue the work of the trenches the ſecond night, in the ſame manner as the firſt, that is, by placing the pioneers uncovered, becauſe they are at ſuch a diſtance from the town, that the fire is not yet dangerous enough to require their being placed otherwiſe: the work goes on quicker in this manner; but it muſt neceſſarily be altered as ſoon as the workmen come within muſket-ſhot of the place.

If the whole compaſs of the firſt parallel has not been undertaken the firſt night, it is to be done the ſecond; and the branches of the trenches are ſtill carried on, though with leſs vivacity and progreſs than the firſt.

The firſt night is the beſt adapted for advancing the works of the trenches, becauſe of the diſtance from the place, which is too great to apprehend any danger from the enemy's fire. Sometimes it happens ſo, that the enemy is not appriſed of theſe works; eſpecially when all the neceſſary precautions have been taken to conceal them, and in that caſe the buſineſs is done in a manner without loſs or danger. It is of importance to advance them with ſuch expedition, that they may be fit to receive the troops, who are to ſupport the pioneers, in order to cover them againſt the fire of the place: and as the firſt parallel is deſigned for this purpoſe, therefore it cannot be perfected too ſoon.

This line is made with a view to protect the advanced works, which become more difficult in proportion as they draw near the place; and it is but prudent not to run the riſk of their being deſtroyed by the enemy; for by being too haſty a contrary effect would follow The grand rule is, not to advance faſter than you are able to maintain your ground.

According to marſhal Vauban, the firſt place of arms, though begun the firſt night, has need of a ſecond and a third, before it can be completely finiſhed and in condition to hold the troops that are to guard the trenches; but the works for perfecting this line will not hinder the beſiegers from advancing to the ſecond parallel, which ought not to be begun till the fourth night. It is to be obſerved, that the guard who mount the trenches are changed every day; they mount about noon, and they are to be as ſtrong as ſhall be requiſite for oppoſing the ſallies which the garriſon of the place may make againſt the workmen. They are generally two-thirds of the garriſon, becauſe the enemy may fall upon the trenches with that number, reſerving the other third to guard the town. But as it is poſſible that the beſieged may think proper to ſally forth with their whole force, and fall upon the workmen, together with the troops that ſupport them; therefore, in order to guard againſt every accident of that ſort, the troops in the trenches ought to be nearly equal to thoſe of the place, eſpecially in ſmall towns, where a few are ſufficient to guard the poſts, or where the burghers are ſo well attached to the prince, that the commandant may depend upon their fidelity in guarding the town; becauſe in that caſe he may make a general effort with his whole garriſon againſt the troops in the trenches.

We have obſerved, that the ſecond night the pioneers may ſtill be placed uncovered; but the third it would be very dangerous to do it, becauſe of the enemy's fire being too near. When the engineers are of this opinion, they take care not to expoſe the men any longer uncovered, and then the works are carried on by ſap.

§ 9. *Of the ſap.*

Plate CCCV. fig. 6.

LET ABC be the part of the trenches advanced to A, ſo near the town as to render it impoſſible, without evident danger, to work any longer at the approaches, unleſs the men have ſome cover againſt the fire of the place: and let the branch AD be traced by the engineer, not with a cord, as at the opening of the trenches, but with ſome pickets, which he has taken care to place in the direction this branch ought to have, to ſerve as a guide to the workmen. A cut is made in the parapet BA of the trenches; and then the men deſigned to work by ſap, who are therefore called ſappers, will move forward through the opening A, ſucceſſively eight in number. The firſt is to roll before him a mantlet, to cover him againſt muſket-ſhot. He advances as far as is neceſſary to place a gabion on the line AD; and this gabion being ſet on its baſe, in the proper ſituation, with the pickets uppermoſt, the ſapper makes a little trench behind, about ſix inches diſtant from the gabion, of a foot and a half in depth, and as many in breadth, and he empties the earth of this ditch into the gabion. This done, he places a ſecond gabion near the firſt, in the ſame manner, and always under the cover of his mantlet; in like manner he makes a ditch behind, the earth of which ſerves to fill his gabion. Thus he places a certain number, till he grows tired of the operation.

The ſecond ſapper, who immediately follows him, widens the ditch made by the former by ſix inches, on the oppoſite ſide to where the gabions are placed, and makes it half a foot deeper. The earth he digs up ſerves to fill the gabions of the firſt ſapper. The third ſapper widens the ditch of the two firſt likewiſe half a foot, and he deepens it in the ſame proportion.

At length the fourth enlarges it alſo in the ſame proportion, in breadth and depth; and then the trench is three feet wide, and the ſame in depth, which is as much as it ought to be. The earth dug up on this occaſion is ſufficient, not only to fill the gabions placed by the ſappers, but likewiſe to make a parapet of the reſt, which is thrown up, and is ſtrong enough to reſiſt muſket-ſhot. The third and fourth ſapper lay the faſcines over the gabions, with their hooks, or otherwiſe; then they preſs them down, ſo that the ſtakes of the gabions ſhall keep them firm. As the ſappers are ranged by brigades of eight each, while the firſt four are working at the ſap, in the manner above deſcribed, the other four furniſh them with gabions, faſcines, and whatever other things they want. But when the firſt four are tired, the four laſt take their places, and work in the ſame manner; after which they are relieved by the firſt, and ſo alternately, till each has performed his part at the head of the ſap.

When the firſt gabions are placed, and the ſap is not as yet perfected, the part in which the gabions touch one another being leſs ſolid than the reſt, their joints are filled up by ſand-bags, which are taken away when the work is completed, or thoſe interſtices are filled up with ſmall faſcines called *ſap-faggots*.

This is the nature of the ſap; a work ſo much the more conſiderable, as it is performed by day as well as night. Several ſaps are carried on at the ſame time; and there is one to both ſides of each of the attacks for the ſecond and third par . There are likewiſe ſaps to each of the advanced parts, and to the half-places of arms or parallels.

We have ſuppoſed that the firſt ſapper covered himſelf with a mantlet; this was the cuſtom formerly, and an excellent cuſtom; but now it is more uſual to have a ſtuffed gabion. He rolls this gabion before him, and uſes it in the ſame manner as he would the mantlet. Though care be taken to give a ſtuffed gabion to the directors of the ſaps, yet it happens ſometimes that the ſappers will not make uſe of them: for as the weight of this gabion renders it ſometimes troubleſome to roll, they chooſe to do without it; and are ſatisfied with rolling ſeveral gabions before them, near one another, and with working behind them. Theſe gabions are indeed of little defence, but are ſufficient to conceal them from the enemy, who cannot tell the gabion behind which the firſt ſapper is. But as the preſervation of theſe men is of great importance, they ought to be obliged to work behind the ſtuffed gabion: for the ſame reaſon, the firſt ſappers ſhould have a cuiraſs, and even a head-piece, muſket-proof.

There are three ſorts of ſap; the ſimple, viz. that which we have been deſcribing, the double, and the flying ſap.

The ſimple ſap, or the ſap without any other appellation, is made on one ſide, or, which is the ſame thing, has only one parapet.

The double ſap has a parapet on each ſide, and is carried on wherever its two ſides are ſeen from the place.

The flying ſap is that in which they do not give themſelves the trouble of filling the gabions with earth; it is made where the workmen are not much expoſed, and in order to accelerate the approaches.

The foregoing account, with the aſſiſtance of the figures relative to this ſubject, is ſufficient to give a very exact idea of whatever relates to the ſap; we have only to obſerve, that as ſoon as the men have brought this work to its proper perfection, the pioneers are ordered forward, and theſe make it the ſame width as the other parts of the trenches; upon which it changes its name of ſap to that of trench. It is called a trench, if it ſerves as a way to the town; and a place of arms, if it be parallel to it, and deſigned to lodge troops.—See Plate CCCV. fig. 7, 8. and CCCVI. fig. 1, 2. See alſo the upper compartment of Plate CCCII. for figures of the different inſtruments uſed in this and other operations of a ſiege.

§ 10. *Of batteries.*

CANNON is made uſe of at a ſiege for two different purpoſes; the firſt to drive away the enemy from their defences, and the ſecond to diſmount their guns.

To produce theſe two effects, the batteries ſhould not be above the mean reach of cannon-ſhot from the place; that is, above 300 fathoms. Therefore there is no poſſibility of conſtructing them till the firſt parallel is formed; and as the diſtance of this firſt parallel from the place is generally 300 fathoms, the batteries muſt be on this line, or beyond it, nearer the town.

In order to judge where they may be placed moſt conveniently, we are to conſider that this muſt be where they are able to diſcover or ſee into a greater part of the enemy's defences. Now this can be no where but on the produced faces of the works attacked. In this ſituation they diſcover the whole length of the faces of thoſe works, which they could not do in any other poſition; therefore we may lay it down as a general rule, always to place the batteries, when the ground will permit, on the produced faces of the works attacked, as we have mentioned in the maxims of attack.

Plate CCCVI. fig. 3.

Let Z be the centre of the place attacked, and the trenches, as well as the parallels, completed. To find a proper poſition for erecting batteries, produce the faces AD, AC, BE, BF of the two baſtions attacked, till their prolongation cuts the firſt parallel. Produce alſo the two faces OM and OL, of the half-moon MOL of the front attacked, and the faces HG and IK of the two collateral half-moons 1 and 2, to the firſt parallel, and erect batteries on theſe produced faces, as you ſee in P, Q, R, S, T, U, X, and Y.

They are advanced beyond the firſt parallel 40 or 50 fathoms; and are parted from the trenches, to the end that they may be uſed with greater eaſe and convenience, and leſs trouble to the workmen.

The conſtruction of batteries belongs to the officers of the artillery, who conſult with the engineer that has the direction of the ſiege, about their ſituation, and the number of guns.

§ 11. *Of ſallies.*

THAT we might not interrupt the making of the trenches, we conducted them to the foot of the glacis, without taking notice of ſallies; that is, attacks which the garriſon may make againſt the trenches, with a view of ruining or retarding the works. As it is not to be preſumed that the enemy will ſuffer themſelves to be ſtraitened in the town without uſing ſome endeavours to prolong the ſiege, and as ſallies ſeem to be one of the principal means they can employ, it is proper to point out the conduct to be obſerved, not only for preventing their effects, but likewiſe for rendering them diſadvantageous to the enemy.

The intent of ſallies is to deſtroy a part of the trenches, to get to ſome battery in order to nail up the cannon, or to ſurpriſe part of the guard in the trenches. When there happens to be a ſtrong garriſon, they likewiſe make ſallies without any particular view: but a ſenſible governor will avoid all ſuch; and we are to ſuppoſe that he acts always with one ſettled deſign, which is to retard the taking of the place; otherwiſe he would wantonly expoſe the garriſon, and be the cauſe of knocking men on the head, without any ſort of neceſſity.

Sallies can be attended with no ſucceſs, unleſs they are made at a time when unexpected; by falling then upon the workmen, they are ſcattered, and obliged to fly. They in running away muſt needs occaſion confuſion and diſorder among the troops that are to ſupport them; and it requires ſome time before they can be brought again to order, and made to charge the enemy. In the mean while the latter avail themſelves of the opportunity to fill up the trenches, and to do all the miſchief poſſible: but when the troops are upon their guard againſt every deſign of the enemy, if the latter ſtir out of the place, they are ſuffered to advance; and care is taken to cut off their retreat, by means of the cavalry and the picket, in caſe they ſhould advance too far into the field: otherwiſe they are fired at from the places of arms, and other works within reach; and then they are briſkly attacked by the grenadiers and the troops upon duty in the trenches. Care, however, muſt be taken not to purſue them too far, for fear of the fire of the place, which never fails to be extremely ſharp when the enemy have got back to the covert-way.

In proportion as the works advance towards the town, ſallies become more dangerous to the beſiegers, becauſe the enemy may fall upon the trenches more readily; for which reaſon, double care ſhould be taken to ſtraiten them more cloſely, and to prevent their ſallying out with impunity. As the works carried on beyond the ſecond parallel are more expoſed than the reſt, becauſe of their proximity to the covert-way, no part ſhould be advaced without being well ſupported. Hence, as we have already taken notice, half-places of arms are formed, in order to ſupport the head of the trenches, till they reach the third place of arms; which muſt be ſet about with the greateſt care and expedition poſſible. When this is done in the manner it ought, there will hardly be any farther danger from the ſallies.

Sallies are ſeldom made in the day-time but by a preſumptuous enemy, who imagine they may ſafely attack and defy the troops on duty in the trenches: but they are eaſily repulſed, unleſs the beſiegers are ſo weak, as not to be able to furniſh a ſufficient guard for the trenches; in which caſe they ought not to continue the ſiege, leſt they run a riſk of being at length entirely defeated.

A garriſon may likewiſe be in a condition to inſult or attack the trenches, after having received a ſtrong reinforcement; and then it is in the option of the general either to continue or to raiſe the ſiege. If it appears that his army ſuffers too much by continuing, he ought to raiſe it: but here we ſuppoſe that he has all the ſuperiority of troops neceſſary for avoiding ſuch a ſtep, which, independently of the expences incurred in preparing for the ſiege, and the number of men ſlain in the different operations, is generally attended with very troubleſome and diſagreeable conſequences.

At the opening of the trenches, and when the beſiegers are at a good diſtance from the place, there is little occaſion to be afraid of any ſallies in the day; for there would be full time enough to prepare to receive them before they reached the works. If the enemy are diſpoſed then to iſſue forth, they will do it by night; but it will be an eaſy matter to get intelligence of any attempt they ſhould make, by ordering parties of 10 or 12 men, headed by a ſerjeant, to range in the night between the trenches and the town.

Theſe men may lie on their faces as near the place as poſſible; remaining in profound ſilence till they hear or perceive ſome motion in the covert-way; then they ſhould ſend one of their own body immediately to acquaint the lieutenant-general who that day commands the trenches, and the reſt ſhould continue there as long as they can be concealed, to ſee which way the enemy direct their courſe. This caution is not only ſimple and eaſy, but ſufficient to guard the beſiegers againſt ſurpriſe, and to enable them to give a warm reception to the enemy.

When the works are advanced pretty near to the place, for inſtance, to the third parallel, if the enemy ſhould then ſally out and fall upon the workmen, the latter muſt be ordered to retire quickly to the back of the third place of arms, and let the guard fire briſkly upon them, without minding the overturning of a dozen or two of gabions; for the galling fire of the ſmall arms, to which the enemy are expoſed during this expedition, will make them pay dearly for what little diſorder they occaſion.

While they are taken up in this buſineſs, the beſiegers muſt fall upon them vigorouſly, and drive them back into the town; taking care, however, not to follow them too far, for fear of being expoſed to the whole fire of the place, as ſoon as the enemy is got back to the covert-way. The miſchief they have done is quickly repaired: Marſhal Vauban ſays that one hour is enough for this purpoſe; and if the fire of the beſiegers has been well ſerved, it does more harm to the beſieged, than that they can have done to the trenches.

§ 12. *Of the Lodgments on the Glacis, and the taking of the Covert-way.*

We left the works at the foot of the glacis, and at the third parallel; our buſineſs is now to make a lodgment there, and to go on with them till we have driven the enemy from the covert-way.

Our being then ſo near the covert-way, renders it impoſſible to defile from it; but in order to prevent the effect of enfilading, it is neceſſary to make the trenches much deeper in the glacis; the fire of the covert-way being very near, cannot plunge into thoſe deep trenches, which renders it leſs dangerous to abide there than it would otherwiſe be were it not for this precaution: or they are made with traverſes much in the ſame manner as in the covert-way, by which means the enfilading will be prevented in part, though not entirely.

And here we are to obſerve, that the enfilades are far leſs dangerous when near than at a diſtance; becauſe it is eaſier to guard againſt them by means of traverſes. When near, the violence of the fire makes the ball deſcribe a line ſenſibly direct; ſo that if it grazes the top of the parapet of one traverſe, it will plunge into the next. But in diſtant enfilades, the balls being at the end of their reach, and having ſpent their force, they deſcribe lines ſenſibly different from direct; ſo that in ſpite of the traverſes and their height, they fall into the part of the trench between the traverſes. This is a remark made by Mr Vauban.

In regard to the figure of the lodgment on the glacis, it varies according to the different circumſtances or poſition of the works by which it is defended. The common way is to make ſeveral ſhort turnings or zigzags upon the ridge of the glacis, in the direction of the ſaliant angle of the covert-way, and continued to this angle; or you begin with making two or three ſhort turnings towards the foot of the glacis, from whence you aſcend afterwards by a direct trench, or ſap, in the following manner.

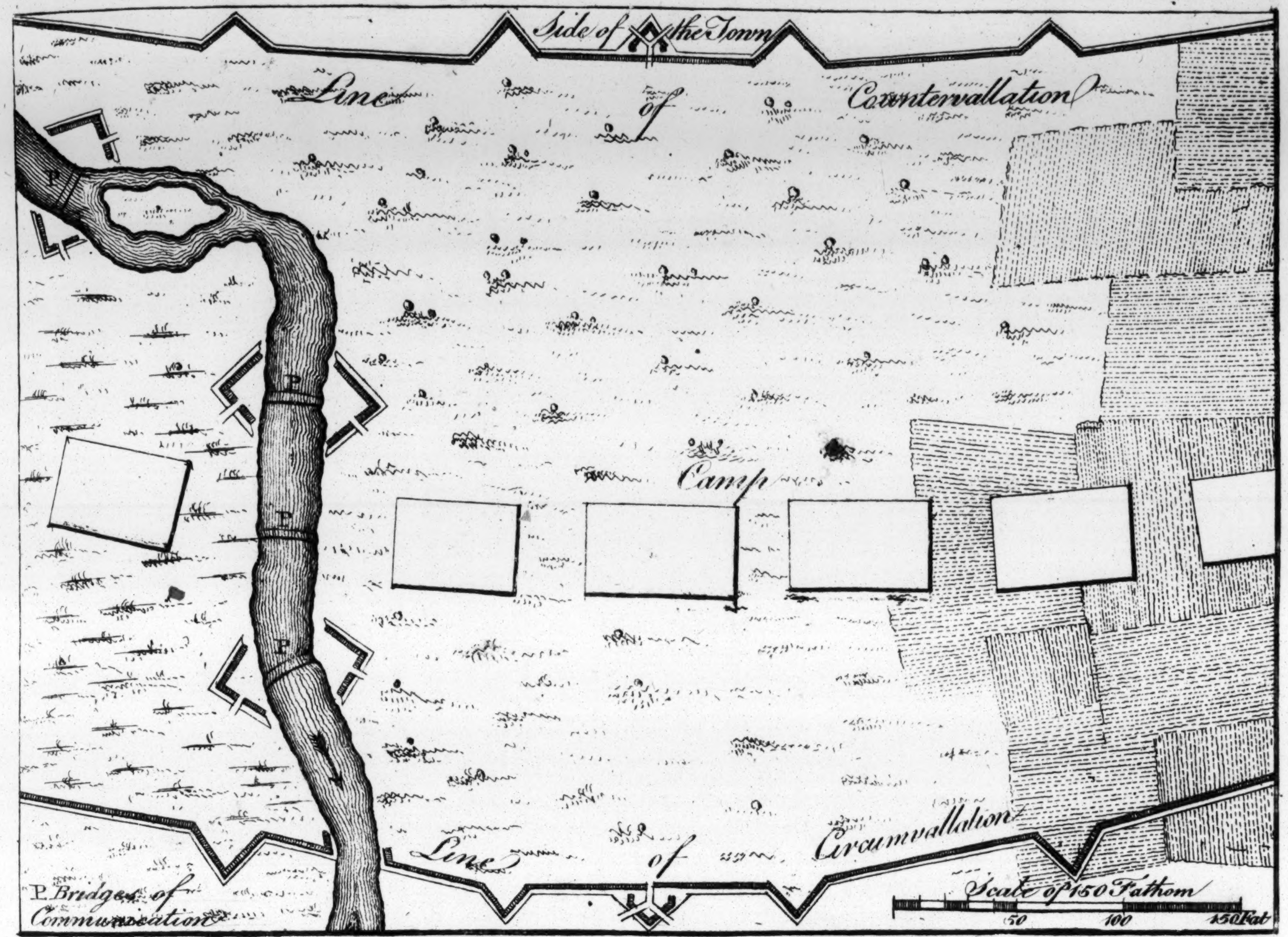
Two ſappers roll each a mantle, or ſtuffed gabion, before them on the ridge of the glacis; each making a ſap, one on one ſide of the ridge, and the other on the other. The ditch is dug deeper than uſual, in order to cover them the better againſt the fire of the place. This work, which advances on both ſides at the ſame time, and both ſides covered, each with a parapet, is what we called a *double ſap*. In the middle they make traverſes three fathoms thick, and of the ſame breadth as the trench. On each ſide ſmall paſſages are made like thoſe overagainſt the traverſe of the covert-way, to the end that the communication thereof be not interrupted,

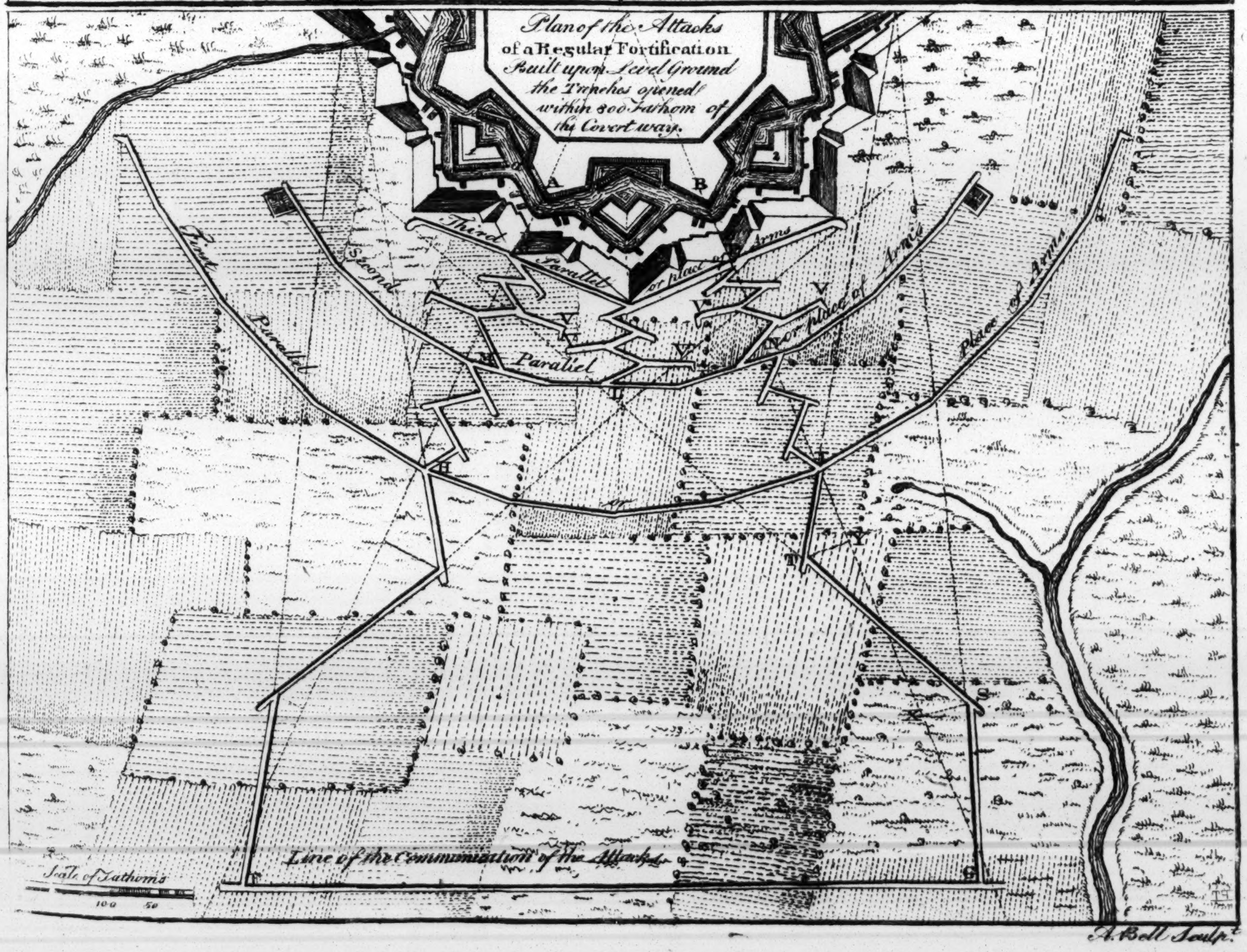
Theſe traverſes are conſtructed ſo near to each other, as to be a ſufficient cover, by their elevation and diſtance, againſt the fire of the place. In order to guard againſt the effect of the grenades, upon coming within their reach, that is, within 14 or 15 fathoms of the covert-way, care then is taken to cover this trench with blinds, or, which is the ſame thing, to cover the upper part of it.

The firſt and ſecond figures of Plate CCCVII. will ſhow this direct trench. The firſt exhibits the plan, and the ſecond the profile, which paſſes over one of the traverſes.

All this being done, and the third parallel finiſhed in the manner we ſuppoſed, they advance from this parallel upon the glacis to each of the ſaliant angles of the covert-way of the front attacked, and they begin with

Fig. 1.


Side of the Town
Line of Countervallation
P
P
P
P
Camp
Line of Circumvallation
P. Bridges of Communication
Scale of 150 Fathom
50
100
150 Fat


Plan of the Attacks of a Regular Fortification Built upon Level Ground the Trenches opened within 300 Fathom of the Covert way.
A
B
Third Parallel or place of Arms
Second Parallel or place of Arms
First Parallel or Place of Arms
Line of the Communication of the Attacks
Scale of Fathoms
100
50

A. Bell Sculp.

3 MA 55

WAR.
Attack of Fortified Places.

Plate. CCCV.

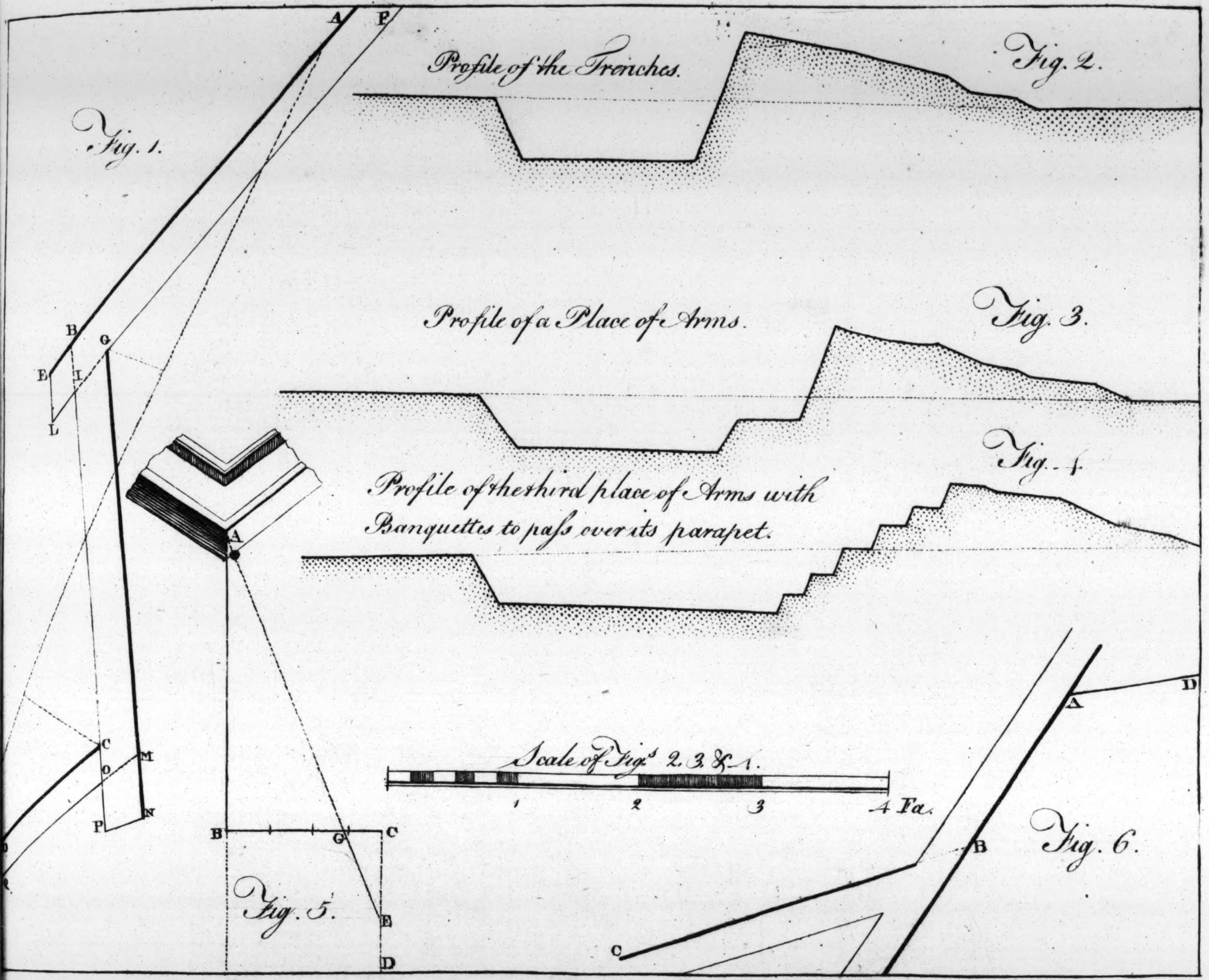


Fig. 1.
A
F
B
G
E
I
L
C
O
M
P
N
A
B
G
C
E
D
Fig. 5.
Fig. 2.
Fig. 3.
Fig. 4.
Scale of Figs 2. 3. & 4.
1
2
3
4 Fa.
Fig. 6.
A
D
B
C

Profile of the Trenches.

Profile of a Place of Arms.

Profile of the third place of Arms with Banquettes to pass over its parapet.

Fig. 7.
Plan of a Sap.

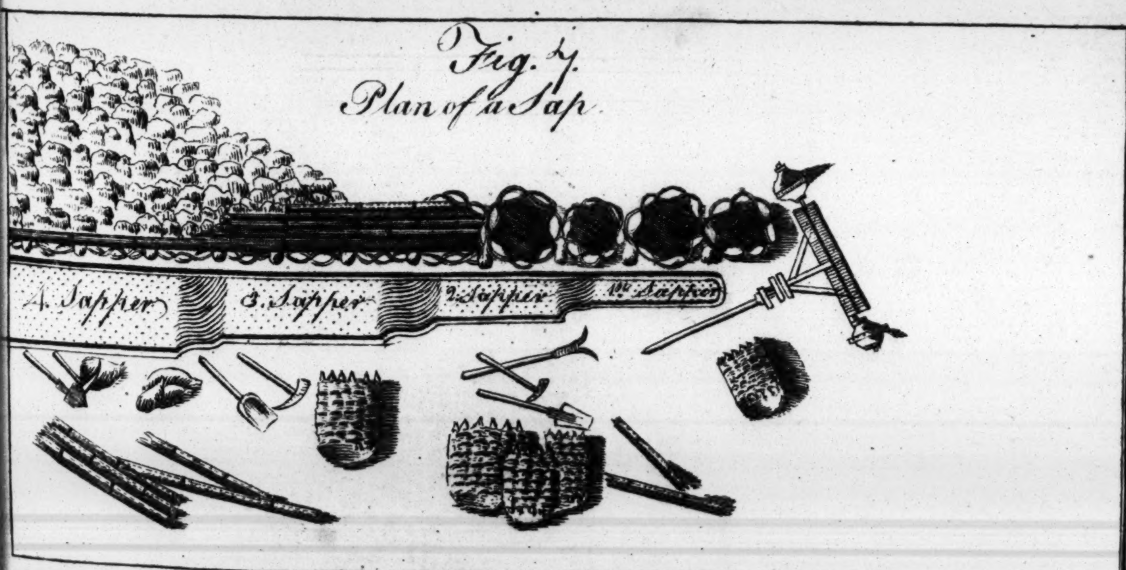
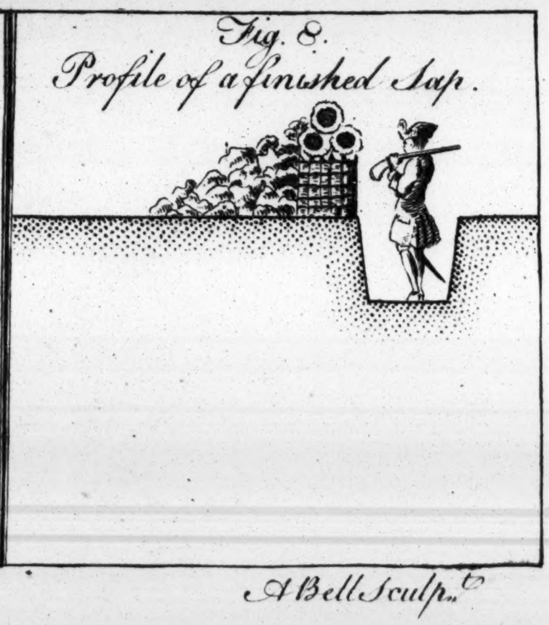

4. Sapper
3. Sapper
2. Sapper
1st Sapper

Fig. 8.
Profile of a finished Sap.



A Bell Sculpt.

3 MA 53

WAR. Plate CCCVI.

Fig. 1.
Back of a Sap.

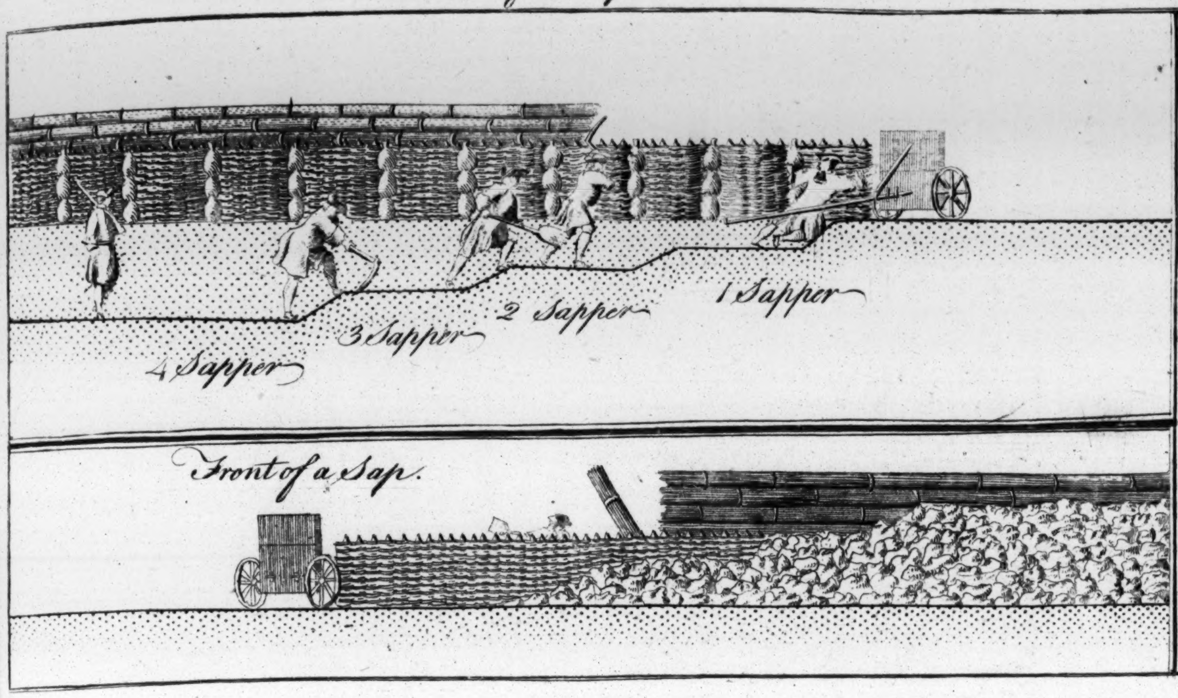

1 Sapper
2 Sapper
3 Sapper
4 Sapper
Front of a Sap.

Fig. 2.
Profile representing the excavation of 4 Sappers

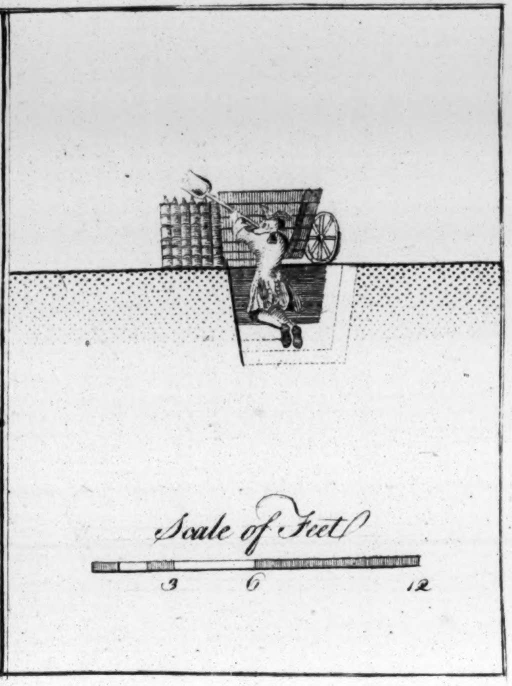
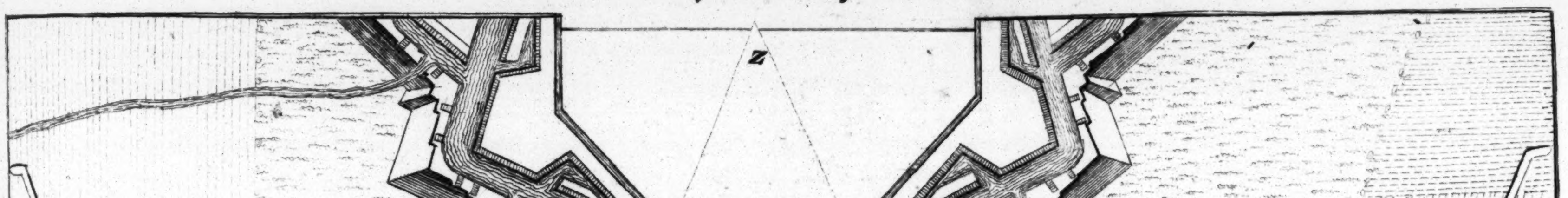

Scale of Feet
3
6
12

Fig. 3.
Plan shewing the disposition of the Batteries.


Z
D
E
G
A
C
M
L
B
O
I
K
P
Q
R
S
T
V
X
Y
Scale of Fathoms
30
90
180

A Bell Sculp.t

3 MA 53

with making two or three ſhort turnings, as marked on Plate CCCVII. fig. 6. along the ridge of the glacis, ſo as to occupy about one-third thereof. Theſe are to be made as deep as is neceſſary, to be a ſhelter againſt the fire of the covert-way; afterwards they may proceed directly along the ridge of the glacis, by a deep ditch, to the ſaliant angle of the covert-way. M. Vauban obſerves, that if we follow directly the ridge of the glacis, this trench is made without much danger. For the paliſade which is placed at the ſaliant angle of the covert-way, and the other two next it, do not preſent directly to the ridge, but only oppoſite to the faces; where at the moſt there is only room for one or two fuſileers to ſee the head of the trenches, and who are eaſily ſilenced by the fire of the third parallel, which ought to be well ſerved, and likewiſe by that of the ricochet.

Upon coming to the middle, or two-thirds of the glacis, two new ſaps are made, *b b, ibid.* which embrace both ſides of the covert-way, to which they are almoſt parallel. Their length is 18 or 20 fathoms, and about five in breadth. They are covered at the end with crochets and winding traverſes, which prevent the fire of the covert-way from enfilading them eaſily.

The parapet of theſe ſaps is raiſed about eight or nine feet above the glacis; and by means of gabions, three banquettes are made, as may be ſeen, Plate CCCVIII. fig. 5. The ſoldier placed on the upper banquette is thereby raiſed high enough to plunge into the covert-way, as appears from the ſame figure. When this work, which Marſhal Vauban calls the *cavalier of the trench*, is once finiſhed, it is very difficult for the enemy to remain any where in the covert-way; for they would be too much expoſed to the fire of the ſoldiers placed on theſe cavaliers. But theſe places of arms or cavaliers cannot be made without being protected by the ricochet batteries, which enfilade the covert-way.

There is alſo another method of driving the enemy from the covert-way, which is by uſing the ricochet bombs. The confuſion and miſchief they occaſion in this part of the fortifications, plainly ſhows there is no poſſibility for the enemy to maintain themſelves there, ſo long as this method is practiſed; as we have obſerved in the above-mentioned treatiſe.

Theſe cavaliers being once finiſhed, it is eaſy to carry on the direct trench, as far as the ſaliant angle of the covert-way, and to eſtabliſh at the point of this angle and on the head of the glacis a ſmall lodgment bounded by a circular arc; whence the enemy may be entirely driven from the ſaliant place of arms of the covert-way. Afterwards this lodgment may be widened on branches of the covert-way, by digging into the upper part of the glacis, at the diſtance of three fathoms from the inner ſide of the covert-way; to the end that this thickneſs may ſerve as a parapet to the lodgment, and ſcreen it from the cannon.

The operation we have been deſcribing, to reach from the third parallel to the ſaliant angle of the covert-way, is formed at the ſame time againſt all the ſaliant angles of the front attacked: hence the enemy is obliged to abandon them almoſt all at the ſame time; and the lodgment on the glacis is afterwards advanced on both ſides of theſe angles, towards the re-entering places of arms of the covert-way.

As it is impoſſible to make this lodgment defile from the works of the place, there is no other way to guard againſt the enemy's fire than by many traverſes. The 5th figure of Plate CCCVII. ſhows in great, the plan of part of this lodgment with its traverſes; which are made with chandeliers and gabions. If the enemy, notwithſtanding the cannon and bomb-batteries *à ricochet*, and the fire of the cavaliers of the trenches, ſhould obſtinately continue in the re-entering places of arms of the covert-way; in order to compel them to remove, batteries for throwing of ſtones are raiſed over againſt thoſe places of arms: and with this view, as ſoon as the lodgment of the glacis is brought within one-half or two-thirds of the branches of the covert-way, on both ſides of the re-entering angle, a ſap is carried on oppoſite to the place of arms; and on this ſap batteries for throwing ſtones are erected, as may be ſeen in *c c*, Plate CCCVII. fig. 6. Theſe batteries being finiſhed and ready to play, they diſcharge a ſhower of ſtones into the place of arms (fig. 6.), which will not ſuffer the enemy to maintain themſelves there any longer. The lodgment continues to advance; and as ſoon as the enemy is driven from the place of arms, it is continued all round the faces thereof; and a lodgment is likewiſe made there, which muſt communicate with that of its faces, and ſhould extend almoſt circularly along its demi-gorges. This lodgment being properly finiſhed, will hinder the enemy from venturing to return to the covert-way; and of courſe will ſecure the poſſeſſion of it to the beſiegers. Theſe lodgments are made with gabions and faſcines; the gabions are filled with earth, faſcines are put over them, and the whole is covered with earth; they ſink into the glacis as deep as is requiſite to be covered againſt the fire of the place.

In the whole of this account we have not made uſe of mines; becauſe we were willing that the diſcription of the works, which are carried on from the third parallel, in order to become maſters of the covert-way, ſhould be as plain poſſible. This omiſſion we ſhall now ſupply, by making mention of the principal difficulties occaſioned by mines, in endeavouring to drive the enemy from the covert-way.

Without mines the enemy would find it very difficult to retard the works we have been deſcribing; becauſe the ricochet batteries muſt gall them exceſſively, and break up their defences, ſo as to deprive them of all ſhelter: but they may have ſome reſource left in works under ground, where their miners can proceed with more ſafety; while thoſe of the beſiegers, not having the ſame knowledge of the ground, can only grope in the dark; ſo that it is altogether a mere chance if they find out the enemy's galleries, and ſucceed ſo as to deſtroy them. If information is received that the glacis is countermined, there can be no manner of doubt but the enemy will avail themſelves of their countermines, to carry branches forward into the field; and then to avoid, as much as poſſible, the miſchief that may be done by thoſe ſubterraneous fires, in the third parallel ſhafts or pits are ſunk eighteen or twenty feet deep, if the ground will permit, in order to get below the galleries of the beſieged: and from thence galleries are carried on towards the covert-way, to meet with thoſe of the enemy, boring the earth with a long iron needle or augre, to find them out. If they are found underneath, an opening is made down into them, and ſhells are thrown in, to drive away the enemy and to ruin their gallery. If, on the contrary, they are to be found above them, a ſmall mine muſt be ſprung to break them: but if none of the enemy's galleries can be found, in that caſe branches muſt be carried to the right and left; at the end of which are made ſmall chambers, to ſhake the neighbouring ground, which can hardly miſs deſtroying the galleries and chambers of the beſieged.

Notwithſtanding all the care that can be taken in the like caſe, it is not to be preſumed that the mines of the beſieged under the glacis ſhould be rendered abſolutely ineffectual; but as ſoon as any of them are ſprung, workmen are immediately ſent to make a lodgment in the pits. In ſome grounds, the mines of the beſieged may be ſpoiled, by letting in a brook or rivulet into the galleries; for which purpoſe you have only to dig pits in the neighbourhood, and let the water run in. The expedient was made uſe of at the ſiege of Turin in 1706, whereby a great many mines of the beſieged were rendered uſeleſs.

The enemy ſhould have mines placed, to hinder the lodgment on the head of the glacis, within four or five fathoms of the paliſades of the covert-way; to the end that in ſpringing them the paliſades may not be hurt, and that they may be under the lodgment which the beſiegers make there.

When they have ſprung their mines, they make lodgments in them; the beſiegers likewiſe on their part ſpring mines, with a view to deſtroy the paliſades. In ſhort, nothing is neglected on either ſide that can help to deſtroy one another. The beſieged do not give up an inch of ground without diſputing it manfully; and the beſiegers employ every method in their power to oblige the enemy to yield as ſoon as poſſible, and with as little loſs of men as may be.

Nothing can be ſaid but what is very general on this ſort of conteſts. They depend on the ſituation of the ground, and upon the capacity and underſtanding of thoſe who attack, and thoſe who defend the place.

Before we made mention of mines, we ſuppoſed, when treating of the lodgment on the top of the glacis, that the fire of the cavaliers of the trenches, together with the cannon and ricochet bomb-batteries, had obliged the enemy to quit the covert-way; but if nowithſtanding theſe fires, they ſhould obſtinately continue in the places of arms and behind the traverſes, the way to drive them entirely from thence, and to make the lodgment we have been ſpeaking of upon the glacis, is as follows.

Whether the enemy has ſprung a mine near the ſaliant angle of the covert-way, or whether the beſieged have blown up ſome of the paliſades near it, as ſoon as the mine is ſprung, workmen muſt be ſent to the excavation; where they are to cover themſelves with all poſſible expedition, and afterwards to extend their lodgment in the covert-way on both ſides of its ſaliant angle.

The double trench, or the double ſap on the ridge of the glacis, muſt be made to communicate with this lodgment, in order to be able to ſuſtain it if there ſhould be occaſion, and to communicate with it more ſafely. Particular care muſt be taken to cover the extremities of it, that is, to make traverſes every where, in order to be ſheltered from the fire of the other parts of the covert-way, where the enemy ſtill maintains themſelves.

When this lodgment is extended to the firſt traverſes of the covert-way, if the enemy keep their ground behind it, as there can be but few under cover there, conſidering the ſpace they have to occupy, a company of grenadiers muſt make a briſk attack to drive them away: this done, ſome of thoſe grenadiers ſhould endeavour to find out in the part abandoned by the enemy the entrance into the mine, and the ſauciſſon; and upon finding it, as there is great probability that they will, they are to cut it off, and thereby render the mine uſeleſs. Workmen may be likewiſe ſent into the paſſage round the traverſe, and there make a ſmall lodgment, which will be the ſafeſt that can be contrived when the enemy is ſo very near. After this an entrance is to be dug in the covert-way oppoſite thoſe traverſes, and continued towards the bank of the ditch, under cover of the traverſe; then a ſap is to be made from each of the extremities of this paſſage, that is, near the border of the counterſcarp; which are to be carried along the rounding of the counterſcarp towards the middle, where they are to meet. This lodgment muſt be made very deep, that it may be no hindrance to that on the head of the glacis; and it is to be managed ſo as to leave between it and the border of the ditch a breadth of earth, ſufficient to reſiſt the cannon of the flanks and the curtain. This lodgment muſt be alſo covered with blinds, to prevent the effect of the grenades; and it is of great uſe towards an opening into the ditch.

During the whole time that the beſiegers are working upon this lodgment in the interior part of the covert-way, they are to continue the lodgment on the top of the glacis, as far as the re-entering places of arms; from whence the enemy may be driven by ordering a few companies of grenadiers to attack them, ſuppoſing they ſhould be ſo obſtinate as to continue there, notwithſtanding the fire of the ricochet batteries, and of the ſhells and ſtones. As ſoon as the enemy have entirely withdrawn themſelves, a lodgment muſt be made there, as we have already mentioned.

§ 13. *Attack of the covert-way, ſword in hand.*

THERE is another method of driving the enemy out of the covert-way, more expeditious indeed, but at the ſame time more bloody, more precarious, and infinitely leſs ſkilful. This conſiſts in making a ſudden attack on the whole front of the covert-way, in driving the enemy from thence by main force, and afterwards making good a lodgment.

There may be circumſtances that ſhall abſolutely require this method of attacking the covert-way; as when there is no poſſibility of erecting ricochet batteries to fire at its branches, nor at the faces of the works in the front of the attack; or when it is preſumed that the enemy are not in a condition to withſtand an attack of this ſort; or, in fine, when it is thought expedient to run any hazard in order to be maſters of the covert-way a few days ſooner: on ſuch occaſions it is uſual to take this method of attacking it, which is conducted thus.

When the reſolution is taken to attack the covert-way ſword in hand*, the third parallel ſhould be made to advance as near as poſſible to the glacis; and the more forward it is brought, the ſafer the attack. All along this parallel banquettes are to be made, ſtep-faſhion, to the top of its parapet, that the troops deſigned for the attack may paſs over it with eaſe. At the back of this line, and in the very line itſelf, a great quantity of materials, as tools, gabions, faſcines, ſand-bags, &c. muſt be got ready, that nothing may be wanting to make the lodgment with all expedition, after driving the enemy out of the covert-way. A ſtrong party of grenadiers is ordered, and placed along the third parallel, four or ſix deep, and the workmen behind them on the back of this parallel with their tools, gabions, faſcines, &c. Care, moreover, is taken, that all the other parts of the trenches be well furniſhed with troops to ſupport the grenadiers, if there ſhould be occaſion; and to fire at the enemy's defences wherever they appear: the grenadiers muſt alſo be provided with hatchets, to cut down the palliſades of the covert-way.

The guns and mortars muſt be ordered to be ready to ſupport the attack with their whole fire.

A ſignal is to be agreed on for all the troops that are to commence the attack, to move at the ſame time, and to fall upon the enemy.

This ſignal is to conſiſt in firing a certain number of cannon, or a certain number of bombs, and at the laſt cannon-ſhot, or at the laſt bomb, the troops are to move.

The ſignal being given, all the troops of the third parallel are to move at the ſame time, and to paſs quickly over the parapet of the parallel, and to march directly to the covert-way; which they enter either through the ſally-ports or paſſages made by the guns, or elſe the grenadiers cut down the paliſades with their hatchets. As ſoon as they have entered, they charge the enemy vigorouſly; and when they have obliged them to abandon ſome of the angles, the engineers ſet the workmen about making a lodgment on the ridge of the glacis, oppoſite to that part of the covert-way which the enemy have abandoned, and within three fathoms of the inſide of it. This lodgment, as I have obſerved, is made with gabions, which workmen lay on the glacis on the ſide of one another. The joints are covered with ſand-bags, or with ſap-faggots. Theſe gabions are filled with earth and covered with faſcines; and a-top of all you are to throw earth taken out of the glacis, by digging and widening the lodgment; and of this a parapet is raiſed to ſcreen the troops as quick as poſſible from the direct fire of the place, and traverſes are to be made every where to prevent the enfilades, as may be ſeen in Plate CCCVII. fig. 5. While this is doing, the batteries of the trenches are to fire inceſſantly upon the defences of the place, in order to diſturb the enemy, and to abate as much as poſſible the briſkneſs of their fire upon the workmen and the lodgment.

When the troops employed in the attack have driven the enemy from the covert-way, or from their places of arms; for it often happens, that at the firſt attack there can be no more than one or two lodgments made in the ſaliant angles; when this is done, I ſay, the troops retire behind the lodgment, where they kneel down till it is in a condition to cover them. Sometimes it ſhall happen that the enemy, who was ſuppoſed to have been driven from the covert-way, will return to the charge, and oblige the beſiegers to renew the attack, by overthrowing the lodgment and falling upon the troops unawares. This attack may be renewed ſeveral times, and vigorouſly diſputed, when there happens to be a ſtrong garriſon. In this caſe the beſiegers muſt exert their bravery, and reſolutely encounter every obſtacle raiſed by the enemy.

When the beſieged find they cannot hold out any longer, they will ſet fire to their mines and retire; upon which workmen are ſent to make a lodgment in their excavation, as we have already obſerved when ſpeaking of this attack by the ſap. In ſhort, the beſiegers are to ſtruggle againſt every difficulty with all their might; and if they happen to be repulſed at the firſt attack, they are to begin it again the next day or the day after, and they are to uſe more precaution than the firſt time for ſecuring their ſucceſs.

Before this attack is begun, the beſiegers muſt make a briſk cannonading againſt the covert-way, in order to break down the paliſades, and to demoliſh the ridge of the glacis, ſo as to render it eaſier for the troops to force their way and to make a lodgment upon it. When this is done, the neceſſary time is to be given for the pieces to cool, that is about an hour, and the attack is to begin in the manner above mentioned; during which the artillery is to play inceſſantly.

It muſt be allowed that this manner of attacking is very bloody: for the beſiegers muſt move almoſt the whole breadth of the glacis uncovered and expoſed to the whole fire of the place. They are obliged to attack the enemy concealed behind the paliſades, which they are to cut down with hatchets before they can come at them. They are to fight for a long while to an evident diſadvantage; and when by dint of valour they have driven away the enemy, they find themſelves expoſed to the whole fire of the ramparts, which on that occaſion is ſerved with more vivacity than uſual. They are likewiſe expoſed to the mines which the enemy blow up, with a view to diſconcert the lodgment; and to throw the troops into diſorder and confuſion, which renders it eaſier for the beſieged to return to the charge, and harraſs them anew. But the former method, of which we have above treated, is far from being ſo precarious and bloody. According to M. Vauban, we ought ever to prefer it when in our power; and to make uſe of the latter, only when we are obliged to it for eſſential reaſons.

Night is the beſt time for this attack, becauſe the beſiegers are leſs ſeen from the place, and of courſe the fire of the beſieged is leſs dangerous: yet there are generals who undertake it by day. There is nothing ſettled in regard to this article; they are at liberty to act as they judge moſt proper, according to the circumſtances of time and place.

§ 14. *Of the batteries on the covert-way.*

When the enemy are entirely driven out of the covert-way, the next thing to be done is erecting batteries, in order to ruin the defences of the place, and to make a breach.

As it is neceſſary for the beſiegers to make themſelves maſters of the half-moon C (Plate CCCVII.

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* Plate CCCV. fig. 4.

fig. 6.) before they can come to the body of the place, which is flanked or defended by part of the faces of the baſtions A and B oppoſite to its ditch; they muſt begin with erecting batteries on the covert-way oppoſite thoſe parts. They are marked on the plan *e*, *e*. Batteries muſt be alſo erected to make a breach in the half-moon. But before they are erected, it will be proper to conſider what part of the face of the half-moon is to be attacked; or, which is the ſame thing, at what part the half-moon is to be entered. It muſt not be at its flanked angle, becauſe an opening towards the point would not afford a ſufficient ſpace to make a lodgment able to withſtand the enemy, and moreover the troops would be ſeen in their paſſage by the two faces of the baſtions by which its flanked angle is defended. The moſt favourable paſſage is towards the third part of its face, reckoning from its flanked angle; becauſe by battering at the ſame time the two faces near this part, the whole point of the half-moon may be deſtroyed, and a large opening made there eaſier than any where elſe. Thus the batteries for making a breach in the half-moon C, will be placed in *d* and *d*, and will occupy almoſt the third part of each of the faces of the half-moon from its flanked angle. Theſe batteries are each to conſiſt of four or five pieces of cannon.

When the faces of the baſtions A and B are well enfiladed by the ricochet batteries, there will be no occaſion for the batteries *e* and *e*; for thoſe which are to batter the half-moon in breach will be ſufficient; and after it is taken, if there is any neceſſity for ruining the faces of the baſtions A and B, you may make uſe of the batteries *d* and *d*, by placing them in *e*, *e*. Batteries muſt alſo be erected to ruin the flanks of the demi-baſtions in the front of the attack. It is evident that they cannot be placed but in *i*, *i*, on the covert-way oppoſite to them. They ought alſo to contain as great a number of guns as the ſpace of ground will permit.

For the ſame reaſon that batteries have been erected to make a breach in the half-moon, oppoſite the third part of the face joining to its flanked angle, thoſe alſo are to be erected which are to make a breach in the baſtions; they are marked *h*, *h*, and are each of ſeven or eight pieces of cannon. Batteries are likewiſe erected to ruin the flanks of the demi-baſtions bordering upon thoſe of the front attacked, in order to favour the paſſage over the ditch which is made on the ſide, upon a ſuppoſition that the baſtion is entered at both faces, as we ſuppoſe in this example. The attacking both faces of the baſtion renders the taking of it more certain and eaſy; but, generally ſpeaking, it is looked upon as ſufficient to make only a breach in the face of earth of the demi-baſtions towards the front attacked.

Beſides all theſe batteries, others are erected in the re-entering places of arms of the covert-way, as in *k*, and in *k*; they ſerve to batter the tenaille when there is one, the curtain, and the faces of the baſtions, &c. Sometimes they are of mortars for throwing of ſtones.

All theſe batteries ſhould have 24 pounders; ſometimes larger pieces are uſed, eſpecially when there is any work of extraordinary ſtrength and ſolidity to be demoliſhed.

They are all to be placed on the parapet of the covert-way; and the outſide of their epaulement is to graze the inſide of the covert-way. It is in order to have room enough for this epaulement, that the lodgment is made on the ridge of the glacis at the diſtance of three fathoms from the inſide of the covert-way.

The only eſſential thing to be obſerved in theſe batteries, is to open their embraſures, ſo that they ſhall perfectly diſcover every part of the place they are to batter, and have a ſufficient ſloping from the back to the fore-part, to fire as low as the bottom of the revettements, which they are intended to deſtroy. It is alſo proper to prevent the enemy's blowing them up with mines: for this end it will be requiſite to dig wells deep enough round the batteries, ſo as to be ſure of being lower than the enemy, and to make ſmall galleries round the batteries, in order to diſcover the branches the enemy have underneath to blow them up.

As the conſtruction of this ſort of batteries is very dangerous, being abſolutely to be made under the fire of the rampart of the place, they are ſometimes maſked; that is, before the part where they are erected, ſand-bags or ſome other materials are placed, with a view to ſhelter the workmen from the enemy.

In order to batter in breach, all the guns ſhould fire together, and towards the ſame part. They ſhould fire as low as they can, and continue to batter the ſame part, till the earth of the rampart behind the revettement begins to fall, which is a ſign that the revettement is entirely deſtroyed. This united firing, repeated in this manner againſt the ſame place, is productive of a much better effect than if the guns were to be fired one after the other; for not only a greater quantity of the wall is ſhaken at the ſame time, but, moreover, the ſhaking is far more conſiderable.

§ 15. *Of the deſcent, and paſſage over the ditch of the half-moon.*

WHILE the batteries on the covert-way are erecting, preparations are made for the deſcent and paſſage over the ditch of the half-moon.

The ditches are either dry, or filled with water, which may be either ſtagnated, or running; and even into dry ditches the enemy may let in water, only opening the ſluices by which it is withheld.

Each of theſe ſorts of ditches requires a different manner of paſſing. We ſhall enter here into ſuch particulars as are moſt neceſſary for giving a right idea of the method of proceeding.

Firſt of all, if the ditch be dry, and very deep, as from 25 to 30 feet, the deſcent may be made by one or ſeveral ſubterraneous galleries, paſſing under the covert-way, and terminating at the bottom of the ditch: the entrance is to begin about the middle of the glacis. Theſe galleries are made like thoſe of miners, and the earth is ſupported by boards and timber frames. They are directed in ſuch a manner, that the opening in the ditch ſhall be oppoſite to that part of the breach where the paſſage is intended.

As this gallery is made ſloping, the buſineſs is to have ſome rule for directing the ſlope, ſo as to prevent its being too ſmall or too great: too ſmall, if it terminated above the bottom of the ditch; and too great, if it terminated below it.

The following is a moſt ſimple way to find it out.

firſt of all, it is requiſite to take the depth of the ditch; which is done by letting fall a plummet, with a ſtring tied to it, from the border of the covert-way to the bottom of the ditch. It is requiſite alſo to know the diſtance from the entrance of the gallery to the border of the covert-way, which may be eaſily meaſured thus: Suppoſe the depth of the ditch is 30 feet, and that the diſtance from the entrance of the gallery to the border of the ditch is 90 feet, then by advancing ſix feet towards the counterſcarp, the ſlope muſt ſink two; that is, there muſt be always the ſame proportion between the length of the paſſage made to approach the counterſcarp and the depth of the ſlope, as between the diſtance from the entrance of the gallery to the border of the counterſcarp and the depth of the ditch: ſo that if the diſtance from the entrance of the gallery to the border of the counterſcarp is four times as much as the depth of the ditch; then for every four feet advanced horizontally towards the ditch, there muſt be one ſunk perpendicularly, &c. When the ditch is not deep, as of 12 or 15 feet deep, inſtead of a gallery under ground, the deſcent is made by a ſap only, which cuts the parapet of the covert-way, and ſinks therein as deep as is neceſſary for the deſcent to terminate at the bottom of the ditch. This ſap muſt begin at the lodgment on the ridge of the glacis; it is ſecured on both ſides with blinds, to ſupport the earth, and it muſt have a good epaulement on the ſide expoſed to the place. Above it is covered with faſcines and with earth, to avoid the ſhell-ſtones and grenades that may be thrown in by the enemy. Upon advancing to the foot of the connterſcarp, an entrance is made into the ditch.

The enemy will uſe all their endeavours to hinder this entrance, and to ruin the gallery, chiefly by making ſmall ſallies to drive away thoſe who are employed in conſtructing it: but they muſt yield at length to numbers. The paſſage is continued with ſapping, to gain the foot of the breach, and by raiſing an epaulement of faſcines, barrels, or old caſks, gabions, &c. towards the face of the baſtion oppoſite the paſſage.

There are generally two or three deſcents made for the ſame paſſage of the ditch, near enough to ſupport each other for greater ſafety.

It is in the paſſage of the dry ditch that the enemy has the advantage in making uſe of various artifices to retard it. In theſe they are chiefly aſſiſted by their miners, who blow up the ſaps by means of ſmall mines, and ſally out at the ſame time, neglecting nothing that can delay the progreſs of the work. They may likewiſe order 12 ſoldiers to fall at once upon the head of the ſap: this number is ſufficient to drive away the ſappers, and to do ſome damage to that work. A few companies of grenadiers ſhould be placed near at hand, to attack theſe men as ſoon as they appear; and the cannon muſt be kept continually firing againſt every part, from whence the enemy may poſſibly ſally out. As the batteries of the covert-way command all their communications, they may deſtroy them, or at leaſt render them very dangerous.

In order to protect the ſap at the bottom of the ditch, the beſiegers may likewiſe make uſe of a kind of ſmall galleries behind the counterſcarp, near the place where the entrance is effected; and they may pierce ſome loop-holes, from whence the enemy may be fired at, and a check put to their ſallies, at leaſt by day: and in regard to night, the beſieged ought to be more circumſpect than by day, ſince they can neither ſee the diſpoſitions, nor the troops that are ordered into the ditch to ſupport the ſappers; ſo that they can only raiſe a falſe alarm, without doing any great miſchief. Yet we muſt obſerve, that this paſſage can be made only ſo far as it is protected by the battery placed on the ridge of the parapet of the covert-way oppoſite the ditch: for as the cannon of this battery keeps continually playing againſt the defences of this ditch, they muſt ruin them of courſe, and deſtroy their parapet, ſo that the enemy ſhall no longer be able to keep any cannon there; the conſequence of which will be, that the beſiegers have only to ſcreen themſelves from muſket-ſhot, which is an eaſy matter.

The paſſage of the ditch is made on each ſide of the faces of the half-moon, as may be ſeen in *m*, *m*, fig. 6. Plate CCCVII.

If the ditch is full of ſtanding water, and the ſurface of it be raiſed to three, four, or five feet, below the upper border of the counterſcarp, the deſcent will be eaſier; becauſe as the ſteps are to have but a very ſmall ſlope, they may begin nearer the border of the ditch, as in the lodgment on the ridge of the glacis, and be directed in ſuch a manner as to terminate at the ſurface of the water. They are to be covered on the ſide expoſed to the place, and ſtrongly ſecured with blinds, placed within five or ſix feet of each other. Blinds are likewiſe to be laid over the deſcent, which is to be covered with faſcines, and theſe with earth, to prevent the enemy from ſetting them on fire.

In order to paſs this ditch, a bridge muſt be made with faſcines; for which end, after breaking the counterſcarp, a number of men, ſufficient to occupy the whole length of the deſcent, are ranged at the diſtance of two feet from each other: theſe men muſt be covered by the parapet, and are to forward the faſcines from hand to hand, from the head of the paſſage to the opening into the ditch. The ſapper in this part (for all theſe works relate to the ſappers) will throw them into the ditch, in order to make an epaulement or covering on that ſide of the town which looks towards the paſſage.

As ſoon as he has flung in a ſufficient number of faſcines to ſhelter himſelf, and to advance a few paces into the ditch, he muſt throw a great number of them into the paſſage, in order to fill the ditch up entirely in that part. They are laid different ways, and ranged in different beds, which are covered with earth, in order to make them ſink to the bottom. All theſe different beds of faſcines muſt be fixed with long ſtakes, that they may keep cloſer together; and as the work advances, the parapet muſt be puſhed forward, otherwiſe it would be impoſſible to effect the paſſage without the utmoſt danger.

When the paſſage is commanded, or fired into from the oppoſite parapet of the place, or from any other part, the foremoſt men muſt be covered with a great heap of faſcines, or by ſome other contrivance; but whatever cover it be, in that caſe the paſſage of the ditch is extremely difficult and dangerous.

After what has been ſaid concerning the paſſage of dry ditches, and thoſe which are full of ſtanding water, it remains to take notice of thoſe which are full of running water, and thoſe that are dry but may be filled at any time with water. Theſe ſorts of ditches are extremely difficult to paſs, unleſs the current can be turned and made to take a different courſe from that which carries it to the town ditches, or unleſs the beſiegers can contrive to break down the ſluices which keep up the water reſerved by the enemy for filling the ditch.

A great deal might be ſaid, were we to enter into the whole detail of the works neceſſary for paſſing theſe ſorts of ditches; we ſhall only touch upon the ſubject.

Suppoſing the ditches to be filled with running water, or with a river, the channel of which can be diverted no other way, which is called *draining the ditch*, it will be requiſite then, generally ſpeaking, to throw into the ditch a large quantity of faſcines, loaded with earth and ſtones, faſtened together with long ſtakes: thus the paſſage is to be puſhed on, till the ditch is contracted to the breadth of 20 or 30 feet; and then ſmall beams may be laid acroſs, to join the bridge of faſcines to the rubbiſh of the breach. The filling up, and conſequently the paſſage of the ditch, may be alſo forwarded, by ordering the miners to advance to the rubbiſh, and to ſpring a mine, in order to blow up part of the revetement of the work into the ditch.

Should the enemy happen to have reſervoirs of water which they may open, and thereby deſtroy the lodgments in the ditch when they are no longer to make a ſtand there, the beſiegers muſt endeavour during the ſiege to deſtroy the ſluices, that is, the ſtone-work or timber that ſerves to keep up the water. This may be done by throwing a great number of bombs towards that part where the ſluices are known to be ſituated; if they ſhould be broke down by that means, then the water will have a free current; and after it has run off, the paſſage of the ditch muſt be attempted in the ſame manner as if it was ſtanding water; if there remains only a very ſmall current, a paſſage muſt be left to drain it, as was mentioned before.

This whole operation is very tedious, difficult, and dangerous; nay, it is impoſſible to be done at all without being protected by a very briſk firing, not only from all the cannon of the covert-way and the ricochet batteries, but moreover from the lodgments on the glacis and thoſe on the covert-way.

Whatever has been ſaid concerning the paſſage over the ditch, is general, as well in regard to the ditch before the out-works, as that before the body of the place.

We ſuppoſed the ditches had a revetement; but if it was otherwiſe, the paſſage would be eaſier. The deſcent might be made along the ſlope of its counterſcarp, and the ditch might be afterwards paſſed over in the manner already mentioned.

In this whole detail, we have made no mention of cunettes, a kind of ſmall ditch, three or four fathoms in breadth, always filled with water, which is ſometimes made in the middle of the great ditch: the reaſon of our being ſilent upon this article is, becauſe it can hardly increaſe the difficulty of paſſing the ditch. As ſoon as the beſiegers reach the border of the cunette, they throw in faſcines to fill it, as into a ditch full of water; being but narrow, it is the more eaſily filled up. The difficulty of the paſſage is increaſed only when there are caponiers in the ditch to command and enfilade it: then to make the paſſage of the cunette, the enemy muſt abſolutely be driven from thoſe caponiers. This may be done by ſhowers of ſhells and ſtones thrown from the lodgments on the covert-way.

Plates CCCVIII. and CCCIX. will illuſtrate all that we have been ſaying upon this head, concerning the deſcent and paſſage over the ditch.

Plate CCCVIII. fig. 1. exhibits the plan of the deſcent under ground, and that of its opening into the dry ditch. Fig. 2. repreſents the profile of that deſcent; the opening of which is made at the lower part of the ditch. Fig. 3. is a perſpective view of the opening of this deſcent, ſeen from the bottom of the glacis: and fig. 4. ſhows in perſpective the opening of the ſame deſcent, ſeen from the top of the breach.

Plate CCCIX. fig. 1. is the plan of the paſſage over a wet ditch in the open air; that is to ſay, the gallery of which is an open ſap. A is the opening of it. You ſee in B, towards its opening, the blinds that are laid on its upper part, to ſupport the faſcines with which it is covered. On theſe blinds, at firſt, is laid a bed of faſcines, ranged according to the length of the gallery: over this firſt bed is laid a ſecond, wherein the faſcines are ranged according to the breadth of the gallery, as you ſee in B and C. D is the epaulement of faſcines, which covers the paſſage againſt the fire of the place, by which it is flanked. E is part of the bridge of faſcines; and F is an elevation alſo of faſcines, intended to cover the head of the work, and to ſecure it from the immediate fire of the place. Fig. 2. repreſents the profile of this deſcent into the ditch. Fig. 3. gives its opening ſeen in perſpective from the country; and fig. 4. its opening into the ditch, alſo in perſpective, as it appears from the top of the breach.

§ 16. *Of the attack of the ravelin, or half-moon.*

The paſſage over the ditch before the half-moon being effected on both ſides, and a breach made 14 or 15 fathoms wide, preparations are made for the aſſault. For this purpoſe a large quantity of materials is collected from all the neighbouring lodgments. Endeavours are uſed to render the breach practicable, by making the ſlope eaſy. The cannon continue playing, in order to throw down the parts of the revetement that may be yet ſtanding. Very good uſe may be alſo made of ſhells fired point blank; for they are eaſily buried in the breach, the earth of which has been already broke up and ſhaken by the cannon; and as they burſt upon that earth, they produce the effect, as it were, of ſmall mines. Howitzers may likewiſe be uſed with ſucceſs on theſe occaſions.

In order to render the breach more practicable, ſome miners, or a ſerjeant with a few grenadiers, are ſent to level it with hooks. The fire from the lodgments and batteries will hinder the enemy from appearing on their defences; or if they ſhould, they muſt do it with great circumſpection, which renders their fire leſs dangerous.

If the enemy have made any galleries along the face of the half-moon, and oppoſite the breaches, the miners may go and diſcover them, in order to ſtop them up, or to cut off the match, or to drive away the enemy; if they cannot find them, they ſpring ſeveral ſmall mines; which being often repeated, muſt needs occaſion ſome diſorders in the galleries and mines belonging to the beſieged. Every thing being ready for making a lodgment in the half-moon, that is, for taking poſſeſſion of the breach; the materials being at hand, in order to be removed hither with eaſe and expedition; the batteries and lodgments of the covert-way being in a condition to fire away briſkly; a ſignal is agreed upon with the officers that command thoſe batteries and lodgments, to give them notice to fire, and to leave off whenever it is thought proper. This ſignal is generally a flag raiſed in the former caſe, and lowered in the latter. All this being ſettled, and the breach, as we obſerved, made practicable, two or three ſappers are ſent to the extremity of the breach next to the place, there being generally a kind of ſmall cover or cavity in this part; there they begin a lodgment for themſelves, and for ſome more, who are ſent after them; when there is room to receive them, they make them mount, and inſenſibly extend the lodgment upon the top of the breach; and thus they proceed till they make a lodgment towards the point, which is generally called a *magpye's neſt*. While theſe ſappers are at work, the fire of the batteries and the lodgments ceaſes; but when the enemy attempts to attack the workmen in order to deſtroy their lodgments, they muſt retire as quick as poſſible; and then the colours being raiſed, the batteries fire upon them with the utmoſt vivacity, to oblige them to quit the upper part of the breach.

Upon this the colours are lowered, the fire ceaſes, the ſappers return to repair the miſchief that was done to their lodgment, and try to enlarge and ſtrengthen it. If the enemy ſhould return, they muſt retire again in the ſame manner; and the batteries, as likewiſe the troops in the lodgments, muſt renew their fire to drive them from the breach; after which the fire once more ceaſes, and the ſappers return to their work.

This way of proceeding muſt be continued till the lodgment is in a ſtate of defence; that is, till it can hold a number of troops ſufficient to awe the enemy, and to withſtand any attack that may happen to be made againſt it. The beſieged, before they entirely quit the half-moon, will ſpring what mines they have ready there. As ſoon as this is done, the beſiegers ſhould directly lodge themſelves in the excavations made by thoſe mines, or at leaſt ſome defence ſhould be made there, to hold a few ſappers, and to forward the lodgments of the inſide of the work.

The lodgment of the point is made in the form of a ſmall arc, the concavity of which is turned towards the place. From each of its extremities a lodgment is carried along the faces of the half-moon, on the platform of its rampart, at the foot of its parapet. This lodgment is ſunk deep in the earth of the rampart, to the end that the ſoldiers may be the better covered againſt the fire of the place; there muſt be alſo traverſes to ſecure it from the enfilades, as was done in regard to the lodgment on the glacis. Within ſide the half-moon lodgments are alſo made, which traverſe the whole breadth thereof, as may be ſeen in the half-moon *C*, Plate CCCVII. fig. 6. They ſerve to command the communication between the tenaille and the place; of courſe to render that communication more difficult, and to hold a ſufficient number of troops to reſiſt the enemy, ſhould they have any deſign to return and repoſſeſs themſelves of the half-moon.

Though the half-moon ſhould happen not to have a revetement, but only to be fraiſed and paliſaded, ſtill the attack ought to be carried on juſt in the ſame manner as if there was a revetement; that is to ſay, the batteries ſhould be diſpoſed in the manner as above laid down; and in regard to the breach, the buſineſs then would be only to deſtroy the fraiſe, the paliſades, and the hedge of the berm (if there ſhould be one oppoſite the part where the beſiegers want to enter the half-moon), and afterwards to take poſſeſſion of it, and make lodgments, as in half-moons that have revetements.

What we have been obſerving, in regard to the attack of the half-moon, is only when the beſiegers intend to take it by the ſap, or with pick-axe and ſpade: But ſometimes they go about it in a more expeditious manner: for when the breach is made ſo as the troops may mount to enter the half-moon, they advance boldly to the aſſault, juſt as in the attack of the covert-way ſword in hand, and endeavour to come up with the enemy, and to drive them entirely out of the work. This attack is very dangerous, and may coſt a great many men, when there happens to be a brave garriſon, who will not eaſily yield their ground. But there are frequent caſes, in which it may be thought prudent to adopt this meaſure, in order to accelerate a few days the taking the half-moon. As ſoon as the beſiegers are maſters of the upper part of the breach, they make a lodgment there in a hurry with gabions and faſcines; and while it is making, as alſo while they charge the enemy, and oblige them to abandon the upper part of the breach, ſome ſoldiers are ſent to diſcover the mines, which the beſieged are ſuppoſed to have made within the inſide of the rampart of the half-moon, and to cut off the ſauciſſon. If they cannot find them, they muſt advance with great circumſpection, and take care not to keep all together, that the mine may have leſs effect. Oftentimes the enemy will ſuffer the beſiegers to carry on their lodgment without making any great oppoſition, becauſe it cannot be effected without a conſiderable loſs of men, the ſappers and the troops being abſolutely expoſed, during this operation, to the whole fire of the place, which is well ſerved, and by its proximity becomes extremely dangerous: but when the lodgment is advanced, the enemy ſpring their mines, and return afterwards to the half-moon, in order to retake it amidſt the confuſion which thoſe ſubterraneous fires muſt unavoidably occaſion among the troops in the lodgment; in that caſe, it will be requiſite to renew the charge moſt vigorouſly with freſh troops, which ſhould be at hand to ſupport thoſe of the half-moon, to place themſelves in the excavations made by the mines, to render the lodgment ſufficiently ſtrong, and to ſecure it with a proper number of ſoldiers, ſo as to be able to withſtand any further attempt of the enemy.

This work can hardly be diſputed in this manner, except when the half-moon has a reduit, as it affords a ſhelter or retreat to the garriſon, and enables them more eaſily to fall upon the half-moon. For if there ſhould be no reduit, and the enemy are driven out of the half-moon, they can ſcarce attempt to return, eſpecially if the communication between the place and the half-moon is diſcovered by the batteries and lodgments of the covert-way: becauſe, if the ditch is filled with water, this communication can hardly be made but with boats, which may be eaſily ſeen from the lodgments of the covert way, and may be overſet by the cannon of the batteries; and if the ditch be dry, and there happens to be a caponnier, the communication, though more ſafe, is not without danger, by reaſon of the fire that may plunge into it from the lodgments of the covert-way; ſo that it will be extremely difficult for the enemy to advance quick enough to repoſſeſs themſelves of the half-moon; beſides, they want room to aſſemble in a large body, and fall all at once upon the lodgments of that work.

There is only one caſe in which they may do it; that is, when in the angle of the gorge of the half-moon they have made a ſpace, nearly as large as the places of arms in the covert-way. This ſpace cannot be ſeen from the covert-way, nor from its lodgments; and as there are generally ſteps to aſcend from the bottom of the ditch to the half-moon, the enemy might take advantage thereof to try to enter it; but if the beſiegers are upon their guard, they will find it eaſy to repulſe them, even with loſs; becauſe in that caſe the enemy have the advantage of ſituation againſt them, and are obliged to attack without cover, while the beſiegers are ſheltered by the lodgment.

The beſt time for attacking the half-moon ſword in hand is by night, for the enemy's fire is not ſo ſure then as by day.

§ 17. *Attack of the reduit.*

When the ſeveral lodgments of the half-moon are effected, the enemy will ſcarce be able to ſtay any longer in the reduit, eſpecially as the communication between it and the body of the place muſt become extremely difficult, and is likely to be more ſo, if the ditch is filled with water, and the bridge of communication between it and the town is demoliſhed by the batteries on the ridge of the glacis: in this caſe the troops in the reduit will hardly be able to avoid ſurrendering themſelves priſoners of war, as was the caſe of thoſe who were in the reduit of the half-moon at the ſiege of Ath in 1697.

To avoid this inconvenience, the enemy generally think proper to abondon the reduit, as it no longer ſerves to diſpute the lodgments of the half-moon, or to afford a retreat to the troops that defend it, when they find themſelves incapable of reſiſting any longer the attacks of the beſiegers againſt this work.

Reduits, generally ſpeaking, conſiſt of a ſingle wall, with loop-holes: but when they happen to have a rampart and a parapet like the half-moon, after taking the latter, the ſame method almoſt muſt be obſerved in attacking the former; they may be battered in breach, by placing the cannon on the ridge of the glacis of the ſaliant angle of the covert-way, oppoſite the half-moon to which the reduit belongs. The deſcent and paſſage over the ditch is to be made there, juſt as in the half-moon; and, in ſhort, a lodgment is effected, either by means of ſappers, who are to carry on their work under the protection of the batteries of the covert-way, and its lodgments, or by attacking it ſword in hand, as was mentioned in regard to the half-moon.

If the enemy have contrived places of arms at the bottom of the dry ditch of the half-moon C, which, as it is well known, do conſiſt only of an elevation of ground that traverſes the breadth of the ditch towards the extremity of the faces of the half-moon, in the part oppoſite to its flanked angle, and which for this reaſon are ſometimes called by no other name than traverſes; care muſt be taken to oblige them to retire from thence, either by the fire of the lodgment on the ridge of the glacis, or by enfilading and firing into them from ſome lodgments made in the places of arms of the covert-way.

§ 18. *The attack of the baſtions.*

Whilst the beſiegers endeavour to poſſeſs themſelves of the half-moon, they work the ſame time at the deſcents into the ditch, which are made nearly towards the third part of the faces, reckoning from the flanked angle of the baſtion. A deſcent may be effected at each face of the two baſtions in the front of the attack, as in *n*, *n*, Plate CCCVII. fig. 6. or, according to the more general cuſtom, only oppoſite the faces in the front attacked. The manner of proceeding is much the ſame as in the deſcent and paſſage over the ditch of the half-moon, whether it be dry or wet; that is, if it be dry, a ſap is carried into the ditch, from the opening of the deſcent to the foot of the breach, and ſtrongly covered towards the oppoſite flank. If the ditch be full of water, it is paſſed over on a bridge of faſcines, conſtructed in the ſame manner as in the paſſage over the ditch of the half-moon.

The batteries erected on the ridge of the glacis for making a breach in the face of the baſtions, muſt fire againſt that part of the faces where the breach is to be effected, and fire all together, as was mentioned in the article of the attack of the half-moon: and when they have made a breach ſufficient to attempt the attack in front, ſome of the guns muſt be kept to batter the upper part of the breach, and ſome muſt be removed to the back of the platform, and diſpoſed in ſuch a manner as to be able to annoy the enemy, whenever they preſent themſelves towards the upper part of the breach. All this is done during the deſcent and paſſage over the ditch. Mines are alſo made uſe of to widen, and ſometimes even to make the breach.

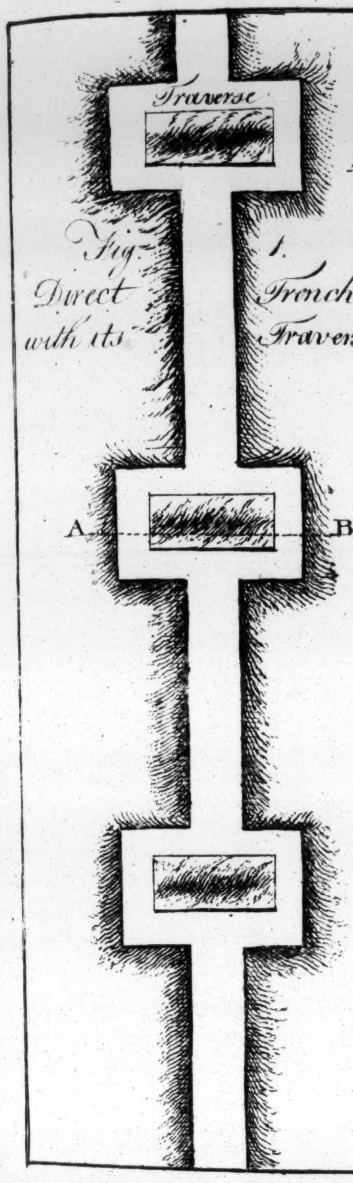
To fix the miner to the wall when the ditch is dry, a lodgment is made near the opening of the deſcent, to protect him from thence againſt the ſallies of the beſieged. Then the wall is broke with cannon, as near as poſſible to the bottom of the ditch, in order to get under the galleries, which the beſieged may have built within-ſide the baſtion. An opening of five or ſix feet may be made with the cannon, to lodge the miner that removes the rubbiſh, and makes room for one or two of his comrades, who are to aſſiſt him to get rid of the earth in the gallery. When the ditch is dry, and the ground will admit of it, the miner ſometimes gets under it by a ſubterraneous gallery, which leads him to the foot of the wall: but if the ditch be filled with water, it is not always the cuſtom

WAR.

Attack of Fortified Places.

Plate. CCCVII.

Fig. 1. Direct Trench with its Traverses


Traverse
A
B

Profile of the direct Trench intersected according to the line AB.

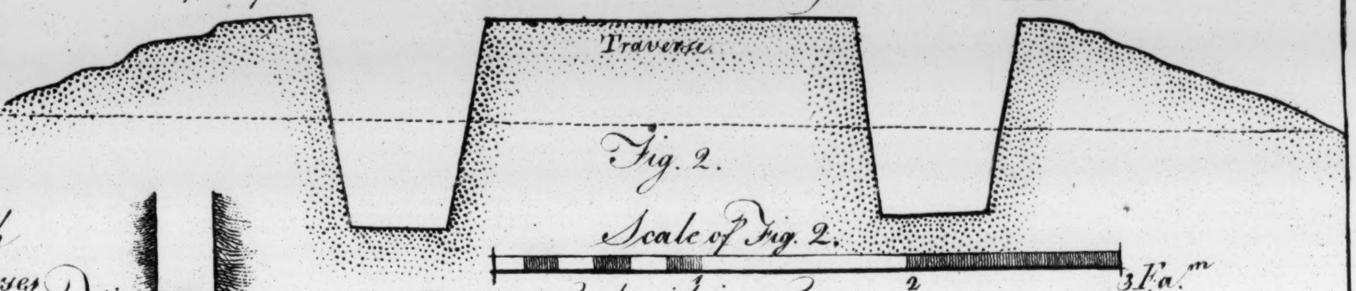
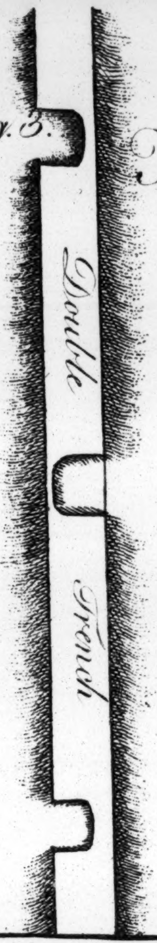

Traverse
Fig. 2.
Scale of Fig. 2.
2
3 Fa.m

Fig. 3. Double Trench



Part of a Trench with its Traverses to prevent enfilading

Fig. 4.

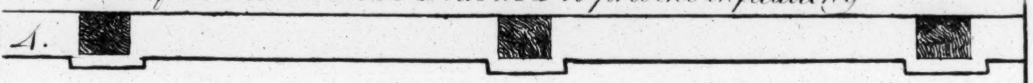
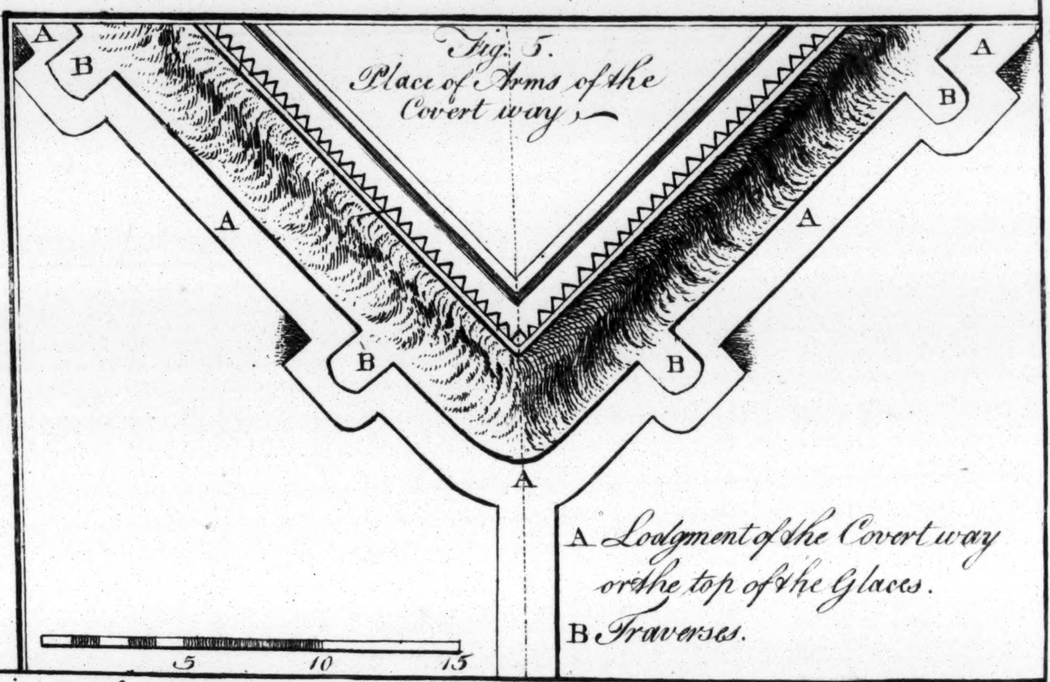


Fig. 5. Place of Arms of the Covert way

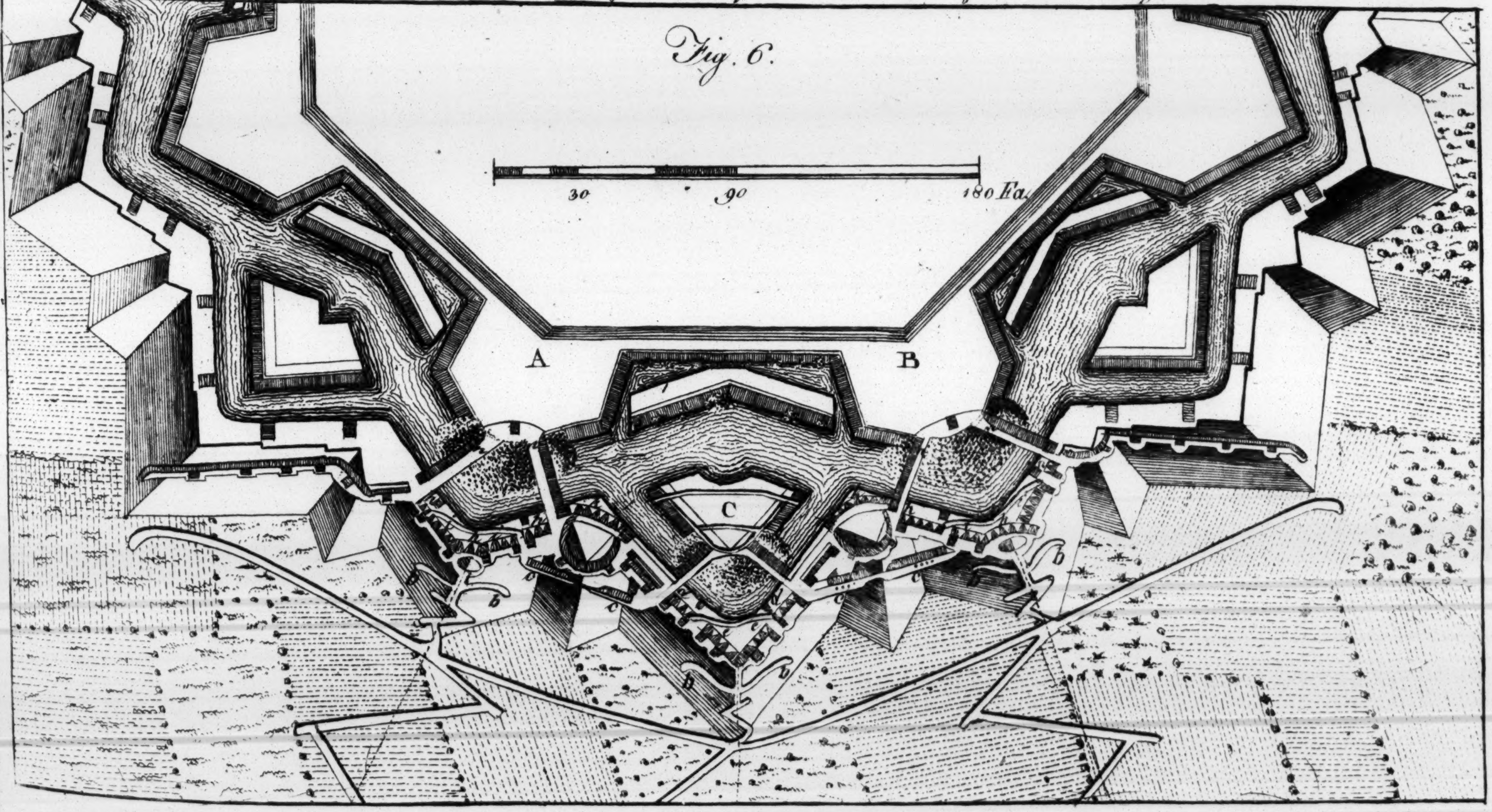

A
B
A
B
A
A
B
B
A
5
10
15

A Lodgment of the Covert way or the top of the Glacis.

B Traverses.

Plan shewing the disposition of the Lodgments & Batteries of the covert way.

Fig. 6.


30
90
180 Fa.
A
B
C
b
b
b
b

A Bell Sculp.t

3 MA 53

WAR. Plate. CCCVIII.

Attack of Fortified Places.

Fig. 1.

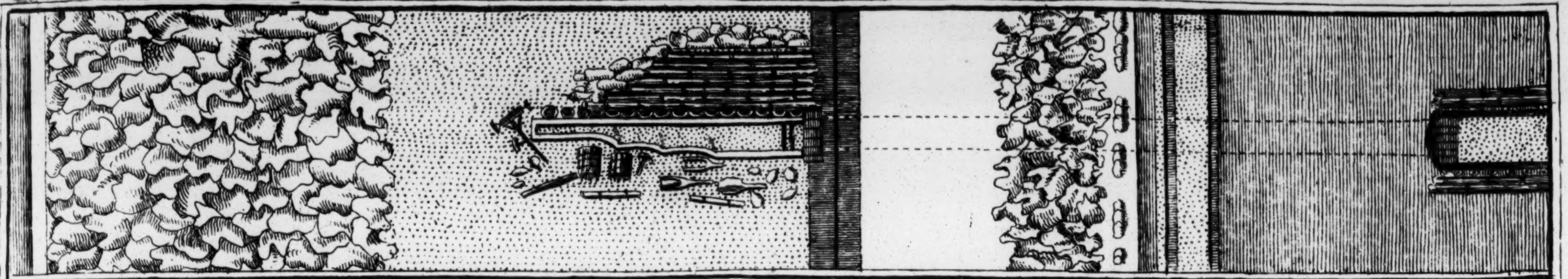
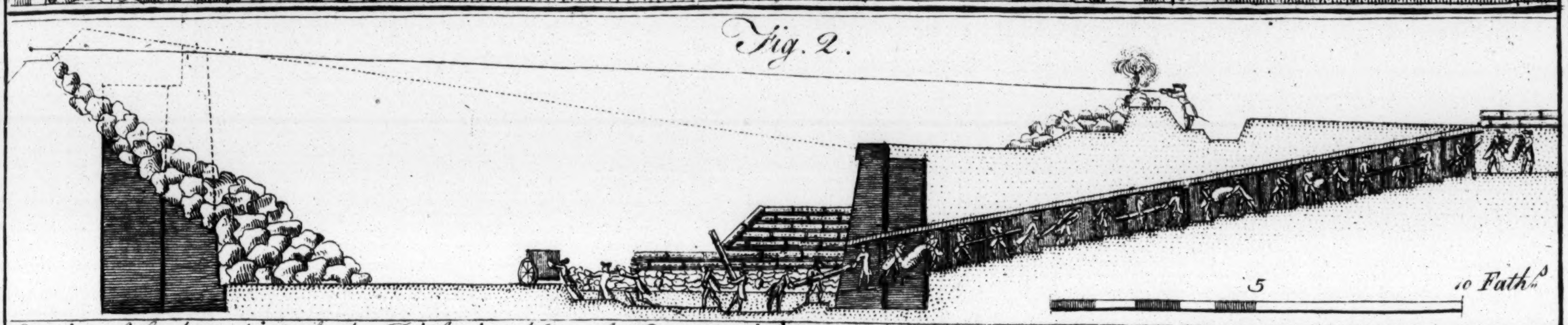
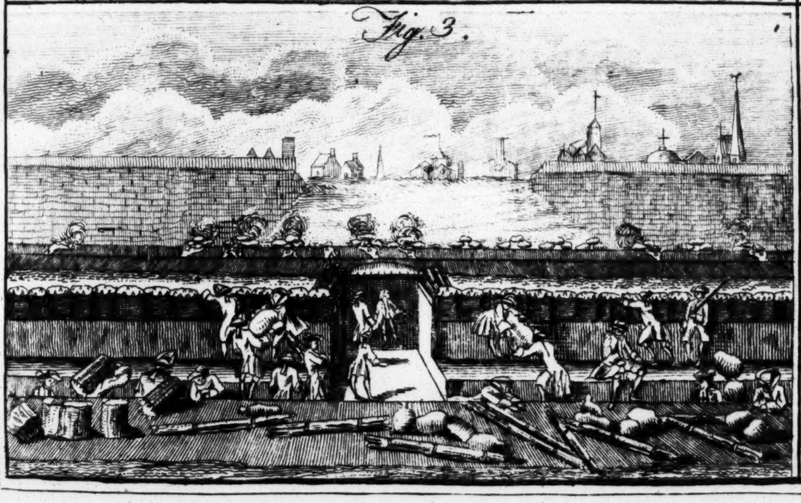


Fig. 2.



Opening of the descent into the dry Ditch viewed from the Country.

Fig. 3



Entrance into the decent of a dry Ditch viewed from the top of the Breach.

Fig. 4

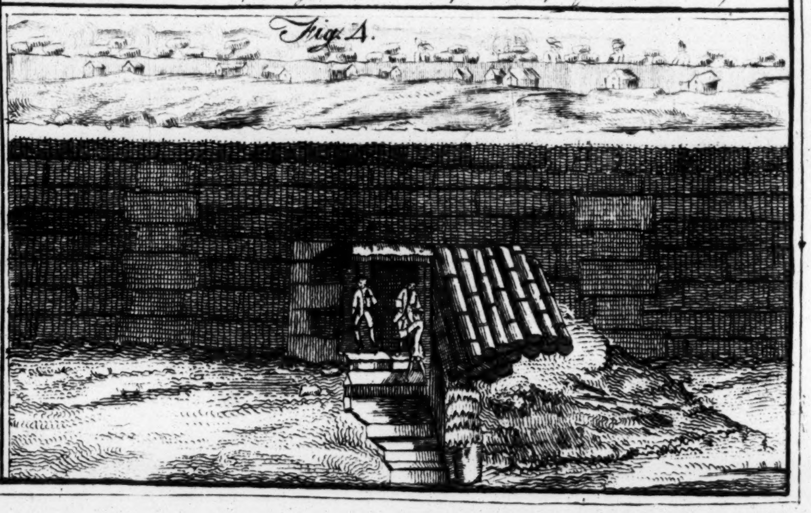
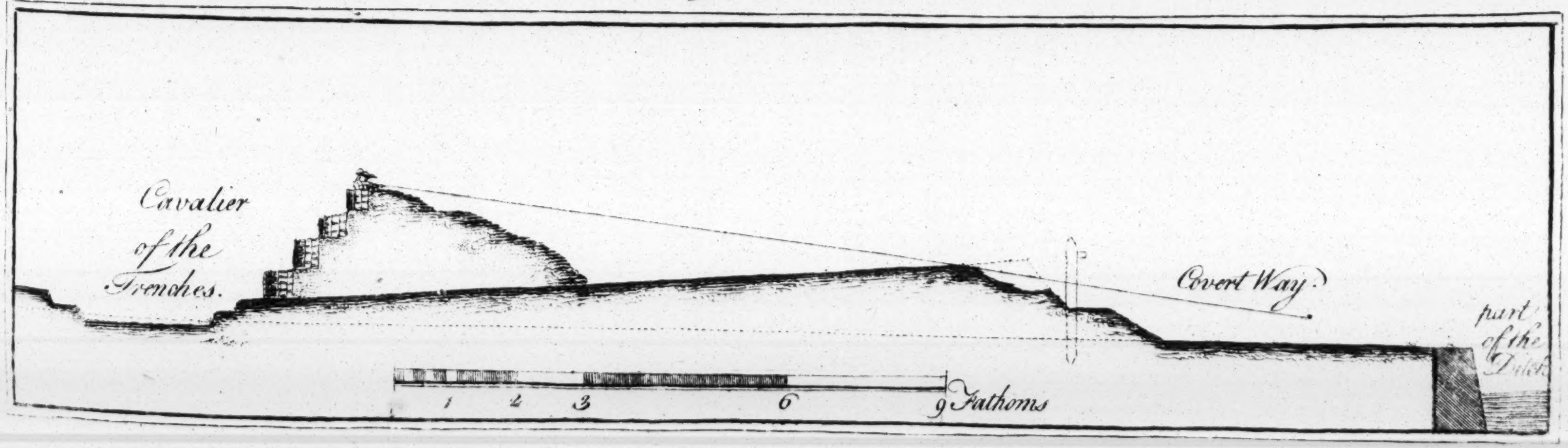


Fig. 5.


Cavalier of the Trenches.
Covert Way.
part of the Ditch.
1
2
3
6
9 Fathoms

A Bell sculp.t

3 MA 53

WAR.

Attack of Fortified Places

Plate CCCIX.

Fig. 1.

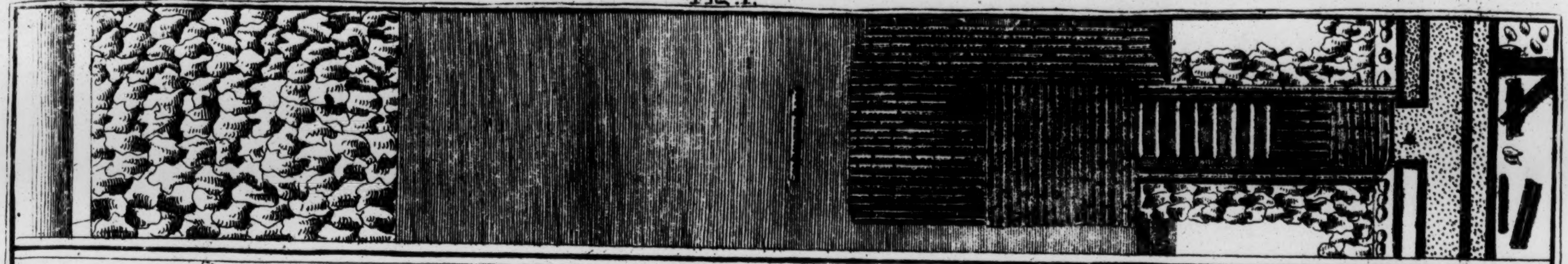
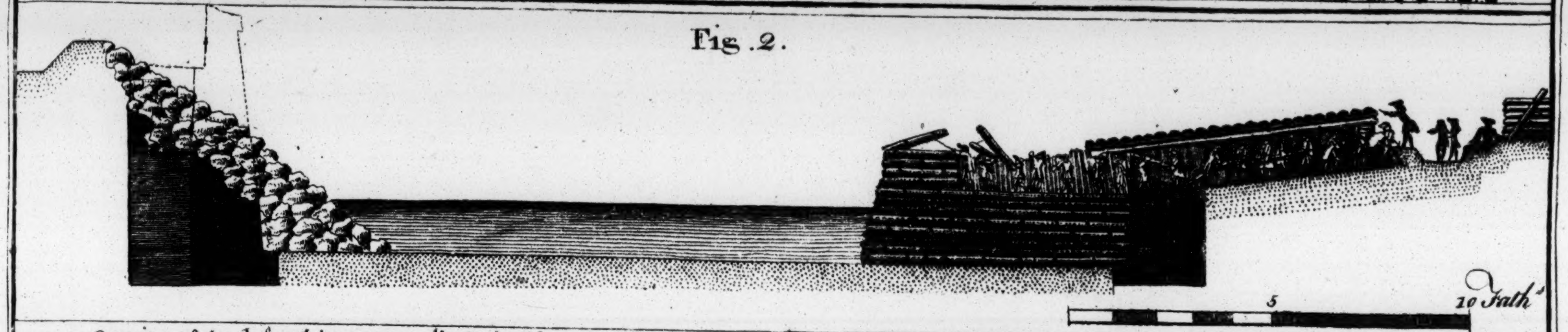
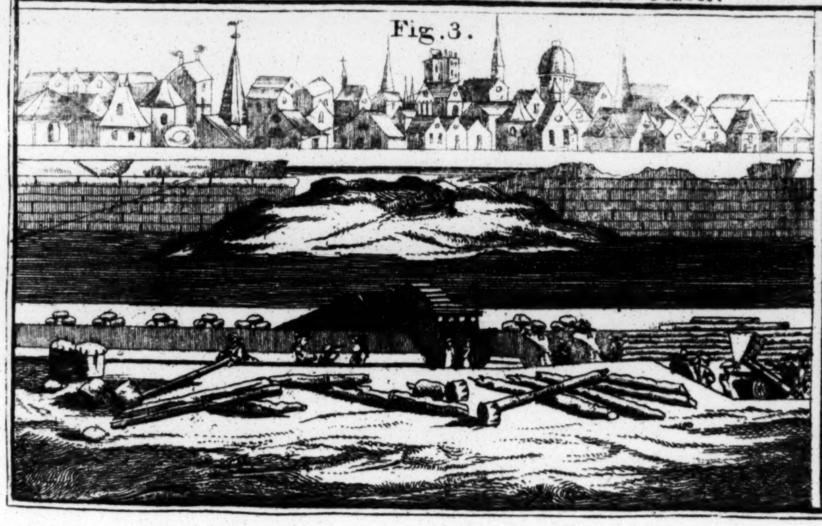


Fig. 2.



Opening of the descent into a wet ditch viewed from the Glacis.

Fig. 3.



Entrance into the descent of the wet ditch viewed from the Breach

Fig. 4.

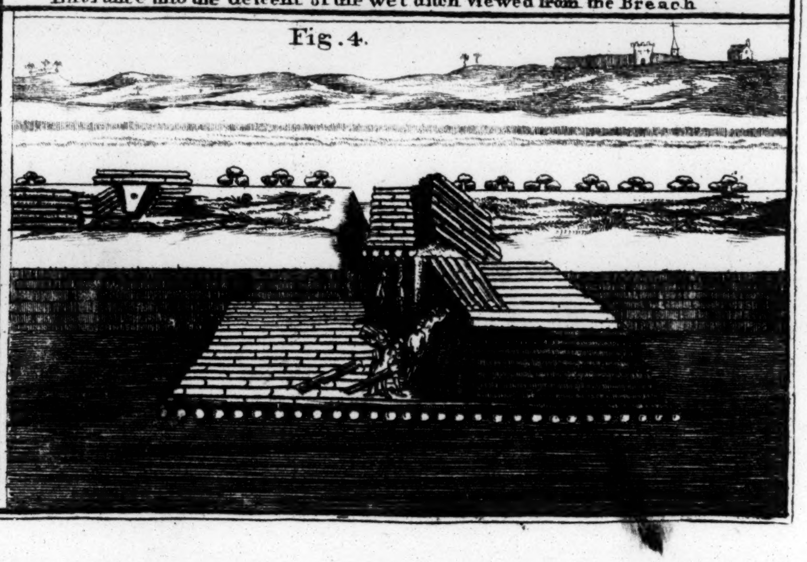
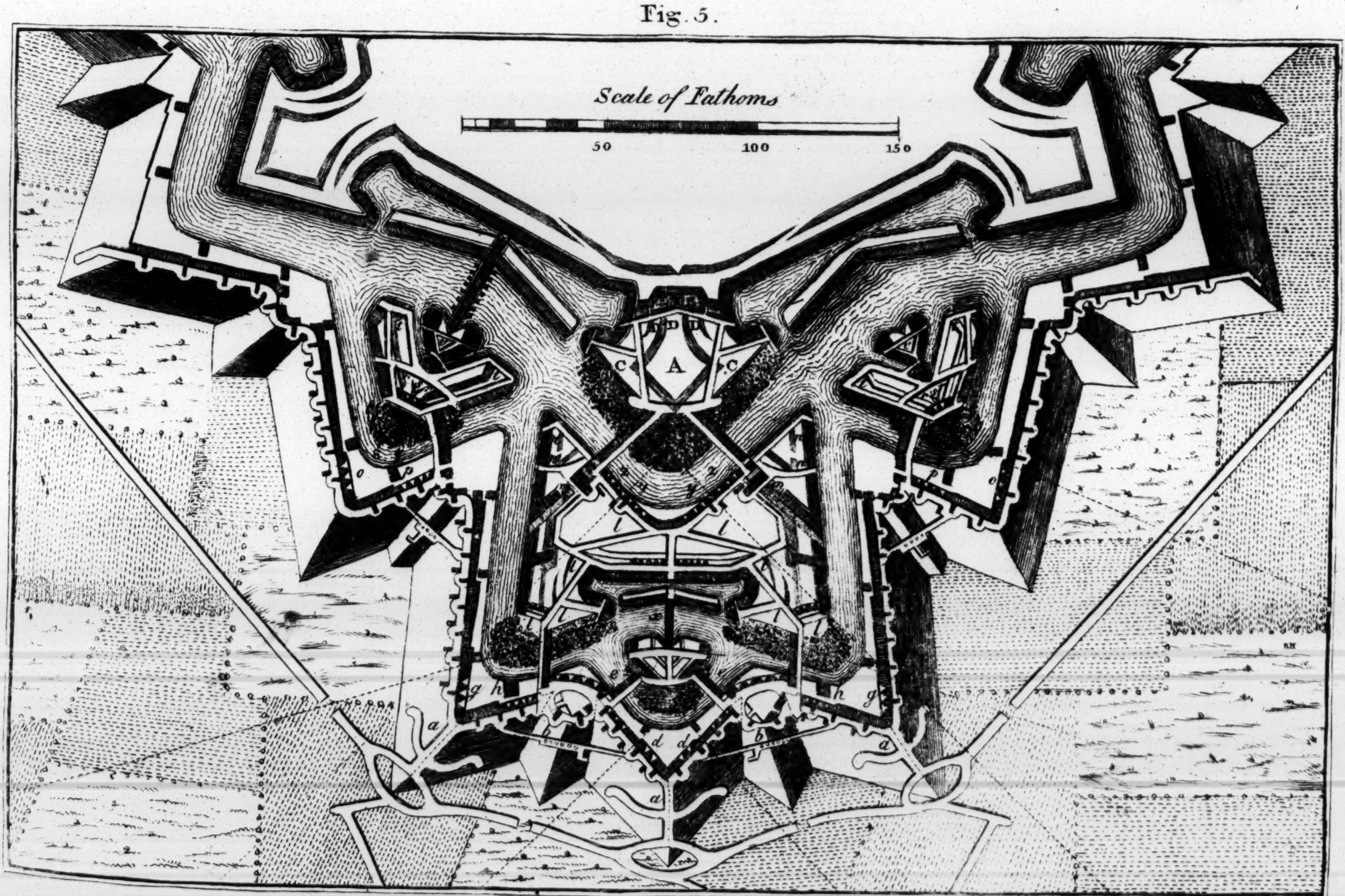


Fig. 5.


Scale of Fathoms
50
100
150
A
C
C
a
b
d
d
g
h
e
l

A Bell Sculp.t

3 MA 55

to wait for the completing of the paſſage over the ditch, before the miner is fixed to the face of the baſtion. The wall is pierced with cannon, in the manner before mentioned; but a little above the ſurface of the water, to the end that the miner may not be incommoded in this gallery; and he is ſent over in a little boat, to place himſelf in the hole. The miners relieve one another every two hours, to carry on their work with more ſpeed; that is, to complete and finiſh their mine. At the ſame time the enemy will uſe various artifices to obſtruct them.

When the miner has pierced the wall, he makes behind it, on both ſides of him, two ſmall galleries, from 12 to 14 feet, at the end of which he places, on both ſides the galleries, two mines, namely, one within the breadth of the wall, and the other ſunk 15 feet under the rampart. A common train is given to theſe four chambers, which taking fire at one and the ſame time, will produce a very large and ſpacious breach.

When there are countermines under the rampart, and along its revettement, care muſt be taken to ſeize them, and to drive the miners from thence. For this purpoſe M. Goulon propoſes to ſpring two fougaſſes near them, in order to burſt them; when this is done, he is for entering it with 10 or 12 grenadiers, and as many ſoldiers, commanded by two ſerjeants; part of theſe grenadiers ſhould have each four grenades, and the reſt ſhould carry four or five ſmall bombs, of which three only ſhould be charged, the other two with fuſees only. The two ſerjeants ſhould begin with attacking the countermine ſword and piſtol in hand, and the grenadiers ſhould follow them. If the beſieged do not appear to defend their countermine, a lodgment is quickly made with ſand-bags. This lodgment conſiſts of no more than a good traverſe, which entirely ſtops up the gallery of the countermine, towards the ſide from whence the enemy may come. If they attempt to oppoſe this operation, the grenadiers ſhould throw their three loaded ſhells, and retire quickly with their comrades, to prevent being hurt by the effect of thoſe ſhells; for the ſmoke they make in burſting, together with the ſplinters, muſt unavoidably oblige the enemy to quit the gallery for ſome time: but as ſoon as they have produced their effect, the ſerjeant and the grenadiers, with their comrades, muſt immediately return, and work as hard as poſſible upon their traverſe, in order to ſtop up the gallery. If the beſieged ſtill perſiſt in interrupting this work, the grenadiers muſt throw the two ſhells with fuſees only, which will oblige the enemy to retire quickly; and as no harm is to be apprehended from them, which is more than the beſieged can tell, the beſiegers continue to finiſh the traverſe. Even openings or loop-holes are made, in order to fire upon the enemy, in caſe they ſhould appear again in the part of the gallery oppoſite the traverſe.

When there is no gallery or countermine behind the walls, or when there is one which cannot eaſily be come at, the miner ſhould leave no means untried to diſcover it; and at the ſame time he ought to uſe the utmoſt precaution to prevent being ſurpriſed himſelf by the enemy's miners, who will attempt to ſmother him in the gallery, and to deſtroy his works: therefore the buſineſs of a miner requires great art and cunning to avoid the ſnares of the enemy. "A miner," ſays M. de Vauban in his Memoirs, "ought to liſten frequently to diſcover whether there are any at work under him. He ought to ſound with his augre towards the place he hears the noiſe come from; but the enemy often make a noiſe on one ſide, while they are at work on the other." If their miner draws too near, a ſmall mine muſt be made to ſtifle him in the gallery; which may be effected thus: A hole of five or ſix inches diameter, and ſix or ſeven deep, is made on that ſide the gallery where the enemy is heard; a cartridge of the ſame ſize, and containing about 10 or 12 pounds of powder, is put into it: the hole or opening towards the gallery is ſtopped cloſe with a ſtrong tampion, which is immediately applied to the cartridge, and ſupported by ſtrong planks well buttreſſed: this powder is ſet on fire by a fuſee, which paſſes through a hole made in the tampion, and communicates with the powder in the cartridge. If the gallery of the enemy's miner is within four or five feet of this powder, it will undoubtedly burſt, and the miner will be either killed, or obliged by the ſmoke to retire.

Another way of burſting the gallery of the beſieged, when it is at no great diſtance, is to put ſeveral ſhells on the ſide where the enemy's miner is at work, and to range them in ſuch a manner that they ſhall have their effect. When the miners are at work in ſearch of one another, they have great iron borers, with which they pierce the interval betwixt them, to find, as near as they can, their diſtance from one another. The miner muſt be very vigilant, and as ſoon as the borer is withdrawn he ſhould clap a piſtol into the hole, which, when well directed, and fired by a man of reſolution, ſeldom fails, as M. Vauban affirms, to kill the miner. The firſt ſhot ought to be followed by three or four more; then the hole ſhould be cleaned with the borer, to prevent the enemy from ſtopping it up on their ſide: and this is a matter of importance; for it will hinder their miner from continuing his work in that ſpot, and oblige him entirely to abandon it. Theſe and many other ſtratagems, which may be ſeen in the Memoirs of M. Vauban, plainly ſhow that the buſineſs of a miner requires not only addreſs and cunning, but likewiſe great courage and reſolution, to guard againſt and remove the ſeveral obſtacles that may be thrown in his way, with a view to prevent the progreſs of the works committed to his direction: he may eaſily guard againſt them when he is undermoſt; but if it be otherwiſe, his ſituation is extremely bad. In order to know for certainty whether they are at work under the gallery, the miner generally makes uſe of a drum with ſomething upon it, and then the ſhaking of the earth muſt occaſion a kind of trembling, which will diſcover that they are at work underneath. Sometimes he liſtens with his ear to the ground; but the fluttering of the drum is the ſureſt way.

While the miner is working upon the conſtruction of his gallery, the beſiegers muſt be employed in demoliſhing all the works of the enemy, and diſabling them from defending or repairing the breach. With this view a continual fire is made againſt the breaches, which will hinder the beſieged from ſhowing themſelves in that part, and from advancing to ſee the works which may be made in the ditch or at the foot of the breaches. If there is a tenaille before the curtain, batteries are placed in the re-entering places of arms of the covert-way of the half-moon, which plunge into the tenaille, and hinder the enemy from making uſe of it to diſturb the paſſage over the ditch. And in order to ſilence them further, another battery of mortars may be erected, in the moſt advanced lodgment of the gorge of the half-moon; which battery being well ſerved, will render it too dangerous and inconvenient for the beſieged to abide there, ſo as to have the attention requiſite for obſtructing the paſſage over the ditch.

But ſometimes the enemy will make oblique embraſures in the curtain; and from thence they fire on the lodgments of the covert-way, ſo as greatly to incommode both thoſe lodgments, and the opening of the deſcent into the ditch. The Imperialiſts, at the laſt ſiege of Philipſburg, had made ſuch embraſures in the two curtains of the attack, which would have deſtroyed a great many men, had the beſiegers been obliged to erect batteries on their counterſcarp, and to make the paſſage over the town ditch. The way to prevent the effect of thoſe batteries, is to endeavour to deſtroy them with ſhells; and, when the ground will permit, to enfilade the curtain with ricochet firing. Four or five pieces may be alſo placed on the upper part of the flanked angle of the half-moon; in which poſition they can fire directly upon the curtain, and plunge into the tenaille and the poſtern, by which the enemy keep a communication with the ditch when it is dry. In ſhort, all methods are tried that experience and genius can contrive, to gain a ſuperiority over the enemy's fire, ſo as entirely to ſilence it, or at leaſt to hinder them from ſhowing themſelves at any of their defences, without being expoſed to the fire of the batteries and lodgments.

Let us at preſent ſuppoſe that the paſſages over the ditches are finiſhed, ſo as to be fit to walk over; that the cannon or the mines have made the breaches ſufficiently wide for the aſſault; that the aſcent is made ſmooth, and that the beſiegers can eaſily mount to the top of the breach; then they may lodge themſelves there, by following either of the two methods mentioned in the article of the half-moon: namely, by ſending a few ſappers, who, under the protection of the fire of the batteries and the lodgments of the covert-way, ſhall begin to lodge themſelves there; or by ordering a body of troops to take poſſeſſion of it ſword in hand; or, which is the ſame thing, by attacking the baſtion.

If the enemy have made no retrenchments in the inſide of the baſtion, they will hardly venture to ſtand an aſſault, as this would only expoſe the place to be carried ſword in hand, themſelves to be taken priſoners of war, and the town to be plundered. Therefore every thing being ready for the aſſault, they will beat the chamade, that is, they will deſire to ſurrender on certain terms.

When a reſolution is taken to attack the baſtions while the mines are making and charging, a conſiderable heap of materials is laid up in the lodgments neareſt the breaches, that they may be handed readily for the conſtruction of the lodgment, as ſoon as the enemy is driven away. Every thing being prepared to ſet fire to the mines, all the grenadiers of the army are ordered to march to the aſſault; and they are to be ſupported by a ſufficient number of detachments, that the enemy may not be able to make a ſtand. Theſe troops being ready, the mines are ſprung; and as ſoon as the duſt is a little laid, the grenadiers, commanded to march and to mount foremoſt, move on to the foot of the breach; and when they get there, they mount immediately with their bayonets fixed, and are followed by the reſt of the troops that are to ſupport them. The enemy will not fail to make uſe of their mines, if they have any left; and will likewiſe throw all kinds of combuſtibles, to make the beſiegers pay as dear as poſſible for the ground which the beſieged will be obliged to yield in the upper part of the breach; for yield at length they muſt, and the ſuperior numbers of the beſiegers muſt ſurmount every obſtacle. If the latter are ſo fortunate as to repel the firſt attack, they will not be able to do the ſame by a ſecond, or a third; in ſhort, they muſt at length determine to retire behind their retrenchments. As ſoon as they are beaten away, and have abandoned the upper part of the breach, the beſiegers muſt ſet about making a lodgment; which will conſiſt at firſt of a kind of arc of a circle, the convexity whereof is turned towards the enemy, if there is a breach in the faces of the two baſtions, otherwiſe it will only be made on the upper part of the breach. The breaches are to be all ſtormed at the ſame time; by which means the reſiſtance of the enemy will be divided. This whole time the batteries and lodgments are to fire with all the vivacity poſſible againſt the ſeveral defences of the enemy, and againſt every place they are in and that can be fired againſt, without annoying the troops that are ſtorming the breaches.

The lodgment on the breach being made, the ſaps are carried on to the right and left towards the centre of the baſtion, and diſpoſed in the manner as in Plate CCCIX. fig. 5. baſtion A. Cannon are brought upon the breach to batter the inner retrenchment, the ditch is paſſed over here alſo, and a lodgment is made upon the breach in the manner mentioned in regard to the baſtions.

If behind this firſt retrenchment there was a ſecond, the enemy, after being forced to quit the former, retires to the latter to capitulate. The conſequence then would be, to attack them as in the former; and at length they muſt be forced to ſurrender. It is very rare to ſee a defence carried ſo far as we have here ſuppoſed; but it was incumbent upon us to make this ſuppoſition, in order to give an idea of what was proper to be done, ſhould the enemy reſolve to defend the place to the laſt extremity.

In attacking the inner retrenchments, beſides cannon there muſt be bombs and ſtone mortars. The bombs do a great deal of miſchief, becauſe the enemy are obliged to keep cloſe together in thoſe retrenchments, which are always very ſmall; and for this reaſon the ſtone mortars are of excellent uſe, becauſe of the ſhower of ſtones which they throw into thoſe works, and which kill and wound a multitude of men.

§ 20. *Attack of a place covered with fore-ditches, lunettes, and other outworks,* &c.

In order to give a more ſimple idea of the operations of a ſiege, we have explained and applied them to a place that had no other outworks than half-moons

3 MA 53

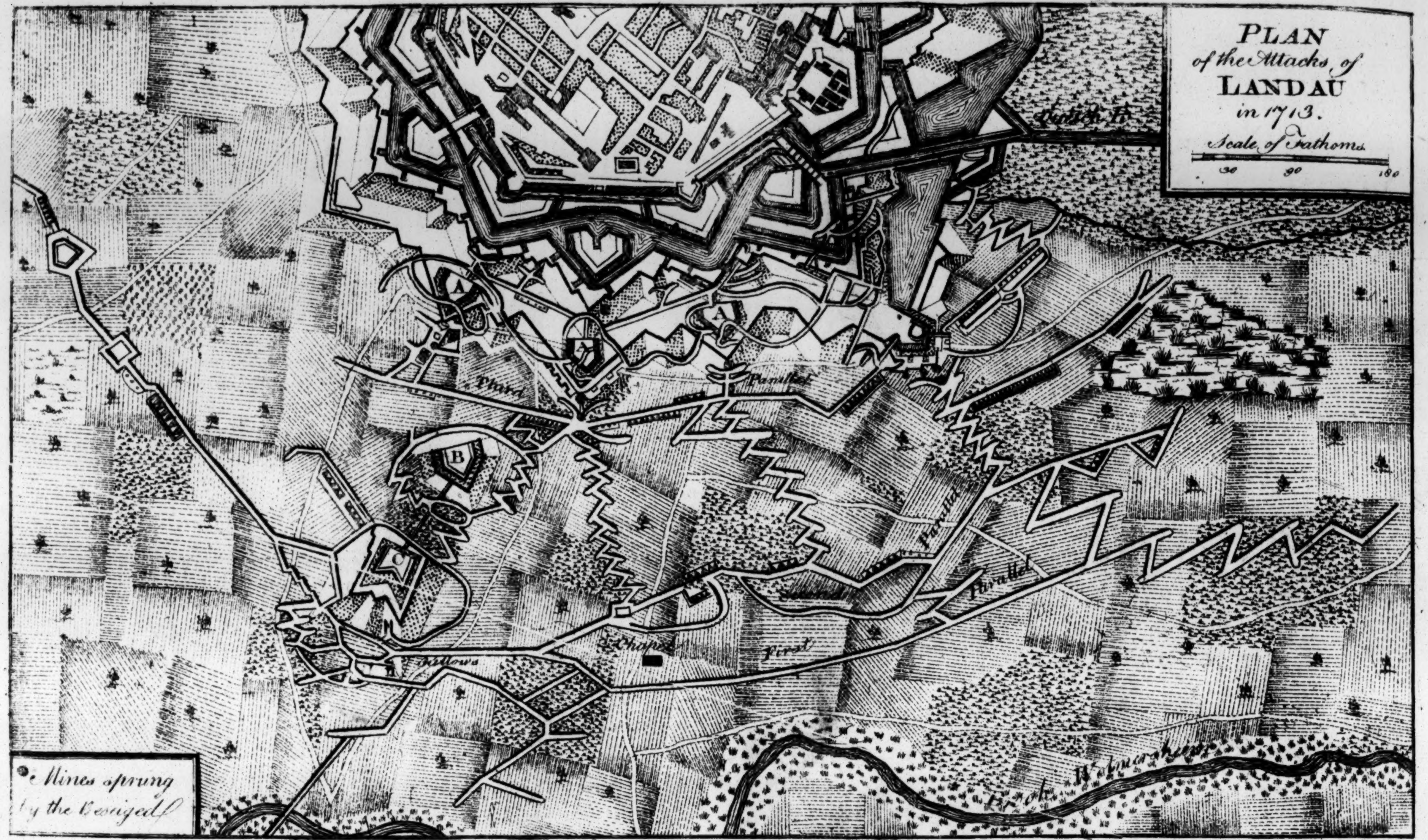

PLAN
of the Attacks of
LANDAU
in 1713.
Scale of Fathoms
30
90
180
A
A
A
B
C
Third
Parallel
Second
Parallel
First
Parallel
Chapel
Gallows
Mines sprung
by the Besieged

Fig. 2.

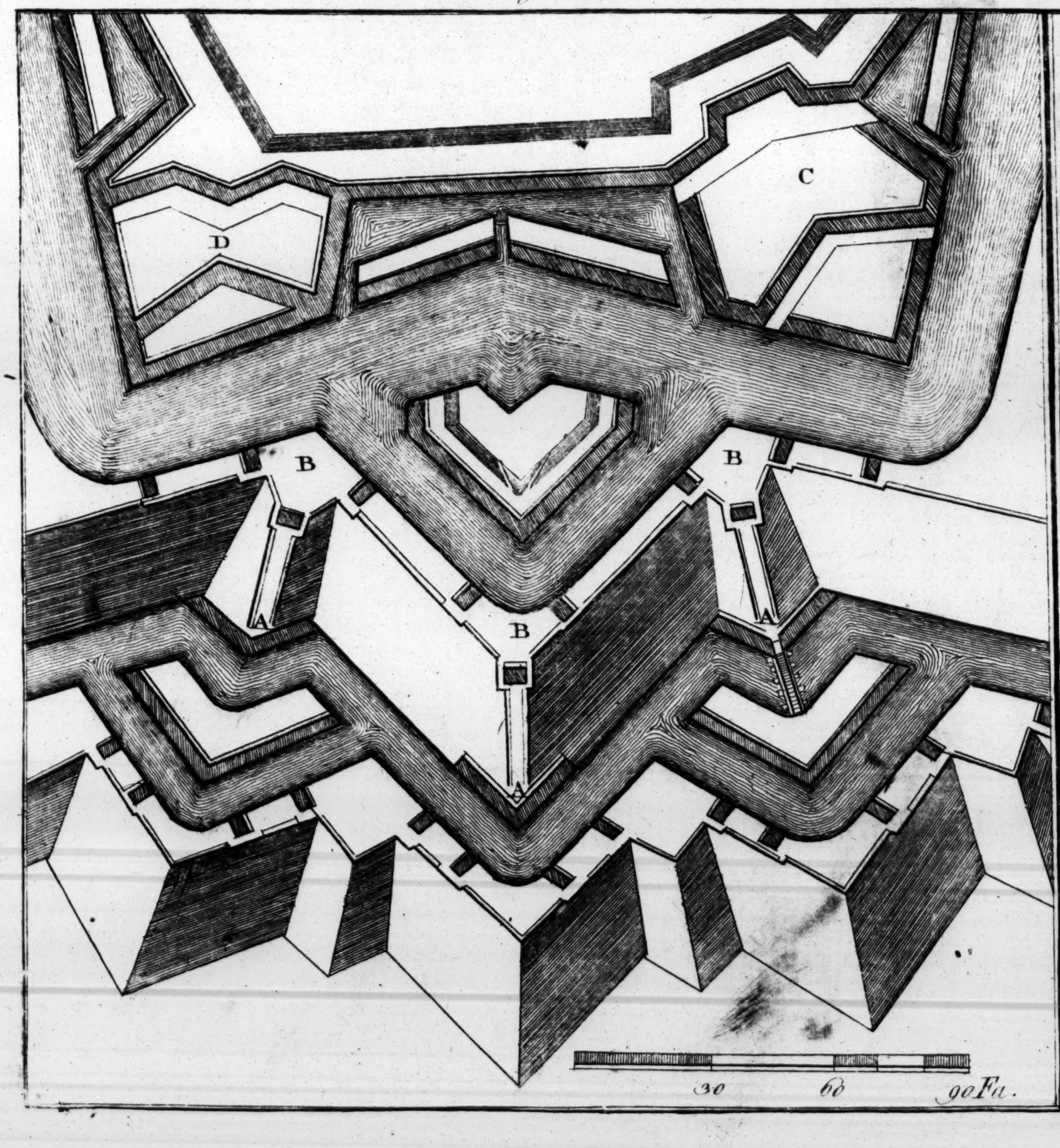
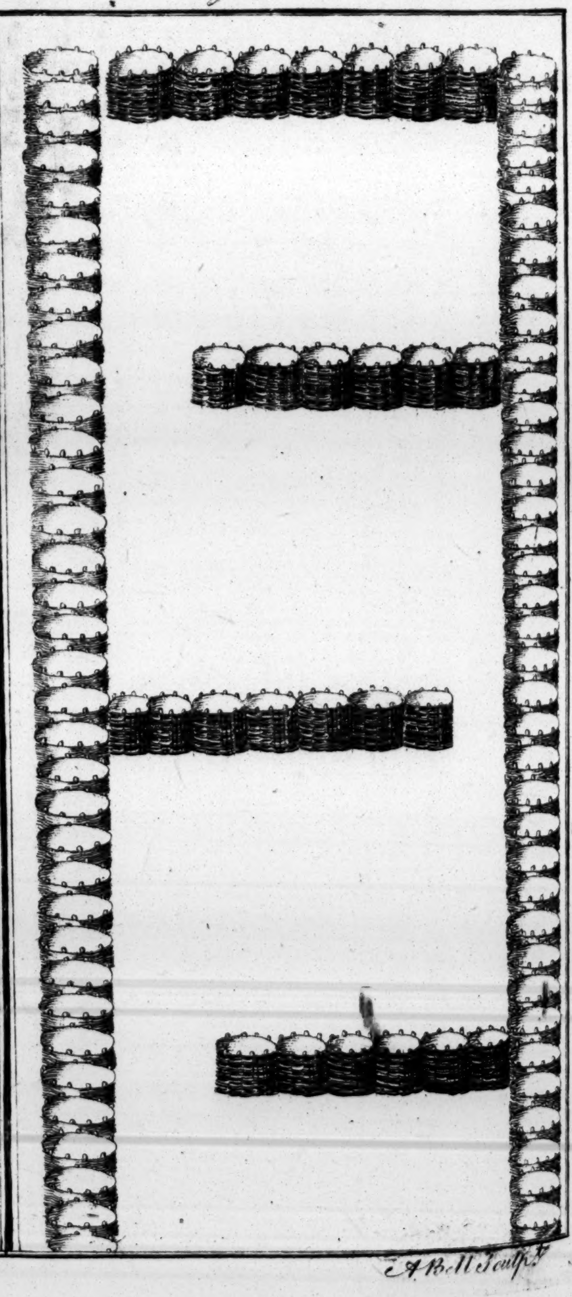

D
C
B
B
B
A
A
A
30
60
90 Ft.

Fig. 3.



A. Bell Sculp.

and a covert way: but a greater number of works will make no alteration in the principles here eſtabliſhed: to take, and keep poſſeſſion of thoſe works, the beſiegers have only to follow the ſame rules; which we ſhall ſhow in a few words.

Let us ſuppoſe a place ſurrounded by a fore-ditch, and a ſecond covert-way, ſtrengthened with lunettes, and ſuppoſe the front by which it may be attacked is covered with a horn or crown work, &c.

Firſt of all the trenches are to be opened as uſual, in order to come to the foot of the glacis of the ſecond covert-way; the ricochet batteries are to be placed on the produced faces of the works attacked, and of their defences; the faces of the lunettes of the front attacked ought to be enfiladed by the ricochet batteries.

The ſecond covert-way is taken in the ſame manner as the common covert-way; and then, if the fore-ditch is full of water, a good lodgment is to be ſecured along this ditch, and batteries are to be erected to make a breach in the lunettes, if the enemy do not think proper to quit them. It is very difficult for them to maintain themſelves in thoſe works, when their communication is ſeen; and they can hardly avoid being ſeen, when a lodgment is made all along the fore-ditch. Be that as it may, ſuppoſing that they are lined with ſtone-work, or only with turf, that they are fraiſed and palliſaded, and that the enemy are obſtinate in their defence, a breach may be made in them, by placing ſome cannon oppoſite the middle of the faces, and the ditch may be paſſed over by filling it with faſcines or ſome other materials. As it is a great deal ſmaller than that before the body of the place, it is much eaſier to paſs.

When the beſiegers have made themſelves maſters of the lunettes which cover the front attacked, they begin to think of paſſing the fore-ditch. This is a very difficult taſk, becauſe it is performed under the grazing fire of the covert-way; but this fire ought to be checked by the ricochet batteries, which ſhould plunge into the covert-way on every ſide. This ditch is croſſed near the ſaliant angles of the glacis. It is always to be underſtood, however, that there is no poſſibility of croſſing any ditch without a good epaulement of faſcines, to cover the paſſage on the ſide which is ſeen by the place, or by the works that defend it.

When the lodgment is entirely finiſhed on the covert-way, then the other attacks are carried on in the manner before explained.

There are places which, without any fore-ditch, have lunettes oppoſite to the ſaliant and re-entering angles of the glacis, which are alſo enveloped by a ſecond covert-way: ſometimes they are vaulted and bomb-proof, as at Luxemburg; and ſometimes they have only a ditch, a parapet, and a covert-way.

Thoſe which are vaulted and bomb-proof are very difficult to take; becauſe the ricochet-firing and the bombs can do them no miſchief. In that caſe they muſt either be turned, or be taken by mines.

A work is ſaid to be turned, when the beſiegers get between that work and the place, and ſo cut off their communication. Sometimes the lunettes have communications under ground, and then there is hardly any other way of driving out the enemy but by mines.

This is tedious work; but there is no remedy for it. The lunettes and the ditch are always defended by branches of the covert-way, with which they have alſo a communication, like thoſe of the lunettes, A, A, Plate CCCX. fig. 1.

This plate, which repreſents part of Landau and its attacks in 1713, may ſerve to give an idea of the manner in which a work is turned. The advanced lunette B, as well as the work C, called a tenaille, are turned; that is, the trenches cut off the communication betwixt them and the place.

When this communication cannot be cut off, there will be often a neceſſity for attacking the lunette and the covert-way at the ſame time; and the reaſon is, becauſe though the enemy ſhould be obliged to abandon the lunette, yet ſo long as they are maſters of the covert-way, they have it in their power to return and retake it. Therefore, the ſure way of keeping poſſeſſion of it is to drive the beſieged out of the covert-way, at the ſame time that they are forced to quit the lunette.

The garriſon may avail themſelves greatly of mines for the defence of theſe ſmall outworks, ſo as to oblige the beſiegers to pay very dear for their acquiſition, and be a long while in making it. But they muſt purſue the ſame methods as the beſieged; they muſt dig deep into the earth, they muſt endeavour to deſtroy the enemy's mines, to blow up their galleries, and to make themſelves maſters of the lower ground. This is an eſſential point, without which the enemy may blow up and deſtroy the lodgments ſeveral times. The celebrated M. de Valiere, in a Diſſertation on Mines, at the end of the third volume of M. Folard's Commentary on Polybius, ſhows that in a ground 25 or 30 feet deep, the enemy may be blown up 20 times. Therefore it is impoſſible to be too cautious in endeavouring to get under the gallery of the beſieged, in order to prevent the miſchief they may do by their great number of mines.

In the neighbourhood of ſome places there are a ſort of ſmall half-moons, called *redoubts*. When they are diſtant from the place, the enemy cannot maintain themſelves there without expoſing their troops to be taken priſoners of war; but when they are covered and defended as they ought to be, and judiciouſly ſituated, they are an object worth attention. Endeavours ought to be uſed to cut off the communication between them and the place, and to oblige the enemy to abandon them by throwing in ſhells; it may even be proper to inſult them and drive them out ſword in hand, provided they are not ſo near the place as to receive powerful ſuccours and able to withſtand the attack. It is a matter of conſequence to get rid of theſe ſmall outworks as ſoon as poſſible, becauſe they may be of great hindrance to the progreſs of the attacks, by having a view of the trenches from the flanks, and enfilading them, &c.

In ſome ſieges, when the garriſon are obſtinate in their defence, ſmall outworks are made at the foot of the ſaliant and re-entering angles of the glacis; theſe conſiſt only of a parapet raiſed at the foot of the glacis upon theſe angles, each ſide of which has about 10 or 12 fathoms. Theſe ſmall works are called *arrows*. They may be ſeen in A, A, A, Plate CCCX. fig. 2. They communicate with the covert-way by a paſſage pierced on the ridge of the glacis, and paliſaded on both ſides. At the entrance of this paſſage is conſtructed a traverſe B, generally called the *tambour*, which hinders the beſiegers from being maſters of the arrow, or diſcovering the inſide of the place of arms belonging to the covert-way.

To prevent the effect of theſe arrows, the beſt method is to ply them well with ricochet batteries, and with ſhells thrown in alſo *à ricochet*. Stone mortars may be likewiſe made uſe of, to annoy the enemy in their arrows; for as theſe works are but ſmall, the ſtone mortars produce a very good effect. We have already taken notice of almoſt all the works the beſiegers may meet with beyond the covert-way; there remains, therefore, only to ſee the manner of conducting the attacks of the other outworks moſt commonly uſed in fortified towns.

§ 21. *Attack of a Horn-work.*

A HORN-work is nothing more than the front of a fortification, which projects into the field, and is joined to the place by two long ſides. It is placed oppoſite to the curtains, and ſometimes alſo to the baſtions. The beſiegers ſhould endeavour, as much as poſſible, to avoid attacking the ſide covered by theſe works, becauſe they are very difficult to take, and of courſe will greatly lengthen out the ſiege. But ſuppoſing there is an abſolute neceſſity for attacking a place on the ſide covered by a horn-work oppoſite the baſtion, and that this horn-work has an half-moon oppoſite to its curtain: The trenches and parallels are to be made in the uſual manner; the ſame method is to be uſed in regard to the ricochet batteries, which will alſo enfilade the branches of the horn-work. The taking of the covert-way of the half-moon, and of the half baſtions of the horn-work, is carried on in the ſame manner as the attack of the half-moon, and the two baſtions of the body of the place. There remains, therefore, only to ſhow how the lodgments are to be made in this work. We will ſuppoſe that there are two retrenchments withinſide, as in Plate CCCIX. fig. 5.

When the lodgments towards the point of the half baſtions are finiſhed, ſome guns are to be planted there, in order to batter the face of the oppoſite baſtion; and they are to be placed overagainſt the lodgments of the flanked angles of the half-baſtions. Theſe lodgments are to be extended on both ſides towards the curtain, along which ſaps are carried on; as alſo towards the orillon of the half-baſtions, if they are made with orillons: this will form a kind of ſmall parallel, the fire of which will help to cover the lodgments in front, in caſe the enemy ſhould make any ſallies to deſtroy them. In large fortifications, ſuch as horn and crown works, the lodgments ought to be carried on with the greateſt circumſpection, in order to be able to ſupport them againſt every attack of the enemy.

As all theſe lodgments are commanded by the baſtion, it will be requiſite to dig the ſaps ſufficiently deep, ſo as to be ſecure againſt their fire; and likewiſe to make *traverſes* near enough to each other for the ſame effect.

If the baſtion can be battered in breach from the rampart of the half-baſtions of the horn-work, the beſiegers will for this purpoſe make uſe of batteries erected on theſe half-baſtions; and for the ſame end they will alſo plant a battery of ſix or eight guns towards the middle of the curtain. Should it be impoſſible to ſink ſufficiently into theſe, ſo as to batter the lower part of the revettement of the baſtion, ſtill they might be uſefully employed in playing againſt the enemy's defences, and driving them out of their retrenchments. When the lodgments are well ſecured withinſide, it will be extremely difficult for the enemy to continue in the retrenchments, without running the riſk of being made priſoners of war; becauſe the communication between them and the place will become too difficult. They might indeed, by means of a bridge level with the water, retire into the collateral half-moons: but at the ſame time that the beſiegers endeavour to make themſelves maſters of the horn-work, they will alſo ſtrive to get poſſeſſion of theſe half-moons; the taking of which muſt inevitably follow that of this work.

As ſoon as the enemy are entirely driven out of the horn-work, the beſiegers muſt poſſeſs themſelves of it by carrying on lodgments which ſhall occupy its whole extent; and if there be any occaſion to erect batteries within, in order to batter the baſtion in breach, they are to be erected along its counterſcarp, as may be ſeen in *z*, (*ibid.*)

Sometimes it ſhall happen, that the ground of the inſide of the horn-work will not permit lodgments to be extended there, as they are ranged in this figure, becauſe it may be too wet and marſhy, or elſe of too narrow a circumference. In that caſe there is no carrying on the lodgments but along the parapet of the front of this work, and along its branches, if the breadth of the platform of the rampart of theſe branches will permit. It muſt be made to defile by frequent zig-zags or turnings; but if it be too narrow, the only way for the beſiegers is to ſink very deep, in order to defile from the fire of the place, and to cover themſelves by traverſes made very near one another.

Explanation of Plate CCCIX. fig. 5.

a, Cavaliers of the trenches. *b*, Batteries of ſtone mortars. *c*, Batteries to breach the half-moon before the horn-work. *d*, Batteries againſt the defences of this half-moon. *e*, Paſſages over the ditch before this half-moon. *f*, Lodgments in it. *g*, Batteries againſt the flanks of the horn-work. *h*, Batteries to breach the half-baſtions of the horn-work. *i*, Batteries againſt its curtain. *l*, Lodgments in the half-baſtions and in the horn-work. *m*, Paſſages over the ditch before the retrenchments in the horn-work. *n*, Lodgments in theſe retrenchments. *o*, Batteries againſt the defences of the collateral half-moons. *p*, Batteries to breach theſe half-moons. *q*, Paſſages over the ditch before theſe works. *r*, Lodgments in the ſame. *s*, Batteries to breach the reduits of the half-moons. *t*, Paſſages over the ditch before the reduits. *u*, Lodgments in the reduits. *x*, Bridge of faſcines, or a road to carry the cannon to the horn-work. *y*, Batteries againſt the defences of the baſtion A. *z*, Batteries to breach this baſtion. B, Paſſages over its ditch. C, Lodgments in the baſtion A. D, Lodgments on the border of the ditch before the retrenchment of the baſtion A. E, Paſſages over the ditch before this retrenchment.

Plate CCCXI. repreſents the plan of the lodgments

WAR.
Attack of Fortified Places.

Plate. CCCXI.

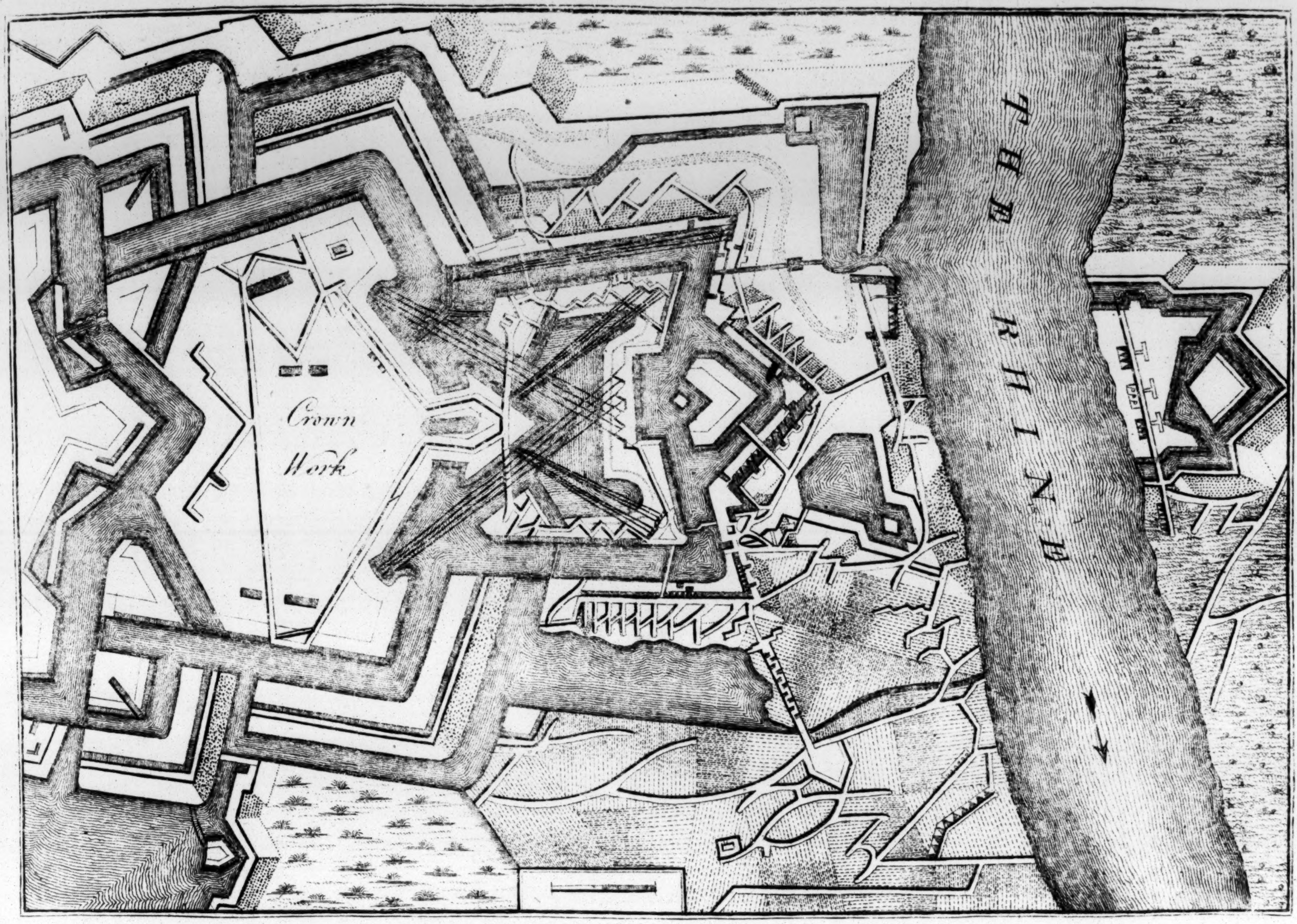
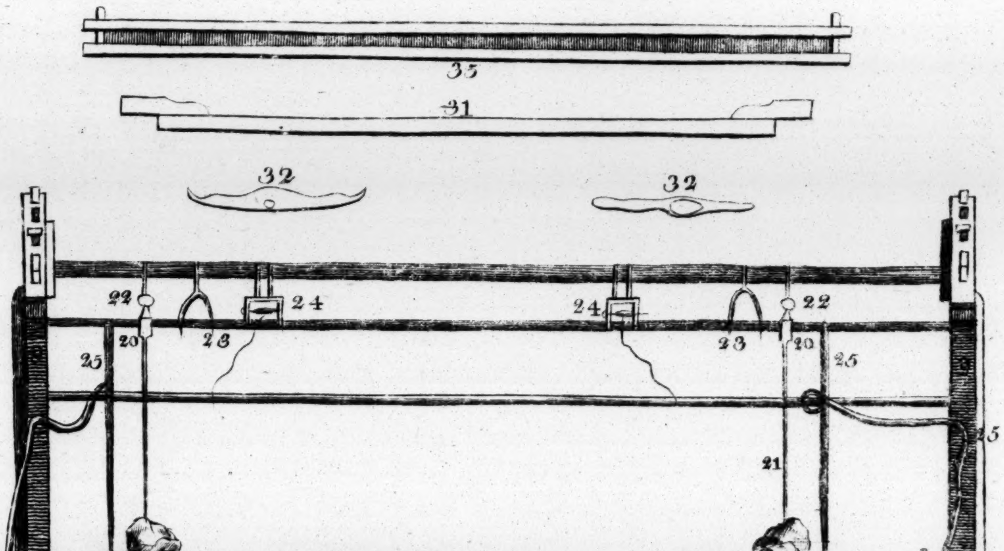

THE RHINE
Crown Work

Fig. 2.

WEAVING Loom &c.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A Bell Sculpt.

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made in the horn and crown work of Philipſburg in 1734.

A great deal more might be ſaid, in regard to all theſe articles; but for the particulars, we refer the reader to the Memoirs of M. de Vauban, which diſplay the whole extent of genius of that great man, and ſhow how capable he was of finding out expedients, for ſurmounting all obſtacles, ariſing either from ſoil, ſituation, or different manners of fortifying.

§ 26. *To prevent ſuccours from being thrown into a town beſieged.*

Not to interrupt the thread of the uſual operations of a ſiege, we have ſuppoſed that the general had taken every neceſſary meaſure to guard againſt all the attempts of the enemy, and to ſecure ſucceſs by the great ſuperiority of his forces. Sometimes, however, it may happen, that an enemy who was looked upon as too weak to relieve the place, ſhall prepare to attack the army of the beſiegers, either in conſequence of drawing out moſt of the troops from the neighbouring garriſons, which are leaſt expoſed, or of having been reinforced from ſome other part. In ſuch caſe, there are two ways to follow. The firſt is, to wait for the enemy in the lines, and to hinder them from breaking through: the ſecond, to leave part of the army in the lines, in order to carry on the ſiege, and to oppoſe any ſallies of the garriſon; with the other to go and meet the enemy, and fight them out of the lines.

Both theſe ways are ſupported by the opinion of different generals; but the latter ſeems to have the moſt general approbation.

The inconvenience of waiting for the enemy in the lines, is the uncertainty on which ſide he intends to direct the attack; for which reaſon the beſiegers are obliged to be equally ſtrong in all their poſts; and when the line is very extenſive, the troops are at too great a diſtance from one another, to make any conſiderable reſiſtance on the ſide where the enemy forms his attack. Moſt lines of circumvallation, that were ever attacked, have been forced; ſo that both reaſon and experience ſeem to eſtabliſh it as a maxm, that it is preferable to go and meet the enemy, and not to let him come within reach of the lines.

Without pretending, however, to determine ſo important a matter, it ſeems, that when a line is not very extenſive, it may be defended to an advantage. And, firſt of all, it is beyond all doubt, that if the troops behind the line know how to avail themſelves of the ſeveral circumſtances in their favour, their ſituation is in many reſpects preferable to that of the aſſailants. The latter are expoſed to the fire of the line for a very conſiderable time before they can come up to the border of the ditch. This ditch muſt be filled up; and all the while they are expoſed to the ſame fire, which muſt kill a great many of their men, and throw their troops into ſome confuſion. And when they break into the line, they can make but a very narrow front; for which reaſon, they may be charged both in front and flank by the troops within; who, if they do their duty, muſt drive them into the ditch. For, ſuppoſe the firſt line of the defendants infantry next the ditch ſhould be obliged to give way, the horſe that are behind them may and ought to fall upon the enemy's foot that have pierced through the line; and as the latter cannot force their way but in ſome confuſion, the former may eaſily drive them out again. Notwithſtanding ſuch evident advantages in entrenchments, experience, ſays the Chevalier Folard, plainly ſhows, that troops are leſs brave and reſolute behind an entrenchment than in an open field. For they place their whole confidence in this defence; ſo that when the enemy, to avoid being expoſed too long to the fire of the line, jumps boldly into the ditch, and endeavours to mount the entrenchment, the ſoldier begins to loſe his confidence, but loſes it entirely as ſoon as he ſees that the enemy breaks through the line. "He looks upon the evil, (ſays this author), as paſt relief, when there is nothing eaſier than to remedy it, by forcing the enemy back again, and tumbling them into the ditch. For, not to mention that they cannot pierce through in good order, they have ſpent their whole fire. Yet (continues the ſame author), nothing of all this is done; the enemy enter pell-mell, and form their ranks while the others retire; the terror ſpreads along the line, they all betake themſelves to flight and diſperſe, without knowing in what manner the enemy forced their way." Upon the whole, we may conclude, that if the troops are ſenſible of the many advantages of a good line, and are determined to defend it; if the ſeveral parts are likewiſe well ſupported, and all the neceſſary precautions have been taken to prevent being ſurpriſed; it will be extremely difficult for the enemy to force it.

Thus, at the ſiege of Philipſburg, in 1734, prince Eugene reconnoitred the lines of circumvallation, and found them ſo well diſpoſed, that he never once attacked them. They formed a kind of irregular ſemi-circle round the place, of which the Rhine might be conſidered as the diameter. They were defended by a kind of fore-ditch, and by wells between this fore-ditch and the lines, as may be ſeen in Plate CCCIII. If the prince had attempted to paſs over this ditch and theſe wells, they would have loſt a great number of men by the fire of the lines. The wells were ſo near to one another, that there was no poſſibility of paſſing between them: they muſt have been filled up, as well as the fore-ditch, with faſcines; which would have been too tedious and dangerous an enterpriſe.

In ſuch a ſituation, therefore, the beſiegers may wait quietly in their lines; but if they ſhould be of ſo great an extent, as not to admit of being equally guarded, then it ſeems to be the ſafeſt way to draw out the troops, and meet the enemy, as marſhal Tallard did Landau, in 1703. After he had defeated the army which was marching to the relief of the place, he returned and finiſhed the ſiege. The duke of Vendome acted juſt in the ſame manner at the ſiege of Barcelona, in 1697. Having had intelligence that the marquis of Valeſco, viceroy of Catalonia, was preparing to attack him, he went out to meet that general, gained a complete victory, and returned afterwards before the place, which was obliged to capitulate.

At the ſame time, we muſt allow that the ſafeſt way to conduct a ſiege, is to have a good army of obſervation advantageouſly poſted, ſo that the enemy ſhall not be able to oblige them to fight, without expoſing themſelves to a very great riſk; and thereby to cover the ſiege, and be near enough to receive ſuccours from the troops employed before the town, ſhould the enemy come to a reſolution of giving battle.

If the enemy do not think proper to attack the beſieging army, they may probably try to throw in ſome ſmall ſuccours of troops and ammunition into the town. The way to prevent them is to make the circumvallation very exact, and not to leave an opening in it, under any pretext whatſoever.

The enemy may likewiſe attempt the raiſing of the ſiege, by making themſelves maſters of the ſpot, or place, from whence the beſiegers draw their proviſions and ammunition. But before a general lays ſiege to a town, he ſhould take all the neceſſary precautions, for ſecuring his magazines, and covering his convoys, and guarding the ſeveral poſts through which the enemy might march to attack him.

Another expedient the enemy may think of for raiſing the ſiege, is to attack ſome place of importance, which the beſiegers have an intereſt in preſerving; in order to engage them to march to its aſſiſtance, and to abandon the ſiege they have in hand. But this expedient ought to have been foreſeen, and ſhould not cauſe the raiſing of the ſiege. It is natural for a general, before he thinks of laying ſiege to a place, to begin with taking all the precautions which prudence and military ſkill can ſuggeſt, for preſerving his own country, and covering it againſt any attack of the enemy. They cannot but think of indemnifying themſelves, if poſſible, for the loſs of any place you take from them, by taking ſome of yours; therefore, as every attempt of theirs muſt naturally be foreſeen, a general ſhould guard againſt it. However, ſhould the enemy find means to engage in an enterpriſe of importance, and which requires an immediate relief, if a general thinks there is not time ſufficient to take the place he has laid ſiege to, and at the ſame time to oppoſe the enemy's deſigns, in that caſe he may raiſe the ſiege; but for ſo doing, there ſhould be very cogent reaſons. When king William laid ſiege to Namur, in 1695, marſhal Villeroy, in order to divert him from his purpoſe, ſat down before Bruſſels, thinking he ſhould oblige that prince to march to its relief, and abandon his enterpriſe againſt Namur; but king William choſe rather to ſuffer that city to be bombarded, than to relinquiſh a very important conqueſt, in which he was in a manner ſure of ſucceeding.

§ 27. *Of the raiſing a ſiege.*

SUPPOSE that, by ſome one circumſtance of thoſe related in the preceding article, or through ſome other cauſe, a general finds himſelf reduced to the neceſſity of abandoning the ſiege; in that caſe, if he apprehends being incommoded by the garriſon in his retreat, he ought carefully to conceal his deſign from them. Firſt of all, the guns and mortars are to be drawn off betimes from their batteries: then the implements are carefully collected, and put into the waggons; and if he intends to ſteal away unknown to the enemy, all the artillery and baggage muſt ſet out at the beginning of the night, the trenches and the places of arms being ſtill filled with troops, who are to continue firing, in order to deceive the enemy; and when the baggage is pretty far removed from the place, all the troops are to follow, while the fires in the camp are left burning as uſual. The whole is to be eſcorted by horſe or foot, according to the country in which the retreat is made, whether through open plains or incloſures. Sometimes it may happen, that a general ſhall be forced to retire in a hurry, without being able to take all his baggage with him; in ſuch caſe, whatever he is obliged to leave, muſt be previouſly burnt and ſpoilt, that it may be of no uſe to the enemy, &c.

When an army is in no danger of being purſued by the garriſon in its retreat, the artillery and baggage are ſent off by day, and the troops march after them.

SECT. II. *Of Defence.*

§ 1. *Of the troops and ammunition with which a fortified town ought to be provided.*

AS the goodneſs of the works, when a place is well provided with troops, ammunition, and proviſions, is what enables it to hold out againſt the attack of an enemy; ſo the want of any one of theſe three articles will not permit all the advantage to be reaped that was propoſed in fortifying a town. Men are properly the ſoul of a defence, and without them the beſt fortifications in the world are not able to make any great reſiſtance againſt the enemy.

Therefore we muſt firſt of all lay down as a maxim, that a governor cannot make a good defence, unleſs he hath the number of troops neceſſary for defending the ſeveral poſts, and obliging the enemy to pay dear for them. Immenſe ſums are expended in fortifying a place, in order to ſtop a ſtrong army with a ſmall force: but what reſiſtance can the place make without exerting a briſk fire; and what will thoſe heaps of walls avail, if they are not defended? The garriſon of a town beſieged ought to have a reaſonable ſtock of proviſions, in order to ſupport themſelves under the fatigue of military duty; they ought alſo to have powder, arms, and generally every thing that is requiſite to annoy the enemy, and to ſtop the progreſs of their operations.

It is not very eaſy to ſettle the number of troops neceſſary to defend a town; the nature of the ground on which the place is ſituated, and the number of outworks, ought to determine the ſtrength of the garriſon. M. Vauban in his Memoirs, reckons, that in a place regularly fortified with good baſtions, half-moons, and covert-ways, we ſhould allow 500 or 600 men to each baſtion: That if the town has horn-works, 600 men may be likewiſe aſſigned to each of thoſe; and in proportion for the other outworks, according to the relation which their defence may require to that of the horn-work. In regard to the horſe which they may want on this occaſion, he ſuppoſes it a tenth part of the infantry.

This being premiſed, ſuppoſe a place has ſix baſtions, there muſt be a garriſon of ſix times ſix hundred foot, which makes 3600, and the tenth part of that number in horſe, which makes 360. Hence a ſufficient garriſon for ſuch a place will be 3960 men.

In order to compute, as near as poſſible, the quantity of ammunition and proviſions that may be requiſite for ſuch a garriſon, we muſt calculate how many days they will be able to maintain a ſiege. The following are M. Vauban's remarks on this ſubject.

	Days.
For the inveſting the place and the tracing the lines -	4
For the opening of the trenches to the attack of the covert-way -	9
For the attack and taking of the covert-way, and making lodgments in it -	4
For the deſcent and paſſage over the ditch before the half-moon -	3
For fixing the miners, or for the batteries till the making of a reaſonable breach	4
For taking and ſecuring the interior part of the half-moon -	3
For the paſſage over the great ditch before the two baſtions, ſuppoſed to be begun before the taking of the half-moon -	4
For fixing the miners, or erecting batteries on the covert-way, to lay the place open and make a reaſonable breach -	4
For the defence and ſupport of the breach after the place is laid open -	2
For the miſtakes which the enemy may happen to commit, and their neglect in their works - -	4
Total of the defence -	41

In this defence it is plain we ſuppoſe a town to be fortified only with half-moons and a covert-way; but if the half moon had a reduit with a revettement and rampart, it might hold out four days longer.

If there were retrenchments in the baſtions, they might retard the taking of the place five or ſix days.

If the ditch was ſtrengthened with tenailles and caponiers, the paſſage over it might be protracted two or three days.

If there was a good horn-wook, or ſome other like fortification properly ſtrengthened with a half-moon, a covert-way, and retrenchments within the work, the taking of it would coſt about 12 or 14 days.

If this work had tenailles, the paſſage over its ditch would be later by two or three days.

If there was a fore-ditch and a ſecond covert-way, the progreſs of the attacks would ſtill be leſs rapid, and we might reckon 10 or 12 days for the taking of this ſecond covert-way and the paſſage over its ditch.

If there were redoubts near the place, they would ſtill protract the taking of it for ſome days.

From this eſtimate, though not very exact, an idea may be formed of the duration of a ſiege: a point abſolutely neceſſary for ſecuring, at leaſt, a ſufficient quantity of ammunition during the time; we ſay at leaſt, becauſe it is always prudent, if poſſible, to have a greater quantity of ammunition than is ſuppoſed to be wanted.

When once the number of the garriſon, together with the duration of the ſiege, is fixed, it is then very eaſy to calculate the quantity of powder and ammunition with which the place is to be provided. We ſhall give here an eſtimate, after mentioning a word or two in regard to the neceſſary quantity of cannon, mortars, &c. and the employment of the garriſon.

It is judged, that to be well provided with cannon, eight pieces ſhould be allowed to each baſtion. Therefore in a place of ſix baſtions there ought to be 48 pieces.

As a town is never attacked on all ſides, and there are ſeldom above two or three attacks at the moſt, the cannon belonging to thoſe baſtions that are not attacked, ſerve to ſtrengthen the baſtions attacked, and they are placed alſo in the outworks of the fronts attacked.

Among the cannon for the defence of the town there ſhould be ſome of 24, of 16, of 12, of 8, and of 4 pounders, and even of 2 and 1. The latter are of very great ſervice, becauſe of their being ſo convenient to remove with eaſe, and with few men, from one place to another; for this diſturbs the enemy, who find it difficult to deſtroy theſe ſmall pieces. The largeſt ſerve to fire againſt their batteries and their works. The ſmall ones are carried to the outworks, and to the covert-way, from whence they are fired *in barbette*. It is cuſtomary to make uſe of ſea carriages for theſe ſmall pieces.

Beſides cannon, the town ought to be provided with a great number of wall guns, carabines, muſkets, &c. We are to ſuppoſe that moſt of the ordinary arms will be broke in the ſervice, and therefore care muſt be taken to provide new ones when wanted.

The number of mortars neceſſary may be eſtimated at two to every baſtion. They muſt be of different bores, of 12 and 8 inches diameter. There ought alſo to be ſeveral ſtone-mortars.

The garriſon of a place of ſix baſtions, conſiſting, as we have already obſerved, of 3600 foot, are to be employed or diſtributed in the following manner.

We ſhould, firſt of all, reckon about 600 ſoldiers wounded and ſick, in the firſt 12 or 15 days of the ſiege, and for the ſervice of the batteries, the removing of ammunition, &c. And then there will remain 3000 for the defence of the place.

Theſe are to be divided into three equal bodies; one for the guard, the other for the biovac under arms, ready to march on the firſt notice where wanted, and the third to reſt.

The horſe are alſo divided into three bodies like the foot; that for the guard is chiefly placed on the right and left of the attack; that for the biovac is generally quartered by brigades, in different parts of the town, where they may be of ſervice, either to keep the inhabitants in awe, or to be ready to act in ſallies. In regard to the third corps, who are to reſt, their horſes muſt be ſaddled in the day; and the horſe or dragoons muſt be ready to mount inſtantly, ſhould there be any occaſion for their ſervice.

The guard of infantry and the biovac ought to be under arms, at the ſeveral poſts aſſigned them in the works of the place; and for the corps at reſt, they muſt be ready to ſupport the troops on guard, in caſe theſe ſhould have need of their aſſiſtance.

The guard of foot of 1000 men, may be ſubdivided nearly into three equal bodies; two of which to defend the poſts attacked, and the third the other poſts not attacked. And in regard to the two firſt, they may be ſubdivided alſo into three equal bodies; two of which are to fire the firſt two hours of the night, the other is to relieve one of them at the end of that time, the next is relieved two hours after; and ſo on alternately, that there may be always two-thirds of this guard in action, and the other third at reſt.

There is no occaſion for ſo briſk a firing by day as by night; becauſe the beſieged are more capable of ſeeing what the enemy are about, and of oppoſing their attempts; but in the night nothing but a ſtrong cannonading can guard againſt their enterpriſes. By day the troops fire from between baſkets, ſand-bags, or gabions, placed on the upper part of the parapet, to the end that being under cover they may take better aim at the enemy.

To know the quantity of powder requiſite for a ſiege of any determined length, it will be neceſſary to know the quantity expended each day.

According to M. Vauban, of whom we have borrowed this whole detail, a pound of powder of 16 ounces may contain from 30 to 40 charges for common muſkets, including their priming. Each ſoldier may fire from 60 to 80, and even to 90 charges, during the guard of 24 hours; and the quantity of powder for each man may be fixed at two pounds at a medium, for ſome will uſe more and ſome leſs.

	Pounds.
We have ſuppoſed, that out of the 1000 men for the guard, there were but two-thirds in the front attacked, that is 666; now, allowing two pounds for each man, it amounts to - -	1332
For the two thirds of the biovac, or thoſe under arms placed near the attack; that is, 666 men, at the rate of half a pound each	333
For the 334 men of the guard at the poſt not attacked, at the rate of a quarter of a pound each - -	84
For 120 horſe guards, at the rate of a quarter of a pound each -	30
For 300 cannon-ſhot for each guard, each ſhot upon a medium rated at five pounds	1500
Obſerve that this eſtimate may be made exactly, when once the number of the pieces that are to be placed in the front attacked is determined; allowing nine pounds of powder to each piece of 24, ſix to each of 16, five to each of 12, three to each of 8, and two to each of four. Or the charge of every gun may be determined by half or a third part of the weight of the ball.	
For 300 ſhot for wall guns, at two ounces each - -	38
Total -	3317

Which is the quantity of powder expended each day, without including that of mortars, bombs, mines, grenades, &c.

Now, ſuppoſe a place is able to hold out 41 days, the quantity of powder, as ſaid before, for theſe 41 days, will be -	135997
Beſides, for 1200 thirteen-inch ſhells thrown during the ſiege, at the rate of 16 pounds each charge -	19200
For 3000 eight-inch ſhells and leſſer, at ſix pounds each - -	18000
For 6000 ſhots, with ſtone-mortars, at a pound and a half each -	9000
For 3600 grenades, at four ounces each	9000
For mines and fougaſſes -	8000
Powder burnt in the breaches -	4000
For combuſtibles -	3500
Allowance for waſte and accidents	30000
For the ſurrender; that is, the quantity which ought to remain at the ſurrender	12000
And as it is adviſable rather to have a ſuperfluity of powder than want, to the above quantity we may farther add -	21303
And reckon for the whole	270000

as that which expreſſes the quantity of powder with which the town ought to be provided againſt a ſiege; and, according to M. Vauban, this quantity may even be augmented to 280000.

After having given the eſtimate of powder, it is eaſy to give that of the ſhot, by taking it at two pounds for each pound of powder.

A great many more things are requiſite in a town beſieged.

Proviſion being as neceſſary as ammunition, in order to know the quantity that is requiſite during a ſiege, it will be proper to obſerve, that every ſoldier is put upon the footing of a ration of bread each day, weighing one pound and a half. An ammunition-loaf, conſiſting of two rations, weighs three pounds or 48 ounces; but to give it this weight after it is baked, experience informs us, that it ought to weigh 56 ounces in dough, that is, the baking diminiſhes four ounces the ration.

A ſack of ordinary flour, weighing 200 pounds, makes a hundred and fourſcore rations. If the garriſon conſiſts of 3960 men, horſe and foot, they will conſume ſo many rations a day; which in 41 days will make 162360 rations, that is 902 ſacks of flour. But though the garriſon diminiſhes daily, this quantity of bread is not ſufficient, becauſe the officers have a greater number of rations, according to their rank; and beſides, it is neceſſary to have proviſions for thoſe that attend the troops, as ſervants, artificers, nurſes, ſurgeons, &c.

There muſt be likewiſe a certain quantity of proviſions in the place when it ſurrenders; therefore it would not be too much to have two thouſand ſacks of flour in ſuch a town as we have ſuppoſed, that is, garriſoned only by 3960 men.

There muſt alſo be a ſufficient quantity of meat for the ſoldiers and officers. It is uſual to allow a live ox and two ſheep to a battalion for three days; which will produce a pound and a half of meat to each ſoldier, that is, half a pound each day. The other two days they have half a pound of bacon or ſalt beef, or a quarter of a pound of cheeſe with vegetables. In regard to the officers, they have meat given to them in proportion to their ration of bread.

As the moſt perfect fortifications cannot hold out long without the neceſſary ammunitions, too much care cannot be taken in regard to this article.

“ The ancients, ſays Mr Folard, were accuſtomed to lay in a great ſtore of proviſions, when a place was threatened with a ſiege; a ſtore ſufficient not only for three or four months, but for three or four years at leaſt. This they were induced to do for two reaſons; the fear of being blockaded; and the inviolable law of defending themſelves to the laſt extremity. The moderns take leſs precaution in reſpect to proviſions, as well as to every thing elſe; they think it ſufficient to lay in a ſtock for three or four months, in towns of the greateſt ſtrength and importance; which is very wrong. I grant, indeed, (continues Mr Folard), that the law of holding out to the very laſt extremity, is looked upon as chimerical at preſent, and entirely left to the ancients: but it ſhould be conſidered, that an enemy well acquainted with the ſtate of things, will meaſure the ſtrength of the place by the quantity of proviſions contained therein; and making a calculation of the loſs of men in the attack, together with the expence of a long ſiege, they will chooſe, if they are wiſe (and certainly they will gain by it in the end), to take it rather by a blockade than by a ſiege in form: at leaſt they will be ſure of becoming maſters of it in three or four months through want of proviſions; whereas a ſiege may laſt that time, if the garriſon are obſtinate. Such a town as Liſle in Flanders, and as Bergues, both of which are out of the line of communication of our frontier, cannot be too well ſtocked with proviſions. A wiſe and experienced miniſter will victual them at leaſt for eighteen months, becauſe they may be blockaded. It is much the ſame in regard to Straſburg and to Landau. The latter was never victualled for more than three or four months: how imprudent, therefore, muſt it be to lay ſiege to it, when it may be taken by a blockade almoſt as ſoon as by a ſiege, which is attended moreover with an infinite loſs of brave men, and a monſtrous expence."

Theſe reflections of M. Folard are very ſolid; but circumſtances will not always permit a place to be ſo well provided as one could wiſh.

When a governor finds that the enemy threatens to lay ſiege to a town under his care, and that the place is in want of the chief things neceſſary for a vigorous defence, he is to exert all his abilities, in order to remedy this inconvenience as much as poſſible. The greateſt want of all is that of proviſions; he muſt therefore endeavour to get a ſupply, both from the country and from the people of the town; which is to be diſtributed among the garriſon with the greateſt œconomy. The uſeleſs mouths ſhould be all ſent out, and an inquiry ought to be made after thoſe who are ſuſpected of having hoarded any corn; and upon paying them for it, or upon giving them ſecurity of payment, they ſhould be obliged to deliver it up for the ſubſiſtence of the garriſon.

Hitherto we have made no mention of the inhabitants; yet they may be rendered ſerviceable in contributing to eaſe the garriſon. The governor ſhould make uſe of ſuch workmen who exerciſe handicraft trades for every thing relating to their reſpective branches; and thoſe who are not artificers, ſhould watch the fire that may be kindled by the ſhells and red-hot bullets; they ought likewiſe to tranſport the materials to the places aſſigned them; and even to work at the different retrenchments which the governor ſhould think fit to order in the town, provided however that they be not too much expoſed to the fire of the beſiegers. The prieſts and religious people may be of ſome uſe, in adminiſtering to the ſick and wounded, and on other occaſions, where there is nothing inconſiſtent with their character. The nuns and the poor women may be employed in waſhing the ſoldiers linen, in making lint, &c. The governor ought to regulate matters ſo, that every one ſhall contribute, as much as in him lies, to the defence of the place. An article of the greateſt importance, in regard to the inhabitants, is to oblige them to lay in a ſtock of proviſions for ſix months. The ſame conduct may be uſed with reſpect to the religious houſes; and thoſe that are able ſhould be obliged to make ſtill a greater proviſion, which will be a reſource to the garriſon when their own ſtock is exhauſted.

§ 2. *Neceſſary preparations for maintaining a ſiege.*

When a town is threatened with a ſiege, the governor ought not only to take care to have a plentiful ſtock of ammunition and proviſions, but moreover he ſhould uſe all the precautions requiſite for retarding the enemy's apppoaches, and rendering them more difficult and dangerous.

He ought therefore to leave nothing in the neighbourhood that may ſerve to cover the enemy; he ſhould clear the adjacent country of all houſes that are within reach of cannon-ſhot, and fill up, if poſſible, the caverns or hollow ways that may be concealed, or build ſome redoubts and other works under the protection of the place, by which they may be enfiladed. He ought to cut down all the trees; in a word, he ſhould prevent the enemy's having any cover within reach of the cannon of the place: he ſhould ſee that the fortifications be all in a good condition, and that the covert-way be well paliſaded; in fine, he ſhould cauſe arrows to be built on the ſaliant angles of the glacis. Retrenchments may alſo be made in the re-entering places of arms of the covert-way, by raiſing a parapet within them, and parallel to their faces, with a ſmall ditch before it. In a word, the governor ought to uſe all expedients poſſible to protract his defence, and to incommode the enemy. Nor ſhould the galleries for the mines be forgotten: on the contrary, they ought to be begun betimes, and carried out into the country as far as the ground will permit; and chambers ſhould be made under all the angles of the glacis. If there are any houſes within the rampart which may obſtruct the defence, the governor ought to ſee them demoliſhed; and nothing ſhould be left, either within or without, which can any way be of ſervice to the beſiegers. If there are new raiſed troops, care ſhould be taken to diſcipline them well. "When the duke of Guiſe arrived at Metz, he found twelve companies of foot, which, as M. de Salignac relates in his account of the ſiege of that city, being new raiſed troops, he endeavoured to diſcipline and train them up to war: for which purpoſe, he gave orders that thoſe who were upon guard, ſhould march regularly from their quarters to the market-place before his houſe, where they drew up in battalia, and went through their exerciſe; and that the muſqueteers might be better uſed to their buſineſs, he made them fire at a mark."

The governor ſhould alſo ſee that the hoſpitals be in a good condition, that the ſick and wounded be taken care of, nor think it beneath his character to viſit them himſelf, and to let the ſoldiers ſee how greatly he has their preſervation at heart. This is the ſureſt way to gain their confidence and affection, and to engage them to do their utmoſt towards defending the place.

As it is now the cuſtom to throw a great number of ſhells into a town beſieged, it is neceſſary to have vaulted

vaulted places under ground bomb-proof, where part of the garriſon not on duty may reſt in ſafety. They are not ſo much wanted in large cities, where there are always different quarters ſecure from the enemy's ſhells: but a ſmall town is in every part expoſed to the bombs; ſo that ſome places under ground are abſolutely neceſſary for the garriſon to take their reſt, and to prevent the troops from being continually incommoded.

Theſe ſubterraneous caverns are generally made in the gorges of the baſtions, and ſometimes under the rampart behind the curtains.

Where there are none of thoſe ſubterraneous places, it will be neceſſary, as ſoon as the town is inveſted, to erect defences to ſhelter the men from the bombs; theſe are made of ſtrong pieces of timber, laid ſloping againſt the parts the leaſt expoſed, and they may be covered with thick planks laid in the ſame manner. The large houſes ſhould alſo be ſhored, that is, all the floors, from top to bottom, ſhould be ſupported with ſtrong upright timbers, and the upper floor covered with large beams laid acroſs one another, and theſe again with earth, faſcines, dung, &c. When they are thus fitted up, they may ſerve either for the accommodation of the troops or for hoſpitals, &c. But what deſerves a more ſpecial care, is the powder-magazines. They ought to be bomb-proof; but as there are very few that can reſiſt the ſhock of a great number of ſhells, they ſhould therefore be covered with ſeven or eight feet thick of earth, and a layer of faſcines, dung, and ſtrong planks laid over them, ſo as to form a kind of roof. But if it ſhould happen, either from their ſituation or height, that this cannot be done, than a range of large trees, well faſtened together, muſt be laid over them, ſo as to diminiſh the ſhock of the ſhells. The windows of the powder-magazines ſhould have no proſpect towards the beſiegers; and to prevent all accidents, nobody ſhould be permitted to go in or out of the doors, but when the fire of the enemy is ſlackened.

When there are no powder-magazines in a town, it is very difficult to preſerve the powder during a ſiege; all that can be done, is to diſtribute it in different places, as in cellars and caves made under the ramparts, or in gardens, &c. and to cover theſe places well with thick planks, earth, faſcines. &c.

The miſchief done by ſhells, conſiſts not only in demoliſhing the buildings on which they fall, but likewiſe in ſetting fire to moſt places they fall upon; and when they are followed by red-hot balls, it is very difficult to hinder the town from being burnt. In order to remedy this evil, timely precautions ſhould be taken, and the inhabitants employed in extinguiſhing the fire.

Frſt of all, a great number of caſks, filled with water, ſhould be placed in the ſtreets; and the ſoldiers and inhabitants ought to be divided into companies, to prevent the ſpreading of the flames. It will be proper to divide theſe into ſmall bodies, and to allot different quarters to each of them, for extinguiſhing any fire that may happen to particular houſes. By theſe means each corps, or company, will become anſwerable, in ſome meaſure, for the houſes entruſted to their care, and uſe the utmoſt endeavours to preſerve them. The pavements muſt alſo be taken up, and dung laid in the ſtreets, to prevent further miſchief from the burſting of the ſhells.

§ 3. *Of the defence from the inveſting to the attack of the covert-way.*

When the place is inveſted, and the beſiegers begin to work upon the line of circumvallation, the governor ought not at firſt to fire upon the enemy's troops with the largeſt cannon, but with his ſmall pieces only, to the end that the enemy, imagining there are no other guns in the place, may pitch their camp in full ſecurity out of the reach of thoſe pieces, though there are much larger in the town: or elſe they may be deceived by half-loading the large ones, by which means they will not reach ſo far as when they have their full charge. As the enemy ought to pitch their camp as near as poſſible to the place, provided they are out of reach of cannon-ſhot, they will think themſelves at a ſufficient diſtance; but as ſoon as they are encamped, the garriſon are to give them a full volley with their great guns, which will oblige them to decamp once more, and make them loſe time.

If the adjacent country is divided by rivers, and the quarters of the camp are ſeparated, the governor ſhould fall upon thoſe which are near at hand; but this muſt be done with great caution and prudence, for fear of having his men cut off, and loſing part of his garriſon.

As it is of importance to the beſieged to know on which ſide the enemy intend to open their trenches, every endeavour ſhould be uſed to diſcover it. The magazines of materials may perhaps direct them in this particular; becauſe it is to be preſumed, that the beſiegers will place them near the attack; and therefore, when this ſpot is once known, the beſieged ſhould watch every night the opening of the trenches, in order to be ready to fire briſkly on the workmen, which will greatly retard their operations.

While the beſiegers are conſtructing the lines, their engineers ſpare no pains to get an exact knowledge of the adjacent ground, and to reconnoitre the fortifications, that they may form the plan of attack, which they will be ſure to make on the weakeſt ſide. To prevent this, M. Goulan propoſes the following ſcheme.

As ſoon as the town is inveſted, the governor ſhould ſend 200 or 300 men every night, to that ſide which he knows to be the weakeſt, with orders to lie upon their faces, in the form of a ſemi-circle, of which the paliſades of the covert-way may be conſidered as its diameter. Theſe men ſhould be divided into ſmall parties, of three or four men each, at the diſtance of 20 or 30 paces from one another, ſo as to occupy a large tract of ground. All theſe different parties ought to agree upon a ſignal, to give notice when any body paſſes by them, and they ſhould remain there in ſilence till day, without ſtirring, unleſs ſomebody happens to paſs by; in which caſe, the firſt that ſees them ſhould riſe, and give the ſignal to the reſt, who are to do the ſame; then all drawing cloſe together, and advanceing to the paliſades, they will take thoſe who paſſed, as it were in a net, without any poſſibility of relief from their eſcort, who cannot be numerous enough to reſcue them from the hands of 200 or 300 men, protected by the fire of the covert-way. If the men who advance to reconnoitre the place, inſtead of paſſing through the intervals, ſhould fall in with ſome of theſe parties, and endeavour to get off, they muſt be fired upon: thus the enemy may be eaſily hindered from reconnoitering, and thereby acquiring a knowledge of the ground, or the ſide moſt proper to be attacked.

From the time the place is inveſted, the beſieged ſhould ſend every night ſmall parties, of eight or ten men, commanded by a ſerjeant, with orders to lie upon their faces, all round the border of the glacis, and to liſten carefully to every thing that paſſes. Whatever care the beſiegers may take to open the trenches in ſilence, ſtill it will be very difficult for this operation to be made, without ſuch a motion as muſt be heard or perceived from the neighbourhood of the glacis. Theſe ſmall parties may even advance a little further, obſerving ſilence, and taking care not to be ſurpriſed by the parties which the enemy alſo may ſend out on that ſide, to watch whether there are any troops of the garriſon ready to fall upon the workmen.

When the ſide on which the enemy open their trenches is known, the great pieces of ordinance are mounted on the rampart of the town *en barbette*, and the ſmall ones on the covert-way, from whence they are to fire briſkly upon the trenches. And to point more exactly, fire-balls are thrown from the mortars, which will give light enough to diſcover the workmen. Juſt at this time, the beſieged ſhould make the greateſt fire againſt the enemy, becauſe it is then they are moſt uncovered, and conſequently moſt expoſed. As the beſieged cannot have their batteries ready till the ſecond or third day after the opening of the trenches, during that time the guns may continue to fire *en barbette;* but it will hardly be poſſible to fire in that manner when the enemy's batteries are once erected. Mortars ſhould likewiſe be uſed for throwing ſhell on the workmen and thoſe employed on the batteries; in ſhort, the beſt uſe ſhould be made of the artillery, before the enemy are in a condition to ſilence it.

It is cuſtomary to make two or three attacks in order to divide the attention of the garriſon; and of theſe, generally ſpeaking, there is only one real: they muſt therefore endeavour to find out this real attack, and to uſe the utmoſt diligence in making good retrenchments, as well in the outworks, which the enemy muſt take before they can come to the body of the place, as in the gorge of the baſtion of the front attacked. But to render theſe retrenchments ſtrong and firm, they ſhould have been begun and even finiſhed before the opening of the trenches. A governor, who has a proper knowledge of fortification, ought to judge on which ſide a town is moſt acceſſible, and to preſume that here the enemy will commence their attack; conſequently he ought to think of every method of defence, the beſt adapted to retard the approaches, and diſpute every inch of ground.

The beſieged ſhould ſo diſpoſe their artillery at the beginning of a ſiege, as to enfilade the branches, and to direct their fire againſt the head of the trenches or the ſaps. This muſt be their principal effort; for it is by continually firing upon them, that they may reaſonably hope to retard the works.

When the enemy have erected their batteries, it is very difficult for the beſieged to maintain theirs, eſpecially if they are placed on the produced faces of the pieces attacked. For as the cannon are continually firing *à ricochet* againſt theſe faces, and it being difficult to guard againſt this firing, it will be very dangerous for the ſoldiers to remain there: all that can be done is to make ſome traverſes, in order to diminiſh their effect; which is difficult indeed to compaſs, becauſe the ſhot falling upon the traverſes will bound between them. The beſieged muſt not pretend to fire at the batteries of the beſiegers, in order to diſmount them; as the latter are more numerous, they muſt of conſequence gain a ſuperiority over thoſe of the garriſon, who by their obſtinacy would render their guns uſeleſs the remainder of the ſiege, ſince they muſt certainly be diſmounted by thoſe of the enemy. It is therefore more adviſable not to perſiſt in firing always from the ſame place againſt the enemy's batteries. By ceaſing to fire from that part where the beſiegers know there was a battery, they may be induced to think they have deſtroyed it, which will prevent their continuing to fire againſt it, and be a means of preſerving the battery for future ſervice. But in order to give them trouble, ſmaller guns may be placed in the outworks, on the faces of the baſtions, from whence the trenches and batteries of the beſiegers can be diſcovered; and they muſt often change place to perplex the enemy, who will find it very difficult to diſmount thoſe moving pieces. The beſieged however muſt endeavour to repair the parapets deſtroyed by the enemy, and to take proper meaſures for firing again from thence, as ſoon as the beſiegers have ſhifted their guns.

It is alſo adviſeable that the batteries of the beſieged ſhould not fire in ſalvo's, or all at a time: for it is well known, that the beſiegers place ſoldiers in the trenches, to obſerve, through ſmall loop holes made with ſand-bags in the parapet of the trench, when the batteries of the town are fired, and to give notice to thoſe who are at work in the trenches, which way the guns are pointed, that they may put themſelves under cover. If the beſieged have only ſix pieces on a battery, and they fire them all at a time, the enemy have ſome moments of ſecurity to look over the parapet and to examine the ground where they intend to work and to conduct the trenches: but when the garriſon vary their manner of firing, they give more uneaſineſs to thoſe who are at work in the trenches, who will not be ſo ready to look over the parapet; which is ever dangerous, but eſpecially when the trenches are brought within muſket-ſhot of the place; though it be neceſſary, in order to view the ſituation of the ground towards which the works are to be directed.

§ 4. *Of ſallies.*

A GARRISON that keep within a place, without making ſallies, are, as the chevalier de Ville ſays, like thoſe who are not concerned when their neighbour's houſe is on fire, and will not ſtir to extinguiſh it till it has reached their own. And indeed, as the beſiegers continually carry on their approaches towards the town, it is of the utmoſt importance to endeavour, in time, to ſtop their progreſs; to which end, the making of ſallies is extremely conducive, eſpecially when they are well conducted, otherwiſe they would rather accelerate than retard the taking of the place.

How great ſoever the advantage of ſallies may be,

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yet they cannot be made in all ſorts of fortified places; they are proper only when a garriſon is numerous. A ſmall garriſon, although well ſtocked with all the kinds of neceſſary ammunitions for making a defence, and for holding out, ought to be very careful how they venture to make a ſally. But a numerous garriſon, not ſo well provided, ought to fatigue the enemy as much as poſſible by frequent ſallies. The ſame meaſure ought to be followed, when a town is but ill fortified; the garriſon ſhould not ſhut themſelves up ſo as to be obliged to ſurrender, as it were, without making much reſiſtance. It is beſt in thoſe caſes to harraſs the enemy continually, to keep them at a diſtance as long as poſſible, and to uſe every ſtratagem and endeavour that may retard their approaching the glacis, and the taking of the covert-way. Thus it was that the marquis of Uxelles, afterwards marſhal of France, behaved at the ſiege of Mentz in 1689. He defended this large and ill-fortified town upwards of two months, with the help of a very brave garriſon; but was obliged to capitulate for want of powder and ammunition, though he was ſtill maſter of the covert-way, and even in ſome meaſure of the glacis: for the enemy had only one lodgment on the ridge of it; and even this, ſays M. de Feuquieres, the marquis ſuffered them to make, in order to have a pretence for capitulating, and that the beſiegers might not ſuſpect he ſurrendered for want of powder. In 1702, Keyſerworth, a place but indifferently fortified, was defended nevertheleſs by numerous ſallies, which rendered it a very dear acquiſition to the enemy. In the like caſes, ſallies ought not to be neglected; but they muſt be made with great art and ſkill, to expect any ſucceſs from them; for it is on theſe occaſions, ſays M. Vauban, that the vigour, diligence, and good conduct of the governor, ought to appear in their full luſtre.

When the beſiegers are at a diſtance from the place, ſallies are very dangerous, becauſe the enemy may cut them off from the town with their horſe; but when they have made their ſecond parallel, and advanced the branches of the trenches towards the third parallel at the foot of the glacis, then is the time for the garriſon to ſally. They may even venture, though with great caution, when the beſiegers are at work upon the ſecond parallel, and before it is entirely finiſhed; but the moſt favourable opportunity of ſallying, is when the beſiegers are come to the third parallel, and want to make a lodgment on the glacis. Then there is no danger of being cut off; and the enemy may be ſurpriſed the more eaſily, as the garriſon have it in their power to fall upon them all at once, and to throw them into confuſion, without giving them time to recover themſelves.

Sallies may be either great or ſmall; the former ought to be with 500 or 600 men at leaſt, or proportioned to the guard in the trenches; the latter are only with 10, 15, or 20 men.

The intent of great ſallies ſhould be to deſtroy a conſiderable part of the works of the beſiegers, in order to oblige them to begin again; to nail up their guns; to retake ſome poſt which had been abandoned; and laſtly, to obſtruct the enemy's works as much as poſſible, and thereby retard the taking of the place.

In regard to ſmall ſallies, they ſerve for no other end than to interrupt the workmen at the head of the trenches, ſo as to frighten them, and oblige them to run away. As it requires ſome time to bring them back, and to make them return to their work, this will occaſion delay, and retard the approaches.

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The beſt time for great ſallies, is two hours before day-light, the troops being then fatigued and ſleepy; therefore more eaſy to ſurpriſe, and leſs capable of making a vigorous reſiſtance. And when it has rained very hard in the night, ſo that the guard in the trenches may be unable to make uſe of their fire-arms, this is alſo a favourable circumſtance: in ſhort, no opportunity ſhould be neglected to ſurpriſe the enemy; for ſallies ſeldom prove advantageous any other way. The following is the order which M. Vauban propoſes to be obſerved.

There ſhould be a detachment of 90 men drawn up, 30 in front, and three deep; to which muſt be added a fourth rank of 30 grenadiers. The three firſt ranks of this detachment ſhould be armed with cuiraſſes: each ſoldier ſhould have a ſword and piſtol at his belt, and a partizan, or long iron fork with a hook, in his hand. This detachment is to be followed by another of 180 men, 30 in front, and ſix deep; the firſt rank of theſe is to be armed as the former, with cuiraſſes and long weapons, the reſt as uſual. The firſt rank in this detachment is to make up the rear in the retreat. After this ſecond detachment 200 workmen are to follow with proper tools to deſtroy the enemy's works, and ſeveral of theſe with combuſtibles to burn what they cannot otherwiſe deſtroy. Some of them are to be provided with long nails of ſteel, and of different magnitude, to ſpike the cannon; there muſt be ſome of a very large ſize, becauſe the touch-holes happen frequently to be ſo very wide, that common nails will not fill them up exactly.

Beſides the two detachments and workmen above mentioned, another body of 300 or 400 men ſhould be ordered to ſupport them, and to follow them ſlowly as far as the head of the trenches; where, if they find that thoſe who went before them have no need of aſſiſtance, they ſhould halt to be ready to act if occaſion requires it. If the guard of the trenches ſhould make a vigorous attack upon the ſally, this detachment will ſupport them, and jointly encounter the beſiegers. If the latter are repulſed, which muſt be the caſe if the ſally is not foreſeen and expected, the workmen muſt ſet about demoliſhing the works, and filling up the trenches as faſt as poſſible. Theſe troops ſhould alſo endeavour to penetrate as far as the batteries, in order to nail up the cannon, and to maintain themſelves in the trenches long enough for the workmen to deſtroy great part of them. When they have done what they propoſed, they retreat to the covert-way in good order; and if the enemy ſhould be ſo imprudent as to purſue them as far as the glacis, they muſt be received with a briſk fire, as well from the cannon of the ramparts as from the troops in the covert-way.

In ſallies, and generally in all actions performed by night, the ſoldiers ſhould put ſomething in their hats, as a white paper or handkerchief, to know one another in the dark. The troops deſigned for this purpoſe are drawn up in the place of arms within the town, or in the ditch if it be dry, or elſe in the covert-way. When they are to march out by different gates, ſome ſignal ſhould be agreed upon, that the troops may all move at the ſame time. If there are more attacks than one againſt the town, as generally is the caſe, then ſeveral ſallies may be made at the ſame time upon theſe attacks. It might be proper to make a great noiſe on one ſide, in order to draw all the attention of the enemy that way; and while they are buſy in the repulſe, to act vigorouſly on the other ſide; for then they will meet with leſs reſiſtance, and will be more capable of hurting the beſiegers. However, as a ſally which has not all the ſucceſs that might be expected, ought not to diſcourage the garriſon from repeating the attempt; ſo one that has been crowned with ſucceſs, ought not to render them too confident, or inſpire them with too great a contempt for the enemy. The miſtakes the latter may have committed, will rouſe their attention, and put them upon their guard. We ought ever to ſuppoſe, that they will do all that we ſhould do, were we in their place, and that they will take proper meaſures to remove every obſtacle that may oppoſe them.

Hitherto we have taken no notice of the uſe of cavalry in ſallies; and yet on ſome occaſions they may be of ſervice, which is when the beſiegers are at a diſtance from the place. In this caſe, two detachments of horſe are ordered to the right and left to ſupport the ſallies, and to hinder the enemy's horſe from falling upon them. Theſe detachments ſerve alſo to protect their retreat, and to prevent their being cut off; but when the beſiegers have finiſhed their third parallel, the ſallies are then made with foot only, and ſhould, as we have above obſerved, be often repeated, provided the garriſon is numerous enough to diſpute every inch of ground with the enemy.

As ſoon as the troops are returned from the ſally, fire-balls ſhould be thrown into the trenches, to diſcover the workmen who are employed in repairing the miſchief that has been done, and are at that time in ſome meaſure uncovered. The fire of the place well ſerved at this juncture, muſt kill a great many of the enemy. So far relates to great ſallies.

The ſmall ſallies, which are intended merely to diſturb the beſiegers without being able to do them much hurt, are conducted in the manner following. The governor orders out parties of 10, 15, or 20 ſtout men only, as hath been already obſerved, who are to advance ſoftly to the head of the trenches, and to jump into them quickly, making a great noiſe, and throwing grenades; after which they are to retire with all expedition: the alarm which they will occaſion is ſufficient to make the workmen take to their heels, who deſire nothing better than to have a ſpecious pretence, as M. Goulon obſerves, to run away upon the leaſt alarm; and it is impoſſible to prevent it, or to bring them back the ſame night, ſo that the beſiegers muſt loſe all this time. If, ſays the ſame author, the beſiegers become accuſtomed to theſe little ſallies, ſo as to grow ſecure and take no notice of them, the beſieged obſerving this muſt make one in good earneſt, which coming unexpected, will eaſily overturn the workmen and the troops that cover them; after which they may retire without fighting, leſt they ſhould draw the whole guard of the trenches upon their backs.

§ 5. *Of the defence of the glacis and the covert-way.*

BESIDES the ſallies which retard the lodgment of the beſiegers on the glacis, mines may increaſe the difficulty of approaching. We have already taken notice of theſe in the ſection of *Attack*; we have only to obſerve here in general, that the beſieged muſt make the beſt uſe of them poſſible, in order to blow up the enemy as often as the ground will permit; this is the ſureſt way to keep the beſiegers in awe, and to oblige them to advance with the greateſt circumſpection.

Beſides the galleries and mines which ought to be under the glacis, the beſieged may alſo lay oppoſite to its angles large planks, ſtuck full of very long nails, with the points upwards, to incommode the enemy in paſſing over the glacis. Theſe planks ought to be ſtrongly fixed, to prevent their being eaſily taken away. The burying of caiſſons in the glacis is alſo productive of a good effect. Theſe are ſmall cheſts, two or three feet long, and a foot and a half broad, filled with powder; they are fired at any time by a train conveyed in a wooden trough into the covert-way: they ought never to be placed nearer than ſix or eight feet to the inſide of the covert-way, leſt they ſhould do any damage to the troops that defend this poſt. Sometimes ſhells are put into theſe caiſſons, and then they produce a ſtill greater effect.

When the enemy endeavour to make a lodgment on the glacis, the garriſon muſt repeat their ſallies with greater vigour; which may be done without any inconvenience, becauſe of the facility of retreating. When the troops are returned from the ſally, fire is ſet to the chambers and caiſſons, which will greatly diſconcert the beſiegers. If the chambers are well diſpoſed, they muſt hurt their lodgments prodigiouſly; and as ſoon as they are ſprung, the beſieged may fall upon the enemy, this being a favourable opportunity for ſurpriſing them in diſorder, and conſequently of deſtroying part of their works. This manner of proceeding ſhould be often repeated, in order to fatigue the beſiegers, and to retard the taking of the covert-way.

When the enemy are ready to ſtorm it, the garriſon muſt prepare to give them a warm reception. The difficulty of making a lodgment in the covert-way may be increaſed by a double row of paliſades: the ſecond ſhould be lower than the firſt, to the end that the enemy may not perceive them. Theſe two rows ought to be at the diſtance of four or five feet from one another, to prevent the beſiegers from jumping over them into the covert-way. Between them may be made a ſmall ditch; moſt of the enemy's grenades will fall into it, and cauſe leſs miſchief to the troops. Care muſt be taken to make ſtrong retrenchments in the places of arms, either by raiſing a parapet withinſide, and parallel to its faces, with a ſmall ditch at the foot of it, or by ſimple rows of paliſades, which will hinder the enemy from forcing their way ſo eaſily as they would otherwiſe be capable of doing. In each place of arms there ſhould be one or two barrels of powder, with balls and ſmall-arms neceſſary for the defence of the covert-way.

All the batteries muſt be got ready to fire with the utmoſt briſkneſs upon the enemy, when they are at work upon their lodgment. Every part of the place that looks into the covert-way ought to be lined with troops, who are to fire upon the beſiegers: but there ought to be no troops in the parts oppoſite to the places of arms, that the troops poſted there may not be hurt by the fire from the body of the place.

The garriſon ſhould endeavour to be informed by deſerters at what time the enemy intend to make their attack; the motions of the latter may be alſo obſerved by perſons poſted on ſteeples; and as ſoon as the troops are perceived to make an extraordinary motion, and the trenches to be filled more than uſual, this is a ſign that they are going to attack. The vicinity of the enemy's works may alſo enable the beſieged to judge of their forwardneſs; and all this together direct them to take ſuch meaſures as are proper for giving a warm reception to the beſiegers.

As ſoon as the garriſon perceive that the enemy are marching out of their trenches, they ſhould keep firing upon them continually with great and ſmall arms, from all the works facing the attack. This will deſtroy a great many of their men before they can reach the paliſades: the two rows of which in the covert-way will prevent their jumping into it directly. They will be under a neceſſity of breaking them ſucceſſively with hatchets; and while this is doing, a general diſcharge is to be made from the batteries of the town, which will do great execution. When, after a vigorous reſiſtance, the garriſon find themſelves hard preſſed by the enemy, they may abandon the covert-way, and retire into the places of arms; and while the beſiegers are working upon their lodgment, they will be expoſed to the fire of the place, which takes them in front; and to that of the places of arms, by which they are taken in flank; ſo that their loſs muſt increaſe conſiderably. If they have mines ready, as we ſuppoſe they have, they muſt ſpring them, after having ſuffered the enemy to work for ſome time upon their lodgments; and after having kept firing againſt them continually with great and ſmall arms, then immediately they ſhould make a ſtrong ſally from the places of arms, and taking advantage of the diſorder into which the beſiegers muſt inevitably be thrown, they will oblige them to abandon the covert-way.

If there is no poſſibility of hindering the enemy from making lodgments on the creſt of the covert-way, or, which is the ſame thing, on the ridge of the glacis, the beſieged muſt endeavour to retard them, and to diſpute as long as poſſible their taking poſſeſſion of the places of arms. On this occaſion fougaſſes are employed with ſucceſs, and ſhould be repeated ſeveral times if the ground will permit. When the beſiegers have once completed their lodgment, and ſupported it in a proper manner, they want nothing further than a little time to extend themſelves, and to become maſters of the covert-way. The obſtinacy of the beſieged can only retard, but not abſolutely hinder the taking of this outwork.

Theſe kinds of attacks ſword in hand are extremely bloody, as we have formerly obſerved; nor are they always attended with ſucceſs. The allies attacked in this manner the covert-way of Liſle, and loſt upwards of 2000 killed and 2667 wounded; and after all they could only make a lodgment on two ſaliant angles, which were not defended by ſo great a number of troops as the reſt. In the ſame manner did marſhal Villars attack the covert-way of Friburg in 1713; and indeed he made himſelf maſter of it through the extraordinary bravery of the troops: but this exploit coſt him 1500 men killed and wounded. The ſingle regiment of Alſace loſt four captains of grenadiers, and 643 men killed and wounded. The method of proceeding by ſap is infinitely leſs bloody and more ſure; beſides, according to M. Vauban, it can hardly retard the taking of the covert-way above four or five days.

Let us ſuppoſe at preſent that the enemy reſolve to approach the covert-way by ſap, and that they have raiſed cavaliers in the trenches to plunge into this outwork, the beſieged muſt ſtrive to retard this operation by every ſtratagem imaginable; for when the cavaliers are once conſtructed, it will be very dangerous to abide any longer in the covert-way. They muſt ſtop the beſiegers at every ſtep with mines; they muſt haraſs them with a conſtant diſcharge of fire-arms, and diſpute every inch of ground, defending themſelves behind every traverſe, and in the places of arms, as well as they can, without running too great a riſk of having their retreat cut off.

§ 6. *Of the defence of the paſſage over the ditch before the half-moon.*

The enemy having made themſelves maſters of the covert-way, and perfected all their lodgments, will erect their batteries for making a breach, and prepare for the deſcent into the ditch. All this while the beſieged muſt keep firing both with their great and ſmall arms, in order to incommode the enemy in the conſtruction of their batteries. If the ditch is dry, the ſoldiers may mount with ladders along the counterſcarp, and from thence throw grenades into the enemy's works; and when they cover themſelves in the covert-way with ſand-bags, gabions, &c. againſt the fire of the place, theſe very ſoldiers ſhould, with great ſap-hooks, pull down part of them, and afterwards jump nimbly into the ditch, leaving the enemy expoſed to the fire of the town while they are putting their materials again into order. Mines may be likewiſe uſed here with great advantage; they furniſh various means to harraſs the enemy, to obſtruct their works, and to make them loſe time and men.

The batteries of the beſiegers being deſtroyed by mines made under them, muſt oblige them to loſe a great deal of time in repairing them, and in endeavouring to make themſelves maſters of the mines, otherwiſe they can never be ſecure. When the beſieged have blown up the batteries that were to open the breach, they muſt make good uſe of the time which the enemy will ſpend in repairing them, and ſtrive to perfect the retrenchments, which ſhould have been ſet about at the commencement of the ſiege, in the gorge of the half-moon, and in thoſe of the baſtions of the front attacked.

At the ſiege of Turin, in 1706, the enemy ſeveral times blew up the French batteries in the covert-way; ſo that by this, and other ſtratagems, they found means to prolong the ſiege, and gave time to prince Eugene to march to their aſſiſtance, who relieved the town, after he had forced the lines behind which the French army was encamped.

The mines for blowing up the batteries of the covert-way, may be diſpoſed in ſuch a manner as to tumble the guns into the ditch, as may be ſeen in the courſe of mathematics by M. Belidor; who performed it with ſucceſs at the academy of La Fere.

It is certainly a great advantage thus to be able to become maſters of the cannon of the beſiegers, and to oblige them to erect new batteries, which muſt take them up a conſiderable time. A doubt here may ariſe, whether if theſe batteries are oppoſite to that part where the enemy intend to paſs the ditch, this would not be helping to fill it up, ſhould the beſieged blow up the guns: but this inconvenience is of no great conſequence, eſpecially as it may eaſily be remedied, by clearing away the rubbiſh of the mine which tumbles into the ditch along with the battery.

As the beſiegers work at the deſcent into the ditch at the ſame time that they are preparing their batteries, the beſieged muſt think of retarding both theſe operations alſo at the ſame time. If the deſcent into the ditch is made under ground, miners ſhould be employed to interrupt the work; and if the ditch is dry, ſmall detachments, as M. Goulon obſerves, of five or ſix men, may be placed near the counterſcarp, to watch the moment that the enemy break through it, and immediately to fire into the gallery: this diſcharge will either kill or frighten the miners; and at leaſt will retard the works. Thoſe who have fired, ſhould retire on each ſide the opening to load their arms again, which may be repeated ſeveral times. Fire-balls and grenades may be likewiſe thrown into this opening, which will oblige the ſappers to retreat. The more endeavours are uſed to interrupt the works of the beſiegers, the more the ſurrender of the place will be retarded.

If the ditch is filled with water, the ſame operations may likewiſe be performed with ſmall boats made on purpoſe; and to cover theſe boats a kind of parapet ſhould be alſo raiſed by means of ſtrong boards, with holes to fire through upon the ſoldiers, who upon opening the gallery will throw faſcines into the ditch. At the ſiege of Liſle, marſhal Boufflers contrived ſome of this kind of boats to retard the paſſage over the ditch, before the grand lunettes or tenaillons in the front attacked, and that before the half-moon.

When the enemy make their opening into the dry ditch, they muſt be oppoſed with a ſtrong fire, as well from the face of the baſtion which flanks the ditch before the half-moon, as from the place of arms or traverſe, which ought to be conſtructed the whole breadth of the ditch, in order to ſtrengthen the defence. By night ſmall ſallies ſhould be made from this place of arms, with a view to interrupt the paſſage over the ditch, and to retard, as much as poſſible, the fixing of the miner.

There are two ways of paſſing the dry ditch, and of bringing the miner to the foot of the revetement, which he is to enter. The firſt conſiſts in making a gallery ſix feet wide, with a double row of barrels. Theſe muſt be filled with ſand-bags, and ſo muſt the ſpaces between them, in order to render the paſſage of the gallery more ſafe; and that there may be a ſhelter from fire-works, ſtrong planks are laid over it, and theſe again are covered with raw hides, or with earth and dung. This gallery is continued within three or four feet of the revetement; and in this ſpace a good epaulement is raiſed with ſand-bags to cover the miner on the ſide expoſed to the place. In regard to the other ſide, it is of no uſe to ſtop it up; nay, it ſerves for an opening to fill the ditch with the earth dug out of the galleries, which the miners are making in the rampart of the work attacked. It is eaſy to oppoſe the progreſs of this gallery with a continual fire, and with ſeveral leſſer works conſtructed within the ditch.

The other way, which, as we have already ſeen in treating of the attack, conſiſts only in getting to the foot of the breach by ſap, with an epaulement on the ſide expoſed to the place, and which may be covered, in order to protect the paſſage from the fire-works and grenades of the beſieged. But this ſap may be retarded by ſallies; the beſieged may likewiſe ſteal away the earth by night from the epaulements, and endeavour with hooks, &c. to diſplace the gabions and faſcines.

If the ditch is filled with water, the beſieged muſt interrupt the enemy's bridge with a continual fire from their great and ſmall guns, as well as with grenades and ſhells, if they are in a condition to fire upon the bridge and its epaulement. If the water has a ſtrong current, they muſt open ſluices in order to break down the bridge, or at leaſt to carry away the faſcines. They ſhould alſo attempt to ſet fire to it, with artificial works prepared for this purpoſe. They may likewiſe approach the epaulement in the night, and draw away the faſcines with hooks. They may even throw anchors upon it; and by means of capſtans placed in thoſe parts which flank the ditch, they may draw theſe anchors with cords faſtened to them, and tumble part of the epaulement into the ditch. In ſhort, every expedient muſt be tried that may poſſibly retard the enemy's approaches: for when once they have perfected their bridge, they will ſoon be maſters of the outwork to which that bridge leads, whatever precaution the garriſon may take to defend the breach; becauſe, as the beſiegers can always pour in freſh men to ſupply the room of thoſe that are loſt in the attack, they muſt at length ſurmount all oppoſition of the beſieged.

§ 7. *Of the defence of the half-moon.*

While the enemy are effecting the paſſage over the ditch, beſides the difficulties that are raiſed to retard the work, all proper precautions ſhould be uſed to defend the breach, and prevent the taking of the half-moon. For this purpoſe guns are placed in all the works from which the breach may be ſeen; and they ſhould be placed on carriages or on pieces of wood, as the garriſon find moſt commodious, of leaſt hindrance to the defence, and productive of the beſt effect.

If the half-moon has no reduit, as here we ſuppoſe it has none, the retrenchments, which ought to have been made there, muſt be put into good condition; a row of paliſades muſt be placed before it, in order to ſtop the firſt fury of the enemy after they have made themſelves maſters of the breach; in a word, the beſieged muſt prepare to diſpute every inch of ground, and to retire from the half-moon into the town, when they find themſelves hard preſſed and no longer able to maintain that poſt.

The enemy may be likewiſe hindered from mounting the breach, if they are ready to mount before the garriſon are prepared to receive them, by throwing a great quantity of combuſtibles at the foot of the breach. At Turin, the garriſon by this means retarded the French ſeveral days from taking the works in the front attacked. When the enemy preſent themſelves at the foot of the breach, a great number of grenades, and ſacks filled with powder, are thrown among them, with a view to fling them into diſorder. Glaſs or earthen bottles filled with powder, and burning matches twiſted round them, are capable of doing them a deal of miſchief. A great quantity of looſe powder may be ſcattered about the breach when the enemy are ready to mount to the aſſault; and when they are mounted, lighted matches or burning coals may be thrown among the powder to ſet it on fire; which will burn and diſable a number of thoſe who are in the breach. It will be proper alſo to throw into the breach a quantity of harrows, ſtuck full of large nails with the points upwards: and to prevent the enemy from removing them, they muſt be faſtened with chains, or with great cords. It is adviſable to be provided with crows-feet, and to ſpread them about; as alſo with chevaux-de-frize, and with heriſſons, that ſhall extend the whole width of the breach. Theſe heriſſons are large pieces of wood, ſtuck thick with very long ſpikes, faſtened with chains or cords, ſo that if the cannon break one of thoſe chains, they are held together by the reſt: they are made to ſlide with rollers; and diſconcert the enemy greatly, by falling upon them when they mount the breach. Shells alſo faſtened to the ends of chains, in order to confine them to that part where they may do moſt damage to the enemy, are an excellent contrivance. Their fuſees are made ſhorter than uſual, to the end that they may produce their effect more readily. Faſcines ſmeared over with tar, thunder-barrels, in ſhort, every ſtratagem ought to be tried to hinder the enemy from lodging themſelves in the breach.

When the beſiegers have ſurmounted all theſe obſtacles, and at laſt have got poſſeſſion of the breach, the mines are ſprung in order to blow them up, and chevaux-de-frize are placed along the whole breadth of the breach. The troops poſt themſelves behind, and continue to make a vigorous fire upon the beſiegers while they are uſing their utmoſt endeavours to penetrate into the half-moon; and when they begin to force their way, the firſt rank of men that defend it, being armed with partiſans or halberts, and ſupported by the other troops, ought to fall upon the enemy, and cut them in pieces. But if the beſiegers at length by dint of numbers ſhould drive the garriſon from the breach, the latter ought to retire into the retrenchment, and from thence make a very briſk firing; and when they find that this is alſo upon the point of being forced, then they are to withdraw their cannon, and whatever ammunition they may have, into the place; and laſt of all, if they have any mines under that ſpot, they muſt ſpring them as they retire, in order to do all the miſchief and to create all the confuſion they can to the beſiegers.

Sometimes it ſhall happen that the enemy, after having made themſelves maſters of the half-moon, omit to leave a ſufficient number of troops to guard the lodgment, upon a preſumption that the beſieged will not attempt to retake it. Whenever they ſhow a confidence of this kind, a ſtrong body of the garriſon ſhould return in the night and ſtorm this work, either by the gorge, or by ſome other part. There are great odds, but ſuch a vigorous and ſudden ſurpriſe will be productive of a very good effect; at leaſt there is no great riſk in trying, if the ſtrength of the garriſon will permit; and ſhould they ſucceed, the taking of the town will be retarded ſeveral days.

Here we have ſuppoſed that the enemy are reſolved to ſtorm the half-moon; but if they ſhould attempt to get poſſeſſion of it by means of ſaps, in that caſe the workmen muſt be continually harraſſed by blowing up of mines, and kept as long as poſſible from the breach, by means of fire-works of all kinds. When they begin to make a lodgment in the breach, then the beſieged ſhould fall upon them briſkly, and deſtroy the lodgment; in ſhort, every artifice imaginable ſhould be uſed to retard their progreſs.

This laſt method is leſs bloody than the other; but on the other hand, it may be very tedious, when the beſieged ſpare no pains to diſturb the enemy's ſappers and miners.

One thing that greatly deſerves attention, and may render it very difficult for the beſiegers to mount to the aſſault, or to lodge themſelves in the breach by means of ſaps, is to clear away the rubbiſh in the breach. In a dry ditch this may be eaſily done; but in a wet one, the thing is more difficult: on the other hand, in the latter caſe the breach is more eaſy to defend than in the former; becauſe as the enemy cannot come to the foot of it but by the bridge of faſcines, which is made in the ditch, and is ſeldom above 10 or 12 feet wide, they cannot of courſe preſent themſelves with ſo large a front before the breach as in a dry ditch; conſequently the garriſon muſt find it much eaſier to repel them.

§ 8. *Of the defence of the paſſage over the ditch before the baſtion.*

At the ſame time that the enemy are carrying on the attacks of the half-moon, they work at the paſſage over the ditch before the baſtion. What has been ſaid in regard to the defence of the ditch before the half-moon, may be applied on this occaſion; we have only to add, that when this ditch is dry, the caponier will be of great uſe to fire upon the enemy in their paſſage over the ditch, and to ſally from thence in order to deſtroy their works. The beſieged muſt fire into the opening of the deſcent, as we have already obſerved in regard to the ditch before the half-moon; even a kind of retrenchment ought to be raiſed oppoſite to that part where it appears that the opening will be made, in order to retard it; ſome ſmall cannon ſhould be alſo charged with cartridge-ſhot, to fire into the hole: and laſt of all, that the ſoldiers in the retrenchment may be ſheltered from the combuſtibles which the beſiegers will throw upon them from the upper part of the covert-way, the retrenchment ſhould be covered with ſtrong planks. By proceeding in the ſame manner oppoſite to all the deſcents, their paſſage may be greatly retarded. Different retrenchments may be alſo made in the ditch, in order to diſpute the ground inch by inch. There ſhould likewiſe be frequent ſallies, which cannot but be productive of a very good effect; and the horſe may be employed without much danger on this occaſion, becauſe they have the extent of the ditch to retire into.

If the ditch is wet, it muſt be defended in the ſame manner as that before the half-moon: here only we ſhall add, that if there is a tenaille oppoſite to the curtain of the front attacked, the fire from thence will greatly annoy thoſe who are employed in filling up the ditch. Beſides, the boats by which we obſerved that the enemy might be incommoded in the paſſage over the ditch, the beſieged may likewiſe have recourſe to a kind of floats, made with double joiſts, at the end of which are faſtened empty barrels, to prevent their ſinking too deep in the water; and theſe floats ſhould be loaded with ſhells, barrels of gunpowder, faſcines, pitch and tar; and in ſhort, with all ſorts of combuſtibles proper for ſetting fire to the bridge, and to the enemy's epaulement: theſe are brought forward and faſtened to the epaulement, and afterwards they are ſet on fire with a match, or with tow laid amidſt the combuſtibles. Doubtleſs there are many other ſtratagems to interrupt the paſſage over the ditch; what we have mentioned here, is only to give ſome idea of it. An able governor may hit upon ſeveral other expedients to diſpute this paſſage, which indeed is the moſt brilliant part of the whole defence. But in order to hold out to the very laſt, he ſhould be able to withſtand the aſſault upon the body of the place; which may be done without any great inconveniency, when there are good retrenchments in the gorges of the baſtions, as we have ſuppoſed in this Treatiſe.

When there are dikes or ſluices, by means of which the ditch may be filled with water at any time, every art muſt be tried to defend it while it is dry; and when all the defences are exhauſted, then the water is let in, and the enemy will be obliged to begin their work again.

§ 9. *Of the defence of the baſtions in the front attacked.*

Here the reader muſt recollect what has been ſaid in regard to the defence of the breach in the half-moon. The defence of the baſtions is more eaſy, becauſe it is not ſo difficult to retreat from thence, by means of the retrenchment; and this retrenchment ſhould be larger and more ſpacious than that of the half-moon, and more difficult to force.

Beſides all the precautions we have been mentioning, as mines under the breaches, within the baſtions, &c. the beſieged ſhould alſo mount ſeveral pieces of cannon on the breach, charged with cartridge-ſhot, and pointed downwards, ſo as to be able to ſweep the whole ſurface of the ground, on which the enemy muſt form in order to march to the aſſault. Care muſt alſo be taken, leſt the enemy, diſcouraged with the difficulty of ſtorming the breach, do attempt to ſcale the baſtion, as hath been practiſed ſeveral times, and particularly by the duke de Noailles, marſhal of France, at the ſiege of Gironne, in 1712, as mentioned by M. Folard, in his Commentary on Polybius, and in the preceding Section *of Attack*. The way to guard againſt this attempt, is to place along the parapet of the works that may be inſulted, large pieces of timber, which are to be tumbled upon the ladders as ſoon as the enemy offer to mount. They ſhould alſo have loaded ſhells all along the rampart, faſtened to chains, and to let down towards the middle of the ladders, where they will burſt and kill thoſe who are mounted. They ſhould likewiſe be provided with combuſtibles of different kinds, to throw upon the beſiegers, and to keep them off from the foot of the revettement. When the garriſon are well prepared againſt this attempt, it will be very difficult for the enemy to ſucceed.

The entrance of the baſtion may likewiſe be defended, by making a ditch in the upper part of the breach, and filling it with all ſorts of combuſtible matter. This will form an impenetrable barrier againſt the enemy, at leaſt for ſome days; which time is to be employed in ſtrengthening the retrenchments, and throwing up others, one behind another, if the ground will permit, and it be reſolved to defend the place to the laſt extremity. Though it is uſual for the enemy to force their way into the town by the baſtion, and therefore the principal retrenchments for defending the entrance of the place ſhould be raiſed in this part; yet it is proper not to neglect the curtain. The enemy may be appriſed of theſe retrenchments, and as it is not the practice to make any behind the curtain, they may take it into their heads to batter it in breach, and to conſtruct a bridge in the ditch before it, in order to penetrate into the town. Thus did prince Eugene act at Liſle; as the back part of the curtain was open, the place was obliged to capitulate. The breaches may likewiſe be defended by repairing them with large trees laid acroſs one another, the branches pointed towards the enemy. Cannon will make no great impreſſion on this kind of wall; which was the principal defence of the ancients when a breach was made.

When the beſiegers have triumphed over all theſe obſtacles, ſo as to be maſters of the breach, and to extend their lodgments on the baſtion; then it is no longer poſſible to defer capitulating, unleſs there are ſeveral retrenchments one behind the other. For in that caſe, the beſieged, if they think proper, may defend themſelves to the very laſt. At Oſtend the garriſon held out till they were forced into the very heart of the town; and the inhabitants of Barcelona did the ſame in 1713: but this deſperate defence is very rare. Few governors defer ſurrendering till reduced to the laſt extremity; they chooſe to preſerve the garriſon, and to ſave the town from being plundered, which would be the caſe, according to the laws of war, if it was taken by ſtorm. When the enemy inſiſt upon the garriſon's ſurrendering priſoners of war, I ſhould think this condition ought not to be ſubmitted to, till they are reduced to the laſt extremity; but it belongs to the generals, and the commanding officers in fortified towns, to behave on this article as their own prudence ſhall direct, and according to the orders they may have received. A diſcuſſion of this kind is neither within our province, nor the nature of this work.

§ 10. *Of precautions to be uſed againſt the ſurpriſing of towns, ſcalades, ſudden attacks, &c.*

The right way to prevent ſurpriſes, is to think that the enemy have a deſign upon the town, and to uſe all the precautions poſſible in order to fruſtrate their deſigns. With this view a governor ſhould put the fortifications into a good ſtate of defence, ſhould ſee that the ſeveral poſts, as well thoſe that are acceſſible as thoſe that are inacceſſible, be well guarded, that parties be ſent to range in all the principal avenues of the place; in a word, he ſhould moſt exactly obſerve whatever is perſcribed in the military ordinances concerning the guard of towns, the opening and ſhutting of gates, &c. We ſhall make no mention of any of theſe particulars, becauſe they are ſo minutely deſcribed in the ordinances; and, moreover, a very ſhort foot of the breach, a great number of grenades, and ſacks filled with powder, are thrown among them, with a view to fling them into diſorder. Glaſs or earthen bottles filled with powder, and burning matches twiſted round them, are capable of doing them a deal of miſchief. A great quantity of looſe powder may be ſcattered about the breach when the enemy are ready to mount to the aſſault; and when they are mounted, lighted matches or burning coals may be thrown among the powder to ſet it on fire; which will burn and diſable a number of thoſe who are in the breach. It will be proper alſo to throw into the breach a quantity of harrows, ſtuck full of large nails with the points upwards: and to prevent the enemy from removing them, they muſt be faſtened with chains, or with great cords. It is adviſable to be provided with crows-feet, and to ſpread them about; as alſo with chevaux-de-frize, and with heriſſons, that ſhall extend the whole width of the breach. Theſe heriſſons are large pieces of wood, ſtuck thick with very long ſpikes, faſtened with chains or cords, ſo that if the cannon break one of thoſe chains, they are held together by the reſt: they are made to ſlide with rollers; and diſconcert the enemy greatly, by falling upon them when they mount the breach. Shells alſo faſtened to the ends of chains, in order to confine them to that part where they may do moſt damage to the enemy, are an excellent contrivance. Their fuſees are made ſhorter than uſual, to the end that they may produce their effect more readily. Faſcines ſmeared over with tar, thunder-barrels, in ſhort, every ſtratagem ought to be tried to hinder the enemy from lodging themſelves in the breach.

When the beſiegers have ſurmounted all theſe obſtacles, and at laſt have got poſſeſſion of the breach, the mines are ſprung in order to blow them up, and chevaux-de-frize are placed along the whole breadth of the breach. The troops poſt themſelves behind, and continue to make a vigorous fire upon the beſiegers while they are uſing their utmoſt endeavours to penetrate into the half-moon; and when they begin to force their way, the firſt rank of men that defend it, being armed with partiſans or halberts, and ſupported by the other troops, ought to fall upon the enemy, and cut them in pieces. But if the beſiegers at length by dint of numbers ſhould drive the garriſon from the breach, the latter ought to retire into the retrenchment, and from thence make a very briſk firing; and when they find that this is alſo upon the point of being forced, then they are to withdraw their cannon, and whatever ammunition they may have, into the place; and laſt of all, if they have any mines under that ſpot, they muſt ſpring them as they retire, in order to do all the miſchief and to create all the confuſion they can to the beſiegers.

Sometimes it ſhall happen that the enemy, after having made themſelves maſters of the half-moon, omit to leave a ſufficient number of troops to guard the lodgment, upon a preſumption that the beſieged will not attempt to retake it. Whenever they ſhow a confidence of this kind, a ſtrong body of the garriſon ſhould return in the night and ſtorm this work, either by the gorge, or by ſome other part. There are great odds, but ſuch a vigorous and ſudden ſurpriſe will be productive of a very good effect; at leaſt there is no great riſk in trying, if the ſtrength of the garriſon will permit; and ſhould they ſucceed, the taking of the town will be retarded ſeveral days.

Here we have ſuppoſed that the enemy are reſolved to ſtorm the half-moon; but if they ſhould attempt to get poſſeſſion of it by means of ſaps, in that caſe the workmen muſt be continually harraſſed by blowing up of mines, and kept as long as poſſible from the breach, by means of fire-works of all kinds. When they begin to make a lodgment in the breach, then the beſieged ſhould fall upon them briſkly, and deſtroy the lodgment; in ſhort, every artifice imaginable ſhould be uſed to retard their progreſs.

This laſt method is leſs bloody than the other; but on the other hand, it may be very tedious, when the beſieged ſpare no pains to diſturb the enemy's ſappers and miners.

One thing that greatly deſerves attention, and may render it very difficult for the beſiegers to mount to the aſſault, or to lodge themſelves in the breach by means of ſaps, is to clear away the rubbiſh in the breach. In a dry ditch this may be eaſily done; but in a wet one, the thing is more difficult: on the other hand, in the latter caſe the breach is more eaſy to defend than in the former; becauſe as the enemy cannot come to the foot of it but by the bridge of faſcines, which is made in the ditch, and is ſeldom above 10 or 12 feet wide, they cannot of courſe preſent themſelves with ſo large a front before the breach as in a dry ditch; conſequently the garriſon muſt find it much eaſier to repel them.

§ 8. *Of the defence of the paſſage over the ditch before the baſtion.*

At the ſame time that the enemy are carrying on the attacks of the half-moon, they work at the paſſage over the ditch before the baſtion. What has been ſaid in regard to the defence of the ditch before the half-moon, may be applied on this occaſion; we have only to add, that when this ditch is dry, the caponier will be of great uſe to fire upon the enemy in their paſſage over the ditch, and to ſally from thence in order to deſtroy their works. The beſieged muſt fire into the opening of the deſcent, as we have already obſerved in regard to the ditch before the half-moon; even a kind of retrenchment ought to be raiſed oppoſite to that part where it appears that the opening will be made, in order to retard it; ſome ſmall cannon ſhould be alſo charged with cartridge-ſhot, to fire into the hole: and laſt of all, that the ſoldiers in the retrenchment may be ſheltered from the combuſtibles which the beſiegers will throw upon them from the upper part of the covert-way, the retrenchment ſhould be covered with ſtrong planks. By proceeding in the ſame manner oppoſite to all the deſcents, their paſſage may be greatly retarded. Different retrenchments may be alſo made in the ditch, in order to diſpute the ground inch by inch. There ſhould likewiſe be frequent ſallies, which cannot but be productive of a very good effect; and the horſe may be employed without much danger on this occaſion, becauſe they have the extent of the ditch to retire into.

If the ditch is wet, it muſt be defended in the ſame manner as that before the half-moon: here only we ſhall add, that if there is a tenaille oppoſite to the curtain of the front attacked, the fire from thence will greatly annoy thoſe who are employed in filling up the ditch. Beſides, the boats by which we obſerved that the enemy might be incommoded in the paſſage over the ditch, the beſieged may likewiſe have recourſe to a kind of floats, made with double joiſts, at the end of which are faſtened empty barrels, to prevent their ſinking too deep in the water; and theſe floats ſhould be loaded with ſhells, barrels of gunpowder, faſcines, pitch and tar; and in ſhort, with all ſorts of combuſtibles proper for ſetting fire to the bridge, and to the enemy's epaulement: theſe are brought forward and faſtened to the epaulement, and afterwards they are ſet on fire with a match, or with tow laid amidſt the combuſtibles. Doubtleſs there are many other ſtratagems to interrupt the paſſage over the ditch; what we have mentioned here, is only to give ſome idea of it. An able governor may hit upon ſeveral other expedients to diſpute this paſſage, which indeed is the moſt brilliant part of the whole defence. But in order to hold out to the very laſt, he ſhould be able to withſtand the aſſault upon the body of the place; which may be done without any great inconveniency, when there are good retrenchments in the gorges of the baſtions, as we have ſuppoſed in this Treatiſe.

When there are dikes or ſluices, by means of which the ditch may be filled with water at any time, every art muſt be tried to defend it while it is dry; and when all the defences are exhauſted, then the water is let in, and the enemy will be obliged to begin their work again.

§ 9. *Of the defence of the baſtions in the front attacked.*

Here the reader muſt recollect what has been ſaid in regard to the defence of the breach in the half-moon. The defence of the baſtions is more eaſy, becauſe it is not ſo difficult to retreat from thence, by means of the retrenchment; and this retrenchment ſhould be larger and more ſpacious than that of the half-moon, and more difficult to force.

Beſides all the precautions we have been mentioning, as mines under the breaches, within the baſtions, &c. the beſieged ſhould alſo mount ſeveral pieces of cannon on the breach, charged with cartridge-ſhot, and pointed downwards, ſo as to be able to ſweep the whole ſurface of the ground, on which the enemy muſt form in order to march to the aſſault. Care muſt alſo be taken, leſt the enemy, diſcouraged with the difficulty of ſtorming the breach, do attempt to ſcale the baſtion, as hath been practiſed ſeveral times, and particularly by the duke de Noailles, marſhal of France, at the ſiege of Gironne, in 1712, as mentioned by M. Folard, in his Commentary on Polybius, and in the preceding Section *of Attack*. The way to guard againſt this attempt, is to place along the parapet of the works that may be inſulted, large pieces of timber, which are to be tumbled upon the ladders as ſoon as the enemy offer to mount. They ſhould alſo have loaded ſhells all along the rampart, faſtened to chains, and to let down towards the middle of the ladders, where they will burſt and kill thoſe who are mounted. They ſhould likewiſe be provided with combuſtibles of different kinds, to throw upon the beſiegers, and to keep them off from the foot of the revettement. When the garriſon are well prepared againſt this attempt, it will be very difficult for the enemy to ſucceed.

The entrance of the baſtion may likewiſe be defended, by making a ditch in the upper part of the breach, and filling it with all ſorts of combuſtible matter. This will form an impenetrable barrier againſt the enemy, at leaſt for ſome days; which time is to be employed in ſtrengthening the retrenchments, and throwing up others, one behind another, if the ground will permit, and it be reſolved to defend the place to the laſt extremity. Though it is uſual for the enemy to force their way into the town by the baſtion, and therefore the principal retrenchments for defending the entrance of the place ſhould be raiſed in this part; yet it is proper not to neglect the curtain. The enemy may be appriſed of theſe retrenchments, and as it is not the practice to make any behind the curtain, they may take it into their heads to batter it in breach, and to conſtruct a bridge in the ditch before it, in order to penetrate into the town. Thus did prince Eugene act at Liſle; as the back part of the curtain was open, the place was obliged to capitulate. The breaches may likewiſe be defended by repairing them with large trees laid acroſs one another, the branches pointed towards the enemy. Cannon will make no great impreſſion on this kind of wall; which was the principal defence of the ancients when a breach was made.

When the beſiegers have triumphed over all theſe obſtacles, ſo as to be maſters of the breach, and to extend their lodgments on the baſtion; then it is no longer poſſible to defer capitulating, unleſs there are ſeveral retrenchments one behind the other. For in that caſe, the beſieged, if they think proper, may defend themſelves to the very laſt. At Oſtend the garriſon held out till they were forced into the very heart of the town; and the inhabitants of Barcelona did the ſame in 1713: but this deſperate defence is very rare. Few governors defer ſurrendering till reduced to the laſt extremity; they chooſe to preſerve the garriſon, and to ſave the town from being plundered, which would be the caſe, according to the laws of war, if it was taken by ſtorm. When the enemy inſiſt upon the garriſon's ſurrendering priſoners of war, I ſhould think this condition ought not to be ſubmitted to, till they are reduced to the laſt extremity; but it belongs to the generals, and the commanding officers in fortified towns, to behave on this article as their own prudence ſhall direct, and according to the orders they may have received. A diſcuſſion of this kind is neither within our province, nor the nature of this work.

§ 10. *Of precautions to be uſed againſt the ſurpriſing of towns, ſcalades, ſudden attacks, &c.*

The right way to prevent ſurpriſes, is to think that the enemy have a deſign upon the town, and to uſe all the precautions poſſible in order to fruſtrate their deſigns. With this view a governor ſhould put the fortifications into a good ſtate of defence, ſhould ſee that the ſeveral poſts, as well thoſe that are acceſſible as thoſe that are inacceſſible, be well guarded, that parties be ſent to range in all the principal avenues of the place; in a word, he ſhould moſt exactly obſerve whatever is perſcribed in the military ordinances concerning the guard of towns, the opening and ſhutting of gates, &c. We ſhall make no mention of any of theſe particulars, becauſe they are ſo minutely deſcribed in the ordinances; and, moreover, a very ſhort ſtay in a garriſon is ſufficient for learning every thing that may relate to the daily and cuſtomary duty, as well for the ſafety of the town, as for the preſerving peace and good order among the inhabitants, and for preventing any ſtrangers or ſuſpected perſons from entering the place, &c.

We ſhall only obſerve, that when a fortreſs is ſituated upon a river, care ſhould be taken to have boats in the night, filled with ſoldiers, both above and below the town, to hinder any body from getting in that way undiſcovered. If the ditches are filled with water, in froſty weather the ice ſhould be broke every day; in ſhort, nothing ſhould be neglected that tends to ſecure the place againſt any enterpriſe either from within or without.

But chiefly on fair or market days this vigilance ſhould be exerted; the guards ought to be doubled at all the gates, and the garriſon ſhould be diſpoſed in ſuch a manner as to be ready to fly to their arms upon the firſt beat of drum; care ſhould be alſo taken to make the cavalry mount on horſeback, ready to act in all events. By uſing theſe precautions, it will be very difficult for the enemy to ſurpriſe the town; nay, the conſequence may be, that hearing of the exact diſcipline obſerved by the garriſon, they will relinquiſh their deſign; for ſurpriſes ſeldom ſucceed, except through neglect of military duty, and too great ſecurity in the governor.

With regard to precautions againſt ſcalades, they conſiſt in having ſmall parties continually about the avenues of the place, in order to be better informed of the enemy's motions, and to keep a patrol all night, to ſee that nobody ſhall enter the ditch unperceived. A cuvette may be likewiſe dug within the ditch, and paliſades planted within ſome diſtance of the wall, to hinder the enemy from fixing their ladders to it; the flanks of the baſtions ſhould be furniſhed with cannon, charged with cartridge ſhot, with balls of a quarter of a pound weight, or with pieces of old iron, to fire upon thoſe who ſhould attempt to ſcale the place oppoſite the curtains; in the corps de gardes, within reach of the rampart, a proviſion ſhould be made of halberts, with all other offenſive weapons fit for repelling the enemy when they appear on the top of the ladder, and for driving them into the ditch; the ramparts ſhould be ſtocked with a great quantity of cylindrical timber, to roll down upon the ladders, and thoſe that are upon them; and if the garriſon are not ſo numerous as to be able to cover the whole ramparts, they ſhould fix chevaux-de-frize, or ſomething elſe, to the upper part of the parapet, which will hinder the enemy from getting over, in order to jump upon the rampart. There ought alſo to be a ſtock of ſhells and grenades all loaden upon the walls, in order to roll them down into the ditch upon the enemy. There ſhould likewiſe be fire-works ready to throw upon them, as faſcines done over with pitch and tar, powder-barrels, fire-pots, &c. a great number of fire-balls ſhould be alſo flung into the ditch in order to give light, and that the cannon of the place may do good execution upon thoſe who are got into it; the ditch ſhould likewiſe be filled with crows-feet, or little holes dug and covered with hurdles and earth, ſo that the enemy ſhall not perceive them, but tumble into them: in the middle of theſe little ditches there ſhould be a paliſade, or ſome long iron ſpikes, ranged in ſuch a manner as to run thoſe through that ſhall fall upon them. All theſe precautions will render the enemy's attempt very difficult; for, as we have obſerved ſeveral times in the courſe of this work, when men are prepared to defend themſelves againſt a ſcalade, it ſeldom ſucceeds. Neither are the gates to be neglected; the enemy will not fail to try to fix a petard to them, while the troops are endeavouring to make themſelves maſters of the rampart. Soldiers muſt be placed in a convenient ſituation for firing on the perſon that fixes the petard: in all events the gates muſt be ſtrengthened within ſide; and large trees muſt be got ready to debar the enemy from entering the town, ſhould they be able to break open the gate; the whole as hath been mentioned in the attack of ſmall towns, caſtles, &c.

At the firſt alarm of an attack, all the troops ought to run to the place aſſigned them, in order to be led from thence to the ramparts. With regard to the cavalry, they ought alſo to mount on horſeback, and to divide themſelves into ſeveral ſmall bodies, which are to be at the foot of the rampart, ready at all events to charge the enemy, ſhould they find means to penetrate by ſome way or other into the town.

If the enemy make ſeveral attacks at the ſame time, it will not be proper to quit thoſe parts where they do not ſhow themſelves; this perhaps is a feint only to draw the troops from the ſide which they really intend to attack; therefore the garriſon ſhould be equally on their guard on all ſides, and leave no poſts naked, unleſs the enemy have forced their way into the town; then indeed the buſineſs is to charge them vigorouſly, in order to oblige them to retire.

Upon the whole, it is eaſy to withſtand a ſcalade when there is no ſurpriſe; and therefore it rarely happens that a governor, who takes the neceſſary precautions againſt any ſuch accidents, will loſe a town by this kind of attack.

A ſcalade may be attempted in the day as well as by night; the latter indeed is more favourable to the aſſailants, yet they will not ſucceed a whit the better, if they find that the garriſon are prepared to receive them, agreeable to what we have already mentioned.

There remains only to mention a word or two in regard to accelerated ſieges; which is, that a governor will not be expoſed to this ſort of ſiege, if he takes the proper precautions to be informed of the ſteps and approaches of the beſiegers.

If the enemy pretend to carry on a ſiege in form, and at the ſame time accelerate their approaches on one ſide of the place; the garriſon muſt fall vigorouſly upon them, and ſpare no pains to drive them out of what works they have ſeized upon. One may ſuſpect their deſign, if it appears that they do not make their attack on the ſide of the town where naturally they ought to make it, if they want to become maſters of the place with greater eaſe; and then the beſieged ſhould double their guard on that ſide. In general, there ſhould be a conſtant attention to all the fronts of the place, and they ſhould be all equally guarded, till it appears clearly by the enemy's works on which ſide they form their attack, and which way they direct their works; neither are the other ſides to be neglected, notwithſtanding all this, leſt the enemy ſhould lay hold of this opportunity to attack them. It is always to be ſuppoſed that they are informed of every thing that paſſes within the town, either by their ſpies, or by deſerters; for which reaſon the poſt that ſeems leaſt acceſſible ought not to be neglected.

§ 11. *Of capitulations.*

The capitulation being the laſt tranſaction, both in the attack and defence of a town, this ſeems to be the moſt natural place for ſpeaking of it, as it ſeems to be the moſt proper ſubject for terminating this work.

When the governor, who defends a town, finds himſelf reduced to the laſt extremity, or is ordered by his court to ſurrender, with a view of obtaining better conditions of the enemy, both for the town and garriſon, he orders the chamade to be beat. For this purpoſe one or more drummers are directed to beat their drums on the rampart, on the ſide next to the attack, to give notice to the beſiegers that the governor has ſomething to propoſe to them; one or more white colours are likewiſe hung out for the ſame purpoſe, and one of them remains either on the rampart or on the breach during the time of negotiation. The ſame is practiſed in demanding a ſuſpenſion of arms, after a very violent attack, to bury the dead, carry off the wounded, &c.

As ſoon as the chamade is beat, the firing ceaſes on both ſides, and the governor ſends ſome officers of diſtinction to the general who commands the ſiege, with the conditions on which it is propoſed to ſurrender. As a ſecurity, or as hoſtages for thoſe officers, the beſiegers ſend at the ſame time the ſame number into the town: if the governor's propoſals are not agreeable to the commander of the beſieging army, he rejects them, and mentions what terms he is willing to grant. Generally ſpeaking he threatens the governor to allow him no conditions at all, if he does not determine to ſurrender quickly; for inſtance, when the paſſage over the ditch of the place is finiſhed, or batteries are erected oppoſite the flanks, &c. If the beſieged find the conditions too hard, the hoſtages are reſtored, and the drums are beat again upon the rampart, to make every body withdraw before hoſtilities are renewed, which is done very ſoon after. It is to be obſerved, that during the negotiation they ought to be quiet on both ſides, and by no means ſhould go on with the operations of the ſiege. The governor ought during this time to be upon his guard, for fear of being ſupriſed by ſtratagem; which might expoſe him to the diſcretion of the beſieger.

Suppoſe that the terms of capitulation are agreed upon, two or three of the principal officers of the garriſon are ſent as hoſtages to the enemy; and the general of the beſieging army ſends back the ſame number, and of equal degree, as a ſecurity for fulfilling the capitulation. When the beſieged have executed every thing they promiſed, their hoſtages are returned; and when the beſiegers have fulfilled their engagements, their hoſtages are returned alſo.

The conditions inſiſted upon by the beſieged muſt vary according to the different circumſtances and ſituations in which they find themſelves. The following are the moſt uſual.

1. That the garriſon ſhall march out through the breach, with arms, baggage, horſes, drums beating, matches lighted at both ends, colours flying, a certain number of cannon and mortars, with their appurtenances, ſpare carriages, ammunition for a certain number of charges, to be conducted in ſafety to the town agreed upon, and which is generally the neareſt of thoſe that belong to the beſieged. It muſt be obſerved to inſert by the ſhorteſt road; or the road by which the garriſon want to be conducted, is particularly mentioned. When the garriſon have ſeveral days to march before they can reach the place appointed, it is required that the troops ſhould be allowed proviſions for four or five days, according to the time they are to be upon the road.

2. That the ſame evening, or at a certain hour the next day, one of the gates of the town ſhall be delivered up to the beſiegers, and the garriſon are to march out a day or two after, according as both parties have agreed.

3. The beſiegers ſhall furniſh a certain number of covered waggons, that is, which are not to be inſpected, beſides waggons for removing the ſick and wounded, that are in a condition of being removed; and in general all the carriages neceſſary for the baggage of the garriſon, and for the artillery allowed by the capitulation.

4. The ſick and wounded, who are obliged to ſtay behind, ſhall have liberty to leave the town, with every thing belonging to them, as ſoon as they are in a condition ſo to do; and in the mean time they ſhall be furniſhed with lodgings *gratis*, or otherwiſe.

5. No indemnification ſhall be required of the beſieged, for horſes taken from the town's people, nor for houſes burnt or demoliſhed during the ſiege.

6. The governor, the general officers, all the officers belonging to the troops, the troops themſelves, and in general every one in the king's ſervice, ſhall be ſuffered to leave the place, without being ſubject to any act of repriſal, of what nature ſoever, and under any pretext whatſoever.

7. If thoſe to whom the town is ſurrendered, are of a different religion from that of the inhabitants, it muſt be mentioned in the capitulation, that the inhabitants ſhall be maintained in the exerciſe of their religion.

8. The inhabitants ſhall alſo be maintained in all their rights and privileges.

9. Thoſe who are willing to quit the town, ſhall be at liberty to go and ſettle where they pleaſe, with all their effects. It is alſo ſtipulated ſometimes, and indeed ought to be ſtipulated, whenever there is any apprehenſion that the enemy will behave with rigour to the inhabitants, for any partiality they may have ſhown during the ſiege to the prince whoſe ſubjects they ceaſe to be, that they ſhall not be diſturbed or moleſted for any thing they may have done before or during the ſiege.

10. It is alſo inſerted in the capitulation, that all the powder and ammunition remaining in the place ſhall be delivered up, and the loaded mines are likewiſe diſcovered.

11. The priſoners made on both ſides during the ſiege ſhall be reſtored.

It muſt be obſerved, that a place ſhould have proviſion and ammunition at leaſt for three days, to be intitled to a capitulation, without which they are made priſoners of war. But if the beſiegers are unacquainted with it, and the capitulation is ſigned, it would not be fair to make the garriſon priſoners of war, upon diſcovering the want of ammunition.

When the beſiegers refuſe to grant a capitulation, unleſs the garriſon ſurrender themſelves priſoners of war, and the latter are under the neceſſity of ſubmitting to this cruel law, they endeavour to ſoften it as much as poſſible: and therefore it is commonly agreed,

1. That the governor, and the principal officers, ſhall keep their ſwords, piſtols, baggage, &c.
2. That the ſubaltern officers, below a captain, ſhall have only their ſwords, with their baggage.
3. That the ſoldiers ſhall be neither rifled, nor ſeparated from their regiments.
4. That the garriſon ſhall be conducted to ſuch a place, to remain priſoners of war.
5. That the principal officers ſhall have leave for two or three months to go and ſettle their affairs.
6. That when the garriſon quit a place, it ſhall not be allowed to decoy the ſoldiers, in order to make them deſert from their regiments.

When the capitulation is entirely ſettled, an officer of artillery from the beſiegers enters the town, to take an inventory of all the artillery and ammunition remaining in the place, in conjunction with an officer of artillery from the garriſon. A commiſſary of ſtores enters likewiſe to take an account of the proviſions.

When a governor finds that he muſt ſurrender, and that there are conſiderable magazines of ammunition and proviſions, he ſhould deſtroy moſt of them before he offers to ſurrender, to the end that there may remain no more in the place than what is neceſſary for a capitulation, and that the enemy may reap no advantage from thence. If he ſhould not, before he enters into a capitulation, burn or deſtroy thoſe magazines, the enemy might inſiſt on their being preſerved; but they can think nothing of it, when thoſe precautions are taken before hand.

As ſoon as the beſieged have delivered up a gate of the town to the enemy, the firſt regiment of the army enters, and mounts guard.

When the day is come that the garriſon are to leave the place, the beſieging army is drawn up in two files of battalions and ſquadrons, and the garriſon are to paſs between them. The hour for their marching out being arrived, the general and the principal officers put themſelves at the head of the troops, to ſee the garriſon defile before them.

The governor puts himſelf at the head, followed by the principal officers; and he makes the garriſon march in the beſt order poſſible. The oldeſt regiments move commonly in the van and the rear, and the others in the centre with their baggage. When there is any cavalry, it is divided in the ſame manner into three corps, for the van, the centre, and the rear. Small detachments of horſe and foot are made to march along with the baggage, and to take care of its not being rifled.

The artillery granted by the capitulation marches after the firſt battalion. When the garriſon arrive at the place agreed upon, they deliver up the hoſtages of the beſiegers to the eſcort; and when the latter have rejoined the army, they ſend back the hoſtages which the beſieged left for the ſecurity of the eſcort, with the waggons, and other things granted by the beſieging army for eſcorting the garriſon.

When the garriſon are made priſoners of war, they are likewiſe eſcorted to the town agreed upon by the terms of the capitulation.

Every thing ſettled in the capitulation ought to be ſacred and inviolable, and ſhould be underſtood in its genuine and moſt natural ſenſe: yet as this is not always practiſed, the governor ſhould take the utmoſt precaution to have no word inſerted that ſhall be in the leaſt equivocal, or liable to different interpretations. There are a great many examples which prove the neceſſity of this precaution.

When the garriſon of a town capitulate in order to retire to the citadel, there are ſome particular conditions to be obſerved, ſuch as follow.

That the citadel ſhall not be attacked on the ſide next the town; that the ſick and wounded, who cannot be removed, ſhall ſtay in their preſent lodgings; and when they are recovered, they ſhall be provided with carriages and tranſports, to retire in ſafety to the place agreed on in the capitulation. None ſhould be ſuffered to enter the citadel, but thoſe who may be of uſe in defending it; the reſt, who are called *uſeleſs mouths*, by no means ought to be admitted. Mention ſhould be made in the capitulation, that thoſe people ſhall be conducted to ſome neighbouring place in the dominions of their ſovereign, which ſhould be named. A certain time ought alſo to be allowed for the whole garriſon to enter the citadel; and it ſhould be expreſsly mentioned, that during this time the beſiegers ſhall conſtruct no works that are neceſſary for the reduction of the citadel.

A maritime town requires alſo ſome particular attention, in regard to the ſhips that may be in the harbour. It ſhould be ſtipulated, that they ſhall quit the harbour the ſame day as the garriſon march out of the town, or when the weather permits to ſail to the port agreed upon. They ſhould preſerve their artillery, rigging, ammunition, and proviſions, &c. If they ſhould be obliged by ſtreſs of weather to put into any harbour of the beſiegers by the way, it ought to be mentioned in the capitulation, that they ſhall be received there, and ſupplied with neceſſaries for continuing their voyage; they ought alſo to be provided with paſſports, and, in a word, to have every kind of ſecurity, that they ſhall not be inſulted by the enemy's ſhips, but ſuffered without the leaſt obſtacle to ſteer to the port agreed upon.

Man of WAR. See MAN *of War*.

*Man-of-*WAR *Bird*. See PELICANUS.

WAR-*Cry* was formerly cuſtomary in the armies of moſt nations, when juſt upon the point of engaging. Sometimes they were only tumultuous ſhouts, or horrid yells, uttered with an intent to ſtrike terror into their adverſaries; ſuch as is now uſed by the Indians in America, called the *war-whoop*.

WARBLES, in farriery. See there § xxxi.

WARD (Dr Seth), an Engliſh prelate, chiefly famous for his knowledge in mathematics and aſtronomy, was born at Buntingford in Hertfordſhire, about the year 1617. He was admitted of Sidney college, Cambridge, where he applied with great vigour to his ſtudies, particularly to the mathematics, and was choſen fellow of his college. He was involved not a little in the conſequences of the civil war, but ſoon after the Reſtoration obtained the biſhopric of Exeter; in 1667, he was tranſlated to Saliſbury, and in 1671 was made chancellor of the order of the garter: he was the firſt Proteſtant biſhop that enjoyed that honour, and he procured it to be annexed to the ſee of Saliſbury. Biſhop Ward was one of thoſe unhappy perſons who have the misfortune to ſurvive their ſenſes, which happened in conſequence of a fever ill cured; he lived to the revolution without knowing any thing of the matter, and died in 1690. He was the author of ſeveral Latin works in mathematics and aſtronomy, which were thought excellent in their day; but their uſe has been ſuperſeded by later diſcoveries and the Newtonian philoſophy.

WARD (Dr John), was the ſon of a diſſenting miniſter, and born at London in 1679. He for ſome years kept a ſchool in Tenter-alley, Moor-fields; but rendered himſelf ſo eminent in the ſtudy of antiquity, that in 1720 he was choſen profeſſor of rhetoric in Greſham college: in 1723, during the preſidency of Sir Iſaac Newton, he was elected a fellow of the royal ſociety; and in 1752 one of the vice-preſidents, in which office he was continued to his death. He was elected one of the truſtees of the Britiſh Muſeum in 1753, and died at Greſham college in 1758. The work for which he is beſt known, is his Lives of the Profeſſors of Greſham College; which is a conſiderable addition to the hiſtory of learning in our country. His Lectures on Oratory were publiſhed after his death, in 2 vols 8vo.

WARD, is variouſly uſed in our old books: a ward in London is a diſtrict or diviſion of the city, committed to the ſpecial charge of one of the aldermen; and in London there are 26 wards, according to the number of the mayor and aldermen, of which every one has his ward for his proper guard and juriſdiction. A foreſt is divided into wards; and a priſon is called a *ward*. Laſtly, the heir of the king's tenant, that held *in capite*, was termed a *ward* during his nonage: but this wardſhip is taken away by the ſtatute 12 Car. II. c. 24.

WARD-*Holding*, in Scots law. See LAW, N° clxv. 1. and clxvi. 3.

WARD-*Hook*, or *Wadd-hook*, in gunnery, a rod or ſtaff, with an iron end turned ſerpent-wiſe, or like a ſcrew, to draw the wadding out of a gun when it is to be unloaded.

WARDEN, or GUARDIAN, one who has the charge or keeping of any perſon, or thing, by office. Such is the warden of the fleet, the keeper of the fleet priſon; who has the charge of the priſoners there, eſpecially ſuch as are committed from the court of chancery for contempt.

WARDHUYS, a port of Norwegian Lapland, 120 miles ſouth-eaſt of the North Cape. E. Long. 28. N. Lat. 71.

WARDMOTE, in London, is a court ſo called, which is kept in every ward of the city; anſwering to the *curiata comitia* of Rome.

WARDROBE, a cloſet or little room adjoining to a bed-chamber, ſerving to diſpoſe and keep a perſon's apparel in; or for a ſervant to lodge in, to be at hand to wait, &c.

Wardrobe, in a prince's court, is an apartment wherein his robes, wearing apparel, and other neceſſaries, are preſerved under the care and direction of proper officers; as the maſter of the wardrobe, clerk, &c. of the wardrobe.

WARDSHIP, in chivalry, one of the incidents of tenure by knight-ſervice. See FEODAL *Syſtem*, KNIGHT-*Service*, and TENURE.

Upon the death of a tenant, if the heir was under the age of 21, being a male, or 14, being a female, the lord was intitled to the wardſhip of the heir, and was called the *guardian in chivalry*. This wardſhip conſiſted in having the cuſtody of the body and lands of ſuch heir, without any account of the profits till the age of 21 in males, and 16 in females. For the law ſuppoſed the heir-male unable to perform knight-ſervice till 21; but as for the female, ſhe was ſuppoſed capable at 14 to marry, and then her huſband might perform the ſervice. The lord therefore had no wardſhip, if at the death of the anceſtor the heir-male was of the full age of 21, or the heir-female of 14: yet if ſhe was then under 14, and the lord once had her in ward, he might keep her ſo till 16, by virtue of the ſtatute of Weſtm. 1. 3 Edw. I. c. 22. the two additional years being given by the legiſlature for no other reaſon but merely to benefit the lord.

This wardſhip, ſo far as it related to land, though it was not nor could be part of the law of feuds, ſo long as they were arbitrary, temporary, or for life only; yet when they became hereditary, and did conſequently often deſcend upon infants, who by reaſon of their age could neither perform nor ſtipulate for the ſervices of the feud, does not ſeem upon feodal principles to have been unreaſonable. For the wardſhip of the land, or cuſtody of the feud, was retained by the lord, that he might out of the profits thereof provide a fit perſon to ſupply the infant's ſervices till he ſhould be of age to perform them himſelf. And if we conſider a feud in its original import, as a ſtipend, fee, or reward for actual ſervice, it could not be thought hard that the lord ſhould withhold the ſtipend ſo long as the ſervice was ſuſpended. Though undoubtedly to our Engliſh anceſtors, where ſuch ſtipendary donation was a mere ſuppoſition or figment, it carried abundance of hardſhip; and accordingly it was relieved by the charter of Henry I. before-mentioned, which took this cuſtody from the lord, and ordained that the cuſtody, both of the land and the children, ſhould belong to the widow or next of kin. But this noble immunity did not continue many years.

The wardſhip of the body was a conſequence of the wardſhip of the land; for he who enjoyed the infant's eſtate was the propereſt perſon to educate and maintain him in his infancy: and alſo in a political view, the lord was moſt concerned to give his tenant a ſuitable education, in order to qualify him the better to perform thoſe ſervices which in his maturity he was bound to render.

When the male heir arrived to the age of 21, or the heir-female to that of 16, they might ſue out their livery or *ouſterlemain*; that is, the delivery of their lands out of their guardian's hands. For this they were obliged to pay a fine, namely, half a year's profits of the land; though this ſeems expreſsly contrary to *magna carta*. However, in conſideration of their lands having been ſo long in ward, they were excuſed all reliefs, and the king's tenants alſo all primer ſeiſins. In order to aſcertain the profits that aroſe to the crown by theſe fruits of tenure, and to grant the heir his livery, the itinerant juſtices, or juſtices in eyre, had it formerly in charge to make inquiſition concerning them by a jury of the county, commonly called an *inquiſitio poſt mortem;* which was inſtituted to inquire (at the death of any man of fortune) the value of his eſtate, the tenure by which it was holden, and who, and of what age, his heir was; thereby to aſcertain the relief and value of the primer ſeiſin, or the wardſhip and livery accruing to the king thereupon. A manner of proceeding that came in proceſs of time to be greatly abuſed, and at length an intolerable grievance; it being one of the principal accuſations againſt Empſon and Dudley, the wicked engines of Henry VII. that by colour of falſe inquiſitions they compelled many perſons to ſue out livery from the crown, who by no means were tenants thereunto. And afterwards a court of wards and liveries was erected, for conducting the ſame inquiries in a more ſolemn and legal manner.

When the heir thus came of full age, provided he held a knight's fee, he was to receive the order of knighthood, and was compellable to take it upon him, or elſe pay a fine to the king. For in thoſe heroical times, no perſon was qualified for deeds of arms and chivalry who had not received this order, which was conferred with much preparation and ſolemnity. We may plainly diſcover the footſteps of a ſimilar cuſtom in what Tacitus relates of the Germans, who, in order to qualify their young men to bear arms, preſented them in a full aſſembly with a ſhield and lance; which ceremony, as was formerly hinted, is ſuppoſed to have been the original of the feodal knighthood. This prerogative, of compelling the vaſſals to be knighted, or to pay a fine, was expreſsly recognized in parliament, by the ſtatute *de militibus*, 1 Edw. II.; was exerted as an expedient for raiſing money by many of our beſt princes, particularly by Edw. VI. and queen Eliſabeth; but this was the occaſion of heavy murmurs when exerted by Charles I.: among whoſe many miſfortunes it was, that neither himſelf nor his people ſeemed able to diſtinguiſh between the arbitrary ſtretch and the legal exertion of prerogative. However, among the other conceſſions made by that unhappy prince before the fatal recourſe to arms, he agreed to diveſt himſelf of this undoubted flower of the crown; and it was accordingly aboliſhed by ſtat. 16 Car. I. c. 20.

WARE, a town of Hertfordſhire, with a market on Tueſdays, and a fair on the laſt Tueſday in April, and Tueſday before St Matthew's day (Sept. 21.) for horſes and other cattle. It is a large, well frequented, and well inhabited thoroughfare town, ſeated on the river Lea, 21 miles north of London. It carries on a great trade in malt and corn, which they are continually ſending in large quantities to London. E. Long. 0. 3. N. Lat. 51. 50.

WARE (Sir James), in Latin *Waræus*, a celebrated antiquarian and hiſtorian, was the ſon of Sir James Ware, and was born at Dublin on the 26th of November 1604. He was educated at Trinity college in that city, where he made an uncommon proficiency. He afterwards received the honour of knighthood, and upon the death of his father enjoyed his poſt of auditor-general of Ireland. In 1639 he was made one of the privy-council of that kingdom; and when the rebellion broke out there, ſuffered much in his eſtate. In 1644 the marquis of Ormond, who enjoyed the poſt of lord-lieutenant, ſent him with two lords to Charles I. who was then in Oxford, about ſome important affairs, which were concluded to their ſatisfaction; but in their return they were taken by a parliament ſhip, and committed priſoners to the Tower of London, where he was detained 11 months. He was afterwards forced to retire to France, where he ſtaid a year and a half. Then coming to England, he ſettled in London, where he compoſed ſeveral of his works. Upon the reſtoration he returned to Ireland, and was reſtored to his places of auditor-general and privy-counſellor. He wrote in Latin, Annals of the reigns of Henry VI. Henry VIII. Edward VI. and Mary; a Treatiſe on the Writers of Ireland; and many other works. He died at Dublin in 1666.

WARN, in law, is to ſummon a perſon to appear in a court of juſtice.

WARNING *of* TENANTS, in Scots law. See LAW, N° clxvii. 16.

WARP, in the manufactures, a name for the threads, whether of ſilk, wool, linen, hemp, &c. that are extended lengthwiſe on the weaver's loom; and acroſs which the workman, by means of his ſhuttle, paſſes the threads of the woof, to form a cloth, ribband, fuſtian, or the like.

WARP, a ſmall rope employed occaſionally to remove a ſhip from one place to another, in a port, road, or river. And hence,

To WARP, is to change the ſituation of a ſhip, by pulling her from one part of a harbour, &c. to ſome other, by means of warps, which are attached to buoys; to anchors ſunk in the bottom; or to certain ſtations upon the ſhore, as poſts, rings, trees, &c. The ſhip is accordingly drawn forwards to thoſe ſtations, either by pulling on the warps by hand, or by the application of ſome purchaſe, as a tackle, windlaſs, or capſtern, upon her deck.

When this operation is performed by the ſhip's leſſer anchors, theſe machines, together with their warps, are carried out in the boats alternately towards the place where the ſhip is endeavouring to arrive: ſo that when ſhe is drawn up cloſe to one anchor, the other is carried out to a competent diſtance before her, and being ſunk, ſerves to fix the other warp by which ſhe is farther advanced.

Warping is generally uſed when the ſails are unbent, or when they cannot be ſucceſsfully employed, which may either ariſe from the unfavourable ſtate of the wind, the oppoſition of the tide, or the narrow limits of the channel.

WARRANDICE, in Scots law. See LAW, N° clxiv. 11.

WARRANT, an act, inſtrument, or obligation, whereby a perſon authoriſes another to do ſomething which he otherwiſe had not a right to do.

A warrant may be granted in extraordinary caſes by the privy council, or ſecretaries of ſtate; but ordinarily by juſtices of the peace. This they may do in any caſes where they have a juriſdiction over the offence, in order to compel the perſon accuſed to appear before them: for it would be abſurd to give them power to examine an offender, unleſs they had alſo a power to compel him to attend, and ſubmit to ſuch examination. And this extends undoubtedly to all treaſons, felonies, and breaches of the peace; and alſo to all ſuch offences as they have power to puniſh by ſtatute. Sir Edward Coke indeed hath laid it down, that a juſtice of the peace cannot iſſue a warrant to apprehend a felon upon bare ſuſpicion; no, not even till an indictment be actually found: and the contrary practice is by others held to be grounded rather upon connivance than the expreſs rule of law; though now by long cuſtom eſtabliſhed. A doctrine which would in moſt caſes give a looſe to felons to eſcape without puniſhment; and therefore Sir Matthew Hale hath combated it with invincible authority and ſtrength of reaſon: Maintaining, 1. That a juſtice of peace hath power to iſſue a warrant to apprehend a perſon accuſed of felony, tho' not yet indicted; and, 2. That he may alſo iſſue a warrant to apprehend a perſon ſuſpected of felony, though the original ſuſpicion be not in himſelf, but in the party that prays his warrant; becauſe he is a competent judge of the probability offered to him of ſuch ſuſpicion. But in both caſes it is fitting to examine upon oath the party requiring a warrant, as well to aſcertain that there is a felony or other crime actually committed, without which no warrant ſhould be granted; as alſo to prove the cauſe and probability of ſuſpecting the party againſt whom the warrant is prayed. This warrant ought to be under the hand and ſeal of the juſtice, ſhould ſet forth the time and place of making, and the cauſe for which it is made, and ſhould be directed to the conſtable, or other peace-officer, (or it may be to any private perſon by name), requiring him to bring the party either generally before any juſtice of the peace for the county, or only before the juſtice who granted it: the warrant in the latter caſe being called a *ſpecial warrant*. A general warrant to apprehend all perſons ſuſpected, without naming or particularly deſcribing any perſon in ſpecial, is illegal and void for its uncertainty; for it is the duty of the magiſtrate, and ought not to be left to the officer, to judge of the ground of ſuſpicion. And a warrant to apprehend all perſons, guilty of a crime therein ſpecified, is no legal warrant: for the point upon which its authority reſts, is a fact to be decided on a ſubſequent trial; namely, whether the perſon apprehended thereupon be really guilty or not. It is therefore in fact no warrant at all; for it will not juſtify the officer who acts under it: whereas a warrant, properly penned (even though the magiſtrate who iſſues it ſhould exceed his juriſdiction), will, by ſtatute 24 Geo. II. c. 44. at all events indemnify the officer who executes the ſame miniſterially. And when a warrant is received by the officer, he is bound to execute it, ſo far as the juriſdiction of the magiſtrate and himſelf extends. A warrant from the chief, or other juſtice of the court of king's-bench, extends all over the kingdom; and is teſte'd, or dated, England; not Oxfordſhire, Berks, or other particular county. But the warrant of a juſtice of the peace in one county, as Yorkſhire, muſt be backed, that is, ſigned by a juſtice of the peace in another, as Middleſex, before it can be executed there. Formerly, regularly ſpeaking, there ought to have been a freſh warrant in every freſh county; but the practice of backing warrants had long prevailed without law, and was at laſt authoriſed by ſtat. 23 Geo. II. c. 26. and 24 Geo. II. c. 55. And now, by ſtatute 13 Geo. III. c. 31. any warrant for apprehending an Engliſh offender, who may have eſcaped into Scotland, and *vice verſa*, may be indorſed and executed by the local magiſtrates, and the offender conveyed back to that part of the united kingdoms in which ſuch offence was committed.

WARREN (Sir Peter), an admiral, diſtinguiſhed by his virtue, learning, and undaunted courage, was deſcended from an ancient family in Ireland, and received a ſuitable education to qualify him for a command in the royal navy, in which he ſerved for ſeveral years with great reputation; but the tranſaction which placed his great abilities in their full light, was the taking of Louiſburg in the year 1745, when he was appointed commodore of the Britiſh ſquadron ſent on that ſervice. He joined the fleet of tranſports from Boſton in Canſo-bay on the 25th of April, having under his command the Superb of 60, and the Launceſton and Eltham of 40 guns; he was afterwards joined by ſeveral other men of war ſent from England, and took poſſeſſion of Louiſburg on the 17th of June. The French, exaſperated at this loſs, were conſtantly on the watch to retake it; and in 1747 fitted out a large fleet for that purpoſe, and at the ſame time another ſquadron to proſecute their ſucceſs in the Eaſt-Indies. Theſe ſquadrons ſailed at the ſame time; but the views of the French were rendered abortive by the gallant admiral Anſon and Mr Warren, who had been created rear-admiral, who with a large fleet of ſhips fell in with the French, defeated the whole fleet, and took the greateſt part of the men of war. This was the laſt ſervice Sir Peter rendered to his country as a commander in the Britiſh fleet; for a peace being concluded in the ſucceeding year, the fleet was laid up in the ſeveral harbours.

He was now choſen one of the repreſentatives in parliament for Weſtminſter; and in the midſt of his popularity he paid a viſit to Ireland, his native country, where he died of an inflammatory fever in 1752, ſincerely lamented by all ranks of people; and an elegant monument of white marble was erected to his memory in Weſtminſter-abbey.

WARREN, is a franchiſe or place privileged by preſcription or grant from the king, for the keeping of beaſts and fowls of the warren; which are hares and coneys, partridges, pheaſants, and ſome add quails, woodcocks, and water-fowl, &c. Theſe being *feræ naturæ*, every one had a natural right to kill as he could: but upon the introduction of the foreſt laws at the Norman conqueſt, theſe animals being looked upon as royal game, and the ſole property of our ſavage monarchs, this franchiſe of free-warren was invented to protect them, by giving the grantee a ſole and excluſive power of killing ſuch game, ſo far as his warren extended, on condition of his preventing other perſons. A man therefore that has the franchiſe of warren, is in reality no more than a royal game-keeper: but no man, not even a lord of a manor, could by common law juſtify ſporting on another's ſoil, or even on his own, unleſs he had the liberty of free-warren. This franchiſe is almoſt fallen into diſregard ſince the new ſtatutes for preſerving the game; the name being now chiefly preſerved in grounds that are ſet apart for breeding hares and rabbits. There are many inſtances of keen ſportſmen in ancient times, who have ſold their eſtates, and reſerved the free-warren, or right of killing game, to themſelves; by which means it comes to paſs that a man and his heirs have ſometimes free-warren over another's ground.

A warren may lie open; and there is no neceſſity of incloſing it as there is of a park. If any perſon offend in a free warren, he is puniſhable by the common law, and by ſtat. 21 Edw. III. And if any one enter wrongfully into any warren, and chaſe, take, or kill any coneys without the conſent of the owner, he ſhall forfeit treble damages, and ſuffer three months impriſonment, &c. by 22 and 23 Car. II. c. 25. When coneys are on the ſoil of the party, he hath a property in them by reaſon of the poſſeſſion, and action lies for killing them; but if they run out of the warren and eat up a neighbour's corn, the owner of the land may kill them, and no action will lie.

WARSAW, the capital of Warſovia in Poland, and indeed of the whole kingdom, ſtands on the Viſtula, almoſt in the centre of the kingdom, and in N. Lat. 52. 14. and E. Long. 21.; 154 miles ſouth-eaſt of Dantzic, 133 north of Cracow, and 300 north of Vienna. Here the king uſually keeps his court in a large ſquare palace, ſtanding amidſt delicate gardens and groves; and at this place are held the general diets, where there is ſuch a concourſe of people, that great numbers of them are obliged to live in tents. The city is large and populous, contains a great many churches, palaces, and convents, both within and without the walls, and is pretty well fortified. Here is alſo a ſtately caſtle, an arſenal, and a curious wooden bridge over the river. Count Zaluſki's library, ſaid to contain 200,000 volumes, was opened in 1746. The ordinary diets are held at the royal palace; but during the interregnum, in a field not far from the city, near the village of Wola. Goods are brought to the city by the Viſtula and other rivers, and ſent from thence to Dantzic. Baron Polnitz, who ſpent ſome time in this city, ſays, he obſerved the ſame politeneſs here as at Paris; that the ladies are amiable, witty, and ſprightly, and paſſionately fond of muſic and plays. Near this city are two royal palaces, viz. Viaſdow, pleaſantly ſituated on the Viſtula, and Villanow, where, in 1732, Auguſtus II. reviewed his troops, and made them go through all the different military exerciſes.

WART, in ſurgery, a little round hard excreſcence, being firſt a ſmall and almoſt imperceptible induration of the ſkin, which if obſerved in time may be eaſily eradicated. If ſuffered to remain, it penetrates deeper into the cellular membrane, and ſends forth roots, frequently becoming cancerous if irritated by the imprudent uſe of cauſtics.

WARWICK, the capital of Warwickſhire in England, and from which this county derives its name. It is very ancient, and ſuppoſed by Cambden to be the place called by the Romans *Præſidinm*, where the Dalmatian horſe were poſted. It ſtands on a rock of free-ſtone, of which all the public edifices in the town are built. At the Norman invaſion it was a conſiderable place; and had many burgeſſes, of whom 12 were obliged by their tenure to accompany the king in his wars. The caſtle was anciently very ſtrong, both by nature and art, and is now a moſt noble and delightful dwelling; the rock on which it ſtands being 40 feet above the river, but on the north ſide level with the town. In September 1694, the city ſuffered much by a fire, occaſioned by a ſpark blown from a ſtick, as it was carrying croſs a lane; but by an act of parliament for rebuilding it, and the liberal contributions of the nation, it hath riſen again out of its aſhes more magnificent than it was before. It is ſupplied with water brought in pipes from ſprings half a mile from the town, beſides what it derives from the wells within it made in the rock; and it is eaſily kept clean, by being ſituated upon a declivity. Four ſtreets, from the four cardinal points of the compaſs, meet in the centre of the town. The country all around is very beautiful; of which, from a terrace in the caſtle, now the ſeat of earl Brook and Warwick, there is a very noble proſpect. The principal public buildings are St Mary's, a very ſtately edifice, an hoſpital, a town-houſe of free-ſtone, three charity ſchools, and a noble bridge over the Avon. It has had ſeveral charters; but is governed at preſent by a mayor, 12 brethren, 24 burgeſſes, &c. It is a very handſome populous town, and gives title of earl to the family of the Grevilles.

WASH, among diſtillers, the fermentable liquor uſed by the malt diſtillers. See BREWERY.

WASHING, in painting, is when a deſign, drawn with a pen or crayon, has ſome one colour laid over it with a pencil, as Indian ink, biſtre, or the like, to make it appear the more natural, by adding the ſhadow of prominences, aperture, &c. and by imitating the particular matters whereof the thing is ſuppoſed to conſiſt.

Thus they waſh with a pale red, to imitate brick and tile; with a pale Indian blue, to imitate water and ſlate; with green, for trees and meadows; with ſaffron or French berries, for gold or braſs; and with ſeveral colours for marbles.

WASHING *of Ores*, the purifying an ore of any metal, by means of water, from earths and ſtones, which would otherwiſe render it difficult of fuſion.

WASP, in zoology. See VESPA.

WATCH, in the art of war, a number of men poſted at any paſſage, or a company of the guards who go on the patrole.

WATCH, in the navy, the ſpace of time wherein one diviſion of a ſhip's crew remains upon deck, to perform the neceſſary ſervices, whilſt the reſt are relieved from duty, either when the veſſel is under ſail or at anchor.

The length of the ſea-watch is not equal in the ſhipping of different nations. It is always kept four hours by our Britiſh ſeamen, if we except the dog-watch between four and eight in the evening, that contains two reliefs, each of which are only two hours on deck. The intent of this is to change the period of the night-watch every 24 hours; ſo that the party watching from 8 till 12 in one night, ſhall watch from midnight till four in the morning on the ſucceeding one. In France the duration of the watch is extremely different, being in ſome places ſix hours, and in others ſeven or eight: and in Turky and Barbary it is uſually five or ſix hours.

A ſhip's company is uſually claſſed into two parties; one of which is called the ſtarboard and the other the larboard watch. It is, however, occaſionally ſeparated into three diviſions, as in a road or in particular voyages.

In a ſhip of war the watch is generally commanded by a lieutenant, and in merchant-ſhips by one of the mates: ſo that if there are four mates in the latter, there are two in each watch; the firſt and third being in the larboard, and the ſecond and fourth in the ſtarboard watch: but in the navy, the officers who command the watch uſually divide themſelves into three parties, in order to lighten their duty.

Watch, is alſo uſed for a ſmall portable movement, or machine, for the meaſuring of time; having its motion regulated by a ſpiral ſpring.

Watches, ſtrictly taken, are all ſuch movements as ſhow the parts of time; as clocks are ſuch as publiſh it, by ſtriking on a bell, &c. But commonly the name *watch* is appropriated to ſuch as are carried in the pocket; and *clock* to the large movements, whether they ſtrike the hour or not. See Clock.

The invention of ſpring or pocket-watches, belongs to the preſent age. It is true, we find mention made of a watch preſented to Charles V. in the hiſtory of that prince: but this, in all probability, was no more than a kind of clock to be ſet on a table, ſome reſemblance whereof we have ſtill remaining in the ancient pieces made before the year 1670. In effect, it is between Dr Hooke and M. Huygens that the glory of this excellent invention lies: but to which of them it properly belongs, is greatly diſputed; the Engliſh aſcribing it to the former, and the French, Dutch, &c. to the latter. Mr Derham, in his Artificial Clockmaker, ſays roundly, that Dr Hooke was the inventor; and adds, that he contrived various ways of regulation. One way was with a loadſtone. Another with a tender ſtraight ſpring, one end whereof played backwards and forwards with the balance; ſo that the balance was to the ſpring as the bob to a pendulum, and the ſpring as the rod thereof. A third method was with two balances, of which there were divers ſorts; ſome having a ſpiral ſpring to the balance for a regulator, and others without. But the way that prevailed, and which continues in mode, was with one balance, and one ſpring running round the upper part of the verge thereof: Though this has a diſadvantage, which thoſe with two ſprings, &c. were free from; in that a ſudden jerk, or confuſed ſhake, will alter its vibrations, and put it in an unuſual hurry.

The time of theſe inventions was about the year 1658; as appears, among other evidences, from an inſcription on one of the double balance watches preſented to king Charles II. viz. Rob. Hooke Inven. 1658. T. Tompion *fecit*, 1675. The invention preſently got into reputation, both at home and abroad; and two of them were ſent for by the dauphin of France. Soon after this, M. Huygens's watch with a ſpiral ſpring got abroad, and made a great noiſe in England, as if the longitude could be found by it. It is certain, however, that his invention was later than the year 1673, when his book *de Horol. Oſcillat.* was publiſhed; wherein he has not one word of this, though he has of ſeveral other contrivances in the ſame way.

One of theſe the lord Brouncker ſent for out of France, where M. Huygens had got a patent for them. This watch agreed with Dr Hooke's, in the application of the ſpring to the balance; only M. Huygens's had a longer ſpiral ſpring, and the pulſes and beats were much ſlower. The balance, inſtead of turning quite round, as Dr Hooke's, turns ſeveral rounds every vibration.

Mr Derham ſuggeſts, that he has reaſon to doubt M. Huygens's fancy firſt was ſet to work by ſome intelligence he might have of Dr Hooke's invention from Mr Oldenburg, or ſome other of his correſpondents in England; though Mr Oldenburg vindicates himſelf againſt that charge, in Philoſophical Tranſactions, N° 118 and 129. Huygens invented divers other kinds of watches, ſome of them without any ſtring or chain at all; which he called, particularly, *pendulum watches*.

As it was in England that watches had their firſt riſe; ſo it is there too they have arrived at their greateſt perfection. Witneſs that exceeding value put on an Engliſh watch in all foreign countries, and that vaſt demand made for them.

M. Savary, in his *Diction. de commerce*, pretends to match the French watchmakers againſt the Engliſh. He aſſerts, "That if the Engliſh be in any condition to diſpute it with them, they owe it entirely to the great number of French workmen who took ſhelter here upon the revocation of the edict of Nantz." He adds, "That three fourths of the watches made in England are the work of Frenchmen."—From what authorities he ſays this we know not: but it need not be told Engliſhmen that it is falſe; there not being one French name, that we know of, among all our famed watchmakers; nor, in the body of watchmakers, is there one eighth part French.

It is certain the French people prefer our watches vaſtly to their own; inſomuch, that to have them with the more eaſe, a number of Engliſh workmen were invited over in 1719, and eſtabliſhed with great countenance at Verſailles, under the direction of the famous Mr Law. But the eſtabliſhment, though every thing promiſed well for it, and the French watch and clock makers ſeemed undone by it, fell to the ground in leſs than a year's time. M. Savary imputes its fall entirely to that ſtrong prejudice of the French people in behalf of the Engliſh workmen, and to the opinion that the watches did not come from England. But the truth is, the workmen ſent over being moſt of them men of looſe characters, grew diſſolute, quarrelled with the prieſts, inſulted the magiſtrates, and were diſmiſſed of neceſſity.

Striking Watches are ſuch, as beſides the proper watch part for meaſuring of time, have a clock-part for ſtriking the hours, &c.

Repeating Watches, are ſuch as by pulling a ſtring, &c. repeat the hour, quarter, or minute, at any time of the day or night.—This repetition was the invention of Mr Barlow, and firſt put in practice by him in larger movements or clocks about the year 1676. The contrivance immediately ſet the other artiſts to work, who ſoon contrived divers ways of effecting the ſame. But its application to pocket-watches was not known before king James the Second's reign; when

Watch.

the ingenious inventor above-mentioned, having directed Mr Thompſon to make a repeating watch, was ſoliciting a patent for the ſame. The talk of a patent engaged Mr Quare to reſume the thoughts of a like contrivance, which he had had in view ſome years before: he now effected it; and being preſſed to endeavour to prevent Mr Barlow's patent, a watch of each kind was produced before the king and council; upon trial of which, the preference was given to Mr Quare's. The difference between them was, that Barlow's was made to repeat by puſhing in two pieces on each ſide the watch-box; one of which repeated the hour, and the other the quarter: whereas Quare's was made to repeat by a pin that ſtuck out near the pendant, which being thruſt in (as now it is done by thruſting in the pendant itſelf), repeated both the hour and quarter with the ſame thruſt.

Of the Mechaniſm of a Watch. Watches, as well as clocks, are compoſed of wheels and pinions, and a regulator to direct the quickneſs or ſlowneſs of the wheels, and of a ſpring which communicates motion to the whole machine. But the regulator and ſpring of a watch are vaſtly inferior to the weight and pendulum of a clock, neither of which can be employed in watches. In place of a pendulum, therefore, we are obliged to uſe a balance (fig. 4.) to regulate the motion of a watch; and of a ſpring (fig. 6.) which ſerves in place of a weight, to give motion to the wheels and balance.

Plate LXXX. (Vol. III.)

The wheels of a watch, like thoſe of a clock, are placed in a frame formed of two plates and four pillars. Fig. 3. repreſents the inſide of a watch, after the plate (fig. 5.) is taken off. A is the barrel which contains the ſpring (fig. 6.) the chain is rolled about the barrel, with one end of it fixed to the barrel A, and the other to the fuſee B.

When a watch is wound up, the chain which was upon the barrel winds about the fuſee, and by this means the ſpring is ſtretched; for the interior end of the ſpring is fixed by a hook to the immoveable axis, about which the barrel revolves; the exterior end of the ſpring is fixed to the inſide of the barrel, which turns upon an axis. It is therefore eaſy to perceive how the ſpring extends itſelf, and how its elaſticity forces the barrel to turn round, and conſequently obliges the chain which is upon the fuſee to unfold and turn the fuſee; the motion of the fuſee is communicated to the wheel CC; then, by means of the teeth, to the pinion *c*, which carries the wheel D; then to the pinion *d*, which carries the wheel E; then to the pinion *e*, which carries the wheel F; then to the pinion *f*, upon which is the balance-wheel G, whoſe pivot runs in the pieces A called the *potance*, and B called a *follower*, which are fixed on the plate fig. 5. This plate, of which only a part is repreſented, is applied to that of fig. 3. in ſuch a manner, that the pivots of the wheels enter into holes made in the plate fig. 3. Thus the impreſſed force of the ſpring is communicated to the wheels: and the pinion *f* being then connected to the wheel F, obliges it to turn (fig. 7.) This wheel acts upon the palettes of the verge 1. 2. (fig. 4.) the axis of which carries the balance HH, (fig. 4. The pivot I, in the end of the verge, enters into the hole *c* in the potance A (fig. 5.) In this figure the palettes are repreſented; but the balance is on the other ſide of the plate, as may be ſeen in fig. 11. The pivot 3 of the balance enters into a hole of the cock BC, (fig. 10.) a perſpective view of which is repreſented in (fig. 12.) Thus the balance turns between the cock and the potance *c*, (fig. 5.) as in a kind of cage. The action of the balance-wheel upon the palettes 1, 2, (fig. 4.) is the ſame with what we have deſcribed with regard to the ſame wheel in the clock; *i. e.* in a watch the balance-wheel obliges the balance to vibrate backwards and forwards like a pendulum. At each vibration of the balance a palette allows a tooth of the balance-wheel to eſcape; ſo that the quickneſs of the motion of the wheels is entirely determined by the quickneſs of the vibrations of the balance, and theſe vibrations of the balance and motion of the wheels are produced by the action of the ſpring.

Watch ‖ Water.

But the quickneſs or ſlowneſs of the vibrations of the balance depend not ſolely upon the action of the great ſpring, but chiefly upon the action of the ſpring *a*, *b*, *c*, called *the ſpiral ſpring*, (fig. 14.) ſituated under the balance H, and repreſented in perſpective (fig. 11.) The exterior end of the ſpiral is fixed to the pin *a*, (fig. 14.) This pin is applied near the plate in *a*, (fig. 11.); the interior end of the ſpiral is fixed by a peg to the centre of the balance. Hence if the balance is turned upon itſelf, the plates remaining immoveable, the ſpring will extend itſelf, and make the balance perform one revolution. Now, after the ſpiral is thus extended, if the balance be left to itſelf, the elaſticity of the ſpiral will bring back the balance, and in this manner the alternate vibrations of the balance are produced.

In fig. 7. all the wheels above deſcribed are repreſented in ſuch a manner, that you may eaſily perceive at firſt ſight how the motion is communicated from the barrel to the balance.

In fig. 8. are repreſented the wheels under the dial-plate by which the hands are moved. The pinion *a* is adjuſted to the force of the prolonged pivot of the wheel D, (fig. 7.) and is called a *cannon pinion*. This wheel revolves in an hour. The end of the axis of the pinion *a*, upon which the minute-hand is fixed, is ſquare; the pinion (fig. 8.) is indented into the wheel *b*, which is carried by the pinion *a*. Fig. 9. is a wheel fixed upon a barrel, into the cavity of which the pinion *a* enters, and upon which it turns freely. This wheel *d* revolves in 12 hours, and carries along with it the hour-hand.

WATCHING, in medicine, is when, through too great a determination of blood to the head, or emptineſs of the veſſels, and an exhauſted ſtate of the body, the patient cannot ſleep. In fevers it is a dangerous ſymptom, and if long continued ends in a delirium.

WATER, in phyſiology, a clear inſipid and colourleſs fluid, coagulable into a tranſparent ſolid ſubſtance at 32° of Fahrenheit's thermometer, and volatile in every degree of heat above that. Many different kinds of waters are commonly ſpoken of, ſuch as Chalybeate waters, ſulphureous, ſaline, putrid waters, &c. but all theſe differ from one another only in having various ſubſtances mixed with them, from which when perfectly freed, the water is always the ſame; ſo that it has not improperly been reckoned one of the four elements.

The general and moſt effectual method of freeing water from any heterogeneous ſubſtance is diſtillation. Thus it may be perfectly purified from almoſt every ſaline ſubſtance whatever; and thus ſea-water may be rendered perfectly freſh and wholeſome. It muſt be obſerved, however, that all diſtilled water acquires an empyreumatic ſmell and taſte by this operation; ſo that it makes but diſagreeable drink until it has ſtood for ſome time. Another diſadvantage which attends water when newly diſtilled, is its want of fixed air; which, however, it ſoon recovers by expoſure to the air for ſome time. If water is actually putrid, it cannot be made fit for uſe by ſimple diſtillation. In this caſe a quantity of lime is neceſſary, which extracts a volatile alkali, but deſtroys the putrid ſubſtance, After the water is once diſtilled in this manner, it may be more fully purified by adding ſome vitriolic or other acid to neutraliſe the alkali, and rediſtilling it with this addition. The ſubſtance from which it is moſt difficult to free water is any volatile oil. This riſes in diſtillation, and will alſo paſs through every kind of ſtrainer. The only cure in this caſe therefore is to expoſe the fluid for a conſiderable time to the air, when the oil will fly off or become effete and fixed, ſo that it cannot riſe in diſtillation; after which the water may eaſily be purified.

Whether or not it is poſſible to convert water into earth, is a queſtion which has much engaged the attention of philoſophers. Mr Boyle relates, that a friend of his, by diſtilling a quantity of water an hundred times, found at length, that he had got ſix-tenths of the firſt quantity in earth: whence he concludes, that the whole water, by further proſecuting the operation, might be converted into earth. Others have made experiments to the ſame purpoſe, and ſeemingly with the ſame ſucceſs; but the deception is now found out. Water has the power of corroding the hardeſt bodies, even glaſs itſelf, by long digeſtion, eſpecially when aſſiſted by heat; and hence thoſe who have made the experiments juſt mentioned have been themſelves deceived, by ſuppoſing the earth which really came from the containing veſſel to come from the water.

It is ſurpriſing to conſider the plenteous ſtock of water which even dry bodies afford. Hartſhorn kept forty years, and turned as hard and dry as any metal, ſo that if ſtruck againſt a flint it will yield ſparks of fire; yet being put into a veſſel, and diſtilled, will afford one-eighth part of its quantity of water. Bones dead and dried 25 years, and thus become almoſt as hard as iron; yet, by diſtillation, have afforded half their weight of water. And the hardeſt ſtones, ground and diſtilled, do always diſcover a portion thereof.

From conſiderations of this kind, Thales, and ſome other philoſophers, have been led to hold, that all things were made of water; which opinion, probably, had its riſe from the writings of Moſes, where he ſpeaks of the ſpirit of God moving upon the face of the waters: But Mr Boyle does not conceive the water here mentioned by Moſes as the univerſal matter, to be our elementary water: we need only ſuppoſe it an agitated congeries of a great variety of ſeminal principles, and of other corpuſcles fit to be ſubdued and faſhioned by them; and it may yet be a body fluid like water, in caſe the corpuſcles it was made up of were by their Creator made ſmall enough, and put into ſuch an actual motion as might make them roll and glide eaſily over one another. However, Baſil Valentine, Paracelſus, Van Helmont, Sendivogius, and others, have maintained the ſame principle, viz. that water is the elemental matter or ſtamen of all things, and ſuffices alone for the production of all the viſible creation. Thus Sir Iſaac Newton, "All birds, beaſts, and fiſhes, inſects, trees, and vegetables, with their ſeveral parts, do grow out of water, and watery tinctures, and ſalts; and, by putrefaction, return again to watery ſubſtances."

Helmont endeavours to prove this doctrine from an experiment; wherein, burning a quantity of earth till all the oil was conſumed, and then mixing it up with water to draw out all the ſalt; and putting this earth, thus prepared, into an earthen pot, which nothing but rain-water could enter; yet a willow, planted therein, grew up to a conſiderable heighth and bulk, without any ſenſible diminution of the earth: whence he concluded, that the water was the only nutriment of the vegetable kind, as vegetables are of the animal. The ſame thing is inferred by Mr Boyle, from a parallel experiment: and the whole is countenanced by Sir Iſaac Newton, who obſerves, that water, ſtanding a few days in the open air, yields a tincture, which, like that of malt, by ſtanding longer, yields a ſediment, and a ſpirit; but before putrefaction, is fit nouriſhment for animals and vegetables.

But Dr Woodward endeavours to ſhow the whole a miſtake: water containing extraneous corpuſcules, ſome of theſe, he ſhows, are the proper matter of nutrition; the water being ſtill found to afford ſo much the leſs nouriſhment the more it is purified by diſtillation. Thus a plant in diſtilled water will not grow ſo faſt as in water not diſtilled; and if the water be diſtilled three or four times over, the plant will ſcarce grow at all, or receive any nouriſhment from it. So that water, as ſuch, does not ſeem the proper nutriment of vegetables, but only the vehicle thereof, which contains the nutritious particles, and carries them along with it through all the parts of the plant. See AGRICUTURE, ſect. i. ii.

No ſtandard for the weight and purity of water.—Water ſcarce ever continues two moments exactly of the ſame weight, by reaſon of the air and fire contained therein. Thus, a piece of pure limpid ice, laid in a nice balance, never continues in equilibrio. In effect, the expanſion of water in boiling, ſhows what effect the different degree of fire has, on the gravity of water. This makes it difficult to fix the ſpecific gravity of water, in order to ſettle its degree of purity; but this we may ſay in the general, that the pureſt water we can procure, is that wich is 880 times as heavy as air. However, neither have we any tolerable ſtandard in air: for, water being ſo much heavier than air, the more water is contained in the air, the heavier of courſe muſt it be; as, in effect, the principal part of the weight of the atmoſphere ſeems to ariſe from the water.

Property and effects of water.—Water is found the moſt penetrative of all bodies, after fire, and the moſt difficult to confine; ſo that a veſſel through which water cannot paſs may retain any thing. Nor is it any objection, that ſyrups and oils will ſometimes paſs through bodies which will hold water; this not being owing to the greater ſubtlety and penetration of their particles, but to the reſin wherewith the wood of ſuch veſſels abounds, to which oils and ſyrups are as menſtruums; ſo that, diſſolving the reſin, they make their way through the ſpaces left thereby: whereas water, not acting on reſins, is retained.

And yet water gradually makes its way even through all woods, and is only retainable in glaſs and metals; nay, it was found by experiment at Florence, that when ſhut up in a ſpherical veſſel of gold, and then violently preſſed with a huge force, it made its way through the pores even of the gold: ſo that the moſt ſolid body in nature is permeable to water.

Water has been ſuppoſed more fluid than air; a body being reputed more fluid than another, when its parts will find way through ſmaller pores: now air, it is known, will not paſs through leather, as is evident in the caſe of an exhauſted receiver covered therewith; whereas water paſſes with eaſe. Again, air may be retained in a bladder, but water oozes through. In effect, it is found, that water will paſs through pores ten times ſmaller than air will. M. Homberg, however accounts for this paſſage of water through the narrow pores of animal ſubſtances which will not admit the air, on another principle, viz. its moiſtening and diſſolving the glutinous matter of the fine fibres of the membranes, and rendering them more pliable and diſtractile; which the air, for want of a wetting property, cannot do. As a proof of this doctrine, he filled a bladder, and compreſſed it with a ſtone, and found no air to come out; but placing the bladder thus compreſſed in water, the air eaſily eſcaped.

This property of water, joined with is ſmoothneſs and lubricity, fits it to ſerve as a vehicle for the commodious and eaſy conveyance of the nutritious matter of all bodies: being ſo fluid, and paſſing and repaſſing ſo readily, it never ſtops up the pores, but leaves room for the following water to bring on a new ſupply of nutritious matter. And yet the ſame water, as little coheſive as it is, and as eaſily ſeparated from moſt bodies, according to ſome is the principle of union in a great number of bodies, and binds them together into the moſt ſolid maſſes. Water, we ſee, mixed up with earth or aſhes, gives them the utmoſt firmneſs and fixity. The aſhes, *e. gr.* of an animal, incorporated with pure water into a paſte, and baked with a vehement fire, grow into a coppel; which is a body remarkable for this, that it will bear the utmoſt effort of a refiner's furnace. It is, in effect, upon the glutinous nature of water alone that our houſes ſtand: for take but this out of wood, and it becomes aſhes; or out of tiles, and they become duſt. Thus, a little clay dried in the ſun, becomes a powder, which, mixed with water, ſticks together again, and may be faſhioned at pleaſure; and this dried again by a gentle fire, or in the ſun, and then baked in a potter's oven by an intenſe fire, becomes little other than a ſtone. It cannot however be proved that the ſmall quantity of water ſuppoſed to remain in bricks, &c. is the cauſe of their coheſion. It ſeems more probable that an incipient vitrification is the reaſon why bricks and earthen ware of all kinds ſtick together. Some of theſe, porcelain and ſtone ware in particular, are evidently vitrified.

For a long time water was ſuppoſed to be incompreſſible, or incapable of being, by any force whatever, reduced into a leſs compaſs. This was thought to be demonſtrated by the famous experiment above-mentioned, made by order of the great duke of Tuſcany. The water being incapable of condenſation, rather than yield, tranſuded through the pores of the metal, ſo that the ball was found wet all over the outſide; till at length making a cleft in the gold, it ſprung out with great vehemence. From this laſt circumſtance, indeed, ſome have weakly concluded it was elaſtic. For the impetus wherewith the water darted forth, was more probably owing to the elaſticity of the gold, which communicated that impreſſion to the water.—Of late, however, the contrary opinion has been adopted; and Mr Canton has made ſome experiments to ſhow, that water not only may be, but actually is, compreſſed, by the weight of the atmoſphere. Theſe we ſhall relate in his own words. "Having procured a ſmall glaſs-tube of about two feet in length, with a ball at one end of it of an inch and a quarter in diameter, I filled the ball and part of the tube with mercury; and keeping it with a Farenheit's thermometer in water which was frequently ſtirred, it was brought exactly to the heat of 50°; and the place where the mercury ſtood in the tube, which was about $6\frac{1}{2}$ inches above the ball, was carefully marked. I then raiſed the mercury by heat to the top of the tube, and ſealed the tube hermetically; and when the mercury was brought to the ſame degree of heat as before, it ſtood in the tube $\frac{32}{100}$ of an inch higher than the mark.

"The ſame ball, and part of the tube, being filled with water exhauſted of air inſtead of the mercury, and the place where the water ſtood in the tube when it came to reſt in the heat of 50° being marked, which being ſealed ſix inches above the ball, the water was then raiſed by heat till it filled the tube; which being ſealed again, and the water brought to the heat of 50° as before, it ſtood in the tube $\frac{43}{100}$ of an inch above the mark.

"Now the weight of the atmoſphere (or about 73 pounds averdupois) preſſing on the outſide of the ball and not on the inſide, will ſqueeze it into leſs compaſs. And by this compreſſion of the ball the mercury and water will be equally raiſed in the tube: but the water is found, by the experiments above related, to riſe $\frac{11}{100}$ of an inch more than the mercury, by removing the weight of the atmoſphere.

"In order to determine how much water is compreſſed by this or a greater weight, I took a glaſs ball of about an inch and $\frac{6}{10}$ in diameter, which was joined to a cylindrical tube of four inches and $\frac{2}{10}$ in length, and diameter about $\frac{1}{100}$ of an inch; and by weighing the quantity of mercury that exactly filled the whole length of the tube, I found that the mercury in $\frac{23}{100}$ of an inch of the tube, was the 100,000th part of that contained in the ball; and with the edge of a file I divided the tube accordingly.

"This being done, I filled the ball and part of the tube with water exhauſted of air; and left the tube open, that the ball, whether in rarefied or condenſed air, might always be equally preſſed within and without, and therefore not altered in its dimenſions. Now by placing this ball and tube under the receiver of an air-pump, I could ſee the degree of expanſion of the water anſwering to any degree of rarefaction of the air; and by putting it into a glaſs receiver of a condenſing engine, I could ſee the degrees of compreſſion of the water anſwering to any degree of condenſation of the air. But great care muſt be taken in making theſe experiments, that the heat of the glaſs ball be not altered, either by the coming on of moiſture, or its going off by evaporation; which may eaſily be prevented by keeping the ball under water, or by uſing oil only in working the pump and condenſer.

" In this manner, I have found by repeated trials, when the heat of the air has been above 50°, and the mercury at a mean height in the barometer, that the water will expand and riſe in the tube by removing the weight of the atmoſphere four diviſions and $\frac{6}{10}$; or one part in 21,740; and will be as much compreſſed under the weight of an additional atmoſphere. Therefore the compreſſion of water by twice the weight of the atmoſphere, is one part in 10,870 of its whole bulk.

" The famous Florentine experiment, which ſo many philoſophical writers have mentioned as a proof of the incompreſſibility of water, will not, when carefully conſidered, appear ſufficient for that purpoſe: for in forcing any part of the water contained in a hollow globe of gold through its pores by preſſure, the figure of the gold muſt be altered, and conſequently the internal ſpace containing the water diminiſhed; but it was impoſſible for the gentlemen of the academy *del Cimento* to determine, that the water which was forced into the pores and through the gold, was exactly equal to the diminution of the internal ſpace by the preſſure."

An eaſy confirmation of this doctrine of Mr Canton's would be, to fill a vial exactly with water taken up at a great depth, by a perſon in a diving bell. If the water at that depth was really compreſſed by what lay above it, it muſt expand during its aſcent to the ſurface, and either break the vial, or drive out the ſtopper.

Hard WATER. By this name is underſtood ſuch water as will not entirely diſſolve ſoap, but produces a white or greyiſh coagulum, more or leſs in quantity in proportion to the hardneſs of the water. Formerly the hardneſs of waters was thought to be occaſioned by ſea-ſalt: but Dr Home in his Treatiſe on Bleaching, ſhows, that this ſalt can never make water hard, nor indeed can it be done by any perfect neutral, unleſs mixed in very large quantity with the water. On the other hand, acids of all kinds, imperfect neutrals, and ammoniacal ſalts, will harden water. The reaſon of this is, that the alkali of the ſoap has a leſs attraction for the oil with which it is united than with the acid, and therefore leaves the oil in order to unite with it; and it is the oil thus ſeparated which we ſee floating like a curd in hard water when ſoap is mixed with it. From this theory we have an eaſy method of ſoftening hard waters; *viz.* by diſſolving in them a quantity of fixed alkali ſufficient to abſorb the acid, after which it can have no more effect in ſeparating the oil which makes part of the ſoap. The moſt common ſubſtances by which waters are rendered hard, are ſelenites and calcareous nitre. From the former they may in good meaſure be freed by boiling; but not from the latter, nor from any imperfect ſalt which readily diſſolves in water.

Holy WATER, a water prepared every Sunday in the Romiſh church, with divers prayers, exorciſms, &c. uſed by the people to croſs themſelves withal at their entrance to and going out of church; and pretended to have the virtue of waſhing away venial ſins, driving away devils, preſerving from thunder, diſſolving charms, ſecuring from, or curing diſeaſes, &c. Many of the Reformed take the uſe of holy water to have been borrowed from the luſtral water of the ancient Romans.

Medicinal WATERS are generally impregnated with iron diſſolved in the aerial acid or fixed air, with vitriol, ſulphur, bitumen, &c. in conſequence of which they produce various effects on the human body. The following directions for analiſing them are given by Dr Lettſom.

Naturaliſt and Travellers Companion.

" As many ſprings contain a volatile principle ſoon liable to be diſſipated, it is neceſſary to make our experiments on the ſpot, in order to diſcover the contents of ſuch waters. Various as theſe contents may at firſt appear, the apparatus proper to detect all of them may be reduced into a very ſmall compaſs.

" When we propoſe to examine any medicinal ſpring, the ſoil and face of the country ſhould be conſidered, the ſtony or mineral appearance, and particularly whether there are any mineral veins; the degree of heat of the water ſhould be aſcertained by a thermometer, and its comparative weight to other ſprings in the neighbourhood alſo carefully obſerved; after which we may enter on our experiments.

" I. *Aërial Matters.* 1. MEPHITIC, fixable, or fixed air, is heavier than common or vital air, and frequently mixed with water; by which union common water is capable of diſſolving iron, and thereby forming a chalybeate ſpring, as in Pyrmont, Spa, and many other celebrated mineral waters.

" This mephitic air is detected by lime-water; the former precipitating the calcareous earth of the latter in a white powder. To diſcover the quantity of this aërial matter, a bottle filled with the mineral water ſhould be tied over the mouth with a looſe bladder: the bottle is then to be placed in boiling water, the heat whereof will extricate the mephitic air, which riſing into the bladder, may be collected by tying the bladder cloſe to the neck of the bottle, and afterwards meaſured by a proportionable bulk of water.

" II. *Saline Bodies.* 1. AN acid is ſometimes found in the compoſition of mineral waters, which is always the vitriolic.

" a, In its fixed ſtate, which is ſuppoſed to be ſeparated from pyrites: this is however very rare, and probably never occurs, as it cannot remain long in this ſtate without being neutraliſed by earths, ſalts, or metals.—Many of thoſe ſprings called *acidulæ*, received this name from the mephitic air we have already mentioned. If this acid be preſent, it may be diſcovered by an infuſion of ſyrup of violets, or by an infuſion of lacmus, or archil, which are turned of a brighter or reddiſh colour by it. This acid may be detected alſo by a ſolution of lead in the nitrous acid; the ſolution ſhould be fully ſaturated. The nitrous acid uniting with calcareous earth, or foſſil alkali, falls in a white ſediment, while the vitriolic acid combines with the lead.

“ b, In its volatile ſulphureous ſtate.

“ 2. An alkali is alſo very ſeldom found in water in its proper ſtate.

“ When a foſſil alkali is preſent, it is more nicely detected by the ſyrup of violets, or infuſion of lacmus, than the former, theſe being turned green by the leaſt portion of alkali. If a conſiderable quantity of alkali were combined with the water, it might be precipitated by a ſolution of calcareous earth, or by acids.

“ A volatile alkali may be diſtinguiſhed by a ſolution of corroſive ſublimate mercury in water, or in the nitrous acid, the alkali rendering the ſolution white, a precipitation of a white powder enſues: but no change is produced when the alkali is the fixed or foſſil; or if any, the mercury will be precipitated in an orange, brown, or reddiſh powder; where there is a conſiderable quantity of the volatile alkali, the water turns blue by the addition of copper. When this alkali is in a very ſmall proportion, ſome of the water ſhould be diſtilled over.

“ 3. Neutral ſalts are frequently found in medicinal waters.

“ Glauber's ſalt, compounded of vitriolic acid, and fixed foſſil alkali; ſpirit of wine added to a ſolution of this ſalt precipitates it in a white powder; but no change is produced by the addition of any alkaline ſalt.

“ Epſom ſalt, formed of the ſame acid, and the earth of magneſia, is often a compoſition in purging waters. Any alkaline ſalt, either fixed or volatile, turns this water milky or curdly; the alkaline ſalt uniting with the vitriolic acid precipitates the earth of magneſia.

“ Nitre is compoſed of the nitrous acid and fixed alkali. Water containing this ſalt ſhould be evaporated, and the nitre remaining may be known by deflagration, or by its making a crackling noiſe over the fire. When the nitrous acid is combined with calcareous earth inſtead of the fixed alkali, the earth may be precipitated by the addition of this alkali.

“ Common ſalt, conſiſting of the muriatic acid, and foſſil alkaline ſalt. The acid of this ſalt is nicely detected by a ſolution of ſilver in the nitrous acid; the muriatic acid having a nearer affinity with ſilver than the nitrous, unites with the ſilver, which falls down in a white ſediment, while the nitrous acid joins with the alkali of the common ſalt. It is proper to have a redundancy of the nitrous acid in the ſolution of ſilver, leſt the ſilver be precipitated by a calcareous earth which may be in the water.

“ III. *Earthy Subſtances.* Calcareous earth, or calcined lime-ſtone, is found in moſt wells and medicinal ſprings; the preſence of which is beſt diſcovered by a ſolution of lead in the nitrous acid. This acid ſhould be ſaturated with as much lead as it will diſſolve, leſt the ſuperfluous acid ſhould ſaturate the earth and prevent the precipitation of the lead. If there be any calcareous earth in the water, this ſolution turns it milky, and after ſome time a white powder is depoſited, the calcareous earth precipitating the lead, by uniting with the nitrous acid.

“ If calcareous earth be ſuſpended in water by combination with the vitriolic acid, gypſum or ſelenites is formed, which may be diſcovered by the addition of alkaline ſalt to this compound; the mixture ſhould be warmed a little, to promote the precipitation of the ſelenitic earth.

“ The ſame acid united with argillaceous earth, or earth of alum, produces an aluminous auſtere compoſition; and the earth may be precipitated alſo by alkaline ſalt, which uniting with the vitriolic acid, allows the earth to fall down in a ſediment.

“ IV. *Sulphureous.* Sulphur may be ſuſpended in its proper form, tho' it is not ſoluble in this ſtate: but when the principle of inflammability in ſulphur is combined with calcareous earth, or any alkali, in the form of an hepar ſulphuris, it readily diſſolves; in which caſe the water ſmells diſagreeably, like the ſcourings of a gun, or putrid eggs. It is diſtinguiſhed alſo by a ſolution of ſaccharum ſaturni (ſugar of lead) in the nitrous or vegetable acids: a little of this ſolution being marked in lines on paper, and the paper ſuſpended over the water, the volatile ſulphureous fumes ariſing from the water turn theſe lines of a brown or dark colour; the inflammable matter of the ſulphur uniting with the lead in the ſolution of the ſaccharum ſaturni, partly revives the metal, and hence produces that dark colour.

“ V. *Bituminous Bodies.* Bitumen frequently runs from amongſt rocks, whence it is called *petroleum;* it is alſo common in the bowels of the earth, as hath been often fatally experienced from thoſe bituminous vapours called *fire-damps*, which prove inflammable, and therefore differ from mephitic air, the latter extinguiſhing fire. Whether this inflammable vapour is formed of the principle of inflammability of ſulphur and the vitriolic acid in a volatile ſtate, is not ſo well aſcertained as the remarkable effects produced by theſe bituminous bodies in the mountains of Ætna, Veſuvius, and many others mentioned in hiſtory.

“ Liquid bitumen, naphtha, or petroleum, is never found combined with water, but floats on its ſurface in a manner evident to the eye, and may be particularly diſtinguiſhed by the taſte and ſmell.

“ VI. *Metallic Subſtances.* Iron is a common ingredient in mineral waters, whence they are called *chalybeate.* The general method of diſtinguiſhing this metal is by an infuſion of powder of galls, which turns water containing iron of a purple or black colour, deeper in proportion to the quantity of iron preſent.

“ But the moſt accurate method is by means of the Pruſſian alkali fully ſaturated with the inflammable matter of dried blood. This alkali mixed with a chalybeate water turns the latter immediately blue, and depoſits the iron in a powder of the ſame colour.

“ Copper in water is precipitated in a red powder by the ſame alkali.

“ Zinc is precipitated in a white powder by the Pruſſian alkali. Although this alkali precipitates all the metallic ſubſtances from acids, ſo that they may be diſtinguiſhed from one another, it does not any of the earths.

“ Arſenic has been ſuſpected in ſome mineral ſprings, but I am acquainted with no proof of it. However, it may poſſibly happen that water running through arſenical veins may carry off a quantity of arſenic. To diſcover this, the water ſhould be evaporated, and the reſiduum may be placed on a hot bar of iron; and if there be any arſenic, it is known by emitting a ſtrong garlic-like ſmell: or this reſiduum may be moiſtened with oil, and put between two bright plates of copper; which, when heated, are turned of a white colour if any arſenic be preſent: but the ſmell generally affords a ſufficient teſt."

Rain-WATER may be looked upon as the pureſt diſtilled water, but impregnated during its paſſage thro' the air with a conſiderable quantity of phlogiſtic and putreſcent matter; whence it is ſuperior to any other in fertilizing the earth. Hence alſo it is inferior for domeſtic purpoſes to ſpring or river-water, even if it could be readily procured; but ſuch as is got from ſpouts placed below the roofs of houſes, the common may of procuring it in this country, is evidently very impure, and becomes putrid in a ſhort time.

River or *Running* WATER, is next in purity to ſnow or diſtilled water; and for domeſtic purpoſes ſuperior to both, in having leſs putreſcent matter, and more fixed air. Such water, however, is to be choſen as runs in a clear ſtream through a rocky or ſtony channel; ſuch as paſſes over mud, clay, or moſſy ground, being impregnated with ſome part of theſe ſubſtances. The water of large rivers which run ſlowly is apt to be putreſcent.

Putrid WATER, is that which has acquired an offenſive ſmell and taſte by the putreſcence of animal or vegetable ſubſtances contained in it. It is in the higheſt degree pernicious to the human frame, and capable of bringing on mortal diſeaſes even by its ſmell. It is not always from the apparent muddineſs of waters that we can judge of their diſpoſition to putrefy; ſome which are ſeemingly very pure being more apt to become putrid than others which appear much more mixed with heterogeneous matters. Under the article ANIMALCULE, n° 33, is mentioned a ſpecies of inſects which have the property of making water ſtink to an incredible degree, though their bulk in proportion to the fluid which ſurrounds them, is leſs than that of one to a million. Other ſubſtances no doubt there are which have the ſame property; and hence almoſt all water which is kept confined from the air is apt to become offenſive, even though kept in glaſs or ſtone ware veſſels. Indeed it is a common obſervation, that water keeps much longer ſweet in earthen or ſtone ware veſſels than in glaſs; but of all others it is moſt apt to putrefy in thoſe of wood. Hence, as ſhips can only be ſupplied with water kept in wooden caſks, ſailors are extremely liable to thoſe diſeaſes which ariſe from putrid water; and the diſcovery of a method by which water could eaſily be prevented from becoming putrid at ſea would be exceedingly valuable. This may indeed be done by quicklime; for when water is impregnated with it, all putreſcent matters are either totally deſtroyed, or altered in ſuch a manner as never to be capable of undergoing the putrefactive fermentation again. But a continued uſe of lime-water could not fail of being pernicious, and it is therefore neceſſary to throw down the lime; after which the water will have all the purity neceſſary for preſerving it free from putrefaction. This can only be done by means of fixed air; and mere expoſure in broad ſhallow veſſels to the atmoſphere would do it without any thing elſe, only taking care to break the cruſt which formed upon it. Two methods, however, have been thought of for doing this with more expedition. The one, invented by Dr Alſton, is, by throwing into the water impregnated with lime a quantity of magneſia. The lime attracts fixed air more powerfully than magneſia, in conſequence of which the latter parts with it to the lime; which thus becoming inſoluble, falls along with the cauſtic magneſia to the bottom, and thus leaves the water perfectly pure. Another method is that of Mr Henry, who propoſes to throw down the lime by means of an efferveſcing mixture of oil of vitriol and chalk put down to the bottom of the water caſk. His apparatus for this purpoſe is as ſimple as it can well be made, though it is hardly probable that ſailors will give themſelves the trouble of uſing it; and Dr Alſton's ſcheme would ſeem better calculated for them, were it not for the expence of the magneſia; which indeed is the only objection made to it by Mr Henry. Putrid water may be reſtored and made potable by a proceſs of the ſame kind.

Sea-WATER is a ſolution of common ſalt, ſal catharticus amarus, a ſelenitic ſubſtance, and a compound of muriatic acid with magneſia, mixed together in various proportions. It may be freſhened by ſimple diſtillation without any addition; a diſcovery for which we are indebted to Dr Lind. Sea-water by itſelf has a purgative quality, owing to the ſalts it contains; and has been greatly recommended in ſcrophulous diſorders. Externally applied, ſea-water is more powerful than common water, by reaſon of its ſuperior coldneſs and ſpecific gravity.

Spring-WATER is commonly impregnated with a ſmall portion of imperfect neutral ſalt, extracted from the different ſtrata through which it percolates. Some contain a vaſt quantity of ſtony matter, which they depoſit as they run along, and thus form maſſes of ſtone; ſometimes incruſtating various animal and vegetable matters, which they are therefore ſaid to petrify. Spring-water is much uſed for domeſtic purpoſes, and on account of its coolneſs is an agreeable drink; but on account of its being generally ſomewhat hard, is inferior to that which has run for a conſiderable way in a channel.

WATER-*Engine*, or engine for extinguiſhing fires. See HYDROSTATICS, n° 33.

WATER-*Ordeal*. See ORDEAL.

WATER, among jewellers, is properly the colour or luſtre of diamonds and pearls. The term, though leſs properly, is ſometimes uſed for the hue or colour of other ſtones.

WATER-*Bellows*. See *Machines for blowing Air into* FURNACES.

WATER-*Colours*, in painting, are ſuch colours as are only diluted and mixed up with gum-water, in contradiſtinction to oil-colours. See COLOUR-*Making*.

WATER-*Gang*, a channel cut to drain a place by carrying off a ſtream of water.

WATER-*Line of a Ship*, certain horizontal lines ſuppoſed to be drawn about the outſide of a ſhip's bottom, cloſe to the ſurface of the water in which ſhe floats. They are accordingly higher or lower upon the bottom, in proportion to the depth of the column of water required to float her. See SHIP-*building*, Part I.

WATER-*Lodged*, the ſtate of a ſhip when, by receiving a great quantity of water into the hold, by leaking, &c. ſhe has become heavy and inactive upon the ſea, ſo as to yield without reſiſtance to the efforts of every wave ruſhing over her decks. As, in this dangerous ſituation, the centre of gravity is no longer fixed, but fluctuating from place to place, the ſtability of the ſhip is utterly loſt: ſhe is therefore almoſt totally deprived of the uſe of her ſails, which would operate to overſet her, or preſs the head under water. Hence there is no reſource for the crew, except to free her by the pumps, or to abandon her by the boats as ſoon as poſſible.

Water-*Sail*, a ſmall ſail ſpread occaſionally under the lower ſtudding-ſail, or driver-boom, in a fair wind and ſmooth ſea.

Water-*Spout*, an extraordinary and dangerous meteor, conſiſting of a large maſs of water, collected into a ſort of column by the force of a whirlwind, and moved with rapidity along the ſurface of the ſea.

A variety of authors have written on the cauſe and effects of theſe meteors, with different degrees of accuracy and probability.

Dr Franklin, in his phyſical and meteorological obſervations, ſuppoſes a water-ſpout and a whirlwind to proceed from the ſame cauſe; their only difference being, that the latter paſſes over the land, and the former over the water. This opinion is corroborated by M. de la Pryme, in the Philoſophical Tranſactions, where he deſcribes two ſpouts obſerved at different times in Yorkſhire, whoſe appearances in the air were exactly like thoſe of the ſpouts at ſea, and their effects the ſame as thoſe of real whirlwinds.

Whirlwinds have generally a progreſſive as well as circular motion; ſo had what is called the ſpout at Topſham, deſcribed in the Tranſactions; and this alſo by its effects appears to have been a real whirlwind.—Water-ſpouts have alſo a progreſſive motion, which is more or leſs rapid; being in ſome violent, and in others barely perceptible.

Whirlwinds generally riſe after calms and great heats: the ſame is obſerved of water-ſpouts, which are therefore moſt frequent in the warm latitudes.

The wind blows every way from a large ſurrounding place to a whirlwind. Three veſſels, employed in the whale-fiſhery, happening to be becalmed, lay in ſight of each other, at about a league diſtance, and in the form of a triangle. After ſome time a water-ſpout appeared near the middle of the triangle; when a briſk gale aroſe, and every veſſel made ſail. It then appeared to them all by the trimming of their ſails, and the courſe of each veſſel, that the ſpout was to leeward of every one of them; and this obſervation was further confirmed by the comparing of accounts when the different obſervers afterwards conferred about the ſubject. Hence whirlwinds and water-ſpouts agree in this particular likewiſe.

But if the ſame meteor, which appears a water-ſpout at ſea, ſhould, in its progreſſive motion, encounter and paſs over land, and there produce all the phenomena and effects of a whirlwind, it would afford a ſtronger conviction that a whirlwind and a water-ſpout are the ſame thing. An ingenious correſpondent of Dr Franklin gives one inſtance of this that fell within his own obſervation.

"I had often ſeen (ſays he) water-ſpouts at a diſtance, and heard many ſtrange ſtories of them, but never knew any thing ſatisfactory of their nature or cauſe, until that which I ſaw at Antigua; which convinced me that a water-ſpout is a whirlwind, which becomes viſible in all its dimenſions by the water it carries up with it.

There appeared, not far from the mouth of the harbour of St John's, two or three water-ſpouts, one of which took its courſe up the harbour. Its progreſſive motion was ſlow and unequal, not in a ſtraight line, but as it were by jerks or ſtarts. When juſt by the wharf, I ſtood about 100 yards from it. There appeared in the water a circle of about 20 yards diameter, which to me had a dreadful though pleaſing appearance. The water in this circle was violently agitated, being whiſked about, and carried up into the air with great rapidity and noiſe, and reflected a luſtre, as if the ſun ſhined bright on that ſpot, which was more conſpicuous, as there appeared a dark circle around it. When it made the ſhore, it carried up with the ſame violence ſhingles, ſtaves, large pieces of the roofs of houſes, &c. and one ſmall wooden houſe it lifted entirely from the foundation on which it ſtood, and carried it to the diſtance of 14 feet, where it ſettled without breaking or overſetting; and, what is remarkable, though the whirlwind moved from weſt to eaſt, the houſe moved from eaſt to weſt. Two or three negroes and a white woman were killed by the fall of the timber, which it carried up into the air, and dropped again. After paſſing through the town, I believe it was ſoon diſſipated; for, except tearing a large limb from a tree, and part of the cover of a ſugar-work near the town, I do not remember any further damage done by it."

A fluid moving from all points horizontally towards a centre, muſt at that centre either mount or deſcend. If a hole be opened in the middle of the bottom of a tub filled with water, the water will flow from all ſides to the centre, and there deſcend in a whirl: but air flowing on or near the ſurface of land or water, from all ſides towards a centre, muſt at that centre aſcend; becauſe the land or water will hinder its deſcent.

If theſe concentring currents of air be in the upper region, they may indeed deſcend in the ſpout or whirlwind; but then, when the united current reached the earth or water, it would ſpread, and probably blow every way from the centre. There may be whirlwinds of both kinds; but from the effects commonly obſerved, Dr Franklin ſuſpects the riſing one to be moſt frequent: when the upper air deſcends, it is perhaps in a greater body, extending wider, as in thunder-guſts, and without much whirling; and when air deſcends in a ſpout or whirlwind, he conceives that it would rather preſs the roof of a houſe inwards, or force in the tiles, ſhingles, or thatch, and force a boat down into the water, or a piece of timber into the earth, than ſnatch them upwards, and carry them away.

The whirlwinds and ſpouts are not always, though moſt frequently, in the day-time. The terrible whirlwind which damaged a great part of Rome, June 11, 1749, happened in the night, and was ſuppoſed to have been previouſly a water-ſpout, it being aſſerted as an undoubted fact, that it gathered in the neighbouring ſea, becauſe it could be traced from Oſtia to Rome.

This whirlwind is ſaid to have appeared as a very black, long, and lofty cloud, diſcoverable, notwithſtanding the darkneſs of the night, by its continually lightning, or emitting flaſhes on all ſides, puſhing along

long with a ſurpriſing ſwiftneſs, and within three or four feet of the ground. Its general effects on houſes were, ſtripping off the roofs, blowing away chimnies, breaking doors and windows, forcing up the floors, and unpaving the rooms; and the very rafters of the houſes were broke and diſperſed, and even hurled againſt houſes at a conſiderable diſtance, &c.

The Doctor, in proceeding to explain his conceptions, begs to be allowed two or three poſitions, as a foundation for his hypotheſis. 1. That the lower region of air is often more heated, and ſo more rarified, than the upper, and by conſequence ſpecifically lighter. The coldneſs of the upper region is manifeſted by the hail, which ſometimes falls from it in warm weather. 2. That heated air may be very moiſt, and yet the moiſture ſo equally diffuſed and rarified as not to be viſible till colder air mixes with it; at which time it condenſes and becomes viſible. Thus our breath, although inviſible in ſummer, becomes viſible in winter.

Theſe circumſtances being granted, he preſuppoſes a tract of land or ſea, of about 60 miles in extent, unſheltered by clouds and unrefreſhed by the wind, during a ſummer's day, or perhaps for ſeveral days without intermiſſion, till it becomes violently heated, together with the lower region of the air in contact with it; ſo that the latter becomes ſpecifically lighter than the ſuperincumbent higher region of the atmoſphere, wherein the clouds are uſually floated: he ſuppoſes alſo that the air ſurrounding this tract has not been ſo much heated during thoſe days, and therefore remains heavier. The conſequence of this, he conceives, ſhould be, that the heated lighter air ſhould aſcend, and the heavier deſcend; and as this riſing cannot operate throughout the whole tract at once, becauſe that would leave too extenſive a vacuum, the riſing will begin preciſely in that column which happens to be lighteſt or moſt rarified; and the warm air will flow horizontally from all parts to this column, where the ſeveral currents meeting, and joining to riſe, a whirl is naturally formed, in the ſame manner as a whirl is formed in a tub of water, by the deſcending fluid receding from all ſides of the tub towards the hole in the centre.

And as the ſeveral currents arrive at this central riſing column, with a conſiderable degree of horizontal motion, they cannot ſuddenly change it to a vertical motion; therefore as they gradually, in approaching the whirl, decline from right to curve or circular lines, ſo, having joined the whirl, they aſcend by a ſpiral motion: in the ſame manner as the water deſcends ſpirally through the hole in the tub before mentioned.

Laſtly, as the lower air neareſt the ſurface is more rarified by the heat of the ſun, it is more impreſſed by the current of the ſurrounding cold and heavy air which is to aſſume its place, and conſequently its motion towards the whirl is ſwifteſt, and ſo the force of the lower part of the whirl ſtrongeſt, and the centrifugal force of its particles greateſt. Hence the vacuum which incloſes the axis of the whirl ſhould be greateſt near the earth or ſea, and diminiſh gradually as it approaches the region of the clouds, till it ends in a point.

This circle is of various diameters, ſometimes very large.

If the vacuum paſſes over water, the water may riſe in a body or column therein to the height of about 32 feet. This whirl of air may be as inviſible as the air itſelf, though reaching in reality from the water to the region of cool air, in which our low ſummer thunder-clouds commonly float; but it will ſoon become viſible at its extremities. The agitation of the water under the whirling of the circle, and the ſwelling and riſing of the water in the commencement of the vacuum, renders it viſible below. It is perceived above by the warm air being brought up to the cooler region, where its moiſture begins to be condenſed by the cold into thick vapour, and is then firſt diſcovered at the higheſt part, which being now cooled condenſes what riſes behind it, and this latter acts in the ſame manner on the ſucceeding body; where, by the contact of the vapours, the cold operates faſter in a right line downwards, than the vapours themſelves can climb in a ſpiral line upwards: they climb, however; and as by continual addition they grow denſer, and by conſequence increaſe their centrifugal force, and being riſen above the concentrating currents that compoſe the whirl, they fly off, and form a cloud.

It ſeems eaſy to conceive, how, by this ſucceſſive condenſation from above, the ſpout appears to drop or deſcend from the cloud, although the materials of which it is compoſed are all the while aſcending. The condenſation of the moiſture contained in ſo great a quantity of warm air as may be ſuppoſed to riſe in a ſhort time in this prodigiouſly rapid whirl, is perhaps ſufficient to form a great extent of cloud; and the friction of the whirling air on the ſides of the column may detach great quantities of its water, diſperſe them into drops, and carry them up in the ſpiral whirl mixed with the air. The heavier drops may indeed fly off, and fall into a ſhower about the ſpout; but much of it will be broken into vapour, and yet remain viſible.

As the whirl weakens, the tube may apparently ſeparate in the middle; the column of water ſubſiding, the ſuperior condenſed part drawing up to the cloud. The tube or whirl of air may nevertheleſs remain entire, the middle only becoming inviſible, as not containing any viſible matter.

Dr Stuart, in the Philoſophical Tranſactions, ſays, "It was obſervable of all the ſpouts he ſaw, but more perceptible of a large one, that towards the end it began to appear like a hollow canal, only black in the borders, but white in the middle; and though it was at firſt altogether black and opaque, yet the ſea-water could very ſoon after be perceived to fly up along the middle of this canal like ſmoke in a chimney."

When Dr Stuart's ſpouts were full charged, that is, when the whirling pipe of air was filled with quantities of drops and vapour torn off from the column, the whole was rendered ſo dark that it could not be ſeen through, nor the ſpiral aſcending motion diſcovered; but when the quantity aſcending leſſened, the pipe became more tranſparent, and the aſcending motion viſible. The ſpiral motion of the vapours, whoſe lines interſect each other on the neareſt and furtheſt ſide of this tranſparent part, appeared therefore to Stuart like ſmoke aſcending in a chimney; for the quantity being ſtill too great in the line of ſight through the ſides of the tube, the motion could not be diſcovered there, and ſo they repreſented the ſolid ſides of the chimney.

Dr Franklin concludes by ſuppoſing a whirlwind or ſpout to be ſtationary, when the concurring winds are equal; but if unequal, the whirl acquires a progreſſive motion in the direction of the ſtrongeſt preſſure. When the wind that communicates this progreſſion becomes ſtronger above than below, or below than above, the ſpout will be bent or inclined. Hence the horizontal proceſs and obliquity of water-ſpouts are derived. See WHIRLWIND.

WATER-*works*, in general, denote all manner of machines moved by or employed in raiſing or ſuſtaining water. See HYDROSTATICS including HYDRAULICS.

WATER-*Works* for entertainment. See HYDROSTATICS, chap. iv.

WATERFORD, a county of Ireland in the province of Munſter, bounded on the weſt by the county of Cork; on the ſouth by the ocean; on the north by the river Sure, which parts it from the county of Tipperary and Kilkenny; and on the eaſt by its own haven, which parts it from the county of Waxford. Its greateſt length, according to ſome, is 46 miles, but according to others only 38; and its breadth 24. It contains 259,000 acres, and ſix baronies. The members it ſends to parliament are two knights for the ſhire, and two burgeſſes a-piece for Waterford city, Liſmore, Dungarvan, and Tallagh.

Waterford, capital of the county of the ſame name, ſtanding upon the river Sure, was firſt built by certain pirates of Norway, and hath been a biſhop's-ſee ever ſince the year 1096, when theſe pirates, who had embraced Chriſtianity, ſent Malchus, a benedictine monk of Wincheſter, to be conſecrated their biſhop by Anſelmn, archbiſhop of Canterbury. Till is was eclipſed by Cork, it was accounted the ſecond city in the kingdom for trade, wealth, and populouſneſs, being ſituated on a fine harbour, defended by Duncannon fort on the eaſt ſide. The ſoil, however, about it is barren, and the air thick. Many conſiderable privileges have been conferred upon it by the kings of England, as a reward for its conſtant fidelity, ſince it was firſt reduced by Richard earl of Pembroke. During the Iriſh rebellion it was in the hands of the rebels, who often made excurſions from it, and committed great outrages; but Oliver Cromwell reduced it in 1650. The Popiſh party got poſſeſſion of it alſo in 1689, and held it till after the battle of Boyn. Here is a fine cathedral; but the houſes are generally of timber, and make but a mean appearance. The city drives a great trade, particularly with England, and ſhips of burden come up cloſe to its fine key. Waterford haven extends near eight miles and a half from ſouth to north, almoſt in a ſtraight line, all the way deep and clear, and but little incumbered with rocks or ſand. The city and its liberties make a diſtinct county. There is a citadel on the weſt ſide, and on the eaſt a block-houſe and ſtore-houſe. Waterford, jointly with Waxford, or Weisford, gives the title of earl to the earl of Shrewſbury in England, and is the county town.

WATERING, in the manufactures, is to give a luſtre to ſtuffs, &c. by wetting them lightly with gum-water, and then paſſing them through the preſs or calender whether hot or cold. The gum-water ought to be pure, thin, and clear, otherwiſe the folds of the ſtuff will all ſtick together: the operation muſt alſo be performed when the water is very hot, that it may penetrate.

WATERLAND (Dr Daniel), a learned Engliſh divine who diſtinguiſhed himſelf greatly in theological controverſies, was born in 1683 at Waſely in Lincolnſhire, of which place his father was rector. He had his academical learning at Magdalen college, Cambridge, where he drew up a uſeful tract which went through ſeveral editions, intitled, *Advice to a young Student, with a Method of Study for the firſt four years.* In 1713 he became maſter of the college, was ſoon after appointed chaplain to George I. and in 1720, preached the firſt courſe of lectures founded by lady Moyer in defence of our Lord's divinity. He went through ſeveral promotions; and at the time of his death in 1740, was canon of Windſor, archdeacon of Middleſex, and vicar of Twickenham. Beſides his controverſial writings, he publiſhed two volumes of ſermons.

WATTS (Dr Iſaac), a learned and eminent diſſenting miniſter, was born at Southampton in 1674, of parents eminent for piety, and conſiderable ſufferers for conſcience-ſake. In 1690 he was ſent up to London for academical education, under the tuition of the Rev. Mr Thomas Rowe; and in 1696 was himſelf engaged as tutor to the ſon of Sir John Hartopp, bart. at Stoke Newington. He began to preach in 1698, and met with general acceptance; and after officiating for three years as an aſſiſtant to the Rev. Dr Iſaac Chauncy, he ſucceeded him in his paſtoral charge in 1702, and continued to preſide over that church as long as he lived. Though his whole income did not amount to an hundred a-year, he allotted one-third of it to the poor. He died in 1748. His numerous works have rendered his name famous among people of every denomination, both in this and other countries, and they have been tranſlated into a variety of languages. His Lyric Poems, his Pſalms and Hymns, and his divine Songs for Children, are a ſufficient proof of his poetical talents, and have had an amazing number of editions. His logic and philoſophy have been much admired. He alſo wrote works upon a variety of other ſubjects, and printed ſeveral volumes of his ſermons. He was admired for the mildneſs and benevolence of his diſpoſition, and the ſweetneſs of his manners. After his death, his works were collected, and publiſhed in ſix volumes quarto.

WATLING-STREET. See WAY.

WAVE, in philoſophy, a cavity in the ſurface of water, or other fluids, with an elevation aſide thereof.

The waves of the ſea are of two kinds, natural and accidental. The natural waves are thoſe which are exactly proportioned in ſize to the ſtrength of the wind, whoſe blowing gives origin to them. The accidental waves are thoſe occaſioned by the wind's reacting upon itſelf by repercuſſion from hills and mountains, or high ſhores, and by the waſhing of the waves themſelves; otherwiſe of the natural kind, againſt rocks and ſhoals: all theſe caſes give the waves an elevation, which they can never have in their natural ſtate.

Mr Boyle has proved, by numerous experiments, that the moſt violent wind never penetrates deeper than ſix feet into the water; and it ſhould ſeem a natural conſequence of this, that the water moved by it can only be elevated to the ſame height of ſix feet from the level of the ſurface in a calm: and this ſix feet of elevation being added to the ſix of excavation, in the part whence that water ſo elevated was raiſed, ſhould give twelve feet for the utmoſt elevation of a wave. This is a calculation that does great honour to its author: for count Marſigi meaſured carefully the elevation of the waves near Provence, and found, that in a very violent tempeſt they aroſe only to ſeven feet above the natural level of the ſea; and this additional foot in height he eaſily reſolved into the accidental ſhocks of the water againſt the bottom, which was, in the place he meaſured them in, not ſo deep as to be out of the way of affecting the waves; and he allows that the addition of one-ſixth of the height of a wave, from ſuch a diſturbance from the bottom, is a very moderate alteration from what would have been its height in a deep ſea; and concludes, that Mr Boyle's calculation holds perfectly right in deep ſeas, where the waves are purely natural, and have no accidental cauſes to render them larger than their juſt proportion. In deep water, under the high ſhores of the ſame part of France, this author found the natural elevation of the waves to be only five feet; but he found alſo, that their breaking againſt rocks, and other accidents to which they were liable in this place, often raiſed them to eight feet high.

We are not to ſuppoſe, from this calculation, that no wave of the ſea can riſe more than ſix feet above it natural level in open and deep water; for waves immenſely higher than theſe are formed in violent tempeſts in the great ſeas. This, however, are not to be accounted waves in their natural ſtate; but they are ſingle waves formed of many others: for in theſe wide plains of water, when one wave is raiſed by the wind, and would elevate itſelf up to the exact height of ſix feet, and no more, the motion of the water is ſo great, and the ſucceſſion of the waves ſo quick, that, during the time this is riſing, it receives into it ſeveral other waves, each of which would have been at the ſame height with itſelf; theſe run into the firſt wave, one after another, as it is riſing; by this means its riſe is continued much longer than it naturally would have been, and it becomes terribly great. A number of theſe complex waves ariſing together, and being continued in a long ſucceſſion by the continuation of the ſtorm, make the waves ſo dangerous to ſhips, which the ſailors in their phraſe call *mountains-high*.

Stilling WAVES *by means of oil.* This wonderful property, though well known to the ancients, as appears from the writings of Pliny, was for many ages either quite unnoticed, or treated as fabulous by ſucceeding philoſophers. Of late it has, by means of Dr Franklin, again attracted the attention of the learned; though from ſome anecdotes it appears that the vulgar have always been acquainted with it. In Martin's deſcription of the Weſtern Iſlands of Scotland, we have the following paſſage: "The ſteward of Kilda, who lives in Pabbay, is accuſtomed, in time of a ſtorm, to tie a bundle of puddings, made of the fat of ſea-fowl, to the end of his cable, and lets it fall into the ſea behind his rudder. This, he ſays, hinders the waves from breaking, and calms the ſea." Mr Pennant in his Britiſh Zoology, vol. iv. under the article *Seal*, takes notice, that when theſe animals are devouring a very oily fiſh, which they always do under water, the waves above are remarkably ſmooth; and by this mark the fiſhermen know where to find them. Sir Gilbert Lawſon, who ſerved long in the army at Gibraltar, aſſured Dr Franklin, that the fiſhermen in that place are accuſtomed to pour a little oil on the ſea, in order to ſtill its motion, that they may be enabled to ſee the oyſters lying at its bottom, which are there very large, and which they take up with a proper inſtrument. A ſimilar practice obtains among fiſhermen in various other parts, and Dr Franklin was informed by an old ſea-captain, that the fiſhermen of Liſbon, when about to return into the river, if they ſaw too great a ſurf upon the bar, to empty a bottle or two of oil into the ſea, which would ſuppreſs the breakers, and allow them to paſs freely.

The Doctor having revolved in his mind all theſe pieces of information, became impatient to try the experiment himſelf. At laſt having an opportunity of obſerving a large pond very rough with the wind, he dropped a ſmall quantity of oil upon it. But having at firſt applied it on the lee-ſide, the oil was driven back again upon the ſhore. He then went to the windward ſide, and poured on about a tea-ſpoonful of oil. This produced an inſtant calm over a ſpace ſeveral yards ſquare, which ſpread amazingly, and extended itſelf gradually till it came to the lee-ſide; making all that quarter of the pond, perhaps half an acre, as ſmooth as glaſs. This experiment was often repeated in different places, and always with ſucceſs. Our author accounts for it in the following manner:

"There ſeems to be no natural repulſion between water and air, to keep them from coming into contact with each other. Hence we find a quantity of air in water; and if we extract it by means of the air pump, the ſame water again expoſed to the air will ſoon imbibe an equal quantity.—Therefore air in motion, which is wind, in paſſing over the ſmooth ſurface of water, may rub as it were upon that ſurface, and raiſe it into wrinkles; which if the wind continues, are the elements of future waves. The ſmalleſt wave once raiſed does not immediately ſubſide and leave the neighbouring water quiet; but in ſubſiding raiſes nearly as much of the water next to it, the friction of the parts making little difference. Thus a ſtone dropped in a pool raiſes firſt a ſingle wave round itſelf, and leaves it, by ſinking to the bottom; but that firſt wave ſubſiding raiſes a ſecond, the ſecond a third, and ſo on in circles to a great extent.

"A ſmall power continually operating, will produce a great action. A finger applied to a weighty ſuſpended bell, can at firſt move it but little; if repeatedly applied, though with no greater ſtrength, the motion increaſes till the bell ſwings to its utmoſt height, and with a force that cannot be reſiſted by the whole ſtrength of the arm and body. Thus the ſmall firſt raiſed waves being continually acted upon by the wind, are, though the wind does not increaſe in ſtrength, continually increaſed in magnitude, riſing higher and extending their baſes, ſo as to include a vaſt maſs of water in each wave, which in its motion acts with great violence. But if there be a mutual repulſion between the particles of oil, and no attraction between oil and water, oil dropped on water will not be held together by adheſion to the ſpot whereon it falls; it will not be imbibed by the water; it will be at liberty to expand itſelf; and it will ſpread on a ſurface that, beſides being ſmooth to the moſt perfect degree of poliſh, prevents, perhaps by repelling the oil, all immediate contact, keeping it at a minute diſtance from itſelf; and the expanſion will continue, till the mutual repulſion between the particles of the oil is weakened and reduced to nothing by their diſtance.

“ Now I imagine that the wind blowing over water thus covered with a film of oil cannot eaſily catch upon it, ſo as to raiſe the firſt wrinkles, but ſlides over it, and leaves it ſmooth as it finds it. It moves a little the oil indeed, which being between it and the water, ſerves it to ſlide with, and prevents friction, as oil does between thoſe parts of a machine that would otherwiſe rub hard together. Hence the oil dropped on the windward ſide of a pond proceeds gradually to leeward, as may be ſeen by the ſmoothneſs it carries with it quite to the oppoſite ſide. For the wind being thus prevented from raiſing the firſt wrinkles that I call the *elements of waves*, cannot produce waves, which are to be made by continually acting upon and enlarging thoſe elements; and thus the whole pond is calmed.

“ Totally therefore we might ſuppreſs the waves in any required place, if we could come at the windward place where they take their riſe. This in the ocean can ſeldom if ever be done. But perhaps ſomething may be done on particular occaſions to moderate the violence of the waves when we are in the midſt of them, and prevent their breaking where that would be inconvenient. For when the wind blows freſh, there are continually riſing on the back of every great wave a number of ſmall ones, which roughen its ſurface, and give the wind hold, as it were, to puſh it with greater force. This hold is diminiſhed by preventing the generation of thoſe ſmall ones. And poſſibly too, when a wave's ſurface is oiled, the wind, in paſſing over it, may rather in ſome degree preſs it down, and contribute to prevent its riſing again, inſtead of promoting it.

“ This, as mere conjecture would have little weight, if the apparent effects of pouring oil into the midſt of waves were not conſiderable, and as yet not otherwiſe accounted for.

“ When the wind blows ſo freſh, as that the waves are not ſufficiently quick in obeying its impulſe, their tops being thinner and lighter are puſhed forward, broken, and turned over in a white foam. Common waves lift a veſſel without entering it; but theſe when large ſometimes break above and pour over it, doing great damage.

“ That this effect might in any degree be prevented, or the height and violence of waves in the ſea moderated, we had no certain account; Pliny's authority for the practice of ſeamen in his time being ſlighted. But diſcourſing lately on this ſubject with his excellency count Bentinck of Holland, his ſon the honourable captain Bentinck, and the learned profeſſor Allemand (to all whom I ſhowed the experiment of ſmoothing in a windy day the large piece of water at the head of the Green Park), a letter was mentioned which had been received by the Count from Batavia, relative to the ſaving of a Dutch ſhip in a ſtorm by pouring oil into the ſea.”

WAVED, in heraldry, is ſaid of a bordure, or any ordinary or charge, in a coat of arms, having its outlines indented in manner of the riſing and falling of waves: it is uſed to denote, that the firſt of the family in whoſe arms it ſtands, acquired its honours for ſea-ſervice.

WAVING, in the ſea-language, is the making ſigns to a veſſel to come near or keep off.

WAX, or *Bees*-WAX, in natural hiſtory, a firm and ſolid ſubſtance, moderately heavy, and of a fine yellow colour, formed by the bees from the farina of flowers. See APIS.

The beſt ſort is that of a lively yellow colour, and an agreeable ſmell, ſomewhat like that of honey: when new, it is toughiſh, yet eaſy to break; but by age it becomes harder and more brittle, loſes its fine colour, and in a great meaſure its ſmell.

From the common yellow wax, by the mere effect of ſun and air, or by what is called *bleaching*, is formed what we term *white-wax*, and ſome very improperly *virgin wax*. The greater the ſurface is in proportion to the quantity, the ſooner and more perfectly this operation is performed. The uſual way is to melt the wax in hot water; when melted, they preſs it through a ſtrainer of tolerable fine linen, and pour it into round and very ſhallow moulds. When hardened by cooling, it is taken out and expoſed to the ſun and air, ſprinkling it now and then with water, and often turning it: by this means it ſoon becomes white. The beſt ſort is of a clear and almoſt tranſparent whiteneſs, dry, hard, brittle, and of an agreeable ſmell, like that of the yellow wax, but much weaker.

The common yellow wax is of very great uſe both in medicine and in many of the arts and manufactures. It is ſometimes given internally, as in dyſenteries and other eroſions of the inteſtines; but its great uſe is in the making ointments and plaſters, and the greater part of thoſe of the ſhops owe their conſiſtence to it. The white wax is alſo an ingredient in ſome of the cerates and ointments of the ſhops; and is uſed in making candles, and in many of the nicer arts and manufactures where wax is required.

Sealing-WAX is made in the following manner: Take one pound of bees-wax; three ounces of fine turpentine: olive oil and roſin, finely powdered, of each one ounce: when they are well melted, and the droſs taken off, put in an ounce and a half of vermilion, or red-lead, finely ground, and ſtir them together till they are well incorporated; and when this mixture grows a little cool, roll it into ſticks, or in any other form. If you would have it black, inſtead of vermilion or red-lead, put in lamp-black. The ſoft, red, and green wax, uſed in large ſeals to ſome of our law-writings, are thus made: Melt bees-wax over a gentle heat, with ſuch a proportion of Venice turpentine as, when cold, will give it the due conſiſtence: this is determined by repeated trials, firſt putting in but little turpentine, and afterwards more and more, till by dropping a piece upon a marble to cool, it is found of the true conſiſtence. They then colour it with red-lead, or vermilion, or with verditer, or whatever colours they pleaſe, the mixture in this ſtate receiving any.

WAX-*Work*, the repreſentation of the faces, &c. of perſons living or dead; made by applying plaſter of Paris in a kind of paſte, and thus forming a mould containing the exact repreſentation of the features. Into this mould melted wax is poured, and thus a kind of maſks are formed; which being painted and ſet with glaſs eyes, and the figures dreſſed in their proper habits,

bits, they bear ſuch a reſemblance that it is difficult to diſtinguiſh between the copy and the original.

WAY, a paſſage or road.

The Roman ways are divided into conſular, prætorian, military, and public; and of theſe we have four remarkable ones in England: the firſt, Watling-ſtreet, or Wathling-ſtreet, leading from Dover to London, Dunſtable, Touceſter, Atterſton, and the Severn, extending as far as Angleſea in Wales. The ſecond, called *Hikenild*, or *Ikenild ſtreet*, ſtretches from Southampton over the river Iſis at Newbridge; thence by Camden and Litchfield; then paſſes the Derwent near Derby, and ends at Tinmouth. The third, called *Foſſe-way*, becauſe in ſome places it was never perfected, but lies as a large ditch, leads from Cornwal through Devonſhire, by Tethbury, near Stow in the Wolds; and beſide Coventry to Leiceſter, Newark, and ſo to Lincoln. The fourth, called *Erming*, or *Erminage-ſtreet*, extends from St David's, in Wales, to Southampton.

WAY *of a Ship*, is ſometimes the ſame as her rake, or run forward or backward: but this term is moſt commonly underſtood of her ſailing.

WAY-*Leaves*, in the coal-buſineſs. See COALERY, p. 2030, col. 2.

Right of WAYS, in law. This may be grounded on a ſpecial permiſſion; as when the owner of the land grants to another a liberty of paſſing over his grounds, to go to church, to market, or the like: in which caſe the gift or grant is particular, and confined to the grantee alone; it dies with the perſon; and if the grantee leaves the country, he cannot aſſign over his right to any other; nor can he juſtify taking another perſon in his company. A way may be alſo by preſcription; as if all the owners and occupiers of ſuch a farm have immemorially uſed to croſs another's ground; for this immemorial uſage ſuppoſes an original grant, whereby a right of way thus apurtenant to land may clearly be created. A right of way may alſo ariſe by act and operation of law: for if a man grants me a piece of ground in the middle of his field, he at the ſame time tacitly and impliedly gives me a way to come at it; and I may croſs his land for that purpoſe without treſpaſs. For when the law doth give any thing to one, it giveth impliedly whatſoever is neceſſary for enjoying the ſame. By the law of the twelve tables at Rome, where a man had the right of way over another's land, and the road was out of repair, he who had the right of way might go over any part of the land he pleaſed: which was the eſtabliſhed rule in public as well as private ways. And the law of England, in both caſes, ſeems to correſpond with the Roman.

WAY *Wode*, a title given to the governors of the chief places in the empire of Muſcovy and in Poland.

WEANING. See ABLACTATION.

WEAR, or WEER, a great ſtank or dam in a river, fitted for the taking of fiſh, or for conveying the ſtream to a mill. New wears are not to be made, or others altered, to the nuiſance of the public, under a certain penalty.

WEASEL, in zoology. See MUSTELA.

WEATHER, the ſtate or diſpoſition of the atmoſphere with regard to heat, cold, wind, rain, froſt, &c.

WEATHER-*Cock*, a moveable vane, in form of a cock, or other ſhape, placed on high, to be turned round according to the direction of the wind, and point out the quarter from whence it blows.

WEATHER-*Glaſſes*. See BAROMETER and THERMOMETER.

WEATHERING, among ſailors, ſignifies the doubling or ſailing by a head-land or other place.

WEAVING, the art of working a web of cloth, ſilk, or other ſtuff, in a loom with a ſhuttle. For an idea of the manner in which this is performed, ſee CLOTH.

WEAVING *Loom*, a machine for weaving cloth, ſilk, &c. by raiſing the threads of the warp in order to throw in the ſhoot, and ſtrike it cloſe. Of theſe there are various kinds, diſtinguiſhed by the different ſorts of cloths, ſtuffs, ſilks, &c. in which they are employed; and which are chiefly diſtinguiſhed by the number and variety of the threads they raiſe in order to work the warp, either plain or in figures, by making more or leſs of the woof or ſhoot appear through the warp. In order to give a general idea of weaving, we ſhall here deſcribe the parts of the common weaver's loom. See plate CCCXI. fig. 2. in which 9, 9, are the loom-poſts. 10. The croſs-bars. 11. The batten; which ſerves to ſtrike in, and cloſe more or leſs the threads of the woof. 12. The cap of the batten, or a long bar, which the weaver takes hold of in one hand and then in the other. 13. The block, or under part of the ſame, containing the reed within the lower bar. 14. The croſs-piece, or burdon and pin, which helps to make the batten moveable. 15. The gallows; a piece of wood ſuſpending the pulley on which the cord moves that is tied to the two lams. 16. The breaſt-bar; a flat ſquare piece of wood, with an opening in it to let the ſtuff through which is rolled on the knee-roll. 17. The cane-roll, which the warp is turned on at the other end of the loom. 18. The reed. 20. Pulleys, upon which the cords roll that are faſtened to the lams. 21. The tumbler; which is a cord that paſſes from one lam to the other over the pulley 20, and cauſes the working of the lams by its aſcending and deſcending. 22. The muffle in which the pulley acts. 23. A ſkain, or leiſh, cut into proper lengths, to mend the leiſhes of the harneſs that happen to break. 24. A bobbin of the warp, to mend the threads of the warp that occaſionally break. 25. Lizier-thread, to mend thoſe of the lizier that happen to break; and which, eſpecially in cloth, are very different from the warp. 26. The box to hold the quills. 28. The foot-bar. 29. The trundles, or moveable bars, tied with two cords to the lower virgee of each lam. When the foot preſſes a treadle, the lam that is faſtened to it ſinks, and the other riſes by the help of the tumbler. 30. The foot-ſtep. 31. The temple; a double flat ruler, having ſmall teeth at the extremities; it may be lengthened or ſhortened by the help of a catch that is in one of the rulers, and introduced in a groove in the other ruler. The teeth in the extremities are faſtened in the lizier of the work, by which means it is kept of an equal breadth; and as the work advances the temple is moved forwards. 32. The ſhuttle ſeen in front and profile. 33. The knee-roll, on which the work is rolled as it is wove. 34. The tantow; an iron leaver to turn the knee-roll. 35. The reed ſeen ſeparate.

WEB, a ſort of tiſſue or texture formed of threads interwoven with each other ; ſome whereof are extended in length, and called the *warp;* others are drawn acroſs, and called the *woof.*

WECHEL (Chriſtian), a famous printer in Paris, before the middle of the 16th century. His editions were ſo extremely correct, that the eratta of a folio volume did not ſometimes contain above two faults ; but he was brought into trouble in 1534, for having ſold a book of Eraſmus *De eſu interdicto Carnium*, which had been cenſured by the faculty of divinity. According to father Garaſſe, he fell into poverty, by an immediate curſe of God, for printing a book, in which the author endeavoured to prove that innocent children would not be eternally damned for dying without baptiſm.

Wechel (Chriſtian and Andrew) two celebrated printers at Francfort, whoſe editions are correct and much eſteemed. They were ſons of the former, and owed this perfection of their art to the learned Frederic Sylburgius, corrector of their printing-houſe. Chriſtian was living in 1552, and Andrew died in 1581. A catalogue of the books which proceeded from their preſſes was printed at Francfort, in 8vo, in 1590.

WEDGE, one of the mechanical powers. See Mechanics.

WEDNESDAY, the fourth day of the week, ſo called from a Saxon idol named *Woden*, ſuppoſed to be Mars, worſhipped on this day.

Aſh-Wednesday, the firſt day of Lent, ſo called from the cuſtom obſerved in the ancient Chriſtian church of penitents expreſſing their humiliation at this time, by appearing in ſackcloth and aſhes.

WEED, a common name for all rank and wild herbs, that grow of themſelves, to the detriment of other uſeful herbs they grow among.

Weed, in the miners language, denotes the degeneracy of a load or vein of fine metal into an uſeleſs marcaſite.

WEEK, in chronology, a diviſion of time compriſing ſeven days. See Astronomy.

Paſſion-Week, or the *Holy* Week, is the laſt week in Lent, wherein the church celebrates the myſtery of our Saviour's death and paſſion.

Week or Wyck, in geography, a parliament and port-town of Scotland, in the ſhire of Caithneſs. W. Long. 2. 45. N. Lat. 58. 40.

WEEVER, in ichthyology. See Trachinus.

WEIGH, a weight of cheeſe, wool, &c. containing 256 pounds averdupois. Of corn, the weigh contains 40 buſhels ; of barley or malt, ſix quarters. In ſome places, as Eſſex, the weigh of cheeſe is 300 pounds.

WEIGHING, the act of examining a body in the balance to find its weight.

Weighing *anchor*, is the drawing it out of the ground it had been caſt into, in order to ſet ſail, or quit a port, road, or the like.

WEIGHT, in phyſics, a quality in natural bodies, whereby they tend downwards towards the centre of the earth. Or, weight may be defined in a leſs limited manner, to be a power inherent in all bodies whereby they tend to ſome common point, called the *centre of gravity* ; and that with a greater or leſs velocity, as they are more or leſs denſe, or as the medium they paſs through is more or leſs rare. See Mechanics.

Weight in commerce, denotes a body of a known weight appointed to be put in the balance againſt other bodies whoſe weight is required.

The ſecurity of commerce depending, in good meaſure, on the juſtneſs of weights, which are uſually of lead, iron, or braſs, moſt nations have taken care to prevent the falſification thereof, by ſtamping or marking them by proper officers, after being adjuſted by ſome original ſtandard. Thus, in England, the ſtandard of weights is kept in the exchequer by a particular officer, called the *clerk of the market.*

Weights may be diſtinguiſhed into ancient and modern, foreign and domeſtic.

Ancient Weights, 1. Thoſe of the ancient Jews, reduced to the Engliſh Troy weights, will ſtand as in the following table:

			℔.	oz.	dwt.	gr.
		Shekel - -	0	0	9	$2\frac{4}{7}$
60		Maneh - -	2	3	6	$10\frac{2}{7}$
3000	50	Talent -	113	10	1	$10\frac{2}{7}$

2. Grecian and Roman weights, reduced to Engliſh Troy weight; will ſtand as in the following table:

										oz.	dwt.	gr.
									Lentes - -	0	0	$0\frac{85}{112}$
4									Siliquæ - -	0	0	$3\frac{1}{28}$
12	3								Obolus - -	0	0	$9\frac{3}{28}$
24	6	2							Scriptulum -	0	0	$18\frac{3}{14}$
72	18	6	3						Drachma	0	2	$6\frac{9}{14}$
96	24	8	4	$1\frac{1}{3}$					Sextula	0	3	$0\frac{6}{7}$
144	36	12	6	2	$1\frac{1}{2}$				Sicilicus	0	4	$13\frac{2}{7}$
192	48	16	8	$2\frac{2}{3}$	2	$1\frac{1}{3}$			Duella	0	6	$1\frac{5}{7}$
576	144	48	24	8	6	4	3		Uncia	0	18	$5\frac{1}{7}$
6912	1728	576	288	96	72	48	36	12	Libra	10	18	$13\frac{5}{7}$

The Roman ounce is the Engliſh averdupois ounce, which they divided into 7 denarii, as well as 8 drachms; and ſince they reckoned their denarius equal to the Attic drachm, this will make the Attic weights one eight heavier than the correſponding Roman weights.

Modern European Weights. 1. Engliſh weights: by the 27th chapter of *magna carta*, the weights all over England are to be the ſame; but for different commodities there are two different ſorts, *viz.* Troy weight and averdupois weight. The origin from which they are both raiſed, is a grain of wheat gathered in the middle of the ear.

In Troy weight, 24 of theſe grains make a penny-weight ſterling; 20 penny-weights make 1 ounce; and 12 ounces 1 pound. See Troy.

By this weight we weigh gold, ſilver, jewels, grains, and liquors. The apothecaries alſo uſe the Troy pound, ounce, Weight.

ounce, and grain; but they differ from the reſt in the intermediate diviſions. They divide the ounce into 8 drachms, the drachm into 3 ſcruples, and the ſcruple into 28 grains. See ARITHMETIC, p. 655.

In averdupois weight, the pound contains 16 ounces, but the ounce is leſs by near one-twelfth than the Troy ounce; this latter containing 490 grains, and the former only 448. The ounce contains 16 drachms. Eighty ounces averdupois are only equal to 73 ounces Troy; and 17 pounds Troy equal to 14 pounds averdupois. See AVERDUPOIS.

By this weight are weighed mercury and grocery wares, baſe metals, wool, tallow, hemp, drugs, bread, &c. See ARITHMETIC, p. 655.

The moneyers, jewellers, &c. have a particular claſs of weights for gold and precious ſtones, *viz.* carat and grain; and for ſilver, the penny-weight and grain. See the article CARACT.

The moneyers have alſo a peculiar ſubdiviſion of the grain Troy: Thus,

The	Grain	into	20 Mites.
	Mite		24 Droits.
	Droit		20 Perits.
	Perit		24 Blanks.

The dealers in wool have likewiſe a particular ſet of weights, *viz.* the ſack, weigh, tod, ſtone, and clove.

2. French weights: The common or Paris pound is 16 ounces; which they divide two ways: the firſt diviſion is into 2 marcs; the marc into 8 ounces; the ounce into 8 gros; the gros into 3 penny-weights; the penny-weight into 24 grains; the grain equivalent to a grain of wheat. The ſecond diviſion of the pound is into 2 half-pounds; the half-pound into 2 quarters; the quarter into 2 half-quarters; the half-quarter into 2 ounces; and the ounce into 2 half-ounces.

The weights of the firſt diviſion are uſed to weigh gold, ſilver, and the richer commodities; and the weights of the ſecond diviſion for commodities of leſs value.

Grains.					
24	Penny-weight.				
72	3	Gros.			
576	24	8	Ounce.		
4608	192	64	8	Marc.	
9216	384	128	16	2	Pound.

Half-ounce.						
2	Ounce.					
4	2	Half-quarter pound				
8	4	2	Quarter-pound.			
16	8	4	2	Half-pound.		
32	16	8	4	2	Pound.	
3200	1680	800	400	100	100	Quintal.

But the pound is not the ſame throughout France. At Lyons, *e. gr.* the city pound is only 14 ounces: ſo that 100 Lyons pounds make only 88 Paris pounds. But beſide the city pound, they have another at Lyons for ſilk, containing 16 ounces. At Tholouſe, and throughout the Upper Languedoc, the pound is 13 ounces and a half of Paris weight. At Marſeilles, and throughout Provence, the pound is 13 ounces of Paris weight. At Rouen, beſide the common Paris pound and marc, they have the weight of the vicomte; which is 16 ounces, a half, and five-ſixths of the Paris weight. The weights enumerated under the two articles of Engliſh and French weights, are the ſame that are uſed throughout the greateſt part of Europe; only under ſomewhat different names, diviſions, and proportions.

Particular nations have alſo certain weights peculiar to themſelves: thus, Spain has its arrobas, containing 25 Spaniſh pounds, or one-fourth of the common quintal; its quintal macho, containing 150 pounds, or one-half common quintal, or 6 arrobas; its adarme, containing one-ſixteenth of its ounce. And for gold, it has its caſtillan, or one-hundredth of a pound. Its tomin, containing 12 grains, or one-eighth of a caſtillan. The ſame are in uſe in the Spaniſh Weſt Indies.

Portugal has alſo its arroba, containing 32 Liſbon arratels, or pounds: Savary alſo mentions its faratelle, containing 2 Liſbon pounds; and its rottoli, containing about 12 pounds. And for gold, its chego, containing 4 carats. The ſame are uſed in the Portugueſe Eaſt Indies.

Italy, and particularly Venice, have their migliaro, containing 4 mirres; the mirre containing 30 Venice pounds: the ſaggio, containing a ſixth part of an ounce. Genoa has five kinds of weights, *viz.* large weights, whereby all merchandiſes are weighed at the cuſtom-houſe; caſh weights, for piaſtres and other ſpecies; the cantara, or quintal, for the coarſeſt commodities; the large balance for raw ſilks; and the ſmall balance for the finer commodities. Sicily has its rottola, 32 and a half pounds of Meſſina.

Germany, Flanders, Holland, the Hanſe towns, Sweden, Denmark, Poland, &c. have their ſchippondt, which at Antwerp and Hamburgh, is 300 pounds; at Lubeck, 320; and at Coningſberg, 400 pounds. In Sweden, the ſchippondt for copper is 320 pounds; and the ſchippondt for proviſions 400 pounds. At Riga and Revel, the ſchippondt is 400 pounds; at Dantzic, 340 pounds; in Norway, 300 pounds; at Amſterdam, 300; containing 20 lyſpondts, each weighing 15 pounds.

In Muſcovy, they weigh their large commodities by the bercheroct, or berkewits, containing 400 of their pounds. They have alſo the poet, or poede, containing 40 pounds, or one-tenth of the bercheroct.

In order to ſhow the proportion of the ſeveral weights uſed throughout Europe, we ſhall add a reduction of them to one ſtandard, *viz.* the London and Amſterdam pound.

I. Proportion of the weights of the principal places of Europe.

The 100 ℔. of England, Scotland, and Ireland are equal to

℔	oz.	
91	8	of Amſterdam, Paris, &c.
96	8	of Antwerp or Brabant.

lb	oz.	
88	0	of Rouen, the viſcounty weight.
106	0	of Lyons, the city weight.
90	9	of Rochelle.
107	11	of Tholouſe and Upper Languedoc.
113	0	of Marſeilles or Provence.
81	7	of Geneva.
93	5	of Hamburgh.
89	7	of Francfort, &c.
96	1	of Leipſic, &c.
137	4	of Genoa.
132	11	of Leghorn.
153	11	of Milan.
152	0	of Venice.
154	10	of Naples.
97	0	of Seville, Cadiz, &c.
104	13	of Portugal.
96	5	of Leige.
112	⅔	of Ruſſia.
107	$\frac{1}{24}$	of Sweden.
89	½	of Denmark.

II. Proportion of the weights of the chief cities in Europe to thoſe of Amſterdam.

An 100 pounds of Amſterdam are equal to

lb	
108	of Alicant.
105	of Antwerp.
120	of Archangel, or 3 poedes.
105	of Arſchor.
120	of Avignon.
98	of Baſil in Switzerland.
100	of Bayonne in France.
166	of Bergamo.
97	of Bergen-op-zoom.
95¼	of Bergen in Norway.
111	of Bern.
100	of Beſançon.
100	of Bilboa.
105	of Bois-le-duc.
151	of Bologna.
100	of Bourdeaux.
104	of Bourg en Breſſe.
103	of Bremen.
125	of Breſlaw.
105	of Bruges.
105	of Bruſſels.
105	of Cadiz.
105	of Cologne.
125	of Coningſberg.
107½	of Copenhagen.
87	rottos of Conſtantinople.
113½	of Dantzic.
100	of Dort.
97	of Dublin.
97	of Edinburgh.
143	of Florence.
98	Francfort on the Maine.
105	of Gaunt.
89	of Geneva.
163	of Genoa, caſh weight.
102	of Hamburgh.
106	of Leyden.
105	of Leipſic.
105½	of Liege.
114	of Liſle.
143	of Leghorn.
106½	of Liſbon.
109	of London, averdupois weight.
105	of Lovane.
105	of Lubec.
141½	of Lucca, light weight.
116	of Lyons, city weight.
114	of Madrid.
105	of Marlines.
123½	of Marſeilles.
154	of Meſſina, light weight.
168	of Milan.
120	of Montpelier.
125	bercherocts of Muſcovy.
100	of Nantes.
106	of Nancy.
169	of Naples.
98	of Noremberg.
100	of Paris.
112½	of Revel.
109	of Riga.
100	of Rochelle.
146	of Rome.
100	of Rotterdam.
96	of Rouen, viſcounty weight.
100	of St Malo.
100	of St Sebaſtian.
158½	of Saragoſa.
106	of Seville.
114	of Smyrna.
110	of Stetin.
81	of Tholouſe and Upper Languedoc.
151	of Turin.
158½	of Valencia.
182	of Venice, ſmall weight.

WEIGHTS *uſed in the ſeveral parts of Aſia, the Eaſt Indies, China, Perſia, &c.* In Turky, at Smyrna, &c. they uſe the batman, or battemant, containing ſix occos; the occo weighing 3 pounds four-fifths Engliſh. They have another batman much leſs, conſiſting, as the former, of ſix occos; but the occo only containing 15 ounces Engliſh: 44 occos of the firſt kind make the Turkiſh quintal. At Cairo, Alexandretta, Aleppo, and Alexandria, they uſe the rotto, rotton, or rottoli. The rottoli at Cairo, and other parts of Egypt, is 144 drachms; being ſomewhat over an Engliſh pound. At Aleppo there are three ſorts of rottos: the firſt 720 drachms, making about 7 pounds Engliſh, and ſerving to weigh cottons, galls, and other large commodities; the ſecond is 624 drachms, uſed for all ſilks but white ones, which are weighed by the third rotto of 700 drachms. At Seyda the rotto is 600 drachms.

The other ports of the Levant not named here, uſe ſome of theſe weights; particularly the occa, or ocqua, the rottoli, and rotto.

The Chineſe weights are the piece, for large commodities; it is divided into 100 catis, or cattis; tho' ſome ſay into 125; the cati into 16 taels, or tales; each tael equivalent to 1⅓ of an ounce Engliſh, or the weight of 1 rial and $\frac{1}{12}$, and containing 12 mas, or maſſes, and each mas 10 condrins. So that the Chineſe piece amounts to 137 pounds Engliſh averdupois, and the cadi to 1 pound 8 ounces. The picol for ſilk containing 66 catis and ¾; the bahar, bakaire, or barr, containing 300 catis.

Tonquin has alſo the ſame weights, meaſures, &c. as China. Japan has only one weight, *viz.* the cati; which however is different from that of China, as containing 20 taels. At Surat, Agra, and throughout the ſtates of the Great Mogul, they uſe the man, or maund, whereof they have two kinds; the king's man, or king's weight; and the man ſimply; the firſt uſed for the weighing of common proviſions, containing 40 ſeers, or ſerres; and each ſeer a juſt Paris pound. The common man, uſed in the weighing of merchandiſe, conſiſts likewiſe of 40 ſeers, but each ſeer is only eſtimated at 12 Paris ounces, or ¾ of the other ſeer.

The man may be looked on as the common weight of the Eaſt Indies, though under ſome difference of name, or rather of pronunciation; it being called *mao* at Cambaya, and in other places *mein*, and *maun*. The ſeer is properly the Indian pound, and of univerſal uſe; the like may be ſaid of the bahar, tael, and catti, abovementioned.

The weights of Siam, are the piece, containing two ſhans or cattis; but the Siameſe catti is only half the Japoneſe, the latter containing 20 taels, and the former only 10; though ſome make the Chineſe catti only 16 taels, and the Siameſe 8. The tael contains 4 baats or ticals, each about a Paris ounce; the baat 4 ſelings or mayons; the mayon 2 fouangs; the fouang 4 payes; the paye 2 clams; the ſompaye half a fouang.

It is to be obſerved, that thoſe are the names of their coins as well as weights; ſilver and gold being commodities there ſold, as other things, by their weights.

In the iſle of Java, and particularly at Bantam, they uſe the gantan, which amounts to near 3 Dutch pounds. In Golconda, at Viſapour, and Goa, they have the furatelle, containing 1 pound 14 ounces Engliſh; the mangalis, or mangelin, for weighing diamonds and precious-ſtones, weighing at Goa 5 grains, at Golconda, &c. 5½ grains. They have alſo the rotolo, containing 14¼ ounces Engliſh; the metricol, containing the ſixth part of an ounce; the wall for piaſtres and ducats, containing the 73d part of a rial.

In Perſia they uſe two kinds of batmans or mans; the one called *cahi* or *cheray*, which is the king's weight, and the other *batman of Tauris*. The firſt weighs 13 pounds 10 ounces Engliſh; the ſecond 6½ pounds. Its diviſions are the ratel, or a 16th; the derhem, or drachm, which is the 50th; the meſchal, which is half the derhem; the dung, which is the 6th part of the meſchal, being equivalent to 6 carat-grains; and, laſtly, the grain, which is the fourth part of the dung. They have alſo the vakie, which exceeds a little our ounce; the ſah-cheray, equal to the 1170th part of the derhem; and the toman, uſed to weigh out large payments of money without telling; its weight is that of 50 abaſſis.

African and American WEIGHTS. We have little to ſay as to the weights of America: the ſeveral European colonies there making uſe of the weights of the ſtates or kingdoms of Europe they belong to. For as to the aroue of Peru, which weighs 27 pounds, it is evidently no other than the Spaniſh arroba with a little difference in the name.

As to the weights of Africa, there are few places that have any, except Egypt, and the countries bordering on the Mediterranean; whoſe weights have been already enumerated among thoſe of the ports of the Levant. The iſland of Madagaſcar indeed has weights, but none that exceed the drachm; nor are they uſed for any thing but gold and ſilver.

Regulation of WEIGHTS *and Meaſures*, is a branch of the king's prerogative. See PREROGATIVE, (and MEASURE in the APPENDIX.)

Theſe, for the advantage of the public, ought to be univerſally the ſame throughout the kingdom; being the general criterions which reduce all things to the ſame or an equivalent value. But as weight and meaſure are things in their nature arbitrary and uncertain, it is therefore expedient that they be reduced to ſome fixed rule or ſtandard: which ſtandard it is impoſſible to fix by any written law or oral proclamation; for no man can, by words only, give another an adequate idea of a foot-rule, or a pound weight. It is therefore neceſſary to have recourſe to ſome viſible, palpable, material ſtandard; by forming a compariſon with which, all weights and meaſures may be reduced to one uniform ſize; and the prerogative of fixing this ſtandard, our ancient law veſted in the crown, as in Normandy it belonged to the duke. This ſtandard was originally kept at Wincheſter: and we find in the laws of king Edgar, near a century before the conqueſt, an injunction that the one meaſure, which was kept at Wincheſter, ſhould be obſerved throughout the realm. Moſt nations have regulated the ſtandard of meaſures of length by compariſon with the parts of the human body; as the palm, the hand, the ſpan, the foot, the cubit, the ell (*ulna* or arm), the pace, and the fathom. But as theſe are of different dimenſions in men of different proportions, our ancient hiſtorians inform us, that a new ſtandard of longitudinal meaſure was aſcertained by king Henry the Firſt; who commanded that the *ulna* or ancient ell, which anſwers to the modern yard, ſhould be made of the exact length of his own arm. And one ſtandard of meaſures of length being gained, all others are eaſily derived from thence; thoſe of greater length by multiplying, thoſe of leſs by dividing, that original ſtandard. Thus, by the ſtatute called *compoſitio ulnarum et perticarum*, five yards and an half make a perch; and the yard is ſubdivided into three feet, and each foot into 12 inches; which inches will be each of the length of three grains of barley. Superficial meaſures are derived by ſquaring thoſe of length; and meaſures of capacity by cubing them. The ſtandard of weights was originally taken from corns of wheat, whence the loweſt denomination of weights we have is ſtill called a *grain*; 32 of which are directed, by the ſtatute called *compoſitio menſurarum*, to compoſe a penny-weight, whereof 20 make an ounce, 12 ounces a pound, and ſo upwards. And upon theſe principles the firſt ſtandards were made; which, being originally ſo fixed by the crown, their ſubſequent regulations have been generally made by the king in parliament. Thus, under king Richard I. in his parliament holden at Weſtminſter, A. D. 1197, it was ordained that there ſhould be only one weight and one meaſure throughout the kingdom, and that the cuſtody of the aſſize or ſtandard of weights and meaſures ſhould be committed to certain perſons in every city and borough; from whence the ancient office of the king's aulnager ſeems to have been derived; whoſe duty it was, for a certain fee, to meaſure all cloths made for ſale, till the office was aboliſhed by the ſtatute 11th and 12th William III. c. 20. In king John's time this ordinance of king Richard was frequently diſpenſed with for money; which occaſioned a proviſion to be made for enforcing it, in the great charters of king John and his ſon. Theſe original ſtandards were called *pondus regis*, and *menſura domini regis*, and are directed by a variety of ſubſequent ſtatutes to be kept in the exchequer chamber, by an officer called the *clerk of the market*, except the wine gallon, which is committed to the city of London, and kept in Guildhall.

The *Scottiſh* ſtandards are diſtributed among the oldeſt boroughs. The elwand is kept at Edinburgh, the pint at Stirling, the pound at Lanark, and the firlot at Linlithgow.

Various ſtatutes have been enacted for regulating and enforcing an uniformity of weights and meaſures; and by the articles of union, the Engliſh ſtandards are eſtabliſhed by law over all Great Britain. But the force of cuſtom is ſo ſtrong, that theſe ſtatutes have been ill obſerved. The Scottiſh ſtandards are ſtill univerſally retained for many purpoſes; and likewiſe a variety of local weights and meaſures are uſed in particular places of both countries, which differ from the general ſtandards of either.

1. *Engliſh Troy* WEIGHT is the moſt ancient of the different kinds uſed in Britain. See the article TROY. See alſo ARITHMETIC, p. 655, Tab. III. IV. the former exhibiting the diviſions uſed by goldſmiths, the latter thoſe uſed by apothecaries.—Goldſmiths in Scotland ſometimes divide the ounce into 16 drops, and the drop into 30 grains; but in all theſe ways the ounce and grain is the ſame, and the ounce contains 480 grains.

A carat is a weight of 4 grains; but when the term is applied to gold, it denotes the degree of fineneſs. Any quantity of gold is ſuppoſed divided into 24 parts. If the whole maſs be pure gold, it is ſaid to be 24 carats fine; if there be 23 parts of pure gold, and 1 part of baſe metal or alloy, it is ſaid to be 23 carats fine, and ſo on.

Pure gold is too ſoft to be uſed for coin. The ſtandard coin of this kingdom is 22 carats fine. A pound of ſtandard gold is coined into 44½ guineas, and therefore every guinea ſhould weigh 5 dwt. 9$\frac{9}{20}$ grains; but as ſome allowance muſt be made for wearing, guineas not under 5 dwt. 8 gr. and half guineas not under 2 dwt. 16 gr. cannot be refuſed in payment.

A Joannes ſhould weigh 9 dwt. 6 gr. Other Portugal pieces in proportion.

A pound of ſtandard ſilver for coin contains 11 ounces 2 dwt. pure ſilver, and 18 dwt. alloy: ſtandard ſilver-plate, 11 ounces pure ſilver, and 1 ounce alloy. A pound of ſilver is coined into 62 ſhillings; therefore the weight of a ſhilling ſhould be 3 dwt. 20$\frac{21}{31}$ grains.

The value of a pound of gold, when coined at the mint-price, is L. 46 : 14 : 6, and the value of a pound of ſilver L. 3, 2s.; but the current price of bullion varies like that of other commodities, according to the ſcarcity or demand.

About the time of the Norman conqueſt, 1 lb. of ſilver was coined into 20 ſhillings, and made L. 1 of the current money of the realm. The value of the coin was afterwards leſſened by degrees; and at preſent a pound ſterling in ſilver does not contain one third part of that quantity. The ſums of money mentioned in the earlier part of the Engliſh hiſtory, muſt be underſtood according to the ſtate of the coin which was current at the time. They may be reduced to money of our preſent ſtandard by the help of the following table; which exhibits the number of ſhillings coined from 1 lb. of ſilver, and the value of 20 of theſe ſhillings in our preſent money.

Years.	Reigns.	Shill. coined from 1 lb.	Value of 20s.		
1066	Will. I.	21 s 4 d	L. 2	18	1½
1087	Will. II.	20 s	3	2	—
1300	Edward I.	20 s 3 d	3	1	2½
1305	Richard II.	25 s	2	9	7½
1412	Henry IV.	32 s	1	18	9
1422	Henry V.	37 s 6 d	1	13	¾
1426	Henry VI.	30 s	2	1	4
1461	Edward IV.	37 s 6 d	1	13	¾
1505	Henry VII.	40 s	1	11	—
1509	Henry VIII.	45 s	1	7	6⅝
1543	Ditto	48 s	1	3	3½
1560	Elizabeth	60 s	1	—	8
1601	Ditto	62 s	1	—	—

This table will enable the reader to compare the old prices of proviſions and other commodities with the preſent. He will find that the prices of corn about the time of the Norman conqueſt was only about one tenth of the preſent price, and cattle were ſtill cheaper in proportion.

It appears, by a houſehold-book compoſed by the earl of Northumberland in the year 1512, that wheat was about 6s. 2 d. per quarter, malt 4s. oats 2s. a lean ox 8s. a fat ox 13s. 4d. a ſheep 1s. 8d. a hog 2s. a hen 2d. a gooſe 3d. French wine L. 4: 13: 4 per ton, an ell of linen 8d. a chalder of coals 4s. 2d. The weight of the coin was then one third more than at preſent.

The prices of commodities increaſed ſlowly before the diſcovery of America. In the 16th century, when great quantities of gold and ſilver were brought from the Spaniſh colonies in America, the value of theſe metals diminiſhed of courſe, and prices roſe quickly, and have ſince continued to increaſe. The price of corn was formerly much more unequal than at preſent. A ſcarcity in any particular country had worſe effects, becauſe commerce was not ſo regular. During a dearth in Queen Elizabeth's time, wheat roſe to upwards of L. 4 per quarter.

2. *Averdupois* WEIGHT was afterwards brought into England. It owed its introduction to the practice of foreign merchants, but was afterwards eſtabliſhed by law, and is now generally known by the name of *Engliſh weight*. The denominations uſed in this weight are contained in Table II. (ARITHMETIC, p. 655.) and are better adapted for bulky commodities, as thoſe of Troy weight are for minute and valuable ones. The pound averdupois contains 7000 grains Troy. The ounce was formerly divided into eight drachms, and the drachm into three ſcruples; but the preſent diviſion of the ounce is into ſixteen drops or drachms.

This weight is uſed in Scotland in collecting the revenue, and in ſelling leather, tallow, ſoap, flour, bread, candle, groceries, roſin, wax, pitch, wrought metals, ſome Baltic goods, and all goods brought from England. It is appointed by the articles of Union as the general weight through Great Britain; but has not been adopted in Scotland, except for the above mentioned commodities.

The following table is uſed for wool weight:

7 lb = clove
2 cloves = 1 ſtone
2 ſtones = 1 tod
6½ tods = 1 wey
2 weys = 1 ſack
12 ſacks — 1 laſt
56 lb. old hay, or 60 lb. new hay, make a truſs
36 truſſes make a load
19½ cwt. lead make a fodder
14 lb. make a ſtone, horſeman's weight
5 lb. glaſs a ſtone
14 oz. butcher-meat, in moſt places, make 1 lb.

3. *Trone* WEIGHT. See TRONE.

WEIMAR, a town of Upper Saxony, and in the territory of Thuringia, with a magnificent caſtle, wherein the duke reſides. It is ſeated on the river Ilm, 20 miles north-eaſt of Erfurt, and ten weſt of Jena. It is the capital of the duchy of Sax-Weimar. E. Long. 11. 18. N. Lat. 50. 10.

WELBY (Henry), a ſingular gentleman, was a native of Lincolnſhire, where he had an eſtate of above 1000 pounds a year. He poſſeſſed, in an eminent degree, the qualifications of a gentleman. Having been a competent time at the univerſity and the inns of court, he completed his education by making the tour of Europe. He was happy in the love and eſteem of his friends, and indeed of all that knew him, as his heart was warm, and the virtues of it were conſpicuous from his many acts of humanity, benevolence, and charity. When he was about 40 years of age, his brother, an abandoned profligate, made an attempt upon his life with a piſtol; which not going off, he wreſted it from his hands, and found it charged with a double bullet. Hence he formed a reſolution of retiring from the world; and taking a houſe in Grubſtreet, he reſerved three rooms for himſelf; the firſt for his diet, the ſecond for his lodging, and the third for his ſtudy. In theſe he kept himſelf ſo cloſely retired, that for 44 years he was never ſeen by any human creature, except an old maid that attended him, who had only been permitted to ſee him in ſome caſes of great neceſſity. His diet was conſtantly bread, water-gruel, milk, and vegetables, and, when he indulged himſelf moſt, the yolk of an egg. He bought all the new books that were publiſhed; moſt of which, upon a ſlight examination, he rejected. His time was regularly ſpent in reading, meditation, and prayer. No Carthuſian monk was ever more conſtant and rigid in his abſtinence. His plain garb, his long and ſilver beard, his mortified and venerable aſpect, beſpoke him an ancient inhabitant of the deſert, rather than a gentleman of fortune in a populous city. He expended a great part of his income in acts of charity, and was very inquiſitive after proper objects. He died the 29th of October 1636, in the 84th year of his age, and lies buried in St Giles's church, near Cripplegate. The old maid-ſervant died but ſix days before her maſter. He had a very amiable daughter, who married Sir Chriſtopher Hilliard, a gentleman of Yorkſhire; but neither ſhe, nor any of her family, ever ſaw her father after his retirement.

WELD, or WOLD, in botany. See RESEDA.

WELDING-HEAT in ſmithery, a degree of heat given to iron, &c. ſufficient only for bending or doubling it up.

WELL, a hole under ground, uſually of a cylindrical figure, and walled with ſtone and mortar: its uſe is to collect the water of the ſtrata around it.

WELL, an apartment formed in the middle of a ſhip's hold to incloſe the pumps, from the bottom to the lower deck. It is uſed as a barrier to preſerve thoſe machines from being damaged by the friction or compreſſion of the materials contained in the hold, and particularly to prevent the entrance of ballaſt, &c. by which the tubes would preſently be choaked, and the pumps rendered incapable of ſervice. By means of this incloſure, the artificers may likewiſe more readily deſcend into the hold, in order to examine the ſtate of the pumps, and repair them, as occaſion requires.

WELL *of a Fiſhing-veſſel*, an apartment in the middle of the hold, which is entirely detached from the reſt, being lined with lead on every ſide, and having the bottom thereof penetrated with a competent number of ſmall holes, paſſing alſo through the ſhip's floor; ſo that the ſalt-water running into the well is always kept as freſh as that in the ſea, and yet prevented from communicating itſelf to the other parts of the hold.

WELL-*room of a Boat*, the place in the bottom where the water lies, between the ceiling and the platform of the ſtern-ſheets, from whence it is thrown out into the ſea with a ſcoop.

Burning-WELL. See BURNING-*Well*.

WELLS, a city of Somerſetſhire, and ſee of a biſhop; the biſhop of Bath being alſo that of Wells. —It is ſuppoſed to take its name from the many ſprings and wells that are near it. It is not very large; but is adorned with handſome buildings, both public and private. Its cathedral is a very beautiful ſtructure, adorned with images and carved ſtone-work. The biſhop's palace joins to the cathedral; and on the other ſide are the houſes for the prebendaries. In the market-place is a fine market-houſe, ſupported by pillars. It is governed by a mayor, and ſends two members to parliament. The chief manufacture is knit hoſe. W. Long. 2. 35. N. Lat. 51. 20.

WEN, a tumour or excreſcence ariſing on different parts of the body, and containing a cyſtus or bag filled with ſome peculiar kind of matter. See NÆVUS.

WERGILD, the price of *homicide*; paid partly to the king for the loſs of a ſubject, partly to the lord whoſe vaſſal he was, and partly to the next of kin of the perſon ſlain.

WEST (Gilbert), was the ſon of Dr Weſt, prebendary of Wincheſter, and chaplain to king George I. but at 12 years of age loſt his father. He ſtudied at Wincheſter and Eton ſchools, and from thence was placed in Chriſt-church college, Oxford. His ſtudious and ſerious turn inclined him to take orders; but lord Cobham, his uncle, diverted him from that purſuit, and gave him a cornetcy in his own regiment. This profeſſion he ſoon quitted, on account of an opening of another nature, which preſented him a flattering proſpect of advancement in life. A number of young gentleman were to be elected from the univerſities, and, at the expence of the government, were to be taught foreign languages, and then ſent to the ſecretaries office, to be initiated into buſineſs, and trained there for public ſervices, as envoys, ambaſſadors, &c. Mr Gilbert Weſt was one of the few pitched upon; and on his firſt introduction into that office, lord Townſend, ſecretary of ſtate, treated him with ſingular marks of regard, and the ſtrongeſt inclinations to ſerve him were teſtified from all quarters. But his uncle lord Cobham's ſtrong oppoſition to the meaſures of the government, rendered theſe advantages entirely fruitleſs; and the miniſters honeſtly told Mr Weſt, that he muſt not expect them to diſtinguiſh his merit, as any favours conferred upon him would be imputed as done to his uncle lord Cobham. Mr Weſt now left that office, and all his views of making his fortune; and entering into marriage, retired to Wickam in Kent, where he lived in great domeſtic comfort and tranquil happineſs. He was there viſited by his valuable friends, who held the moſt delightful converſe of wit, humour, and learning, ſupported upon the principles of virtue, ſound reaſoning, and ſolid friendſhip, which rendered the whole cheerful, animating, and inſtructive. Mr William Pitt, who was one of thoſe that compoſed this happy ſociety, becoming paymaſter, appointed Mr Weſt treaſurer to Chelſea-hoſpital; and he obtained a ſeat at the council-board, in conſequence of a friendſhip contracted at ſchool with one of the duke of Devonſhire's ſons, who procured of his grace his being nominated one of the clerks extraordinary of that office. Towards the latter part of Mr Weſt's life, he wholly applied himſelf to the ſtudy of the ſcriptures, being extremely anxious to try his utmoſt endeavours to reconcile the ſeeming inconſiſtences which gave the enemies to revealed religion a handle to doubt and diſcredit their authenticity. His works bear teſtimony to his worth and learning. He had a mind replete with virtue, and was an honour to his country; but died at 50 years of age.

West, one of the cardinal points of the horizon, diametrically oppoſite to the eaſt; and ſtrictly defined the interſection of the prime vertical with the horizon on that ſide the ſun ſets in.

WESTMINSTER, a city which forms the weſt part of the capital of Britain, but has a government diſtinct from the reſt. This city had its name from the ſituation of its abbey, anciently called a *minſter*, in reſpect of that of St Paul. That part properly called the city of Weſtminſter, comprehending the pariſhes of St John and St Margaret, was once an iſland formed by the Thames, called *Thorney iſland*, from the thorns with which it was over-run; and the abbey that ſtood in it, Thorney abbey. The liberties of Weſtminſter contain the ſeveral pariſhes of St Martin in the Fields, St James's, St Anne, St Paul, Covent-garden, St Mary le Strand, St Clement, Danes, St George, Hanover-ſquare, and the precinct of the Savoy. The government, both of the city and liberties, is under the juriſdiction of the dean and chapter of Weſtminſter, in civil as well as eccleſiaſtical affairs; and their authority extends to the precinct of St Martin le Grand, by Newgate-ſtreet, and in ſome towns of Eſſex, that are exempted from the juriſdiction of the biſhop of London and the archbiſhop of Canterbury; but the management of the civil part has, ever ſince the Reformation, been in the hands of laymen, elected from time to time, and confirmed by the dean and chapter. The chief of theſe laymen are the high-ſteward, the deputy-ſteward, and the high-bailiff, who hold their offices for life. There are alſo 16 burgeſſes and their aſſiſtants, out of which are elected two head-burgeſſes, one for the city, and the other for the liberties. Another officer is the high-conſtable, who has all the other conſtables under his direction.

WESTMORELAND, a ſmall inland county of England, bounded on the eaſt by part of Yorkſhire, and the biſhopric of Durham; on the ſouth by Lancaſhire; and on the weſt and north by Cumberland. It extends 30 miles in length, and 24 in breadth, comprehending 32 pariſhes, eight market towns, a conſiderable number of villages, about 7000 houſes, and about 35000 inhabitants. It is divided into the two great baronies of Weſtmoreland and Kendal; the former belonging to the dioceſe of Carliſle, and the latter to the biſhopric of Cheſter. It was of old inhabited by the Brigantes; it afterwards conſtituted part of the Northumbrian kingdom; and now gives title of earl to the noble family of Fane.

Weſtmoreland is one of the moſt mountainous countries in England, particularly the barony of Kendal, which abounds in hills and fells, moors and rocks, beſides the great ridge of mountains that ſeparate this province from Yorkſhire. Among the mountains of this county, one of the moſt remarkable is called *Iſanparles*, extremely high and difficult of acceſs, famous for being, as it were, ſcooped into divers caverns and labrinths, which ſeem to have been formed as retreats in times of trouble and calamity. The county produces plenty of wood, both on the mountains and plains.

The largeſt lake in England is the Winander-mere of this county, lying among the mountains on the borders of Cumberland, ſtretching ten miles in length, of a very conſiderable depth, having a rocky bottom, ſtudded with ſeveral verdant iſles or holmes, and abounding with the delicate fiſh called *char*, which being potted and preſerved, is ſent in preſents from hence to all parts of England. It is ſwelled by the ſmall rivers Ruthey and Brathey, which fall into it, and by its communication with a chain of ſmall lakes called *Greſmere*. The moſt conſiderable rivers of this county are the Eden, the Can, the Lone, and the Loder. The laſt hath given the name to the ancient family of Lowther.

The air of Weſtmoreland is keen and ſalubrious; but the climate is moiſt, conſequently not very agreeable. The barony of Kendal is mountainous, therefore not ſo fit for tillage as for paſture: but the other part, properly called *Weſtmoreland*, is an open champaign country, which, if well cultivated, would be fruitful in both. Beſides the water of the common fountains and rivers, which is pure, agreeable, and fit for all the uſual purpoſes, this county affords ſome ſprings of peculiar qualities. In Betham-park, there is the dropping-well, in which moſs, wood, and leaves are petrified. On the north ſide of Jeffery-mount there is a ſmall ſpring called *Goudſike*, which continually throws up ſmall ſpangles that glitter like ſilver. In the neighbourhood of Burrow, upon Stanemore, the inhabitants have diſcovered a chalybeate fountain.

In all probability, the mountains of Weſtmoreland are well ſtored with minerals, though no mines are worked in this county; yet here is plenty of coal for fuel. The county produces conſiderable crops of corn and hay, together with many plants not commonly found in the neighbouring provinces. The animal productions of this county are in all reſpects the ſame as thoſe in Cumberland, particularly great plenty of game, and vaſt flocks of ſheep that feed upon the moors or commons, from whence the province derives its name.

Weſtmoreland exhibits ſome monuments of Roman as well as of Britiſh antiquity. At Ambleſide, near Winander-mere, ſuppoſed by ſome to be the Amboglana of the Romans, we ſee the ruins of an old city; and here ſeveral medals of gold, ſilver, copper, have been dug out of the ground. Brough under Stanemore, imagined to be the ancient Verteræ, is ſituated on a Roman highway. At Whelp-caſtle, near Kirkby Thore, appear the ruins of an old town, thought to be Gallatum, where we ſee conſiderable remains of antiquity. Hard by Kirkby Thore begins the old cauſeway, called the *Maiden way*, which runs about 20 miles from hence to Caer-vorran, in the neighbourhood of the great wall. Near the conflux of the Lowther and Eimot, there is a circular mound, known by the appellation of *Arthur's round table*, ſecured on the inſide by a trench, and ſuppoſed to have been a kind of liſts, or amphitheatre, for tournament or wreſtling. Hard by this monument there is a heap of rude ſtones piled up in form of a horſe ſhoe, called *Mayburgh*, where a peace is ſaid to have been eſtabliſhed in the tenth century, between Athelſtan king of Northumberland, Conſtantine king of Scotland, and divers other princes. Near Whelp-caſtle we ſee the remains of ditches, ramparts, and mounds of earth, among which ſeveral ſtones have been found with Roman inſcriptions. There are beſides divers remains of Saxon and Daniſh monuments. In the northern part of the county we ſee a pillar erected, with an inſcription by Anne counteſs-dowager of Pembroke, in memory of her parting at this place from her mother the counteſs-dowager of Cumberland, in the year 1616.

Weſtmoreland is too mountanious to be full of people: nevertheleſs the level country is well inhabited by a ſtout, rugged, hardy race; who are either employed in breeding and feeding ſheep and cattle, in coal-digging, or in the woollen manufacture of cloths and ſtockings. The farmers are either poorer, or leſs ſkilful in agriculture here, than in any other county of England: for there are very few incloſures, except thoſe belonging to noblemen and gentlemen of fortune; and thoſe we ſee are made with looſe ſtones, without lime or mortar. This nakedneſs of the county, however, gives the better effect to the ſeats of the gentry, of which there is a conſiderable number in this diſtrict elegant and delightful. Among theſe we reckon Pendragon-caſtle, about 12 miles from Appleby, belonging to the earl of Thanet, hereditary ſheriff of the county; Beltham-caſtle, at the diſtance of ſeven miles from Kendal, a ſeat of the earl of Derby; and Lowther-hall, near Ulles water, poſſeſſed by the lord viſcount Lonſdale. There are beſides ſeveral ancient caſtles; from whence ſeveral families have taken their names, ſuch as Muſgrave, Wharton, Warcop, and Langdale.

The moſt remarkable places in Weſtmoreland are Appleby, Shap, Kirkby-Stephen, Orton, Ambleſide, Kendal, Kirkby Lonſdale, Burton, and Milthorpe.

WESTPHALIA, a duchy of Germany, bounded to the eaſt by the biſhopric of Paderborn, and the territories of Waldeck and Heſſe; to the ſouth by the counties of Witgenſtein and Naſſau, and the duchy of Berg; to the north by the biſhopric of Munſter and the county of Lippe. It is about 40 miles in length, and 30 in breadth. The lower part of it is very fruitful, yielding plenty of corn and cattle, and ſome ſalt-ſprings. The higher affords iron-ore, calamine, lead, copper, ſome ſilver and gold, fine woods, cattle, game, fiſh, with a little corn. The rivers, that either paſs through the duchy or along its borders, are the Rahr, the Lenne, the Bigge, the Dimel, and the Lippe. There are 28 towns in it, beſides boroughs and cloiſters. The provincial diets are held at Arenſberg. In the year 1180, the emperor Fred. I. made a donation of this duchy to the archbiſhopric of Cologne, which was confirmed by ſucceeding emperors; and in 1638, the laſt duke of Arenſberg ceded to it alſo the county of Arenſberg. The duchy is governed at preſent by a bailiff, under the archbiſhop, and is divided into the Hellwege, the Haarſtrank, and the Sarland; or otherwiſe into the Ruden, the Werl, the Bilſtein, and the Brilon quarters.

WESTPHALIA, one of the circles of Germany, anciently the people inhabiting between the Weſer and the Rhine, were called *Weſtphalians*; and hence that tract got the name of *Weſtphalia*: but the circle of that name is of a larger extent, being ſurrounded by the circle of Burgundy, or the Auſtrian Netherlands, the United Provinces, and the North-Sea, with the circles of the Upper and Lower Rhine, and compriſing a great many different ſtates.

The ſummoning princes and directors of the circle of Weſtphalia, are the biſhops of Munſter, alternately with the electors of Brandenburg and Palatine, as dukes of Cleve and Juliers. The archives belonging to it are kept at Duſſeldorp. Its quota of men and money is ſomewhat more than the ninth part of the whole ſum granted by the empire. With reſpect to religion, it is partly Proteſtant and partly Catholic; but the Proteſtants predominate, and are, at leaſt the greater part of them, Calviniſts. The air of this country is not reckoned very wholeſome, and towards the north is extremely cold in winter. The ſoil in general is marſhy and barren; yet there is ſome good corn and paſture land: but the fruit is chiefly uſed to feed hogs; and hence it is that their bacon and hams are ſo much valued and admired. In all other reſpects it is certainly the moſt wretched part of Germany; ſo that it is commonly and juſtly ſaid, that a traveller will find nothing in it but long miles, ſmall beer, coarſe bread, and the worſt of lodgings. Nor is the character of the people, by all the accounts we have of them, much more amiable than their climate and ſoil; but this is not ſo much the effect of the cold barren country they inhabit, as of the tyranny and oppreſſion of a multitude of petty princes, by whom they are cruelly fleeced and enſlaved.

WETSTEIN (John James), a very learned German divine, born at Baſil in 1693. On his admiſſion to the miniſtry, he maintained a theſis *de variis Novi Teſtamenti lectionibus*; in which he ſhowed that the great variety of readings of the New Teſtament afford no argument againſt the authenticity of the text. He had made theſe various readings the object of his attention; and travelled into foreign countries to examine all the MSS. he could come at. In 1730, he publiſhed *Prolegomena ad Novi Teſtamenti Græci editionem accuratiſſimam, &c.* Some divines dreading his unſettling the preſent text, procured a decree of the ſenate of Baſil againſt his undertaking, and even got him prohibited from officiating in the miniſtry; on which he went to Amſterdam, where the remonſtrants named him to ſucceed the famous Le Clerc, then ſuperannuated, as profeſſor of philoſophy and hiſtory. At laſt he publiſhed his edition of the New Teſtament, in 2 vols. folio, 1752; in which he left the text as he found it, placing the various readings, with a critical commentary, underneath; ſubjoining two epiſtles of Clemens Romanus, till then unknown to the learned, but diſcovered by him in a Syraic MS. of the New Teſtament. He alſo publiſhed ſome ſmall works; and is ſaid to have been not only an univerſal ſcholar, but to abound in good and amiable qualities. He died at Amſterdam of a mortification in 1754.

WETTERAVIA, the ſouthern diviſion of the Landgravate of Heſſe in Germany, lying along the northern back of the river Maine, comprehending the counties of Hanau and Naſſau.

WEXFORD, or WEISFORD, a county of Ireland, in the province of Munſter, bounded by Wicklow on the north, St George's-channel on the ſouth and ſouth-weſt, and part of Catherlogh and Kilkenny on the weſt. Its greateſt length is about 47 miles, breadth about 27, and contains eight baronies. The air is good, but the ſoil various. In ſome places it is coarſe and poor, in others fruitful both in corn and graſs. The county ſends 18 members to parliament; namely, two for the county, and two for each of the boroughs of Wexford, New-Roſs, Enneſcorthy, Feathard, Newborough, Bannow, Clomenis, Taghman.

WEXFORD, or *Weiſford*, the capital of the above county, is a large ancient town, at the mouth of the Slane, the firſt place the Engliſh got poſſeſſion of when they invaded Ireland in 1170, and is now much frequented by ſtrangers in ſummer, on account of a chalybeate ſpring near it. Here is a very good harbour for veſſels of conſiderable burden, and barracks for two companies of foot, with a very ancient caſtle ſtill ſtanding. Both Wexford and Waterford give title of earl to the Talbots, earls of Shrewſbury, in England.

WEYMOUTH, a town of Dorſetſhire in England, deriving its name from its ſituation at the mouth of the river Wey. It is a very neat agreeable town, though it lies low. Melcombe-Regis, which ſtands on the oppoſite bank of the river, makes with it but one corporation, which ſends as many members to parliament as London; every voter having, as in the capital, the privilege of polling for four perſons. The corporation conſiſts of a mayor, recorder, two bailiffs, 24 capital burgeſſes; and every mayor is an alderman for life. Here is a cuſtomhouſe and good quay; but little trade, unleſs what is clandeſtine. Their fair trade is chiefly in wine, and fiſh brought from Newfoundland. The town gives title of viſcount to the family of Thynne.—Melcombe-Regis, as we obſerved before, makes but one corporation with Weymouth, being ſituated upon the oppoſite bank of the river, and joined to it by a bridge. Theſe towns were united into one corporation in the reign of James I. Melcombe has four tolerable ſtreets, and is the moſt thriving and populous of the two. The port, which is ſaid to be the moſt frequented in the county, and is defended by two caſtles, goes by the name of *Weymouth.*

WHALE, in ichthyology. See BALÆNA and PHYSETER.

WHARF, a ſpace on the banks of a haven, creek, or hithe, provided for the convenient loading and unloading of veſſels.

WHARTON, (Philip duke of), a nobleman of the moſt brilliant parts, but of the moſt whimſical, extravagant, and inconſiſtent turn of mind, was educated by his father's expreſs order at home. He very early married a young lady, the daughter of major-general Holmes, which diſappointed his father's views of diſpoſing of him in ſuch a marriage as would have been a conſiderable addition to the fortune and grandeur of his illuſtrious family; yet that amiable lady deſerved infinitely more felicity than ſhe met with by this alliance. This precipitate marriage is thought to have haſtened the death of his father; after which the duke being free from paternal reſtraints, plunged into thoſe exceſſes which rendered him, as Pope expreſſes it,

> " A tyrant to the wife his heart approv'd,
> " A rebel to the very king he loved."

In the beginning of the year 1716, his lordſhip began his travels; and as he was deſigned to be inſtructed in the ſtricteſt Whig principles, Geneva was thought a proper place for his reſidence. He firſt paſſed through Holland, and viſited ſeveral courts of Germany; and being arrived at Geneva, conceived ſuch a diſguſt againſt his governor, that he left him, and ſet out poſt for Lyons, where he wrote a letter to the chevalier de St George, who then reſided at Avignon, and preſented him a very fine ſtout horſe; which the chevalier no ſooner received than he ſent a man of quality to him, who took him privately to his court, where he was entertained with the greateſt marks of eſteem, and had the title of duke of Northumberland conferred upon him. He, however, remained there but one day, and then returned poſt to Lyons, from whence he ſet out for Paris. He likewiſe paid a viſit to the conſort of James II. who then reſided at St Germains, to whom he alſo paid his court. During his ſtay at Paris, his winning addreſs and abilities gained him the eſteem and admiration of all the Britiſh ſubjects of rank of both parties.

About the latter end of December 1716, he arrived in England, whence he ſoon after ſet out for Ireland, where, though under age, he was allowed the honour to take his ſeat in the houſe of peers, and immediately diſtinguiſhed himſelf, notwithſtanding his former conduct, as a violent partizan for the miniſtry; in conſequence of which zeal the king created him a duke. He no ſooner came of age than he was introduced to the houſe of lords in England with the ſame blaze of reputation. In a little time he oppoſed the court, and appeared one of the moſt vigorous in defence of the biſhop of Rocheſter; and ſoon after printed his thoughts twice a-week, in a paper called the *True Briton*, ſeveral thouſands of which were diſperſed weekly.

The duke's boundleſs profuſion had by this time ſo burdened his eſtate, that by a decree of Chancery it was veſted in the hands of truſtees for the payment of his debts, allowing him a proviſion of 1200l. per ann. for his ſubſiſtence. This being not ſufficient to ſupport his title with ſuitable dignity, he went abroad and ſhone to great advantage, with reſpect to his perſonal character, at the Imperial court. From thence he made a tour to Spain; where the Engliſh miniſter was ſo alarmed at his arrival, as to ſend two expreſſes from Madrid to London, upon the apprehenſion that his grace was received there in the character of an ambaſſador: upon which the duke received a ſummons under the privy-ſeal to return home; but inſtead of obeying it, he endeavoured to inflame the Spaniſh court againſt that of Great-Britain, for exerciſing an act of power, as he was pleaſed to call it, within the juriſdiction of his catholic majeſty. He then acted openly in the ſervice of the Pretender, and was received at his court with the greateſt marks of favour.

While his grace was thus employed, his neglected ducheſs died in England on the 14th of April 1726, without iſſue; and ſoon after the duke fell violently in love with M. Oberne, one of the maids of honour to the queen of Spain, the daughter of an Iriſh colonel who had died in that ſervice, and whoſe fortune chiefly conſiſted in her perſonal accompliſhments. All his friends, and particularly the queen of Spain, oppoſed the match; but he falling into a lingering fever, occaſioned by his diſappointment, the queen gave her conſent, and they were ſoon after married. He then ſpent ſome time at Rome, where he accepted of a blue garter, aſſumed the title of duke of Northumberland, and for a while enjoyed the confidence of the exiled prince. But not always keeping within the bounds of Italian gravity, it became neceſſary for him to remove from thence; when, going by ſea to Barcelona, he wrote a letter to the king of Spain, acquainting him that he would aſſiſt at the ſiege of Gibraltar as a volunteer. The king thanked him for the honour, and accepted his ſervice: but the duke ſoon growing weary, wrote a reſpectful letter to the chevalier de St George, expreſſing a deſire to viſit his court; but the chevalier adviſed him to draw near to England.

The duke ſeemed reſolved to follow his advice; and ſetting out with his ducheſs, arrived at Paris in May 1728, whence he ſoon after proceeded to Rouen, where he took up his reſidence; and was ſo far from making any conceſſion to the government of England, that he did not give himſelf the leaſt trouble about his eſtate, or any other concern there; though, on his arrival at Rouen, he had only about 600l. in his poſſeſſion, and a bill of indictment was preferred againſt him in England for high-treaſon. Soon after the chevalier ſent him 2000l. which he ſquandered away in a courſe of extravagance; when, to ſave the charges of travelling by land, he went from Orleans to Nantz by water, and ſtaid there till he got a remittance from Paris, which was ſquandered almoſt as ſoon as received. At Nantz he was joined by his ragged ſervants, and from thence took ſhipping with them for Bilboa, when the queen of Spain took the ducheſs to attend her perſon. About the beginning of the year 1731, the duke, who commanded a regiment, was at Lerida, but declined ſo faſt that he could not move without aſſiſtance; yet when free from pain did not loſe his gaiety. He, however, received benefit from ſome mineral waters in Catalonia; but ſoon after relapſed at a ſmall village, where he was utterly deſtitute of all the neceſſaries of life, till ſome charitable fathers of a Bernardine convent removed him to their houſe, and gave him all the relief in their power. Under their hoſpitable roof he languiſhed a week, and then died, without one friend or acquaintance to cloſe his eyes; and his funeral was performed in the ſame manner in which the fathers inter thoſe of their own fraternity.

Thus died Philip duke of Wharton, "who, like Buckingham and Rocheſter (ſays Mr Walpole), comforted all the grave and dull, by throwing away the brighteſt profuſion of parts on witty fooleries, debaucheries, and ſcrapes, which may mix graces with a great character, but never can compoſe one. If Julius Cæſar had only rioted with Catiline, he had never been emperor of the world. Indeed, the duke of Wharton was not made for conqueſts; he was not equally formed for a round-houſe and Pharſalia: in one of his ballads he bantered his own want of heroiſm. It was in a ſong he made on being ſeized by the guard in St James's park, for ſinging the Jacobite air, The king ſhall have his own again.

The duke he drew out half his ſword,
——— the guard drew out the reſt.

"With attachment to no party, though with talents to govern any party, this lively man changed the free air of Weſtminſter for the gloom of the Eſcurial, the proſpect of king George's garter for the Pretender's; and with indifference to all religion, the frolic lord who had writ the ballad on the archbiſhop of Canterbury, died in the habit of a capuchin. It is difficult to give an account of the works of ſo mercurial a man, whoſe library was a tavern, and women of pleaſure his muſes. A thouſand ſallies of his imagination may have been loſt. There are only two volumes in 8vo, called *his Life and Writings*. Theſe contain nothing of the latter, but 74 numbers of the True Briton, and his ſpeech againſt the biſhop of Rocheſter. His other works are the ballads above mentioned; the Drinking Match at Eden-hall, in imitation of the Chevy-Chace, printed in a miſcellany called *Whartoinana*; and a parody of a ſong ſung at the opera-houſe by Mrs Tofts. His lordſhip alſo began a play on the ſtory of the queen of Scots."

WHARTON (Henry), a learned Engliſh divine, was born in 1664, at Worſtead in Norfolk, of which pariſh his father was vicar. He ſtudied at Gonville and Caius college, Cambridge, where he proſecuted his ſtudies with great vigour; and was inſtructed in the mathematics by Mr Iſaac Newton, amongſt a ſelect company to whom that great man taught that ſcience in his own private chamber. He afterwards aſſiſted Dr William Cave in compiling his *Hiſtoria Literaria*, and at length became tutor to the only ſon of the Lord Arundel. In 1678, he diſtinguiſhed himſelf by publiſhing ſeveral pieces in defence of the Proteſtant religion; and, though as yet no more than a deacon, was honoured by archbiſhop Sancroft with a licence for preaching through the whole province of Canterbury, and was alſo made one of the archbiſhop's chaplains. The ſame year he obtained the vicarage of Minſter in the Iſle of Thanet, and afterwards the rectory of Chartham; but died in the 31ſt year of his age, in conſequence of his immoderate ſtudies. He was interred in Weſtminſter abbey, where a ſmall monument is erected to his memory. He was a man of great natural endowments; and was modeſt, ſober, pious, and charitable. His death was greatly lamented by all learned men both at home and abroad. His principal works are, *Anglia Sacra*, 2 vols, folio; and *Hiſtoria de Epiſcopis et Decanis Londinenſibus*, 8vo.

WHEAT, in botany. See TRITICUM. For the culture of wheat, ſee AGRICULTURE, n° 112—115.

WHEEL, in mechanics, a ſimple machine, conſiſting of a round piece of wood, metal, or other matter, which revolves on its axis. See MECHANICS.

WHEEL-*Carriages*. See MECHANICS, chap. v.

WHEEL-*Animal*. See ANIMALCULE, n° 16—22.

WHEEL of *Orſyreus*, a machine ſuppoſed by profeſſor Graveſande to be a perpetual motion; of which we have the following account in a Letter from the Profeſſor to Sir Iſaac Newton. "It is an hollow wheel, or kind of drum, about 14 inches thick, and 12 feet diameter; being very light, as it conſiſts of ſeveral croſs pieces of wood framed together; the whole of which is covered over with canvas, to prevent the inſide from being ſeen. Thro' the centre of this wheel or drum runs an axis of about 6 inches diameter, terminated at both ends by iron axes of $\frac{3}{4}$ths of an inch diameter, upon which the machine turns. I have examined theſe axes, and am firmly perſuaded that nothing from without the wheel in the leaſt contributes to its motion. When I turned it but gently, it always ſtood ſtill as ſoon as I took away my hand; but when I gave it any tolerable degree of velocity, I was always obliged to ſtop it again by force; for when I let it go, it acquired in two or three turns its greateſt velocity, after which it revolved from 25 to 26 times in a minute. This motion it preſerved ſome time ago for two months, in an apartment of the caſtle: the doors and windows of which were locked and ſealed, ſo that there was no poſſibility of fraud. At the expiration of that term, indeed his ſerene highneſs ordered the apartment to be opened, and the machine to be ſtopped; leaſt, as it was only a model, the parts might ſuffer by ſo much agitation. The landgrave being himſelf preſent on my examination of this machine, I took the liberty to aſk him, as he had ſeen the inſide of it, whether, after being in motion for a certain time, no alteration was made in the component parts; or whether none of thoſe parts might be ſuſpected of concealing ſome fraud; on which his ſerene highneſs aſſured me to the contrary, and that the machine was very ſimple."

WHEELER (Sir George), a learned traveller and divine, was the ſon of colonel Wheeler of Charing in Kent, and was born in 1650 at Breda, where his parents as royaliſts were then in exile. He travelled through various parts of Greece and the Eaſt in company with Dr James Spon of Lyons; and taking orders on his return, was inſtalled a prebend of Durham, made vicar of Baſingſtoke, and afterward rector of Houghton le Spring. He publiſhed an account of his Travels in 1682 in folio; and in 1689, his Obſervations on ancient edifices of Churches yet remaining in the Eaſt, compared with Euſebius: alſo the Proteſtant Monaſtery, or Chriſtian œconomics. He died in 1724.

WHEELINGS, in the military art, are different motions made both by horſe and foot, either to the right and left, or to the right and left about.

General Rules for WHEELING. The circle is divided into four equal points: thence, wheeling to the right or left, is only a quarter of the circle; wheeling to the right or left about, is one half of the circle.

When you wheel to the right, you are to cloſe to the right, ſo near as to touch your right-hand man, but without preſſing him; and to look to the left, in order to bring the rank about even.

When you wheel to the left, you are to cloſe to the left, and look to the right, as above directed. This rule will ſerve for all the wheeling by ranks; as when a battalion is marching by ſubdiviſions with their ranks open, then each rank wheels diſtinctly by itſelf, when it comes to the ground on which the ranks before it wheeled, but not before.

In wheeling, the men are to take particular care neither to open nor cloſe their ranks, and to carry their arms well.

In wheeling, the motion of each man is quicker or ſlower, according to the diſtance he is from the right or the left: thus, when you wheel to the right, each man moves quicker than his right-hand man; and wheeling to the left, each man moves quicker than his left-hand man; the circle that every man wheels being larger, according to the diſtance he is from the hand he wheels to; as may be ſeen by deſcribing ſeveral circles within one another, at two feet diſtance from each, which is nearly the ſpace every man is ſuppoſed to take up.

WHELK, in zoology. See BUCCINUM.

WHELP, the young of a dog, fox, lion, or any wild beaſt.

WHELPS, in a ſhip, the ſeaman's term for thoſe brackets which are ſet up on the capſtan cloſe under the bars; they give the ſweep to it, and are ſo contrived that the cable winding about them may not ſurge ſo much as it might otherwiſe do if the body of the capſtan were quite round and ſmooth.

WHETSTONE, a ſtone which ſerves for the whetting of knives and other tools upon.

WHEY, the ſerum, or watery part of milk.

WHICHCOT (Dr Benjamin), a learned Engliſh divine, was born in Shropſhire in 1609, and educated at Cambridge, where he was choſen fellow of his college, and was an excellent tutor and inſtructor of youth. He was afterwards made provoſt of King's-college, where he was a moſt vigilant and prudent governor, a great encourager of learning and good order, and by his wiſe management of the eſtate of the college he brought it into a very flouriſhing condition. After he left Cambridge he came to London, and was choſen miniſter of Blackfriars, where he continued till the fire of London, and then retired to a donative which he had at Milton near Cambridge, where he preached conſtantly, and relieved the poor. In 1668 he was preſented to the rectory of St Laurence Jewry; but during the building of that church, he preached for about the ſpace of ſeven years before the court of aldermen at Guildhall chapel with great approbation. When his church was built, he conſtantly officiated twice a week, and gained the general love and reſpect of his pariſh. He died in 1683. Dr John Tillotſon preached his funeral ſermon, in which his character is drawn to great advantage. His Select Sermons were printed at London in 1698, with a preface by the late earl of Shafteſbury author of the Characteriſtics.

WHIG, a party in Britain, oppoſite to the Tories, from whom they differ chiefly in their political principles. See Tories.

The names of *Whig* and *Tory* were not known till about the middle of the reign of Char. II. when theſe were given as party-diſtinctions. Theſe parties may be conſidered either with regard to the ſtate, or to religion. The ſtate Tories are either violent or moderate: the firſt would have the king to be abſolute, and therefore plead for paſſive obedience, non-reſiſtance, and the hereditary right of the houſe of Stuart. The moderate Tories would not ſuffer the king to loſe any of his prerogative; but then they would not ſacrifice thoſe of the people. The ſtate Whigs are either ſtrong republicans or moderate ones. "The firſt (ſays Rapin) are the remains of the party of the long parliament, who attempted to change monarchy to a commonwealth: but theſe make ſo ſlender a figure, that they only ſerve to ſtrengthen the party of the other Whigs. The Tories would perſuade the world, that all the Whigs are of this kind; as the Whigs would make us believe that all the Tories are violent. The moderate ſtate Whigs are much in the ſame ſentiments with the moderate Tories, and deſire that the government may be maintained on the ancient foundation: all the difference is, that the firſt bear a little more to the parliament and people, and the latter to that of the king. In ſhort, the old Whigs were always jealous of the encroachments of the royal prerogative, and watchful over the preſervation of the liberties and properties of the people.

WHIP, or Whip-*Staff*, in a ſhip, a piece of timber, in form of a ſtrong ſtaff, faſtened into the helm, for the ſteerſman, in ſmall ſhips, to hold in his hand, in order to move the rudder and direct the ſhip.

WHIRLPOOL, an eddy, vortex, or gulph, where the water is continually turning round.

Theſe in rivers are very common, from various accidents, and are uſually very trivial, and of little conſequence. In the ſea they are more rare, but more dangerous. Sibbald has related the effects of a very remarkable marine whirlpool among the Orcades, which would prove very dangerous to ſtrangers, though it is of no conſequence to the people who are uſed to it. This is not fixed to any particular place, but appears in various parts of the limits of the ſea among thoſe iſlands. Wherever it appears, it is very furious; and boats, &c. would inevitably be drawn in and periſh with it; but the people who navigate them are prepared for it, and always carry an empty veſſel, a log of wood, or large bundle of ſtraw, or ſome ſuch thing, in the boat with them; as ſoon as they perceive the whirlpool, they toſs this within its vortex, keeping themſelves out: this ſubſtance, whatever it be, is immediately received into the centre, and carried under water; and as ſoon as this is done, the ſurface of the place where the whirlpool was becomes ſmooth, and they row over it with ſafety; and in about an hour they ſee the vortex begin again in ſome other place, uſually at about a mile's diſtance from the firſt.

WHIRLWIND, a wind that riſes ſuddenly, is exceedingly rapid and impetuous when riſen, but is ſoon ſpent. See Wind.

The origin of whirlwinds has been already given under that of Water-*Spouts*. It is, however, highly probable that all theſe violent motions of the air are ultimately owing to the emiſſion of electric matter from the earth. It is mentioned as a certain ſign of an approaching hurricane in the Weſt Indies, that the ſea-water becomes exceedingly clear and tranſparent of a ſudden; after which it ſeems to boil, and the waves begin to riſe, though there is not the leaſt wind. Both theſe phenomena can be accounted for on no other principle than that of a quantity of electric matter attempting to get out from the earth. Now though hurricanes are not preciſely of the nature of whirlwinds, as not having a circular motion, it is highly probable that the latter alſo are occaſioned ſomehow or other by a ſimilar cauſe. A ſtream of electric matter iſſuing with violence into the atmoſphere from any part of the earth, will cauſe a kind of vacuum in the atmoſphere directly above that place, and of conſequence a whirlwind or water-ſpout by the air ruſhing in on all ſides to ſupply the vacuum *. If this is the true principle on which theſe phenomena depend, then we are ſure that there never was any hurricane or whirlwind ſo violent as to remove an obſtacle of the ſize of only one cubic inch, provided that was ſupported by a power equivalent to 15 pounds; for this is the utmoſt force of the atmoſphere when ruſhing into a perfect vacuum, which never could take place in the centre of a whirlwind or water-ſpout. Indeed, notwithſtanding the dreadful effects ſometimes obſerved from hurricanes and whirlwinds, we ſhall eaſily perceive that the utmoſt of their power always falls very far ſhort of this. The diminution of the ſpecific gravity of the air by only $\frac{1}{4}$th in the middle of the column, would produce ſuch an afflux of air from all quarters, that an obſtacle preſenting a ſurface of one foot ſquare would require a force of 504 pounds to prevent it from being carried away; which ſcarce the ſtrongeſt walls that can be built by human art could reſiſt. Nay, even the tenth part of this, or the diminution of the gravity of the atmoſphere by $\frac{1}{40}$th part, would produce a preſſure of upwards of 50 pounds on every ſquare foot of ſurface, which it is to be doubted whether any of our common houſes could reſiſt.

As this degree of rarefaction in the atmoſphere would only produce a deſcent of about $\frac{3}{4}$ths of an inch in the barometer, it may ſeem wonderful why the moſt violent whirlwinds do not take place at thoſe times when the mercury deſcends two or more inches, which deſcents are by no means unfrequent. But here it is to be remembered, that by whatever means this deſcent of the barometer is occaſioned, by a certain expanſive power in the rarefied place of the atmoſphere, the air is prevented from ruſhing in eddies, and forming the whirlwind. Now, in the caſe of electric matter eſcaping from the earth, aſcending into the high regions of the atmoſphere, and carrying part of the air along with it, we ſee that there could be no expanſion, but on the contrary a continued ſuction; and if the electric ſtream ſhould happen to be ſtopped in one place and break out in another, the ſpout or whirlwind would immediately vaniſh in the one place and appear in the other, as is often obſerved in whirlwinds and water-ſpouts. Its progreſſive motion might be owing to the electric current perpetually ſhifting its place; in which caſe the whirlwind would conſtantly follow it, for the reaſons already given.

Some kinds of whirlwinds move with a ſlow motion, and are injurious only by their vortex; while others ſeem to do miſchief as well by their progreſſive as their whirling motion. Of this kind are thoſe called *typhons;* which, by their frequently following the courſe of rivers, ſeem thus alſo to diſcover their electrical origin. Of the deſtructive effects of theſe, we have an inſtance in what happened at Charleſtown in South Carolina on the 1ſt of June 1761. It was firſt obſerved about noon, on land, upwards of 50 miles weſt-by-ſouth of Charleſtown, and deſtroyed ſeveral houſes, &c. as it paſſed along, in many places making wide avenues through the woods; from whence every tree and ſhrub was torn up, and great branches of trees were driven about in the column as it paſſed along. It directed its courſe to Aſhley river, down which it came with ſurpriſing velocity; in its appearance reſembling a column of ſmoke or vapour, whoſe motion was very irregular and tumultuous. Its momentum was ſo great, that Aſhley river was ploughed to the bottom, and the channel laid bare. As it came down this river it made a conſtant noiſe like thunder; its diameter being computed about 300 fathoms. It was met at White Point by another of the ſame kind which came down Cooper's river, but with inferior ſtrength; however, on their meeting together, the agitation of the air was much greater, while the clouds, which were driving in all directions to the place, ſeemed to be precipitated and whirled round with incredible velocity. It then fell upon the ſhipping in the road; entirely deſtroying ſome, and damaging others: being ſcarce three minutes in its paſſage, though the diſtance was near two leagues. In that ſhort time it did damage to the amount of 20,000 l.; and had not its direction been altered by that guſt which came down Cooper's river, it muſt have totally deſtroyed Charleſtown, as no obſtacle whatever ſeemed capable of reſiſting its fury.

It is obſervable, that whirlwinds do not ariſe with all their fury at once, but increaſe in ſtrength as they go along. Dr Franklin relates, that he once rode for a conſiderable way by the ſide of one which had but newly ariſen, and could ſcarce lift up any thing but duſt, its vortex being only a few inches in diameter; but as it went along the ſtrength and diameter conſtantly increaſed, till at laſt, as it began to take up and whirl round large branches of trees, it became dangerous for him to accompany it any longer. See WATER-*Spout* and WIND.

WHISPERING-PLACES. See ACOUSTICS, nº25.

WHIST, a well known game at cards, ſo called from the ſilence obſerved during the time of play.

WHISTON (William), an Engliſh divine of great parts, uncommon learning, and of a ſingular character, was born at Norton near Twycroſſe in the county of Leiceſter, where his father was rector, in 1667. He was admitted of Clarehall, Cambridge, where he purſued his ſtudies, particularly in the mathematics, and commenced tutor; which his ill health at length forced him to decline. Having entered into orders, he, in 1694, became chaplain to Dr More biſhop of Norwich; and in this ſtation he publiſhed his firſt work, intitled, *A New Theory of the Earth, &c.* in which he undertook to prove the Moſaic doctrine of the earth perfectly agreeable to reaſon and philoſophy: which work, though it was wrote againſt by Mr John Keil, brought no ſmall reputation to the author. In the beginning of this century he was made Sir Iſaac Newton's deputy, and afterward his ſucceſſor, in the Lucaſian profeſſorſhip of mathematics; when he reſigned a living he had in Suffolk, and went to reſide at Cambridge. About this time he publiſhed ſeveral ſcientifical works explanatory of the Newtonian philoſophy; and he had the honour of being one of the firſt, if not the very firſt, who rendered thoſe principles popular and intelligible to the generality of readers. About the year 1710, he was known to have adopted Arian principles, and was forming projects to ſupport and propagate them: among other things, he had tranſlated the Apoſtolical Conſtitutions into Engliſh, which favoured the Arian doctrine, and which he aſſerted to be genuine. The conſequence was, that he was deprived of his profeſſorſhip, and baniſhed the univerſity; he nevertheleſs purſued his ſcheme, by publiſhing the next year his Primitive Chriſtianity Revived, 4 vols, 8vo. for which the convocation fell upon him very vehemently. On his expulſion from Cambridge Mr Whiſton ſettled in London; where, without ſuffering his zeal to be intimidated, he continued to write, and to propagate his Primitive Chriſtianity with as much ardour as if he had been in the moſt flouriſhing circumſtances. In 1721, a ſubſcription was made for the ſupport of his family, which amounted to 470l. For though he drew profits from reading aſtronomical and philoſophical lectures, and alſo from his publications, which were very numerous, yet theſe of themſelves would have been very inſufficient: nor, when joined with the benevolence and charity of thoſe who loved and eſteemed him for his learning, integrity, and piety, did they prevent his being frequently in great diſtreſs. He continued long a member of the church of England, and regularly frequented its ſervice, though he diſapproved of many things in it: but at laſt he went over to the Baptiſts, and attended Dr Forſter's meeting at Pinner's Hall, Broadſtreet. Among other performances not ſpecified above, he wrote Memoirs of his own life and writings, which contain ſome curious particulars. He died in 1762.

WHITBY (Dr Daniel), a very learned Engliſh writer, was born in 1638, and bred at Oxford; where in 1664 he was elected perpetual fellow of his college. He afterward became chaplain to Dr Seth Ward, biſhop of Saliſbury; who collated him in 1668 to the prebend of Yateſbury in that church, and ſoon after to that of Huſborn and Burbach. In 1672 he was admitted chanter of the ſaid church on the death of Mr John South, and then, or ſoon after, rector of St Edmund's church in Saliſbury. He was made a prebendary of Taunton Regis in 1696, and died in 1726. He was ever ſtrangely ignorant of worldly affairs, even to a degree that is ſcarcely to be conceived. His writings are numerous, and well known; particularly his Commentary on the New Teſtament.

WHITBY, a ſea-port town in the North Riding of Yorkſhire, ſeated on the river Eſk, near the place where it falls into the ſea; over which there is a wooden bridge. It was formerly of great note for its abbey; which, though now in ruins, continues to be very uſeful as a land-mark. The houſes are neat, ſtrong, and convenient; the number of inhabitants about 9000. Ship-building is their principal manufacture. W. Long. 0. 7. N. Lat. 54. 30.

WHITE, one of the colours of natural bodies.

WHITE *of the Eye*, denotes the firſt tunic or coat of the eye, called *albuginea*. See ANATOMY, n° 406, i.

WHITE *of an Egg*. See ALBUMEN and EGG.

WHITE-*Friars*, a name common to ſeveral orders of monks, from being clothed in a white habit.

WHITE-*Sea*, is a bay of the Frozen Ocean, ſo called, in the north part of Muſcovy, lying between Ruſſian Lapland and Samoieda; at the bottom of which ſtands the city of Archangel. This was the chief port the Ruſſians had before their conqueſt of Livonia.

WHITE-*Colour* for painting. See CHEMISTRY, n° 152.

WHITE-*Copper*. See CHEMISTRY, n° 381.

WHITE-*Drop*, Ward's. See CHEMISTRY, n° 191.

WHITE-*Lead*. See CHEMISTRY, n° 281.

WHITE-*Throat*, in ornithology. See MOTACILLA.

WHITEFIELD (George), the celebrated preacher among the people called *Methodiſts*, was born in the year 1714, at the Bell in the city of Glouceſter, which was then kept by his mother. At about 12 years of age he was put to a grammar ſchool; but his mother entering into a ſecond marriage, which proved a diſadvantageous one, he, when about 15, put on a blue apron, and ſerved her in the capacity of a drawer or waiter. After continuing about a year in this ſervile employment, ſhe turned over the buſineſs to his brother; who marrying, and George not agreeing with his ſiſter-in-law, he left the inn. Some time after, meeting with an old ſchool-fellow, then a ſervitor in Pembroke college, Oxford, he was induced to attempt getting into the ſame college in a like capacity, and ſucceeded. Here Mr Whitefield, who from his own account appears to have always had a ſtrong tincture of enthuſiaſm in his conſtitution from his very childhood, diſtinguiſhed himſelf by the auſterities of his devotion, and acquired conſiderable eminence in ſome religious aſſemblies in that city. At the age of 21, the fame of his piety recommended him ſo effectually to Dr Benſon, then biſhop of Glouceſter, that he made him a voluntary offer of ordination. Immediately after this regular admiſſion into the miniſtry, Mr Whitefield applied himſelf to the moſt extraordinary, the moſt indefatigable duties of his character, preaching daily in priſons, fields, and open ſtreets, wherever he thought there would be a likelihood of making proſelytes. Having at length made himſelf univerſally known in England, he embarked for America, where the tenets of Methodiſm began to ſpread very faſt under his friends the Weſleys; and firſt determined upon the inſtitution of the orphan-houſe at Georgia, which he afterwards effected. After a long courſe of perigrination, his fortune increaſed as his fame extended among his followers, and he erected two very extenſive buildings for public worſhip, under the name of *tabernacles*; one in Tottenham-Court Road, and the other in Moorfields. Here, with the help of ſome aſſiſtants, he continued for ſeveral years, attended by very crowded congregations, and quitting the kingdom only occaſionally. Beſides the two tabernacles already mentioned, Mr Whitefield, by being chaplain to the counteſs dowager of Huntingdon, was connected with two other religious meetings, one at Bath, and the other at Tunbridge, chiefly erected under that lady's patronage. By a lively, fertile, and penetrating genius, by the moſt unwearied zeal, and by a forcible and perſuaſive delivery, he never failed of the deſired effect upon his ever crowded and admiring audiences. America, however, which always engaged much of his attention, was deſtined to cloſe his eyes; and he died at Newberry, about 40 miles from Boſton in New England, in 1770.

WHITEHAVEN, a ſea-port town of Cumberland, with a market on Thurſdays, and one fair on Auguſt 1ſt, for merchandiſe and toys. It is ſeated on a creek of the ſea, on the north end of a great bergh or hill, waſhed by the tide of flood on the weſt ſide, where there is a large rock or quarry of hard white ſtone, which gives name to the place, and which, with the help of a ſtrong ſtone wall, ſecures the harbour, into which ſmall barks may enter. It is lately much improved in its buildings, and noted for its trade in pit-coal and ſalt, there being near it a prodigious coal-mine, which runs a conſiderable way under the ſea. They have a cuſtomhouſe here; and they carry on a good trade to Ireland, Scotland, Cheſter, Briſtol, and other parts. It is 10 miles ſouth-weſt of Cockermouth, and 289 north-weſt of London. W. Long. 3. 6. N. Lat. 54. 30.

WHITEHEAD (Paul), a celebrated ſatiriſt, the ſon of a taylor, was born in Weſtminſter in the year 1710, and put apprentice to a woollen-draper. Unhappily he became acquainted with Mr Fleetwood the manager of Drury-lane theatre; who, in one of his difficulties, prevailed on Whitehead to become joint ſecurity with him for the payment of 3000 l. which Fleetwood failing to diſcharge, his deluded friend was reduced to take refuge in the liberties of the Fleet-priſon for a conſiderable time. It was principally owing to him that the town was well diverted with the burleſque proceſſion calculated to ridicule the anniverſary parade of the ſociety of Free Maſons; whoſe public appearance has been diſcontinued from that time. He was very active on the part of Sir George Vandeput in the famous conteſted Weſtminſter election in 1749; frequently heading numerous bodies of electors in perſon, and ſupplying the preſs with electioneering ſquibs. He was indeed generally reputed a rank Tory, heightened with a ſtrong tincture of the Jacobite; for which ſuppoſition the frequent ſneers at the Houſe of Hanover, to be met with in his writings, furniſhed no ſmall countenance. But if we pay any regard to the ſpirit of independence and public virtue he likewiſe manifeſts, his attachment to tyrants from principle may juſtly be queſtioned. The truth ſeems to be, that having a turn to ſatire, the party he adhered to was as much owing to accident as to choice: whether ſuch conduct is conſiſtent with any valuable principle, is another queſtion. Sir Francis Daſhwood, ſince lord Le Deſpencer, became Mr Whitehead's patron; and when he roſe to power under lord Bute, he procured a patent place of 800 l. a-year for his favourite bard, which he enjoyed to his death in 1774. He beſtowed among other legacies, the uncommon one of his heart, to his noble friend; who depoſited it in a ſolemn manner, in a mauſoleum erected for that purpoſe in his garden at High Wycomb in Buckinghamſhire. His principal writings are, Manners, a ſatire; Honour, a ſatire; the State Dunces, a ſatire; the Gymnaſiad, a mock heroic poem; and an Epiſtle to Dr Thompſon: his ſmaller pieces in proſe and verſe are numerous; but he could never be prevailed on to collect and publiſh them. He ſpent three days before his death in burning MSS.

WHITELOCKE (Bulſtrode), an eminent politician, hiſtorian, and lawyer, was the ſon of Sir James Whitelocke, knight, one of the judges, and was born at London in 1605. He was educated in grammar-learning in Merchant-Taylor's ſchool, and became a gentleman-commoner in St John's college in Oxford; but before he had taken a degree, went to the Middle Temple, where he became eminent for his ſkill in the common law. In the beginning of the long parliament he was choſen a burgeſs for Marlow in Bucks, and was appointed chairman of the committee for drawing up the charge againſt the earl of Strafford, and one of the managers againſt him at his trial. He was appointed one of the lay-gentlemen to ſit among the aſſembly of divines; in which he made a ſpeech concerning the *jus divinum* of church government by preſbytery. In 1648 he retired into the country, that he might not have any concern in the king's trial. In 1649 he was conſtituted keeper of the king's library and medals, which in 1647 he had hindered from being ſold. In 1653 he went ambaſſador to Sweden. In 1656 he was choſen ſpeaker of the houſe of commons *pro tempore*; and the year following was ſummoned by Oliver the Protector to ſit in *the other houſe*, by the name of *Bulſtrode lord Whitelocke*. In 1659 he was preſident of the council of ſtate, and one of the *committee of ſafety*. He ſoon after retired into the country, where he ſpent the remainder of his days. He died in 1676. We are told that he acquitted himſelf with great ſucceſs and reputation in all his employments, foreign and domeſtic. Several of his ſpeeches were publiſhed; and beſide his *Memorials of the Engliſh affairs*, he wrote many other pieces. Lord Clarendon has left this teſtimony in favour of Mr Whitelocke; whom, numbering among his early friends in life, he calls, "a man of eminent parts and great learning out of his profeſſion, and in his profeſſion of ſignal reputation. And though, (ſays the noble hiſtorian,) he did afterward bow his knee to Baal, and ſo ſwerved from his allegiance, it was with leſs rancour and malice than other men. He never led, but followed; and was rather carried away with the torrent than ſwam with the ſtream; and failed through thoſe infirmities, which leſs than a general defection and a proſperous rebellion could never have diſcovered." Lord Clarendon has elſewhere deſcribed him, as from the beginning concurring with the parliament, without any inclinations to their perſons or principles; and, ſays he, "he had the ſame reaſon afterwards not to ſeparate from them. All his eſtate was in their quarters; and he had a nature that could not bear or ſubmit to be undone: though to his friends, who were commiſſioners for the king, he uſed his old openneſs, and profeſſed his deteſtation of all the proceedings of his party, yet could not leave them."

WHITENESS, the quality which denominates or conſtitutes a body white.

WHITES, or Fluor *Albus*. See Medicine, n° 364.

WHITING, in ichthyology. See Gadus.

WHITSUNDAY, a ſolemn feſtival of the Chriſtian church, obſerved on the fiftieth day after Eaſter, in memory of the deſcent of the Holy Ghoſt upon the apoſtles in the viſible appearance of fiery cloven tongues, and of thoſe miraculous powers which were then conferred upon them.

It is called *Whitſunday*, or *White-Sunday*; becauſe this being one of the ſtated times for baptiſm in the ancient church, thoſe who were baptiſed put on white garments, as types of that ſpiritual purity they received in baptiſm. As the deſcent of the Holy Ghoſt upon the apoſtles happened upon the day which the Jews called *Pentecoſt*, this feſtival retained the name of *Pentecoſt* among the Chriſtians.

Whitsunday *Iſle*, one of the New Hebrides, which lies about four miles to the ſouth, runs in the ſame direction, and is of the ſame length, having more ſloping expoſures than Aurora: it appears to be better inhabited, and to contain more plantations.

WIBURG, a conſiderable town of Denmark, in North Jutland, with a biſhop's ſee, remarkable for being the ſeat of the chief court of juſtice in the province. The hall where the council aſſembles has the archives of the country, and eſcaped the terrible fire that happened in the year 1726, and which burned the cathedral-church, that of the Black Friars, the town-houſe, and the biſhop's palace; but they have all been rebuilt more magnificent than before. It is ſeated on the lake Weter, in a peninſula, 25 miles north-weſt of Sleſwick, and 110 north-by-weſt of Copenhagen. E. Long. 10. 16. N. Lat. 56. 50.

WICKER, a twig of the oſier ſhrub ſingle or wrought.

WICKET, a ſmall door in the gate of a fortified place, &c. or a hole in a door through which to view what paſſes without.

WICKLIFF (John), the firſt divine in Europe who had the ſenſe, honeſty, and reſolution, to attempt a reformation of religion, was born about the year 1324, in the pariſh of Wycliff, near Richmond, in Yorkſhire. He was educated at Oxford, firſt in Queen's, and afterwards in Merton college, of which he was a probationer-fellow. Having acquired the reputation of a man of great learning and abilities, in 1361 he was choſen maſter of Baliol hall, and in 1365 conſtituted warden of Canterbury college, by the founder archbiſhop Simon de Iſlip; but was, 1367, ejected by the regulars, together with three ſecular-fellows. He thought their proceedings arbitrary, and therefore appealed to the pope; but inſtead of obtaining redreſs, in 1370 the ejectment was confirmed. This diſappointment probably contributed ſomewhat towards his enmity to the ſee of Rome, or rather to confirm that enmity; for he had long before written againſt the pope's exactions and corruptions of religion. However, his credit in the univerſity continued; for having taken the degree of doctor in divinity, he read public lectures with great applauſe; in which he frequently expoſed the impoſitions of the Mendicant friars. About this time he publiſhed a defence of his ſovereign Edward III. againſt the pope, who had inſiſted on the homage to which his predeceſſor king John had agreed. This defence was the cauſe of Wickliff's introduction at court, and of his being

Wickliff, Wicklow.

ſent one of the ambaſſadors in 1374, to Bruges where they met the pope's nuncios, in order to ſettle ſeveral eccleſiaſtical matters relative to the pope's authority. In the mean time Wickliff was preſented by the king to the rectory of Lutterworth in Leiceſterſhire, and in 1375 he obtained a prebend in the church of Weſtbury in Gloceſterſhire. Wickliff continued hitherto, without moleſtation, to oppoſe the papal authority; but in 1377 a bull was ſent over to the archbiſhop of Canterbury, and to Courtney biſhop of London, ordering them to ſecure this arch-heretic, and lay him in irons: at the ſame time the pope wrote to the king, requeſting him to favour the biſhops in the proſecution: he alſo ſent a bull to Oxford, commanding the univerſity to give him up. Before theſe bulls reached England Edward III. was dead, and Wickliff, protected by John duke of Lancaſter, uncle to Richard II. favoured by the queen-mother, and ſupported by the citizens of London, eluded the perſecution of pope Gregory IX. who died in 1378. In the following year this intrepid reformer preſented to parliament a ſevere paper againſt the tyranny of Rome, wrote againſt the papal ſupremacy and infallibility, and publiſhed a book *On the truth of the ſcriptures*, intended to prepare the way for an Engliſh tranſlation of them, in which he had made conſiderable progreſs. In 1381 he publiſhed *Sixteen Concluſions*; in the firſt of which he ventured to expoſe the grand article of tranſubſtantiation. Theſe concluſions being condemned by the chancellor of Oxford, Wickliff appealed to the king and parliament; but being deſerted by his unſteady patron the duke of Lancaſter, he was obliged to make a confeſſion at Oxford; and by an order from the king was expelled the univerſity. He now retired to his living of Lutterworth, where he finiſhed his tranſlation of the bible. This verſion of the bible, of which there are ſeveral manuſcript copies in the libraries of the univerſities, Britiſh Muſeum, &c. is a very literal tranſlation from the Latin vulgate. In 1383 he was ſuddenly ſtruck with the palſy; a repetition of which put an end to his life in December 1384. He was buried in his own church, where his bones were ſuffered to reſt in peace till the year 1428, when, by an order from the pope, they were taken up and burnt.—Beſides a number of works that have been printed, he left a prodigious number of manuſcripts; an accurate liſt of which may be ſeen in biſhop Tanner's Bib. Brit. Hib. Some of them are in the Bodleian Lib. others in the Brit. Muſeum, &c.

Wickliff was doubtleſs a very extraordinary man, conſidering the times in which he lived. His natural ſagacity diſcovered the abſurdities and impoſitions of the church of Rome, and he had the honeſty and reſolution to promulgate his opinions, which a little more ſupport would probably have enabled him to eſtabliſh: they were evidently the foundation of the ſubſequent reformation.

Wicklow.

WICKLOW, a county of Ireland, in the province of Lunſter, bounded by Wexford on the ſouth; that of Dublin and part of Kildare on the north; St George's channel on the eaſt; and Kildare and Catherlogh counties on the weſt. Its length, where longeſt, is 36 miles, and its greateſt breadth 28. It is divided into ſix baronies. There are ſome pretty high mountains in this county; in one of which there is a copper-mine, wrought at the expence of ſome Engliſh gentlemen. The lowlands are pretty well inhabited, encloſed and cultivated, the ſoil being good and the air wholeſome. From the mountains in this county, one may ſee, in a clear day, very diſtinctly the mountains of Snowdown in North Wales. In the Wicklow mountains are alſo ſome of thoſe deep dark vallies called *glyns*, very beautiful and pictureſque, together with ſome grand and aſtoniſhing water-falls. Among the former, the dark glyn and the glyn of the mountains, are particularly remarkable. "The dark glyn, (ſays the author of the Hibernia Curioſa), is much viſited in the ſummer-ſeaſon by the gentry from Dublin, and moſt of the people of fortune that come to this city. It is equal, if not ſuperior, to any of the kind in the kingdom, one of the deepeſt, and at the ſame time the narroweſt and moſt irriguous vallies I remember to have ſeen. The ſides of the hills which ſkirt it, adorned with trees to the very tops, and intermixed with rocky precipices, together with the murmuring of a little river at the bottom, that winds its way through this intricate valley over numberleſs little breaks and falls, that add greatly to the beauty of the ſcene, render it altogether a moſt pleaſing ſummer recreation. The cloſeneſs of the lofty ſhading hills on the ſides, at the ſame time that it affords a moſt delightful cool retreat from the heat of the ſun, throws a kind of gloomy ſolemnity on the bottom of this deep valley; and from this circumſtance it is very properly called the *dark glyn*. It is rather a deep chaſm than a valley, extending about a mile through a lofty range of hills. At the very bottom of the glyn is a way cut out by the ſide of the ſtream, and adapted to the gloomy retirement of the place, where the lover, the poet, or philoſopher, may wander, with every circumſtance, every ſcene about him, calculated to warm his imagination, or produce the moſt ſerious reflections. The glyn of the mountains in this neighbourhood is a more open and ſpacious valley, but immenſely deep, and ſkirted on either hand with the moſt enormous aſtoniſhing mountains, covered for the moſt part with trees from their bottoms to the very tops, preſenting a proſpect of the moſt horrible impending rocks. The bottom of the valley is juſt wide enough for a road and a river that runs through it. There is ſomething inexpreſſible ſtriking, beautiful, grand, and awful in this ſcene." Theſe glyns are not far from Powerſcourt, a moſt beautiful ſeat, 14 miles from Dublin, belonging and giving the title of viſcount to the family of Wingfield. Near this charming ſeat is one of the moſt beautiful water-falls in the world, called the *Fall of Powerſcourt*; which, from the peculiarity of its ſituation, its prodigious height and ſingular beauty, well deſerves the notice of every traveller. It is produced by a ſmall river ariſing from ſprings and rains collected on the plains or ſhallow vallies, on the top of an adjacent range of mountains, and falls at leaſt 300 feet, of which 200 are viſible on the plain below. The only time to ſee this moſt beautiful and aſtoniſhing water-fall in its higheſt perfection is immediately after heavy rains on the mountains above. No deſcription can then convey an adequate idea of the beauty and grandeur of the ſcene, or the tranſport of the ſpectator. The trees, which grow from the bottom to the top of the hill on the ſides of this prodigious water-fall, are an inexpreſſible addition to its charms. The whole ſcenery indeed, above and below, is the moſt extraordinary and entertaining of its kind that can be conceived. This county ſends 10 members to parliament, viz. two for the ſhire, and two for each of theſe boroughs, Wicklow, Baltinglaſs, Carysfort, and Bleſſington.

Wicklow gives name to the county, and is its capital. This town is noted for the beſt ale in Ireland. It has barracks for three companies of foot, and a kind of caſtle and haven at the mouth of the river Leitrim; but moſt of its trade conſiſts in carrying proviſions in ſmall veſſels to Dublin. It gives the title of baron to lord Maynard.

WIDGEON, in ornithology. See ANAS.

WIDOW, a woman who has loſt her huſband.

WIFE, a married woman, or one joined with, and under the protection of an huſband. See HUSBAND.

Iſle of WIGHT, a part of the county of Southampton, ſeparated from the reſt by a channel about 20 miles long and 12 broad. It ſeems to have been called by the Britons *Uict*, the diminutive of *Uiz*, which ſignifies an iſland. Hence the Romans, imitating, as their cuſtom was, the ſound of the Britiſh word, ſtyled it *Victis*, *Vectis*, and *Vecta*. Diodorus Siculus, coming near to the Britiſh name, calls it *Icta*. The Saxons, *Wiht*, or *Wihte*, and *Wightland*, becauſe poſſeſſed by the Jutes, called ſometimes *Vitæ* and *Viti*, as well as *Juti*; whence, in the modern Welſh, it appears to be ſtyled *Guith*, which, becauſe it ſignifies disjoined or divorced, ſome have thought a very ſignificant appellation; but the former account, though more modern, is however more natural, and therefore ſeems to come nearer the truth.

It is ſeparated from Hampſhire by a ſmall arm of the ſea, called anciently the *Solent*, which is, in ſome places, 12, in others ſeven, in moſt about four miles broad, except at the ſtrait between Sharpnor and Hurſt caſtles, where it is not quite two. This iſland is, or rather was, of an oval form, and thence ſaid to reſemble an egg; and in length, from eaſt to weſt, was anciently 30 miles, at preſent 23 at moſt; in breadth, from north to ſouth, 12; in circumference, 60. The ſouth ſide of the iſland, which is oppoſed to France, is naturally fortified by exceeding ſteep cliffs; and whereever theſe are are wanting, forts and blockhouſes have been built.

There are alſo large and dangerous banks of ſand on the north ſide, called the *Horſe*, *No Man's Land*, and the *Brambles*; on the weſt ſide a long ridge of rocks, and nearer the ſhore the needles; on the ſouth Atherfeld rocks, Challarme, and Done Moſs; to the eaſt, the Black Rocks, the Mixon, and the White Cliff, afford a kind of natural and effectual barrier againſt all invaders.

It looks as if theſe rocks, ſhoals, and ſands, were remnants of the land belonging to this iſland when 30 miles long, and ſhaped like an egg, as ancient authors deſcribe it.

A long ridge of hills runs from weſt to eaſt. The country on the ſouth ſide is wonderfully rich and fertile, producing vaſt quantities of excellent corn; ſome ſay, in one good year as much as will ſerve the inhabitants ſeven. The middle and mountainous part of the iſland has ſome wood, and abundance of fine graſs, which nouriſhes a vaſt number of ſheep; and their fleece is not inferior to any in Great Britain, except thoſe of Cotſwould and Lempſter. Cattle, fowl, and fiſh, are equally good, and, except in time of war, when the iſland is crowded with people, cheap. There were likewiſe two parks, but one of theſe is now converted into arable land, and a foreſt ſtored with excellent veniſon; to which when we add, that the climate is ſo mild, that myrtles grow in the open air, and ſo wholeſome (except towards the eaſtern extremity, where agues are very common) that the people are generally healthy, and live frequently to a great age, we may be juſtified in ſaying, that few places can boaſt of being more plentiful or more pleaſant.

It is admirably watered in every part by ſprings, brooks, or rivers. The famous road of St Helens lies on the north-eaſt ſide of the iſland, where the ſea enters ſo deep, as almoſt to cut off one part; the moſt eaſtern promontory of which is Benbridge Point, and that extremity obtains the name of *Benbridge Iſle*. There is another large opening about the middle, on the north ſide, where the river Cowes falls into the ſea, and forms a harbour, defended formerly by two ſtrong caſtles, called the *Eaſt* and *Weſt Cowes*; but the latter only is now ſtanding. About four miles up the river ſtands Newport, the capital of the iſle, in which there are at preſent between 3000 and 4000 inhabitants: It is a neat town, built with ſtone, to which veſſels of a ſmall burden come up; and being called in Latin *Medena*, the iſland is on that account divided into the Hundreds of Eaſt Meden and Weſt Meden. About a mile from thence ſtands Careſbrook caſtle upon an high rock. To the weſt of Newport-haven lies that of Newton, which, notwithſtanding it is now inconſiderable, was heretofore alſo a pretty good town; and ſtill farther to the weſt lies the caſtle and town of South Yarmouth, where the ſea enters again into the land, and penetrates within a mile of the ſouth coaſt. The iſland being here as much interſected as at the eaſtern extremity, as that is ſtyled *Benbridge*, ſo this is called *Freſhwater Iſle*.

WILDERNESS, in gardening, a kind of grove of large trees in a ſpacious garden, in which the walls are commonly made, either to interſect each other in angles, or have the appearance of meanders and labyrinths.

WILKINS (Dr John), a moſt ingenious and learned Engliſh biſhop, was the ſon of a goldſmith of Oxford, and was born in 1614. He adhered to the parliament during the civil wars, by whom he was made warden of Wadham college in 1648: he married afterwards the ſiſter of Oliver Cromwell, and procured a diſpenſation to retain his wardenſhip notwithſtanding. Richard Cromwell made him maſter of Trinity-college, Cambridge, from which he was ejected on the Reſtoration. He then became preacher to Gray's-Inn, rector of St Laurence Jewry, London, dean of Rippon, and in 1668 was promoted to the biſhopric of Cheſter: he died in 1672. Biſhop Wilkins thought it prudent to ſubmit to the powers in being; he therefore ſubſcribed to the ſolemn league and covenant while it was enforced, and was equally ready to ſwear allegiance to king Charles when he was reſtored: this, with his moderate ſpirit toward diſſenters, rendered him not very agreeable to churchmen. His mathematical and philoſophical works, which contain many ingenious and curious pieces, conſidering the time when they were wrote, have been collected in one vol. 8vo. He publiſhed alſo ſome theological tracts.

WILL, that faculty of the mind by which it embraces or rejects any thing offered to it. See METAPHYSICS, n° 76, 78, 80.

WILL, or *Laſt* WILL, in law, ſignifies the declaration of a man's mind and intent relating to the diſpoſition of his lands, goods, or other eſtate, or of what he would have done after his death. In the common law there is a diſtinction made between a will and a teſtament: that is called a *will* where lands or tenements are given; and when the diſpoſition concerns goods and chattels alone, it is termed a *teſtament*. See TESTAMENT.

WILL *with-a-whiſp*, or *Jack with-a-lanthorn*, two popular names for the meteor called *ignis fatuus*. See LIGHT, n° 27.

WILLIAM *of* MALMSBURY, an hiſtorian of conſiderable merit in the reign of king Stephen; but of whoſe life few particulars are known. According to Bale and Pits, he was ſurnamed *Somerſetus*, from the county in which he was born. From his own preface to his ſecond book *De regibus Anglorum*, it appears that he was addicted to learning from his youth; that he applied himſelf to the ſtudy of logic, phyſic, ethics, and particularly to hiſtory. He retired to the Benedictine convent at Malmſbury, became a monk, and was made precentor and librarian; a ſituation which eſpecially favoured his intention of writing the hiſtory of this kingdom. In this monaſtery he ſpent the remainder of his life, and died in the year 1142. He is one of our moſt ancient and moſt faithful hiſtorians. His capital work is that intitled *De regibus Anglorum*, in five books; with an Appendix, which he ſtyles *Hiſtoriæ Novellæ*, in two more. It is a judicious collection of whatever he found on record relative to England, from the invaſion of the Saxons to his own times.

WILLIAM *of Newbury*, ſo called from a monaſtery in Yorkſhire, of which he was a member, wrote a hiſtory which begins at the conqueſt, and ends at the year 1197. His Latin ſtyle is preferred to that of Matthew Paris; and he is intitled to particular praiſe, for his honeſt regard to truth, in treating the fables of Jeffery of Monmouth with the contempt they deſerve; as well as for expreſſing his approbation of Henry II's deſign of reforming the clergy, by bringing them under the regulation of the ſecular power.

WILLIAM *of Poictiers*, chaplain to king William the Conqueror, wrote a fair account of the Norman revolution, that has found good credit with moſt of our hiſtorians.

WILLIAM, archbiſhop of Tyre, was a learned prelate, who in the reign of Henry II. was ſent to implore all the powers of Europe to aid the Holy Land by a new cruſade. He has left *A Hiſtory of the Holy Wars*, from their commencement to the year 1183, which in matter and ſtyle is far ſuperior to any other of that or many preceding ages.

WILLIAM *of Wykeham*, biſhop of Wincheſter, was born in the village of Wykeham, in the county of Southampton, in 1324. He had his education at Wincheſter and Oxford. Having continued near ſix years in the univerſity, his patron Nicholas Wedal, governor of the province of Southampton, took him into his family, and appointed him his counſellor and ſecretary. He could not have made choice of a fitter perſon for that employment, no man in that age writing or ſpeaking more politely than Wykeham. For this reaſon Edington, biſhop of Wincheſter, lord high-treaſurer of the kingdom, appointed him his ſecretary three years after, and alſo recommended him to king Edward III. who took him into his ſervice. Being ſkilled in geometry and architecture, he was appointed ſurveyor of the royal buildings, and alſo chief-juſtice in Eyre: he it was who ſuperintended the building of Windſor-caſtle. He was afterward chief ſecretary of ſtate, and keeper of the privy-ſeal; and in 1367 ſucceeded Edington in the ſee of Wincheſter. A little after he was appointed lord high-chancellor and preſident of the privy-council. That he might well diſcharge the ſeveral functions of his employments, both eccleſiaſtical and civil, he endeavoured, on one hand, to regulate his own life according to the ſtricteſt maxims, and to promote ſuch pariſh-prieſts only as were able to give due inſtructions to their pariſhioners, and at the ſame time led exemplary lives: on the other hand, he did all in his power to cauſe juſtice to be exactly adminiſtered. In 1371 he reſigned his chancellorſhip, and ſome time after the great ſeal. Edward being returned to England, after having carried on a very ſucceſsful war in France, found his exchequer in great diſorder. The duke of Lancaſter, one of his ſons, at the head of ſeveral lords, having brought complaints againſt the clergy, who then enjoyed moſt poſts in the kingdom, the king removed them from their employments. But the laymen, who were raiſed to them, behaved ſo ill, that the king was forced to reſtore the eccleſiaſtics. The duke of Lancaſter ſhowed ſtrong animoſity to the clergy, and ſet every engine at work to ruin Wykeham. He impeached him of extortion, and of diſguiſing things, and obliged him to appear at the King's-bench. He got ſuch judges appointed as condemned him; and not ſatisfied with depriving him of all the temporalities of his biſhopric, he adviſed Edward to baniſh him: but this prince rejected the propoſal, and afterward reſtored to Wykeham all that he had been diveſted of. Richard II. was but eleven years old when Edward died; whereby the duke of Lancaſter had an eaſy opportunity of reviving the accuſations againſt the biſhop of Wincheſter: nevertheleſs Wykeham cleared himſelf. Then he founded two noble colleges, the one in Oxford, the other in Wincheſter. Whilſt he was exerting his utmoſt endeavours to improve theſe two fine foundations, he was recalled to court, and in a manner forced to accept of the office of lord high-chancellor in 1389.—Having excellently diſcharged the duties of that employment for three years, he obtained leave to reſign it, foreſeeing the diſturbances that were going to break out. Being returned to his church, he finiſhed his college, and built there ſo magnificent a cathedral, that it almoſt equals that of St Paul's in London. He laid out ſeveral ſums in things advantageous to the public and to the poor; notwithſtanding which, in 1397 he was in great danger; for he and ſome others were impeached of high-treaſon in open parliament: however, he was again fully cleared. From that time till his death he kept quiet in his dioceſe, and there employed himſelf in all the duties of a good prelate. He died in 1404, in the 81ſt year of his age.

WILLIAM, the name of ſeveral kings of England. See ENGLAND, n° 86. 91. and BRITAIN, n° 280, &c.

WILLIAMSBURG, the capital of Virginia in North America, ſituated in James county, between James and York rivers. W. Long. 76. 30. N. Lat. 37. 20.

WILLIAM's FOTR, is a factory of Aſia belonging to the Eaſt-India company, ſeated on one of the branches of the river Ganges, in the kingdom of Bengal. The fort was firſt built in the ſhape of an irregular tetragon of brick and mortar; and the town has nothing regular in it, becauſe every one built a houſe as he liked beſt, and for his own conveniency. The governor's houſe is within the fort, and is the beſt piece of architecture in theſe parts. Here there are alſo convenient lodgings for the factors and writers, with ſtore-houſes for the company's goods, and magazines for ammunition. About 50 yards from the fort is the church, built by the charity of merchants reſiding here. The town is called *Calcutta*, and has a pretty good hoſpital for the ſick, though few come out of it alive. It is governed by a mayor and aldermen, as moſt of the company's factories in the Eaſt Indies now are. In 1757 it was ſurpriſed by the nabob of Bengal, who took it, and put moſt of thoſe that had made reſiſtance into a place called the *Black Hole*, where moſt of them were ſmoothered. This nabob was afterwards killed, and another ſet up in his room, more friendly to the Engliſh; and the factory was re-eſtabliſhed. E. Long. 86. 0. N. Lat. 22. 27.

WILLIAMSTADT, a ſea-port town of Holland. It is a handſome ſtrong place, and the harbour is well frequented. It was built by William prince of Orange in 1585; and in 1732 belonged to the ſtadtholder of Frieſland. The river near which it is built is called *Butterfliet*, or *Holland Diep*; and is one of the bulwarks of the Dutch on the ſide of Brabant, where they always keep a garriſon. E. Long. 4. 23. N. Lat. 51. 41.

WILLIS (Dr Thomas), a celebrated Engliſh phyſician, was born at Great Bodwin, in Wiltſhire, in 1621, and ſtudied at Chriſt-church college, Oxford. When that city was garriſoned for the king, he, among other ſcholars, bore arms for his Majeſty, and devoted his leiſure hours to the ſtudy of phyſic. The garriſon of Oxford at length ſurrendering to the parliament, he applied himſelf to the practice of his profeſſion; and ſoon rendered himſelf famous by his care and ſkill. He appropriated a room as an oratory for divine ſervice according to the church of England, whither moſt of the loyaliſts in Oxford daily reſorted. In 1660, he became Sedleian profeſſor of natural philoſophy, and the ſame year took the degree of doctor of phyſic. In 1664, he diſcovered the famous medicinal ſpring at Alſtropp, near Brackley. He was one of the firſt members of the Royal Society, and ſoon made his name illuſtrious by his excellent writings. In 1666, after the fire of London, he removed to Weſtminſter; and his practice became greater than that of any of the phyſicians his cotemporaries. Soon after his ſettlement in London, his only ſon Thomas falling into a conſumption, he ſent him to Montpelier in France for the recovery of his health; and it proved ſucceſsful. His wife alſo labouring under the ſame diſorder, he offered to leave the town; but ſhe, not ſuffering him to neglect the means of providing for his family, died in 1670. He died at his houſe in St Martin's in 1675, and was buried near her in Weſtminſter abbey. Dr Willis was extremely modeſt and unambitious, and refuſed the honour of knighthood. He was remarkably pious: As he roſe early in the morning, that he might be preſent at divine ſervice, which he conſtantly frequented before he viſited his patients, he procured prayers to be read beyond the accuſtomed times while he lived; and at his death ſettled a ſtipend of 20l. *per annum* to continue them. He was a liberal benefactor to the poor wherever he came, having from his early practice allotted part of his profits to charitable uſes. He was exact and regular in all his hours: and though his table was the reſort of moſt of the great men of London, yet he was remarkable for his plainneſs, and his being a man of little diſcourſe, complaiſance, or ſociety; but he was juſtly admired for his deep inſight into natural and experimental philoſophy, anatomy, and chemiſtry; for his ſucceſsful practice; and for the elegance and purity of his Latin ſtyle. He wrote, 1. A treatiſe in Engliſh, intitled *A plain and eaſy Method for preſerving thoſe that are well from the Infection of the Plague, and for curing ſuch as are infected.* 2. Several Latin works, which were collected and printed at Amſterdam, in 1682, in 2 vols, 4to.

WILLIS (Brown), grandſon of the famous phyſician, and an eminent antiquary, was born in Dorſetſhire in 1682. He was educated in Weſtminſter ſchool, where the ſolemnity of the adjoining abbey engaged his admiration, and impreſſed his mind with an early love of antiquities. From thence he removed to Chriſtchurch, Oxford; and during the courſe of his life viſited almoſt all the cathedrals in England and Wales; which journies he uſed to call his *pilgrimages*. He publiſhed Surveys of them in 4 vols, 4to. He wrote alſo A Hiſtory of the mitred Parliamentary Abbeys, 2 vols, 8vo.; and *Notitia Parliamentaria*, 2 vols, 8vo, with ſome other things. He was choſen member for the town of Buckingham in 1705, was created doctor of laws at Oxford in 1749, and died in 1760.

WILLOUGHBY (Francis), a celebrated natural hiſtorian, was the only ſon of Sir Francis Willoughby, knight. He was fond of ſtudy from his childhood, and held idleneſs in abhorrence; he being ſo great an œconomiſt with regard to his time, as not willingly to loſe or miſapply the leaſt part of it; by which means he attained great ſkill in all branches of learning, and particularly in the mathematics: but obſerving that the hiſtory of animals was in a great meaſure neglected by his countrymen, he particularly applied himſelf to that province; and for this purpoſe carefully read over what had been written on that ſubject by others. He then travelled ſeveral times over his native country; and afterwards into France, Spain, Italy, Germany, and the Low Countries, attended by his ingenious friend Mr John Ray. It is remarkable, that, notwithſtanding the advantages of birth, fortune, and parts, he was as humble as any man of the meaneſt fortune; was ſober, temperate, and chaſte; ſcrupulouſly juſt; ſo true to his word and promiſe, that a man might venture his eſtate and life upon it; ſo faithful and conſtant to his friend, as never to deſert him when fortune frowned upon him; and remarkably pious, patient, and ſubmiſſive to the divine will. This is the character given of him by Mr Ray, whoſe veracity none will doubt. This ingenious and learned gentleman died in 1672, at 37 years of age; having impaired his health by his application. He wrote, 1. *Ornithologiæ libri tres*, folio, which was afterwards tranſlated into Engliſh, with an Appendix by Mr Ray, in folio. 2. *Hiſtoriæ Piſcium libri quatuor*, folio. 3. Letters of Francis Willoughby, Eſq; added to Philoſophical Letters between the learned Mr Ray and ſeveral of his correſpondents, publiſhed, in 8vo, by William Derham. 4. Several ingenious papers in the Philoſophical Tranſactions.

WILMOT (John), earl of Rocheſter, a great wit in the reign of Charles II. the ſon of Henry earl of Rocheſter, was born in 1648. He was taught grammar and claſſical learning at the free-ſchool at Burford; where he obtained a quick reliſh of the beauties of the Latin tongue, and afterwards became well verſed in the authors of the Auguſtine age. In 1659, he was admitted a nobleman of Wadham college, where he obtained the degree of maſter of arts. He afterwards travelled through France and Italy; and at his return was made one of the gentlemen of the bedchamber to the king, and comptroller of Woodſtock Park. In 1665, he went to ſea, and was in the Revenge, commanded by Sir Thomas Tiddiman, when the attack was made on the port of Bergen in Norway; during the whole action he ſhowed the greateſt reſolution, and gained a high reputation for courage; which he ſupported in a ſecond expedition, but afterwards loſt it in a private adventure with Lord Mulgrave.

Before the earl of Rocheſter travelled, he had given into the moſt diſorderly and intemperate way of living; yet he had ſo far got the better of it at his return, that he hated nothing more. But falling into the company of the courtiers, who continually practiſed theſe exceſſes, he became ſo ſunk in debauchery, that he was for five years together ſo given up to drinking, that during all that time he was never cool enough to be maſter of himſelf. His violent love of pleaſure, and his diſpoſition to extravagant mirth, carried him to great exceſſes. The firſt involved him in ſenſuality, and the other led him into many adventures and ridiculous frolics. Once diſguiſing himſelf ſo that he could not be known by his neareſt friends, he ſet up in Tower-ſtreet for an Italian mountebank, and there diſperſed his noſtrums for ſome weeks. He often diſguiſed himſelf as a porter, or as a beggar, ſometimes to follow a mean amour: at other times, he would go about merely for diverſion, in odd ſhapes; and acted his part ſo naturally, that he could not be known even by his friends. In ſhort, by his conſtant indulgence in wine, women, and irregular frolics, he entirely wore out an excellent conſtitution before he was 30 years of age. In October 1679, when recovering from a violent diſeaſe, which ended in a conſumption, he was viſited by Dr Burnet, upon an intimation that ſuch a viſit would be agreeable to him. Dr Burnet publiſhed an account of his conferences with Lord Rocheſter; in which it appears, that though he had lived the life of a libertine and atheiſt, yet he died the death of a penitent Chriſtian. His death happened in 1680; ſince which time his poems have been various times printed, both ſeparately and together: but when once he obtained the character of a lewd and obſcene writer, every thing in that ſtrain was fathered upon him; and thus many pieces not of his writing have crept into the later editions of his works. The author of the Catalogue of Royal and Noble Authors, ſays, he was "a man whom the Muſes were fond to inſpire, and aſhamed to avow, and who practiſed without the leaſt reſerve that ſecret which can make verſes more read for their defects than their merits. Lord Rocheſter's Poems have much more obſcenity than wit, more wit than poetry, and more poetry than politeneſs. One is amazed at hearing the age of Charles II. called polite; becauſe the Preſbyterians and religioniſts had affected to call every thing by a Scripture name. The court had no pretenſions to politeneſs, but by its reſemblance to another age, which called its own groſſneſs polite, the age of Ariſtophanes. Would a Scythian have been civilized by the Athenian ſtage, or a Hottentot by the drawing-room of Charles II.? The characters and anecdotes being forgot, the ſtate-poems of that time are a heap of ſenſeleſs ribaldry, ſcarcely rhime, and more ſeldom in metre. When Satyrs were brought to court, no wonder the Graces would not truſt themſelves there." His writings, beſides thoſe already mentioned, are, a Satyre againſt Mankind; Nothing, a poem; Valentinian, a tragedy; Fifty-four Letters to Henry Saville, and others; Seven more to his Wife and Son; a Letter on his deathbed to Dr Burnet. He alſo left behind him ſeveral other papers, and a Hiſtory of the Intrigues of the Court of Charles II. but his mother, a very devout lady, ordered all his papers to be burned.

WILSON (Florence), known in the republic of letters by the name of *Florentius Voluſinus*, was born at Elgin in the ſhire of Murray in Scotland, and educated in the univerſity of Aberdeen. Travelling to England with an intention to improve his fortune, he had the felicity to be introduced to cardinal Wolſey, who appointed him tutor to one of his nephews. In that capacity he went to Paris, and continued there till the cardinal's death. During his reſidence in that city he became acquainted with the learned cardinal Bellai, archbiſhop of Paris, who allowed him a penſion, and meant to have appointed him royal profeſſor of the Greek and Latin languages in the univerſity of Paris: but Bellai being diſgraced, Wilſon's proſpects faded with the fortunes of his patron, whom nevertheleſs he attended on his journey to Rome. Wilſon was taken ill at Avignon, and the cardinal proceeded without him. After his recovery, he paid a viſit to the celebrated cardinal Sabolet, the Mecænas of his time, who was alſo biſhop of Carpentras, where he then reſided. The cardinal was ſo charmed with his erudition, that he appointed him profeſſor of the learned languages, with a ſtipend of 100 piſtoles *per annum*.

During his reſidence at Carpentras, he wrote his celebrated treatiſe *De animi tranquillitate*. Mackenzie ſays that he afterwards taught philoſophy in Italy; and that, being at length deſirous of returning to Scotland, he began his journey homeward, was taken ill at Viene in Dauphiny, and died there in the year 1547. He was generally eſteemed an accompliſhed linguiſt, Wilſon.

an admirable philoſopher, and an excellent Latin poet. He wrote, beſide the above treatiſe, 1. *Poemata.* Lond. 1619, 4to. 2. *Commentatio quædam theologica in aphoriſmos diſſecta, per Sebaſt. Gryph.* 3. *Philoſophiæ Ariſtot. ſynopſis,* lib. iv.

WILSON (Thomas), lord biſhop of Sodor and Man, was born in 1663, at Burton, in the county of Cheſter. He received the rudiments of his education at the county town, and from thence was removed to the univerſity of Dublin. His allowance at the univerſity was 20l. a-year; a ſum, ſmall as it may now appear, which was in thoſe days ſufficient for a ſober youth in ſo cheap a country as Ireland.

His firſt intention was to have applied to the ſtudy of phyſic; but from this he was diverted by archdeacon Hewetſon, by whoſe advice he dedicated himſelf to the church. He continued at college till the year 1686, when, on the 29th of June, he was ordained deacon.

The exact time of Mr Wilſon's leaving Dublin is not known: but on account of the political and religious diſputes of thoſe days, it was ſooner than he intended. On the 10th of December in the ſame year, he was licenſed to the curacy of New Church in Winwick, of which Dr Sherlock, his maternal uncle, was rector. His ſtipend was no more than 30l. a-year; but being an excellent œconomiſt, and having the advantage of living with his uncle, this ſmall income was not only ſufficient to ſupply his own wants, but it enabled him to ſupply the wants of others; and for this purpoſe he ſet apart one-tenth of his income.

In 1692 he was appointed domeſtic chaplain to William earl of Derby, and tutor to his ſon James Lord Strange, with a ſalary of 30l. a-year. He was ſoon after elected maſter of the alms-houſe at Latham, which brought him in 20l. a-year more. Having now an income far beyond his expectations, or his wiſhes, except as it increaſed his ability to do good, he ſet apart one fifth of his income for pious uſes, and particularly for the poor. In ſhort, as his income increaſed, he increaſed the portion of it which was allotted to the purpoſes of charity. At firſt he ſet apart a tenth, then a fifth, afterwards a third, and laſtly, when he became a biſhop, he dedicated the full half of his revenues to pious and charitable uſes.

He had not been long in the ſervice of Lord Derby, before he was offered the valuable living of Buddeſworth in Yorkſhire; which he refuſed to accept, as being inconſiſtent with the reſolves of his conſcience againſt non-reſidence, Lord Derby chooſing ſtill to retain him as chaplain, and tutor to his ſon. In 1697 he was promoted, not without ſome degree of compulſion on the part of his patron, to the biſhopric of the Iſle of Man; a preferment which he held 58 years. In 1698 he married Mary, daughter of Thomas Patten, Eſq; of Warrington. By this lady, who ſurvived her marriage about ſix years, he had four children; none of whom are living except Dr Wilſon, prebendary of Weſtminſter.

“ The annual receipts of the biſhopric (ſays the author of his memoirs) did not exceed 300l. in money. Some neceſſaries in his houſe, as ſpices, ſugar, wine, books, &c. muſt be paid for with money; diſtreſſed or ſhipwrecked mariners, and ſome other poor objects, required to be relieved with money; but the poor of the iſland were fed and clothed, and the houſe in general ſupplied from his demeſnes, by exchange, without money. The poor, who could weave or ſpin, found the beſt market at Biſhop's-court, where they bartered the produce of their labour for corn. Taylors and ſhoemakers were kept in the houſe conſtantly employed, to make into garments or ſhoes that cloth or leather which his corn had purchaſed; and the aged and infirm were ſupplied according to their ſeveral wants. Mr Moore of Douglas informed the editor, that he was once witneſs to a pleaſing and ſingular inſtance of the Biſhop's attention to ſome aged poor of the iſland. As he was diſtributing ſpectacles to ſome whoſe eyeſight failed them, Mr Moore expreſſed his ſurpriſe, as he well knew not one of them could read a letter. ‘ No matter, (ſaid the Biſhop with a ſmile) they will find uſe enough for them; theſe ſpectacles will help them to thread a needle, to mend their clothes, or, if need be, to keep themſelves free from vermin.”

Wilſon.

The year 1720 brings us to a remarkable epocha in the life of this zealous and worthy Biſhop; the hiſtory of which will be beſt related in the biographer's own words. “ The ſuſpended perſon alluded to in the Biſhop's charge of June the 9th, 1720, was no leſs a perſon than Mrs Horn, wife of Captain Horn, governor of the iſland. In the year 1719, ſhe accuſed Mrs Puller, a widow woman of fair character, of fornication with Sir James Pool; and from this ſtory, to pleaſe Mrs Horn, archdeacon Horrobin refuſed Mrs Puller the ſacrament. Uneaſy under this reſtriction, ſhe had recourſe to the mode pointed out by the conſtitutions of the church to prove her innocence, namely, by oath; which ſhe and Sir James Pool took before the Biſhop, with compurgators of the beſt character: and no evidence being produced to prove their guilt, they were by the Biſhop cleared of the charge; and Mrs Horn was ſentenced to aſk pardon of the parties whom ſhe had ſo unjuſtly traduced. This ſhe refuſed to do; and treated the Biſhop and his authority, as well as the eccleſiaſtical conſtitutions of the iſland, with contempt. For this indecent diſreſpect to the laws of the church, the eccleſiaſtical cenſure was pronounced, which baniſhed her from the ſacrament till atonement was made. The archdeacon, who was chaplain to the governor, out of pique to the Biſhop, or from ſome unworthy motive, received her at the communion, contrary to the cuſtom and orders of the church. An inſult to himſelf the Biſhop would have forgiven, but diſobedience to the church and its laws he could not allow of. He conſidered it as the oblation of wrath, rather than the bond of peace, and at laſt ſuſpended the archdeacon. The archdeacon in a rage, inſtead of applying to the archbiſhop of York as metropolitan, and conſequently the proper judge to appeal to in matters relating to the church, threw himſelf on the civil power; and the governor, under pretence that the Biſhop had acted illegally and extrajudicially, fined him 50l. and his two vicars-general, who had been officially concerned in the ſuſpenſion, 20l. each. This fine they all refuſed to pay, as an arbitrary and unjuſt impoſition: upon which the governor ſent a party of ſoldiers; and they were, on the 29th of June 1722, committed to the priſon of Caſtle Ruſhin, where they were kept cloſely confined, and no perſons admitted within the walls to ſee or converſe with them.” The Biſhop was confined in this priſon two months, and

Wiltſhire, Winchelſea

releaſed at the end of that time upon his petition to the king and council."

So great was the Biſhop's attachment to his flock, that no temptation could ſeduce him from their ſervice. He more than once refuſed the offer of an Engliſh biſhopric. There is an anecdote of his Lordſhip and cardinal Fleury, which does great credit to them both. The cardinal wanted much to ſee him, and ſent over on purpoſe to inquire after his health, his age, and the date of his conſecration, as they were the two oldeſt biſhops, and he believed the pooreſt, in Europe; at the ſame time inviting him to France. The Biſhop ſent the cardinal an anſwer, which gave him ſo high an opinion of him, that the cardinal obtained an order that no French privateer ſhould ravage the Iſle of Man.

This good prelate lived till the year 1755, dying at the advanced age of 93. His works have lately been publiſhed in 2 vols 4to.

WILTSHIRE, a county of England, bounded on the weſt by Somerſetſhire, on the eaſt by Berkſhire and Hampſhire, on the north by Gloceſterſhire, and on the ſouth by Dorſetſhire and part of Hampſhire. The length amounts to 39 miles; its breadth to 30; and its circumference to 140. It contains 29 hundreds, 23 market-towns, 304 pariſhes, and about 876,000 ſouls. Beſides two members for the ſhire, and two for the city of Saliſbury, each of the following towns ſends two to parliament, *viz.* Wilton, Downton, Hindon, Heyteſbury, Weſtbury, Calne, Devizes, Chippanham, Malmſbury, Cricklade, Great Bedwin, Ludgerſhall, Old Sarum, Wooton-Baſſet, Marlborough.

The air of this county is very healthy, not only in the more low and level parts, but alſo on the hills. The ſoil of the vales is very rich, and produces corn and graſs in great plenty. The beautiful downs in the ſouth yield the fineſt paſture for ſheep, with which they are overſpread. The greateſt diſadvantage the county labours under is want of fuel, as there are no coal-pits, and but little wood. This county is noted for great quantities of very fine cheeſe, and for its manufacture of broad cloth, to which it was invited by the great plenty and fineneſs of its wool. Beſides a number of leſſer ſtreams, it is watered by the rivers Iſis, Kennet, Upper and Lower Avon, Willy, Burne, and Nadder, which are well ſtored with fiſh.

WINCHELSEA, a town in Suſſex, which has no market, but has one fair on May 14, for cattle and pedlars-ware. It was an ancient place, at leaſt the old town, which was ſwallowed up by the ocean in 1250. It is now dwindled to a mean place, though it retains its privileges, and ſends two members to parliament. It is ſeated on a rocky cliff, on an inlet of the ſea; and had a haven, now choaked up. It had 18 pariſh-churches, now reduced to one. The market-houſe is in the midſt of the town, from whence run four paved ſtreets, at the end of which are four ways, which had formerly buildings on each ſide for a conſiderable diſtance. It is 2 miles ſouth-weſt of Rye, and 71 ſouth-eaſt of London. It is governed by a mayor and jurats, though it has but about 70 houſes. Three of the gates are ſtill ſtanding, but much decayed. E. Long. 0. 45. N. Lat. 50 58.

WINCHELSEA (Anne counteſs of), a lady of excellent genius, eſpecially in poetry, was maid of honour to the ducheſs of York, ſecond wife to king James II. and was afterwards married to Heneage, ſecond ſon of the earl of Winchelſea. One of the moſt conſiderable of the counteſs of Winchelſea's poems was that on the Spleen. A collection of her poems were printed at London in 1713, containing a tragedy never acted, intitled *Ariſtomenes*. The counteſs died in 1720 without iſſue, as her huſband did in 1726.

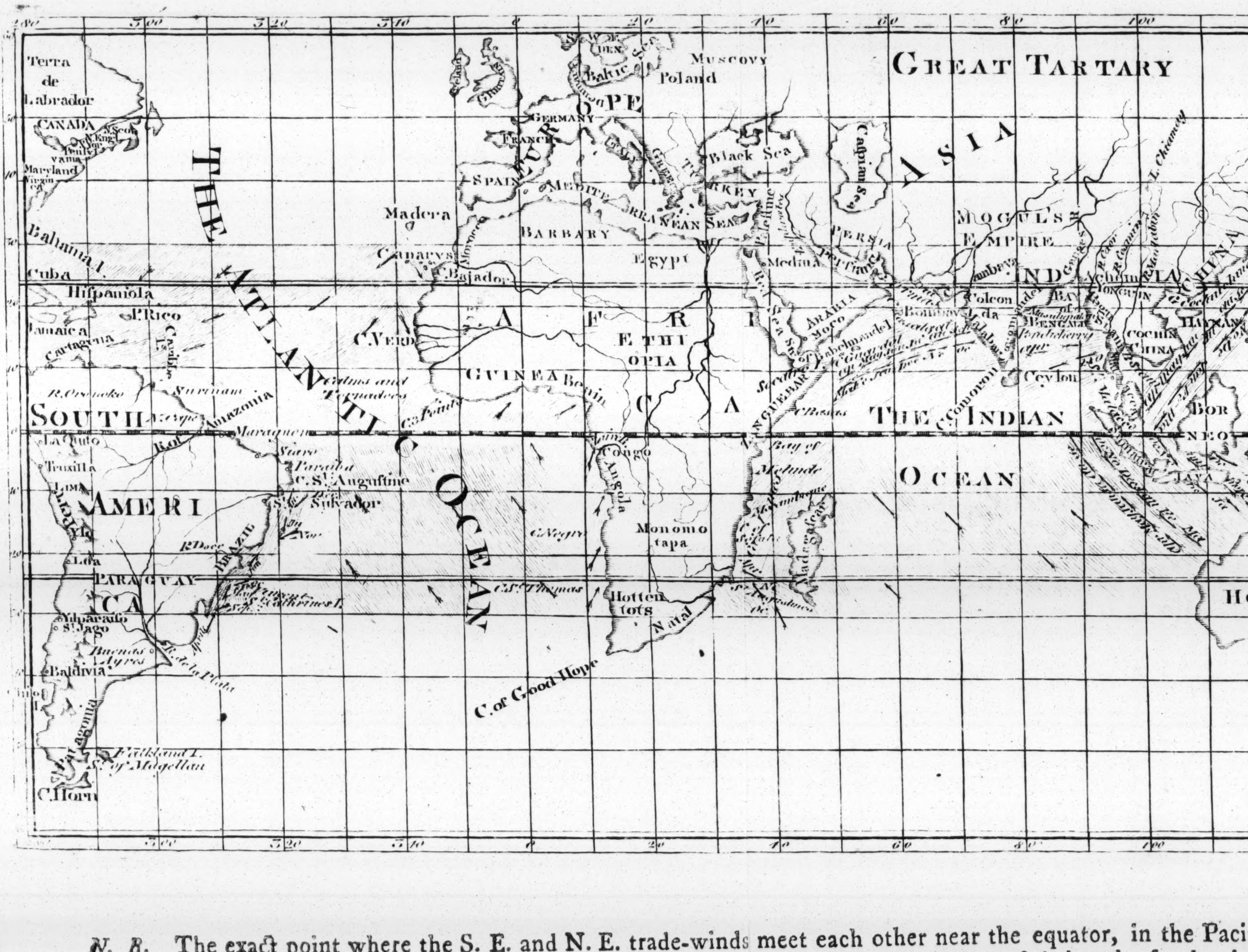
Wincheſter.

WINCHESTER, the capital of the county of Hampſhire in England. It is a very ancient city, ſuppoſed to have been built ſeveral centuries before Chriſt. The Romans called it *Venta Belgarum*, the Britons *Caer Givent*, and the Saxons *Wittanceaſter*; whence came the preſent name. It ſtands upon the river Itchin, in a bottom ſurrounded with chalky hills; and is generally allowed to have been a conſiderable place in the time of the Romans. Some of the firſt converts to Chriſtianity are ſuppoſed to have lived here. In the caſtle, near the weſt-gate, many of the Saxon kings anciently kept their court. In the hall where the aſſizes are kept, is ſhown a round table of one piece of wood, which, it is pretended, is above 1200 years old, and was that at which king Arthur, with his knights, uſed to carouſe: but Cambden ſays it plainly appears to be of a much more modern date. There is an inſcription in Saxon characters upon it, which is now illegible, ſaid to be the names of his 24 knights. The cathedral was founded by Kenegulſe, a king of the Mercians; but there were many Chriſtians, and places for their worſhip here, long before that period. Kinewal, or Kenwalchius, the ſon of Kenegulſe, tranſlated the ſee of Sherburn hither, and made Wina a Frenchman the firſt biſhop; who falling afterwards under the diſpleaſure of Kinewal, purchaſed the ſee of London from Wulphire king of Mercia, and is reckoned the firſt ſimoniacal biſhop in England. Here Egbert I. ſole monarch of England, was crowned; and not long after Swithin, one of the biſhops of this ſee, was canonized. Another of the biſhops of this ſee was Denewulf, whom Alfred preferred to it, after he had acquired a ſufficient ſtock of learning, though he had been a ſwine-herd, as a reward for having concealed him from the Danes. A monaſtery was built here by Edward the Elder; and richly endowed by him and his ſucceſſors. Edward the Confeſſor was crowned in this place by Edſius, archbiſhop of Canterbury. At that time Alwyn was biſhop of this ſee; but was confined to a monaſtery on ſuſpicion of a criminal correſpondence with queen Emma: from which he was diſcharged upon the queen's clearing herſelf by ordeal. By way of thankſgiving to St Swithin for her deliverance, the queen gave nine manors to his church. Walkelin, the next biſhop, laid the foundation of the preſent cathedral. William the Conqueror kept his court here; and at this place he beheaded Waltheof, the great Saxon earl of Northumberland. He not only confined for life in the caſtle, but put out the eyes of Ederic, another Saxon earl, becauſe he had delivered up the caſtle of York to Edgar Atheling. Giffard, the next biſhop, to terminate the quarrels between the monks of the old and new minſters, removed the latter to Hyde, in this neighbourhood, where he had built an abbey for their reception. His ſucceſſor was Henry of Blois, brother to king Stephen; who reduced the empreſs Maud to ſuch ſtraits in this city and caſtle, that ſhe cauſed a report to be ſpread of her death, and was carried out in a coffin. The biſhop after his return, founded and endowed the hoſpital of St Croſs, about a mile to the ſouth of this city, and built the biſhop's palace called *Wolveſey*. Here Henry II. held a parliament, and was crowned with his queen. When Godfrey Lucy, ſon to Richard, lord chief juſtice of England and governor of the caſtle, was biſhop, Richard II. granted a charter, with very ample privileges, to the citizens. King John reſided in this city; and his ſon Henry III. was born there. Peter de la Roche, another of its biſhops, was lord chief-juſtice and governor of the kingdom in the minority of Henry III. In his time Henry the Lion, duke of Bavaria, with his ducheſs Matilda, daughter of Henry II. reſided at Wincheſter, where their ſon William, duke of Bavaria, was born. Hen. III. kept his Chriſtmas here in 1239, when Raleigh was biſhop. When the barons roſe, the city was taken, and all the Jews in the town put to the ſword; but the earl of Leiceſter, whoſe ſon had taken it, being ſlain, it was recovered by the king. After the murder of Edward II. his uncle, Edmund Plantagenet, was beheaded at the caſtle-gate of this city. William Edendon, biſhop of this ſee, being elected archbiſhop of Canterbury, refuſed it, ſaying, "If Canterbury is the higher rack, Wincheſter is the better manger." This biſhop, who had been treaſurer of England, was buried in an alabaſter tomb on the ſouth-ſide of the entrance into the choir. He was ſucceeded by the famous WILLIAM of WICKHAM, ſo denominated from a village near this place, who became prime miniſter to Edward III. He procured a charter, by which this city was made a ſtaple for wool; and founded a college called *St Mary's*, which he endowed with a liberal maintenance for a warden, 10 fellows, 2 maſters, 70 ſcholars, 3 chaplains, 3 clerks, an organiſt, and 16 choriſters, to which he granted great privileges. The college conſiſts of two courts, in which are lodgings for the maſters and ſcholars, &c. a large hall, chapel, ſchools, and a library. After a certain time of continuance in the ſchool, the ſcholars, if they chooſe to proſecute their ſtudies, have exhibitions for that purpoſe in New-college, Oxford, which was alſo founded by Wickham. The ſame prelate built alſo the nave of the church, and obtained the offices of chancellor to the archbiſhop of Canterbury, and prelate of the garter, to be annexed to this ſee. Beſides theſe donations, he expended 20,000 merks in the repair of houſes, mended the highways from hence to London, built ſeveral free-ſchools and hoſpitals, both in this county and Surry; all which have his coat of arms on them, with this motto, "Manners make the man." Henry IV. was married in this city; and Henry V. gave audience in it to the French ambaſſadors who came to implore peace. The biſhop at that time was Henry de Beaufort, uncle to the king, who was thrice chancellor of the kingdom, a cardinal, and general of the Pope's forces againſt the Bohemians. He founded an hoſpital here, left legacies to all the cathedrals of England, and lies buried in a fine tomb in the church; in which he is repreſented in his cardinal's robes and hat. Arthur, eldeſt ſon of Henry VII. was born in this city in 1486. Waynfleet, biſhop of this ſee, founded Magdalen college in Oxford. One of his ſucceſſors, Richard Foſſe, collected the bones of Kengulſe, Kinulphus, Egbert, Edmund, Canute, queen Emma, William Rufus, and his brother Richard, which had been diſperſed in the civil wars, depoſited them in leaden cheſts, and interred them at the foot of the great wall of the choir. In 1554 queen Mary was married in this city to Philip of Spain, and the chair uſed on that occaſion is ſtill preſerved. In her reign the perſecuting Gardiner was biſhop of this ſee. One of his ſucceſſors was Cooper, author of the Theſaurus, which bears his name. Morley, who was biſhop of this ſee after the Reſtoration, built a new epiſcopal palace, and a college for 10 miniſters widows, which he endowed with a good revenue. In his time a palace was begun and almoſt finiſhed here by Charles II. which is now going to ruins. In the monaſtery at Hyde was a croſs, the gift of Canute the Dane, which coſt him one year's revenue of all England. When the monks were ejected out of the other convent dedicated to the Holy Trinity, they were ſucceeded by a dean and 12 prebendaries. The cathedral is a large pile, and has a venerable look, but is not very elegant. Beſides the tombs, there are many curious pieces of workmanſhip in it; the chief of which are, 1. The font, erected in the time of the Saxons. 2. Copper ſtatues of James I. and Charles I. 3. The biſhop's throne. 4. The ſtalls of the dean and prebendaries. 5. The aſcent to the choir and altar. 6. The pavement, inlaid with marble of diverſe colours, in various figures. 7. The altar-piece, reckoned the nobleſt in England. 8. The paintings in the windows, eſpecially the great eaſt window. At the hoſpital of the Holy Croſs mentioned above, every traveller that knocks at the door may claim a manchet of white bread and a cup of beer; of which a great quantity is provided every day for that purpoſe. This hoſpital was intended for the maintenance of a maſter and 30 penſioners, but only 14 are now maintained in it; and the maſter enjoys a revenue of 800l. a-year. This city is about a mile and a half in compaſs, and almoſt ſurrounded with a wall of flint, has ſix gates, large ſuburbs, broad clean ſtreets; but the private houſes are in general but ordinary, many of them being very old. The city is interſperſed with a great many gardens, which contribute to its beauty and healthineſs. There is a great deal of good company in the city and neighbourhood, and many clergymen, but little trade or manufacture. Many other public edifices, beſides thoſe we have mentioned, adorn this city; particularly an infirmary, an hoſpital called *St John's*, and the guildhall. The corporation conſiſts of a mayor, high-ſteward, recorder, aldermen, two coroners, two bailiffs, 24 common-council-men, a town-clerk, four conſtables, and four ſerjeants at mace; and the city gives title of *marquis* to the duke of Bolton. A Roman highway leads from hence to Alton; and went formerly, as it is thought, from thence to London. The charming downs in the neighbourhood contribute greatly to the health and pleaſure of the inhabitants. The river Itchin is navigable for barges from hence to Southampton.

WIND. As the air is a fluid, ſubjected to the ſame laws of gravitation as other fluids, it neceſſarily has a conſtant tendency to preſerve an equilibrium in every part; ſo that if, by any means whatever, it is rendered lighter in any one place than another, the weightier air will ruſh in from every ſide towards this place, till

A
C H A
E X H I B I
A View of the GENERAL and COASTING TRADE-WINDS, and MONS

N. B. *The arrows among the lines, ſhow the courſe of the winds. The double arrows, pointing*
the darts always pointing the way that the wind blows



Terra de Labrador
CANADA
Maryland
Bahama I.
Cuba
Hispaniola
Jamaica
P. Rico
Cartagena
R. Oronoko
Surinam
SOUTH
Amazonia
Maraguen
Quito
Truxillo
Lima
AMERI
CA
PARAGUAY
S. Salvador
C. S. Augustine
Valparaiso
S. Jago
Buenos Ayres
R. de la Plata
Baldivia
Patagonia
Falkland I.
S. of Magellan
C. Horn
THE ATLANTIC OCEAN
Madera
Canarys
C. Bajador
C. Verd
Calms and Tornadoes
C. S. Thomas
C. Negro
GUINEA
Benin
Congo
Angola
Hottentots
Natal
C. of Good Hope
SPAIN
FRANCE
GERMANY
EUROPE
Baltic Sea
Muscovy
Poland
MEDITERRANEAN SEA
BARBARY
Egypt
AFRICA
ETHIOPIA
Monomotapa
Zanguebar
Melinde
Madagascar
Black Sea
TURKEY
Caspian Sea
PERSIA
ARABIA
Medina
Red Sea
GREAT TARTARY
ASIA
MOGUL'S EMPIRE
INDIA
Golconda
Bombay
Bengal
Pondicherry
Ceylon
THE INDIAN
OCEAN
CHINA
Tonquin
Cochin China
BORNEO
JAVA
30°
20°
10°
0
20°
40°
60°
80°
100°

N. B. The exact point where the S. E. and N. E. trade-winds meet each other near the equator, in the Paci
of the wind on each ſide of the equator, at ſome diſtance from it. It is generally ſuppoſed that the ſouth win
to us more probable, that this point varies according to the courſe of the ſun; the ſouth wind extending to the
vations are wanting to confirm this.

Neither is it eaſy to aſcertain with preciſion the exact boundaries between the invariable trade-winds and th
to the ſouth of the equator, extend weſt from Sumatra and Java.

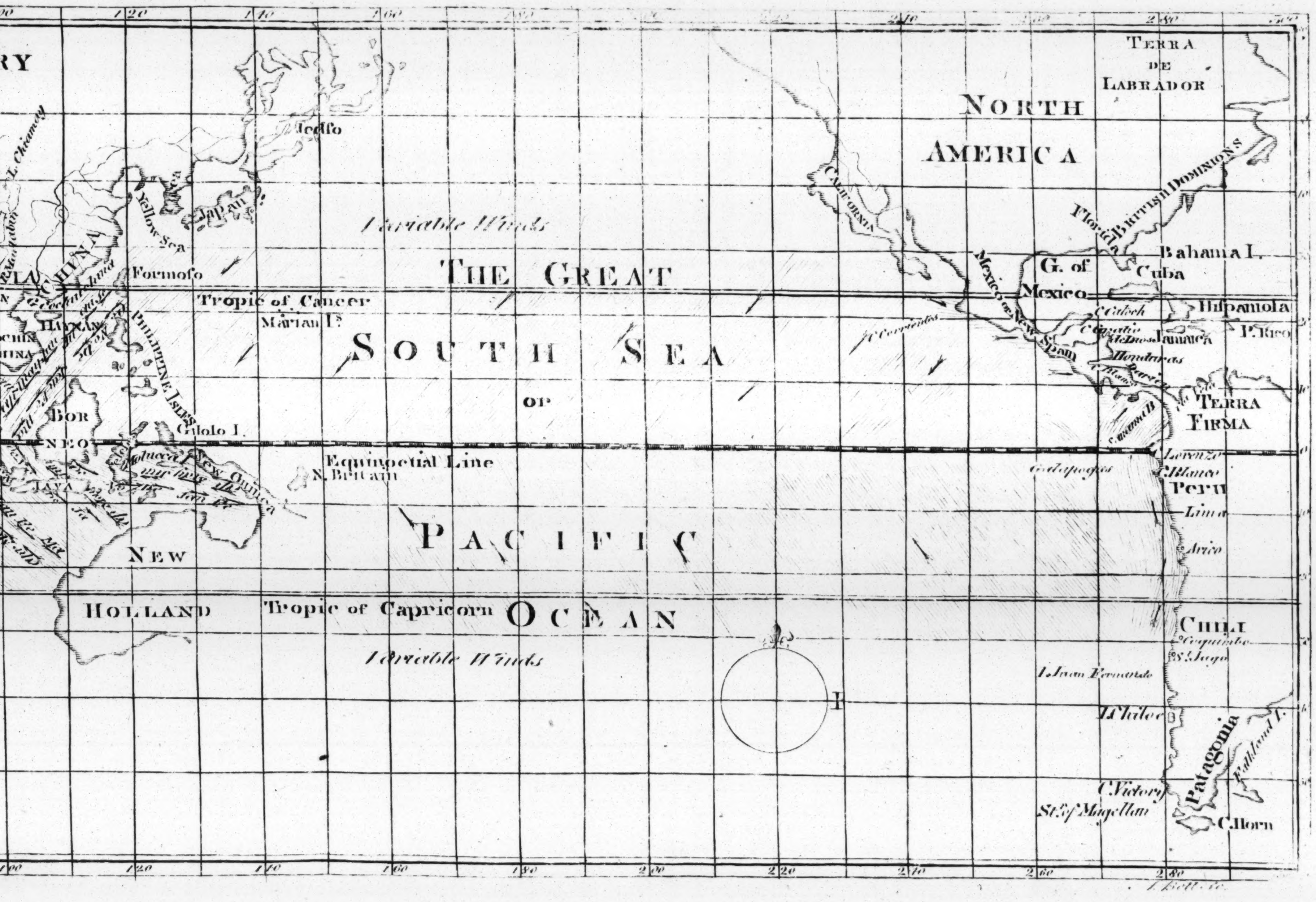
A Plate CCCXII.

ART,

IBITING

MONSOONS or SHIFTING TRADE-WINDS, through the whole WORLD.

pointing different ways, in thoſe places where the lines are thicker than uſual, denote the monſoons,
ind blows in the months which are written by the darts.


RY
Jedſo
Japan
Yellow Sea
CHINA
Formoſo
Tropic of Cancer
Marian I.
PHILIPPINE ISLES
BOR NEO
Gilolo I.
Equinoctial Line
N. Britain
New Guinea
JAVA
NEW HOLLAND
Tropic of Capricorn
Variable Winds
THE GREAT SOUTH SEA OR PACIFIC OCEAN
Variable Winds
NORTH AMERICA
TERRA DE LABRADOR
CALIFORNIA
Florida
BRITISH DOMINIONS
Bahama I.
G. of Mexico
Cuba
Mexico or New Spain
Hiſpaniola
P. Rico
Jamaica
Honduras
C. Corrientes
TERRA FIRMA
Galapagos
Lorenzo
C. Blanco
Peru
Lima
Arica
CHILI
Coquimbo
St. Jago
I. Juan Fernando
I. Chiloe
Patagonia
Falkland I.
C. Victory
St. of Magellan
C. Horn
100
120
140
160
180
200
220
240
260
280
300
A. Bell Sc.

n the Pacific Ocean, is not preciſely aſcertained. We have therefore diſcontinued the lines which denote the courſe
ſouth wind extends to the north of the line, as in the Atlantic Ocean: upon what authority we know not. It ſeems
ing to the north of the line during our ſummer-ſeaſon, and the north wind to the ſouth of it in winter. But obſer-

nds and the monſoons in the Indian Ocean, near the line; or to ſay exactly, how far the monſoons, which take place

as much be there accumulated as makes it of an equal weight with the reſt of the atmoſphere: it is theſe currents of air which are called *winds*.

Many are the cauſes which may vary the weight of the atmoſphere, and occaſion particular tropical winds.

Although other cauſes may occaſion winds in certain circumſtances, yet their principal and moſt univerſal cauſe is the ſun, which warmeth the air to a much greater degree in ſome places of the atmoſphere than in others; and as the air is ſuſceptible of a great degree of expanſion by heat in thoſe places where it is heated to any conſiderable degree, it is expanded ſo much as to become lighter than the air in thoſe places where it is colder; ſo that the weightier cold air from all the circumjacent parts ruſhes towards this point to reſtore the equilibrium which had been deſtroyed. So that if there be any particular part upon the earth's ſurface where the ſun acts conſtantly with greater force than on any other part, a current of air will conſtantly flow from theſe towards the warmer region: but the ſun acts with greater force upon thoſe parts of the earth which are neareſt the equator, than thoſe which approach towards either poles; ſo that we might naturally expect that a wind would conſtantly blow from the polar regions towards the equator; which is really found to be the caſe in the torrid zone, where the influence of the ſun overcomes almoſt all the other leſſer cauſes which produce the variable winds in our more northerly regions. However, even in the torrid zone, theſe north and ſouth winds are varied in different ways.

Although the heat of the equatorial region is greater than any other, yet as the ſun acts perpendicularly in his diurnal courſe upon one point of the equator only at one time, and immediately paſſes over it, and as the air retains the heat communicated to it by the ſun but for a ſhort time, cooling gradually as he retires, and continuing ſtill to decreaſe till his influence again returns the following day; the degree of heat upon this great circle muſt be very different in different parts, and perpetually varying in every point; which muſt in ſome meaſure tend to diſturb thoſe winds coming from the polar regions, which we have already mentioned. To comprehend clearly what will be the effects of this rotation, let us conſider what effect it would naturally produce upon the equator with regard to wind, ſuppoſing no other cauſe ſhould interrupt it. And here we muſt obſerve, that as the point upon which the ſun acts with the greateſt power is conſtantly moving from eaſt to weſt, the air to the eaſt of that point over which the ſun has more lately paſſed will be more rarefied than that to the weſt, and will naturally flow towards that point from eaſt to weſt with greater velocity than from weſt to eaſt, as the cool air to the weſt of that point will be interrupted in its motion towards it by the motion of the ſun meeting it. Hence therefore it follows, that from the diurnal motion of the earth from weſt to eaſt a conſtant wind would always be produced, were it not obſtructed by other cauſes. But as there is a conſtant ſtream of air flowing from the polar towards the equatorial regions, a compoſition of theſe two currents of air acting at the ſame time will produce a north-eaſt wind in all parts of the northern hemiſphere, and a ſouth-eaſt wind in all parts of the ſouthern one. Theſe winds are known by the name of the *general trade-winds*.

If there were no inequalities on the ſurface of our globe, and if it were compoſed of a ſubſtance perfectly homogeneous, this wind would invariably take place at all times on every part of the earth's ſurface: but as this is not the caſe, it is liable to ſeveral very conſiderable variations. In all thoſe regions towards the poles, as the influence of the ſun is there but weak, other leſſer cauſes occaſion particular winds, and diſturb that regularity which at firſt view we might expect; ſo that the general trade wind does not invariably take place beyond the 28th or 30th degree of latitude; and the regions between that and the poles have nothing but variable winds. Even in the torrid zone, there are many cauſes which in particular places alter this direction of the wind; ſo that the genuine trade-winds do not take place except in the Atlantic and Pacific oceans on each ſide the equator to the diſtance of 28 or 30 degrees, and in the greateſt part of the Indian ocean to the ſouth of the equator, as appears more diſtinctly upon the MAP, (Plate CCCXII.) where the courſe of the winds are marked by the direction of the ſtrokes, the darts pointing in the ſame direction as the wind blows.

Having thus explained the nature and cauſes of the general trade-wind, we now proceed to take notice of the principal deviations which take place in the torrid zone. The general trade-wind, when thus altered at particular ſeaſons, is known by the name of *monſoons*. There are other variations, which, although as general, are yet of ſmaller and more limited influence. Theſe are known by the name of *breezes;* and as they blow periodically from the ſea, they are denominated *ſea* or *land breezes*, and take place more or leſs in every ſea-coaſt within the tropics. As the cauſes of the monſoons will be more clearly comprehended after the nature of theſe breezes is explained, we ſhall firſt conſider them.

The ſea and land breezes of the torrid zone are gentle periodical winds regularly ſhifting twice every day, and blowing from the ſea towards the land during the day time, and from the land towards the ſea in the night. Theſe breezes do not blow with an equal degree of force throughout the whole day and night, but are perpetually varying, being always ſtrongeſt about midday and midnight, and becoming gradually weaker till the time of change in the evening and morning; about which time the air continues for a ſhort ſpace perfectly calm: but in a little the breeze begins to be felt on the ſide oppoſite to that from which it blew laſt, ſo faint at firſt as hardly to be perceived; but by degrees acquiring greater ſtrength, it goes on increaſing for five or ſix hours, after which it again as gradually ſinks and dies away. They always blow directly off or towards the ſhore, and never extend their influence to a great diſtance from it, although this is varied by particular circumſtances in different places; as they never extend ſo far from the points of capes and promontories, as in deep bays; nor upon the windward, as lee-ſhores.

Theſe breezes are produced by the ſame cauſe which gives riſe to the trade-wind, *viz.* the heat of the ſun. In theſe warm regions the days and nights are nearly of an equal length throughout the whole year; the ſun riſing high in the day time, and deſcending almoſt perpendicularly at night; which occaſions a much greater variation between the heat of the day and night than is experienced in the more temperate climates; and it is this great difference between the heat of the night and day which produces the breezes. For the rays of the ſun are reverberated from the land during the day-time, much more powerfully than from the ſea, whoſe ſurface is conſtantly evaporating; and the air above the land is rendered much warmer, and conſequently more rarefied than above the ſea; ſo that a current of air neceſſarily takes place at that time from the ſea towards the land, increaſing and diminiſhing in ſtrength as the heat increaſes or declines. But when the ſun deſcends below the horizon, the evaporation from the ſurface of the ſea is ſtopped or greatly diminiſhed, and the cold which it occaſioned is of conſequence removed: the reverberation of the ſun's rays from the ſurface of the earth is likewiſe removed, and the air above the land quickly reſumes its natural degree of cold, which is always greater than the ſea when the influence of the ſun is withdrawn: ſo that the air above the ſea becomes warmer during the night than that above the land, and a current of air is of courſe eſtabliſhed from the land to the ſea, which forms the land-breeze, which acts as uniformly, although leſs powerfully, than the ſea-breeze; blowing at firſt gently as the air begins to cool, and gradually gathering ſtrength as the ſun retires below the horizon; till his influence begins to be full again in the morning, when it gradually gives place to the more powerful influences of the ſea-breeze. Theſe breezes are not, however, entirely confined to the torrid zone. They are even felt in more northern regions; the ſea-breeze in particular being almoſt as perceptible during the ſummer ſeaſon along the coaſts of the Mediterranean and the Levant, both on the African, European, and Aſiatic ſhores, as within the tropics. Even in our own colder climate, the effects of this are often ſenſibly felt during the ſummer ſeaſon; although, from the length of the day and ſhortneſs of the night, the difference between the heat of theſe is far leſs than in warmer climates. And although the ſhortneſs of our nights prevents us from feeling a nocturnal breeze, ſimilar to the land-breezes of the torrid zone; yet in every ſerene evening, we have an opportunity of obſerving a phenomenon, proceeding from a ſimilar cauſe with that which occaſions them in warmer climates. For as the waters retain their heat longer than the earth after the ſun withdraws, the moiſture which was raiſed during the heat of the day to a ſmall diſtance from the earth's ſurface is quickly condenſed by the cold of the evening, and falls down in copious dews; whereas that which is above the ſurface of the water is more ſlowly condenſed, by reaſon of the heat which that element retains longer, and hovers at a ſmall diſtance above it in the form of a denſe vapour, which ſlowly ſubſides as it loſes its heat. This is the cauſe of thoſe low miſts which are ſo often ſeen hovering above the ſurface of rivers and other waters in the evenings towards the end of ſummer.

It was already obſerved, that in the Indian ocean the general trade-wind only took place in ſome parts to the ſouth of the equator. To the north of the line, and in ſome places to the ſouth of it in that ocean, the general trade-wind only blows regularly for ſix months; and during the other ſix months the wind blows in a direction entirely oppoſite. It is theſe winds, which ſhift thus regularly, which are called *monſoons*, although they are alſo ſometimes called *trade-winds*.

At the equator the days and nights are always of an equal length throughout the whole year; ſo that the heat being thus equally divided, it never arrives to ſuch an intenſe degree as to be inſupportable to the inhabitants. And as there is no viciſſitude of ſeaſons at the equator, ſo at the poles they never experience the more pleaſing viciſſitudes of day and night, the ſun never ſetting during the ſummer ſeaſon, nor riſing above the horizon during the winter: and although the day decreaſes in length as we recede from the pole, from 6 months to 24 hours; yet in all high latitudes the ſun deſcends for ſuch a ſhort ſpace below the horizon, and in ſuch an oblique direction, that the difference between the heat of the day and night is but very inconſiderable. From which it follows, that during this ſeaſon, when the ſun continues to act with ſuch uninterrupted influence upon the ſurface of the earth, the air will then be rarefied more above the dry land than upon the ſurface of the water; ſo that a wind would naturally ſet in at that time from the ſea towards the land, ſimilar to the diurnal ſea-breezes in the warmer climates; and on the contrary, during the winter ſeaſon, the air in theſe northern regions being colder above the land than the water, the winds will naturally blow from the land towards the ſea, ſimilar to the land-breezes of the torrid zone. But as the influence of the ſun, although of longer continuance, is in general more languid in climates of a high latitude than in thoſe near the line, it is not to be expected that theſe effects will follow with the ſame regularity as in the torrid zone; being more apt to be interrupted by leſſer cauſes which affect the atmoſphere and produce winds in different directions. Yet theſe are not ſo totally interrupted but that we can eaſily trace their effects even in our own cold climate: for during the ſummer ſeaſon, the large continent to the eaſt of us, being more heated than the Atlantic ocean weſtward, produces a general tendency of the current of air towards the eaſt, inſomuch that weſterly winds are obſerved to prevail more than any other, not only here, but in all the frontier countries on the continent, during the ſummer ſeaſon. And eaſterly winds become again more prevalent in the winter and ſpring. On the contrary, it is obſerved in North America, that the eaſterly winds prevail more in ſummer than at any other time; and the weſt winds always prevail during the cold months of winter. The ſame effects take place with a greater degree of conſtancy in other parts of Europe, particularly in Greece, and the countries in that neighbourhood; as the ancient Greeks have particularly remarked, that the winds blew from the ſouth during the heat of ſummer, particularly about the dog-days, and from the north during the colder weather of winter.

Any attentive reader, who has accompanied us thus far, will readily ſee, that the monſoons which take place in the Indian ocean proceed from the ſame general cauſe. For when the ſun, in his annual courſe, has croſſed the line, and comes to act very ſtrongly upon the extenſive countries of Arabia, Perſia, China, and the other parts of India, theſe become heated to a much higher degree than the ocean to the ſouth of them; and the air above theſe extenſive countries being ſo much rarefied, naturally draws the wind towards that place, which, by overcoming the general trade-wind, produces the ſoutherly monſoons which take place in all thoſe ſeas during the months of April, May, June, July, Auguſt, and September. But when the ſun has again retreated towards the ſouthern hemiſphere, this great degree of heat in theſe countries ſubſides, and the genuine trade-wind again reſumes its natural courſe; forming what they call the *northerly monſoon*, which blows in the months of October, November, December, January, February, and March: and as the continent of Aſia now aſſumes a greater degree of cold than the Atlantic and Pacific oceans in the ſame latitude, it produces a briſker and more ſteady gale during the continuance of this monſoon, than is ever experienced in the general trade-wind.

Having thus explained the nature of the monſoons in general, we ſhall proceed to conſider the particulars which influence the direction of theſe in thoſe parts where they take place. In all that part of the Indian ocean which lies between the iſland of Magadaſcar and Cape Commorin, the wind blows conſtantly from the W. S. W. between the months of April and October; and in the oppoſite direction from the month of October till April, although with ſome variation in different places, as theſe winds are neither ſo ſtrong nor conſtant in the bay of Bengal as in the Indian ocean. And it is likewiſe remarkable, that the S. W. winds in theſe ſeas are generally more ſoutherly on the African ſide, and more weſterly on the Indian, as appears diſtinctly in the map. But theſe variations are not repugnant to the general theory. For it is ſufficiently known, that high lands in every part of the globe are much colder than low and flat countries; and as that part of Africa is very high and mountainous, the cold in theſe regions is much greater than in the more flat countries of Arabia and India; ſo that the wind naturally blows from theſe cold regions, in the ſummer ſeaſon, towards the warmer continent of Aſia; which occaſions thoſe inflections of the wind to the eaſtward which take place in theſe ſeas during the ſummer months; and is ſtill farther aſſiſted by the peninſula of India, the kingdom of Siam, and the iſlands of Sumatra and Java, on the eaſtern part of this ocean, lying ſo much farther ſouth than the kingdoms of Arabia and Perſia; ſo that theſe, being more heated than the ocean to the weſtward, naturally draw the wind towards them, and produce the eaſterly variation of the monſoon which takes place in this part of the ocean, while the warm and ſandy deſarts of Arabia draw the winds more directly northward near the African coaſt.

In the eaſtern parts of the Indian ocean, beyond the iſland of Sumatra, through the gulph of Siam and bay of Tonquin, and along the ſouthern parts of China, and among the Philippine iſlands, &c to the north of the equator, the monſoons obſerve a different direction, blowing nearly due ſouth and north. Here the greateſt part of the warm continent is to the weſt of this diſtrict, which makes the wind naturally aſſume this direction. A little to the eaſt of this, among the Mariamne iſlands, the general trade-wind takes place, there being no continent to the north of them to occaſion monſoons.

The monſoons are as regular in the eaſtern part of the Indian ocean to the ſouth of the equator, as they are to the north of it; as here a northern monſoon ſets in from the month of October till April, and a ſouthern from April to October. And here, as to the north of the line, we find the direction of the monſoons varying according to particular circumſtances in different places: for about the iſland of Sumatra, and towards the weſt end of Java, the monſoons ſet in nearly from the north and ſouth; but towards Celebes and Timur, they begin to tend a little more to the eaſt and weſt, gradually declining as they approach the coaſt of New Guinea; near to which the northerly monſoon from October till April blows from the N. W. and the oppoſite monſoon from the S. E. between October and April. The reader will eaſily perceive that theſe monſoons are occaſioned by the continent of New Holland and Guinea; which being heated by the ſun when in the ſouthern ſigns, draws the wind towards that in the ſummer ſeaſon, in the ſame manner as the continent of Aſia produces the monſoons to the north of the line. And it is likewiſe ſufficiently plain, that the inflection of theſe periodical winds about Celebes and Timur is occaſioned by that part of the continent called *New Guinea* jutting out ſo near to the equator to the eaſt of theſe, and drawing the wind toward that quarter.

Theſe are the moſt general and extenſive monſoons which take place in our globe. But there are other periodical winds, which occur in particular places in theſe warm regions, that deſerves particular attention.

In the Red Sea, the monſoon ſhifts as regularly as in other places; but being influenced by the coaſts, it tends a little more to the north and ſouth than in the Indian ocean.

On the ſouth coaſt of Africa, to the ſouth of Cape Corientes, and about the ſouthern parts of the iſland of Madagaſcar, the regular trade-wind from the S. E. takes place between October and April; but from April till October the wind blows from the W. or N. W. and is at that ſeaſon exceedingly cold. This is evidently occaſioned by a cauſe already taken notice of: for notwitſtanding the high and cold nature of this continent, yet when the ſun is to the ſouth of the line, his powerful influence at that ſeaſon ſo far abates their natural degree of cold, as not to interrupt the general trade-wind between the months of October and April: But when he returns to the northern hemiſphere, the high mountains of Africa reſume their native coldneſs, and repel the general trade-winds by their cold and more powerful blaſt, ſo as to produce the intemperate monſoon which here takes place between the months of April and October.

From Mozambique to Cape Guardaſoy, at the mouth of the Red Sea, the monſoons are a little more irregular than in the other parts of the Indian ocean. For it is obſerved, that between October and January the winds are variable, although chiefly from the north. In January the N. E. monſoon ſets in, and continues regular till the month of May. From May till October the winds again become variable, but blow chiefly from the ſouthern points; but in the months of June, July, and Auguſt, there are frequent calms, eſpecially about the bay of Melinda, which ſometimes continue for ſeveral weeks together, and extend only about 100 leagues from ſhore.

Before we can explain the cauſe of this irregularity clearly, it will be neceſſary to attend to the direction of the wind on each ſide of this track at each particular ſeaſon. In the months of October, November, and December, the winds are here variable, but chiefly from the north. Now during theſe three months, the wind to the ſouth of this beyond Cape Corientes blows from the S. E. at the Red Sea, and all to the north of this the wind during this ſeaſon of the year is from the N. E. And as the ſun is then perpendicular to the bay of Melinda, theſe oppoſite winds here meeting and oppoſing one another, and being both of them ſtopped in their courſe weſtward by the cold regions of Africa near the Mountains of the Moon, will naturally produce the variable winds here obſerved, according as the one or the other of theſe three balancing powers ſhall predominate: although, as the coaſt here runs away towards the ſouth-weſt, it is natural to expect that the northerly wind, which follows the ſame direction, ſhould more frequently prevail than thoſe which are oppoſed by it; eſpecially when we conſider, that the iſland of Madagaſcar, now beginning to be warmed by the influence of the ſun, will concur in drawing the wind to the ſouthward; and when the continent of Africa is more heated in the months of January and February, it does not oppoſe the eaſterly monſoon, ſo that the winds become then more fixed than before. But in the months of June, July, and Auguſt, the wind to the ſouth of Cape Corientes is from the N. W.; and near the Red Sea, and throughout the northern part of the Indian ocean, the S. W. monſoon is then in its greateſt vigour; ſo that on each end of this diſtrict the wind is blowing in an oppoſite direction; from which reſults theſe calms about Melinda, which we juſt now mentioned.

This much may ſuffice for the ſhifting winds on the African and Aſiatic coaſts. As to America, the only places where the wind ſhifts regularly are, the bays of Honduras and Campeachy on the eaſt, and that of Panama and ſome parts on the coaſt of Mexico on the weſt, with a ſmall track upon the coaſt of Brazil. In the ſouth part of the bay of Honduras, between Cape Gratia de Dios and Cape la Bela, the common trade-wind between E. and N. E. blows between March and November; from October till March there are weſterly winds, not conſtant or violent, but blowing moderately ſometimes two or three days, or a week; and then the eaſterly breeze may again prevail for an equal length of time. The reaſon of the peculiarity here obſerved is this: During the ſummer ſeaſon, the high land on the iſthmus of Darien is ſo much warmed as not to interrupt the courſe of the general trade-winds; but when he retires to the ſouthern hemiſphere, the cold upon the iſthmus at that ſeaſon becomes ſo great, as to condenſe the air to ſuch a degree as to repel the trade-wind for ſome time: but not being cooled to ſuch an intenſe degree as in ſome of the larger continents, the trade-wind at times overcomes and repels theſe land-breezes in its turn, and produces the phenomena above deſcribed. And that this is really the caſe, appears evident from this cirumſtance, that the land breezes are moſt prevalent and of longeſt duration in the coldeſt months of December and January; before and after which two months, the trade-wind being generally checked only a day or two about the full or change of the moon. As theſe weſtern breezes on this coaſt take their riſe from the ſame cauſe as the diurnal land-breeze in warm climates, they may be conſidered as land-breezes of two or three days continuance, and forming an intermediate ſtep between the land-breezes and monſoons. Although the influence of theſe breezes is felt farther off at ſea than the common diurnal breeze, yet they do not extend a great way, being ſeldom felt above 20, 30, or 40 leagues from ſhore; and about Cape La Vela, which is much expoſed to the eaſt wind, theſe breezes ſeldom extend above eight or ten leagues from ſhore. Land-breezes of the ſame nature, and proceeding from ſimilar cauſes, are alſo experienced in the winter ſeaſon in the bay of Campeachy, which are there known by the name of *Smmaſenta winds*. Beyond Cape la Vela theſe weſtern breezes are not felt, which is undoubtedly occaſioned by the whole of that coaſt as far as Cape St Auguſtine being ſo much expoſed to the general trade-wind, which here ſweeps along the coaſt with ſo much violence, as almoſt totally to repreſs the weaker influence of the breezes. But between Cape St Auguſtine and St Catharine's iſland, or a little farther, we again meet with a variation of the wind at different ſeaſons, as it is here obſerved to blow in an E. or N. E. direction from September till April, and from April till September from the S. W. This variable wind, or monſoon, like the others on this coaſt, extends but for a very ſhort way from ſhore, and is evidently occaſioned by the ſame cauſes as the other periodical winds. For in the ſummer months (which in this climate is between September and April), the land of the continent being heated by the ſun, draws the trade-wind from its common courſe of S. E. a little to the weſtward; and as the coaſt here tends towards the S. W. the wind in ſome meaſure (as it always does) follows the ſame direction, and produces this E. N. E. monſoon. But in the winter, when this region becomes more cool, the eaſt wind is repelled by the denſe cold air from the mountains; by which means it is bent to the northward, and is forced along the coaſt to Cape St Auguſtine; where, meeting with no further hindrance, it again falls in with the general trade-wind, and is carried along with it in its proper direction.

We have purpoſely omitted mentioning the winds on the weſt coaſts of Africa and America till the others were explained, as the cauſes of the peculiarities here obſerved will be now more eaſily comprehended. On the coaſts of Chili and Peru, in America, from 25° or 30° of ſouth latitude to the line; and on the parallel coaſt of Angola, &c. in Africa, the wind blows all the year from the ſouth, varying in its direction a little in different places according to the direction of the coaſt, towards which it always inclines a little. But whatever is the direction at any one place, it continues the ſame throughout the whole year without any variation, and always blows from ſome ſoutherly point. But there is this difference between this wind upon the coaſts of Chili and Angola, that it extends much farther out to ſea upon the former than upon the latter.

In order to explain the cauſe of this ſingular phenomenon, it is neceſſary to recollect, that the general trade-wind is produced by the concurrence of two ſeparate cauſes. One is the great heat of the equatorial region, by which alone would be produced a conſtant north or ſouth wind. The other is the diurnal revolution of the earth, which would cauſe a perpetual tendency of the air in theſe warm regions from eaſt to weſt. From the concurrence of theſe two cauſes reſult the general trade-wind, which would conſtantly blow from the S. E. or N. E. as we have already demonſtrated. But if any one of theſe two cauſes, in any particular place, is prevented from producing its full effect, while the other continues to exert its influence, the general direction of the wind will be varied, and it will aſſume another. Thus, if the eaſt wind was prevented from acting in any particular place, while nothing interrupted the ſouth or north wind, it is evident that the air would ruſh towards the equator in that direction which was neareſt and eaſieſt, whether that ſhould be pointing eaſtward or weſtward. Now as the high mountains in the internal parts of Africa and America interrupt the courſe of the eaſt wind near the ſurface of the earth, while theſe coaſts of which we now treat are entirely open to the ſouth, the wind naturally ruſhes along the coaſts of Chili and Angola from north to ſouth; and as the low lands near the ſhore, in theſe warm regions, is generally warmer than the ſea, the wind will naturally point in towards the ſhore, as is generally obſerved to happen.

This, then, is the obvious cauſe of the ſouth wind which always prevails upon the coaſts of Chili and Peru, as well as along the ſhores of Angola, Loango, &c. But it is only near the ſhore that this can take place; nor can it extend to a great height above theſe low and fertile regions. For as the internal parts of theſe countries are exceedingly high, but more eſpecially the Andes of America, which experience a perpetual degree of cold more intenſe than ſome polar regions ever experience; the air muſt here be condenſed to a very great degree, and ſend forth from theſe high regions a perpetual wind to every ſide, which occaſions almoſt all the peculiarities that have been remarked in theſe climates: for by oppoſing the general current of the trade-wind upon the eaſtern part of theſe continents, they produce theſe deluges of rain which ſupply the immenſe rivers of the Amazons, La Plata, &c. theſe do not, like the Nile and Gambia, ſwell only at a particular ſeaſon, and then ſhrink into a dimunitive ſize again; but continue throughout the whole year, with leſs variation of ſize, to pour their immenſe floods of water into the ocean. Theſe cold winds likewiſe ſtretching to the weſtward, at a conſiderable diſtance above the warmer regions of the ſea-coaſt, at length deſcend as low as the ocean, and form the general trade-wind, and occaſion that unuſual degree of cold which mariners have ſo often complained of even under the line to the weſtward of America. To the ſame cauſe alſo muſt we attribute the thick fogs ſo common upon the ſouthern parts of Chili and along the coaſts of Peru, with the other peculiarities of that ſingular climate about Lima and the kingdom of Valles in South America; for the vapours which are exhaled in ſuch great abundance in the warm regions on the ſea-ſhore, are, at a little height above the earth, condenſed by the cold winds which come from the mountains, and form theſe thick miſts which are ſo often obſerved in this climate. The ſame effects are felt in ſome degree on the ſimilar coaſt of Africa. But as the mountains of Africa are not ſo high as the Andes of America, nor approach ſo near the weſtern coaſt, the effects are leſs ſenſible here than in America. The great height of the Andes above the mountains of the ſimilarly ſituated country of Africa, is the only reaſon why the effects on that coaſt are not felt to an equal degree, although ſimilar in kind.

A more ſingular deviation from the general trade-wind is obſerved to take place on the African and American coaſts to the north of the line, than thoſe we have taken notice of to the ſouth of it. For it is obſerved, that from California to the bay of Panama, all along the coaſts of New Spain, the winds blow almoſt conſtantly from the weſt or S. W. nearly directly oppoſite to the trade-wind; and on the coaſt of Africa from Cape Bayador to Cape Verde, they blow chiefly from the N. W. ſtanding in upon the ſhore; from thence the wind bends gradually more and more from the north to the weſt, and ſo round to the S. W. all along the coaſt of Guinea, as will be diſtinctly ſeen by the map. After what we have ſaid of the winds on the ſouthern parts of theſe regions, it will be unneceſſary to ſpend much time in explaining the cauſe of theſe peculiarities, as it will evidently appear that they are nearly the ſame, the variations here obſerved being occaſioned by the particular direction of the coaſt.—Thus, along the coaſt of New Spain, the wind blows nearly the ſame direction in every place, as there are no remarkable bendings on the coaſt; being uniformly drawn towards the ſhore by the great heat of the low part of the continent near the ſea; which in theſe regions is always more heated than the water of the ocean, and occaſions that inflection. But as the coaſt of Africa is more irregular, the winds alſo are found to be more different in their direction. To the north of Cape Verde, as the coaſt ſtretches nearly ſouth and north, the wind, being drawn towards it a little, blows from the N. W. But beyond that, the coaſt bends more eaſtward to Cape Palmas; from which it runs E. or N. E. all along the coaſt of Guinea, the wind ſhifting gradually more and more to the weſt, ſtill pointing in upon the coaſt. And as there is nothing to oppoſe the current of air, which comes from the ſouth along the coaſt of Angola, it ſtretches forward till it comes within the influence of the coaſt of Guinea, and is there drawn in towards the ſhore in a S. W. direction. But as it is only the lower regions of the coaſt of Guinea which are ſo much warmed, the high mountains within continuing cold; the northerly wind coming from theſe meeting and oppoſing the ſoutherly winds in the higher regions of the air, by their mutual conflicts occaſion thoſe inceſſant rains and tremenduous thunder ſo remarkable along the whole of this uncomfortable coaſt.

It has been often obſerved by mariners, that there is a track of ſea to the weſt of Guinea from five to ten degrees of north latitude, in which the trade-wind blows with leſs ſteadineſs than in any other part of that ocean, being almoſt conſtantly troubled with calms and tornadoes; the cauſe of which the reader will perceive by inſpecting the map, as he will eaſily ſee that the winds are drawn from this quarter almoſt in every direction: ſo that there can be here no conſtant wind; but being exhauſted of its air, it muſt become lighter than the circumjacent parts, and muſt then be ſupplied from either ſide, as chance or occaſional circumſtances may direct, which occaſions thoſe ſudden flurries and tornadoes here obſerved.

Before we take leave of this ſubject, it is neceſſary to obſerve, that in the bay of Panama the winds between September and March are eaſterly; but from March till September they blow chiefly from the S. S. W. that is, during the winter months, while the ſun is far from them, the winds are off ſhore; and during the ſummer months, the land being heated to a conſiderable degree, they are drawn towards the ſhore as uſual. It is remarkable, however, that this is the only part on the weſt of a large continent where the wind ſhifts regularly at different ſeaſons; which ſeems to be occaſioneed by the great height of the iſthmus of Darien, and the Terra Firma to the eaſt of it, and the nearneſs of theſe to the ſea, in compariſon of the mountains near Benin on the ſimilarly ſituated coaſt of Africa; which is greatly aſſiſted by the deepneſs of the bay, which, by bending ſo much to the eaſtward from Cape Lorenzo, is in a great meaſure ſcreened from the force of the ſouth winds, which allows the winter breeze to extend itſelf upon the bay with more facility. We ought here alſo to remark, that along the coaſt of Mexico, between Cape Pelanco and Guatimala, there are land winds which blow in the months of May, June, and July, called by the Spaniards *Popogaios*. They greatly reſemble the Summaſenta winds in the bay of Campeachy, as they blow both night and day a moderate breeze without intermiſſion, ſometimes three or four days or a week together. But as theſe blow from the land in ſummer only, whereas the Summaſenta's blow only in winter, they muſt be occaſioned by a different cauſe, which ſeems to be this: As the continent which divide the South Sea from the bay of Mexico and gulph of Honduras, is but of very ſmall breadth, and in many places very high ground, the heat which it receives from the ſun in ſummer is not ſo great as on the ſimilar coaſt of Africa: and as the trade-wind coming from the great Atlantic ocean ſweeps along the eaſtern part of the American coaſt from Cape St Auguſtine to the bay of Honduras with very great violence at that ſeaſon, the ſmall heat of this narrow continent is not ſufficient to ſtop it entirely during that ſeaſon; ſo that at ſome times it blows for a ſhort time quite acroſs it, and occaſions thoſe winds called *Popogaios*.

Beſides theſe more general winds, there are likewiſe ſome particular winds which are only felt in particular places at certain times, whoſe effects are ſo ſingular as to merit attention; ſome of which we ſhall here take notice of. In the gulph of Perſia, particularly at Ormuz, during the months of June and July, there ſometimes blows from the weſt, for a day or two together, a hot ſuffocating fiery wind, which ſcorches up and deſtroys any animal that may be expoſed to it; for which reaſon, almoſt every body leave their habitations at Ormuz during theſe two months, and retire to the mountains near Schiras in Perſia, where they enjoy a more comfortable climate. To explain the cauſe of which, it is neceſſary to obſerve, that along all the coaſts of Aſia, to the north of the Indian ocean, the diurnal ſea and land breezes take place, as in every part of the torrid zone; by means of which the monſoons are not felt cloſe in upon the ſhores. But as the monſoon continues to blow regularly at a ſmall diſtance from ſhore, ſo in all probability it continues its courſe without interruption at a ſmall diſtance above the ſurface of the earth. Now when the monſoon is in its greateſt vigour, its influence will ſometimes deſcend even as low as the ſurface of the earth, and, interrupting the courſe of the breezes, hurry along with it theſe warm vapours, which ought to have aſcended upwards, and produced the ſalutary ſea breeze; and as the earth is thus deprived of the refreſhing influence and moiſture of the ſea-breeze, the air, by the ſtrong reverberation of the ſun-beams from ſuch dry and ſandy countries as Arabia, muſt ſoon be heated to an amazing degree, and produce theſe hot and ſuffocating winds. It is alſo remarkable, that theſe hot winds are more often experienced near headlands, where the ſea-breezes are weakeſt, which ſeems to confirm this hypotheſis.—Winds ſimilar to theſe in kind, though not in degree, are felt upon the coaſt of Coromandel during the months of June, July, and Auguſt, while the weſt monſoon reigns; and on the Malabar coaſt they are likewiſe felt in the months of December and January, while the eaſt monſoon reigns; but theſe are much leſs powerful than either of the others. As theſe hot winds always come from the land, they are known upon theſe coaſts by the name of *Terreno's*.

It has likewiſe been obſerved, that on the coaſt of Africa to the north of Cape Verde, during the months of December, January, and February, there ſometimes blows, for a day or two together, an eaſterly wind, ſo very intenſely cold as to be almoſt as deſtructive as the warm winds at Ormuz. We have already in ſome meaſure explained the cauſe of this phenomenon.—During theſe months, when the ſun is far from them, his influence is leſs felt than at other ſeaſons, and the northerly wind upon the coaſt is of courſe weakened, inſomuch that the cold produced by the mountains in the heart of the country being now in its greateſt degree of force, burſts its uſual confinement for a time, ſpreading to the weſt with great violence, and producing thoſe uncommon effects already mentioned. Thoſe who ſail on theſe coaſts, diſtinguiſh this particular wind by the name of *Harmattan*.

Theſe are the principal winds, whether conſtant or periodical, that take place within the tropics; and thus ſimple are their cauſes.

The ſucceſſion of ſea and land breezes renders the torrid zone not only habitable but comfortable. Beſides, as theſe currents of cold air, ruſhing from each ſide of the globe, and carrying along with them vaſt quantities of aqueous vapours which they collect from the ſurface of the earth in their courſe, meet and oppoſe one another at that part of the atmoſphere where the influence of the ſun is greateſt at the time, the water is there forced from the clouds in ſuch prodigious quantities, as to produce a diverſity of ſeaſons in the torid zone, ſomething ſimilar to what is experienced in more temperate climates; with this difference, however, that whereas, in temperate climates, the warmeſt and moſt comfortable ſeaſon is when the ſun approaches neareſt perpendicular to them, in theſe warmer climates the heavy rains which fall upon them at that ſeaſon moderates the heat, and prevents the ſun from having ſuch an effect as at other times; ſo that their coldeſt and moſt inconſtant weather, which they call *winter*, is at that ſeaſon, when, without this cauſe, they would be expoſed to the ſun's moſt powerful influence.

We ſhall only take notice of one other inſtance of the happy effects produced on our globe by the laws of nature with reſpect to winds. We have ſeen, that in the great Atlantic and Pacific oceans, the trade-wind blows conſtantly from the eaſterly points throughout the whole year, ſo that ſhips ſail from eaſt to weſt within the tropics with the utmoſt facility; but it is abſolutely impoſſible in theſe ſeas to ſail from weſt to eaſt, as the wind would be conſtantly againſt them; ſo that ſhips bound for any port to the eaſtward in theſe regions, muſt ſtand to the north or ſouth till they are beyond the limits of the trade-winds, where they meet with variable breezes, by the help of which they ſail to the eaſtward. But if the ſame conſtant trade-wind had taken place in the northern part of the Indian ocean, it would have been impoſſible to have ſailed to the eaſtward at all; becauſe the continent of Aſia would have prevented the ſhips from ſailing far enough north to find the variable winds. But here, as in almoſt every caſe in which the operations of nature are concerned, we find, that what produceth the diſeaſe, at the ſame time furniſheth a remedy; for that very continent which would have ſtood in our way going northward, draws the wind towards itſelf at one ſeaſon, which makes that courſe of navigation unneceſſary, the ſhifting of the monſoons ſupplying a nearer and more commodious courſe. Thus we ſee, that wherever the ſea is open to the ſouth or north, near the tropics, ſo as that ſhips are at freedom to reach the variable winds, the trade-wind conſtantly blows in one direction; but wherever there is any extent of continent within the verge of the torid zone, ſo as that they could not be at liberty to reach the variable winds, there the courſe of the trade-wind is altered, being drawn towards it in ſummer, and from it in winter, forming that ſhifting wind called *monſoons*. From which we may naturally infer, that as there are no monſoons in the Pacific or Atlantic, or in the weſtern part of the Indian ocean, to the ſouth of the line, there are no extenſive continents near the tropics in either of theſe places.

WIND-*Flower*. See ANEMONE.

WIND-*Mill*, a kind of mill, the internal parts of which are much the ſame with thoſe of a water-mill: from which, however, it differs, in being moved by the impulſe of the wind upon its ſails or vanes, which are to be conſidered as a wheel in axes.

WIND-*Gage*. See *Wind*-GAGE.

WIND-*Galls*, in farriery. See there, § xxxii.

Inſtruments for meaſuring the ſtrength, velocity, &c. *of the* WIND. See *Wind*-GAGE, ANEMOMETER, and ANEMOSCOPE.

The following ingenious method of meaſuring the velocity of the wind is extracted from a letter of the Rev. Mr Bryce of Kirknewton to the preſident of the Royal Society.

"The velocity of the wind near the earth is very unequal, upon account of the frequent interruptions it meets with from hills, trees, and houſes, and even in open plains; the ſurface of the earth, though much ſmoother than it commonly is, muſt reflect and interrupt ſuch a fluid as the air, and occaſion great irregularity in the velocity of its current: this is the reaſon when a feather is let fly with the wind, why it ſeldom, if ever, deſcribes a ſtraight line, but moves ſometimes in a kind of ſpiral, now high, and then low, ſometimes to the right, and then again to the left; and why two feathers let fly at once ſeldom, if ever, keep together, or deſcribe ſimilar lines.

"But at ſome conſiderable diſtance from the earth, the velocity of the wind ſeems to be regular and ſteady: nothing can be more uniform than the velocity of a cloud in the ſky appears to be even in the greateſt ſtorm: it is like a ſhip carried away inſenſibly by a ſmooth and gentle current, paſſing over equal ſpaces in equal times. This ſuggeſted the thought, that the motion of a cloud, or its ſhadow over the ſurface of the earth, would be a much more proper meaſure of the velocity of the wind.

"In the end of March 1763, I had as favourable an opportunity of putting this method into practice as I could have wiſhed for: the ſtorm was exceeding high, and moved with vaſt velocity; the ſun was bright, the ſky clear, except where it was ſpotted with light floating clouds. I took my ſtation in the north window of my dining room, near the clock, from which I had a free proſpect of the fields: the ſun was in the meridian, the wind due weſt interſecting his rays at right angles. I waited until the fore-part of the ſhadow of a cloud, that was diſtinct, and well defined, juſt touched a ſouth and north line, which I had marked upon the ground: at that inſtant I began my reckoning, and followed the ſhadow with my eye in its progreſs, counting ſeconds all the while by the clock, until I had reckoned up 15 ſeconds; then I obſerved exactly where the foreſaid edge of the ſhadow was.

"This experiment I repeated ten times in half an hour, and ſeldom found the difference of a ſecond in the time which different clouds took to move over the ſame ſpace. On the 5th of May current, I repeated the trial four different times, the ſun being alſo near the meridian, the wind in the weſt, with light clouds floating in a clear ſky as formerly; and found that the ſhadows of different clouds took ſome of them 44, and others 45 ſeconds, to paſs over the ſame ſpace which they had moved over in 15 ſeconds in the former trials.

Feet
This ſpace meaſures exactly 1384 = ſpace paſſed over in 15″
which multiplied by 4
gives 5536 = ſpace paſſed over in 1 m.
which multiplied by 60
gives 332,160 = ſpace paſſed over in 1 h.

"Which ſpace is = 62.9 Engliſh miles *per* hour, the velocity of the wind in March 1763.

"One third of this (or 21 miles nearly) ſhows the velocity of the wind on May the 6th, when it blew a freſh gale.

"This day, May 12, there was a ſmall weſterly breeze, the velocity of which I meaſured upon the ſame line, the ſun being 10 minutes paſt the meridian, and found that the ſhadow took 95 ſeconds to paſs over the above ſpace; which gives the velocity of the wind at the rate of 9.9 Engliſh miles *per* hour.

"Thus, by having ſeveral lines in different directions of a known length marked upon the ground, one may eaſily (and with great accuracy, I imagine) meaſure the velocity of the wind. If a perſon was proviſupplied from either ſide, as chance or occaſional circumſtances may direct, which occaſions thoſe ſudden flurries and tornadoes here obſerved.

Before we take leave of this ſubject, it is neceſſary to obſerve, that in the bay of Panama the winds between September and March are eaſterly; but from March till September they blow chiefly from the S. S. W. that is, during the winter months, while the ſun is far from them, the winds are off ſhore; and during the ſummer months, the land being heated to a conſiderable degree, they are drawn towards the ſhore as uſual. It is remarkable, however, that this is the only part on the weſt of a large continent where the wind ſhifts regularly at different ſeaſons; which ſeems to be occaſioneed by the great height of the iſthmus of Darien, and the Terra Firma to the eaſt of it, and the nearneſs of theſe to the ſea, in compariſon of the mountains near Benin on the ſimilarly ſituated coaſt of Africa; which is greatly aſſiſted by the deepneſs of the bay, which, by bending ſo much to the eaſtward from Cape Lorenzo, is in a great meaſure ſcreened from the force of the ſouth winds, which allows the winter breeze to extend itſelf upon the bay with more facility. We ought here alſo to remark, that along the coaſt of Mexico, between Cape Pelanco and Guatimala, there are land winds which blow in the months of May, June, and July, called by the Spaniards *Popogaios*. They greatly reſemble the Summaſenta winds in the bay of Campeachy, as they blow both night and day a moderate breeze without intermiſſion, ſometimes three or four days or a week together. But as theſe blow from the land in ſummer only, whereas the Summaſenta's blow only in winter, they muſt be occaſioned by a different cauſe, which ſeems to be this: As the continent which divide the South Sea from the bay of Mexico and gulph of Honduras, is but of very ſmall breadth, and in many places very high ground, the heat which it receives from the ſun in ſummer is not ſo great as on the ſimilar coaſt of Africa: and as the trade-wind coming from the great Atlantic ocean ſweeps along the eaſtern part of the American coaſt from Cape St Auguſtine to the bay of Honduras with very great violence at that ſeaſon, the ſmall heat of this narrow continent is not ſufficient to ſtop it entirely during that ſeaſon; ſo that at ſome times it blows for a ſhort time quite acroſs it, and occaſions thoſe winds called *Popogaios*.

Beſides theſe more general winds, there are likewiſe ſome particular winds which are only felt in particular places at certain times, whoſe effects are ſo ſingular as to merit attention; ſome of which we ſhall here take notice of. In the gulph of Perſia, particularly at Ormuz, during the months of June and July, there ſometimes blows from the weſt, for a day or two together, a hot ſuffocating fiery wind, which ſcorches up and deſtroys any animal that may be expoſed to it; for which reaſon, almoſt every body leave their habitations at Ormuz during theſe two months, and retire to the mountains near Schiras in Perſia, where they enjoy a more comfortable climate. To explain the cauſe of which, it is neceſſary to obſerve, that along all the coaſts of Aſia, to the north of the Indian ocean, the diurnal ſea and land breezes take place, as in every part of the torrid zone; by means of which the monſoons are not felt cloſe in upon the ſhores. But as the monſoon continues to blow regularly at a ſmall diſtance from ſhore, ſo in all probability it continues its courſe without interruption at a ſmall diſtance above the ſurface of the earth. Now when the monſoon is in its greateſt vigour, its influence will ſometimes deſcend even as low as the ſurface of the earth, and, interrupting the courſe of the breezes, hurry along with it theſe warm vapours, which ought to have aſcended upwards, and produced the ſalutary ſea breeze; and as the earth is thus deprived of the refreſhing influence and moiſture of the ſea-breeze, the air, by the ſtrong reverberation of the ſun-beams from ſuch dry and ſandy countries as Arabia, muſt ſoon be heated to an amazing degree, and produce theſe hot and ſuffocating winds. It is alſo remarkable, that theſe hot winds are more often experienced near headlands, where the ſea-breezes are weakeſt, which ſeems to confirm this hypotheſis.—Winds ſimilar to theſe in kind, though not in degree, are felt upon the coaſt of Coromandel during the months of June, July, and Auguſt, while the weſt monſoon reigns; and on the Malabar coaſt they are likewiſe felt in the months of December and January, while the eaſt monſoon reigns; but theſe are much leſs powerful than either of the others. As theſe hot winds always come from the land, they are known upon theſe coaſts by the name of *Terreno's*.

It has likewiſe been obſerved, that on the coaſt of Africa to the north of Cape Verde, during the months of December, January, and February, there ſometimes blows, for a day or two together, an eaſterly wind, ſo very intenſely cold as to be almoſt as deſtructive as the warm winds at Ormuz. We have already in ſome meaſure explained the cauſe of this phenomenon.—During theſe months, when the ſun is far from them, his influence is leſs felt than at other ſeaſons, and the northerly wind upon the coaſt is of courſe weakened, inſomuch that the cold produced by the mountains in the heart of the country being now in its greateſt degree of force, burſts its uſual confinement for a time, ſpreading to the weſt with great violence, and producing thoſe uncommon effects already mentioned. Thoſe who ſail on theſe coaſts, diſtinguiſh this particular wind by the name of *Harmattan*.

Theſe are the principal winds, whether conſtant or periodical, that take place within the tropics; and thus ſimple are their cauſes.

The ſucceſſion of ſea and land breezes renders the torrid zone not only habitable but comfortable. Beſides, as theſe currents of cold air, ruſhing from each ſide of the globe, and carrying along with them vaſt quantities of aqueous vapours which they collect from the ſurface of the earth in their courſe, meet and oppoſe one another at that part of the atmoſphere where the influence of the ſun is greateſt at the time, the water is there forced from the clouds in ſuch prodigious quantities, as to produce a diverſity of ſeaſons in the torid zone, ſomething ſimilar to what is experienced in more temperate climates; with this difference, however, that whereas, in temperate climates, the warmeſt and moſt comfortable ſeaſon is when the ſun approaches neareſt perpendicular to them, in theſe warmer climates the heavy rains which fall upon them at that ſeaſon moderates the heat, and prevents the ſun from having ſuch an effect as at other times; ſo that their coldeſt and moſt inconſtant weather, which they call *winter*, is at that ſeaſon, when, without this cauſe, they would be expoſed to the ſun's moſt powerful influence.

We ſhall only take notice of one other inſtance of the happy effects produced on our globe by the laws of nature with reſpect to winds. We have ſeen, that in the great Atlantic and Pacific oceans, the trade-wind blows conſtantly from the eaſterly points throughout the whole year, ſo that ſhips ſail from eaſt to weſt within the tropics with the utmoſt facility; but it is abſolutely impoſſible in theſe ſeas to ſail from weſt to eaſt, as the wind would be conſtantly againſt them; ſo that ſhips bound for any port to the eaſtward in theſe regions, muſt ſtand to the north or ſouth till they are beyond the limits of the trade-winds, where they meet with variable breezes, by the help of which they ſail to the eaſtward. But if the ſame conſtant trade-wind had taken place in the northern part of the Indian ocean, it would have been impoſſible to have ſailed to the eaſtward at all; becauſe the continent of Aſia would have prevented the ſhips from ſailing far enough north to find the variable winds. But here, as in almoſt every caſe in which the operations of nature are concerned, we find, that what produceth the diſeaſe, at the ſame time furniſheth a remedy; for that very continent which would have ſtood in our way going northward, draws the wind towards itſelf at one ſeaſon, which makes that courſe of navigation unneceſſary, the ſhifting of the monſoons ſupplying a nearer and more commodious courſe. Thus we ſee, that wherever the ſea is open to the ſouth or north, near the tropics, ſo as that ſhips are at freedom to reach the variable winds, the trade-wind conſtantly blows in one direction; but wherever there is any extent of continent within the verge of the torid zone, ſo as that they could not be at liberty to reach the variable winds, there the courſe of the trade-wind is altered, being drawn towards it in ſummer, and from it in winter, forming that ſhifting wind called *monſoons*. From which we may naturally infer, that as there are no monſoons in the Pacific or Atlantic, or in the weſtern part of the Indian ocean, to the ſouth of the line, there are no extenſive continents near the tropics in either of theſe places.

WIND-*Flower*. See ANEMONE.

WIND-*Mill*, a kind of mill, the internal parts of which are much the ſame with thoſe of a water-mill: from which, however, it differs, in being moved by the impulſe of the wind upon its ſails or vanes, which are to be conſidered as a wheel in axes.

WIND-*Gage*. See *Wind*-GAGE.

WIND-*Galls*, in farriery. See there, § xxxii.

Inſtruments for meaſuring the ſtrength, velocity, &c. *of the* WIND. See *Wind*-GAGE, ANEMOMETER, and ANEMOSCOPE.

The following ingenious method of meaſuring the velocity of the wind is extracted from a letter of the Rev. Mr Bryce of Kirknewton to the preſident of the Royal Society.

"The velocity of the wind near the earth is very unequal, upon account of the frequent interruptions it meets with from hills, trees, and houſes, and even in open plains; the ſurface of the earth, though much ſmoother than it commonly is, muſt reflect and interrupt ſuch a fluid as the air, and occaſion great irregularity in the velocity of its current: this is the reaſon when a feather is let fly with the wind, why it ſeldom, if ever, deſcribes a ſtraight line, but moves ſometimes in a kind of ſpiral, now high, and then low, ſometimes to the right, and then again to the left; and why two feathers let fly at once ſeldom, if ever, keep together, or deſcribe ſimilar lines.

"But at ſome conſiderable diſtance from the earth, the velocity of the wind ſeems to be regular and ſteady: nothing can be more uniform than the velocity of a cloud in the ſky appears to be even in the greateſt ſtorm: it is like a ſhip carried away inſenſibly by a ſmooth and gentle current, paſſing over equal ſpaces in equal times. This ſuggeſted the thought, that the motion of a cloud, or its ſhadow over the ſurface of the earth, would be a much more proper meaſure of the velocity of the wind.

"In the end of March 1763, I had as favourable an opportunity of putting this method into practice as I could have wiſhed for: the ſtorm was exceeding high, and moved with vaſt velocity; the ſun was bright, the ſky clear, except where it was ſpotted with light floating clouds. I took my ſtation in the north window of my dining room, near the clock, from which I had a free proſpect of the fields: the ſun was in the meridian, the wind due weſt interſecting his rays at right angles. I waited until the fore-part of the ſhadow of a cloud, that was diſtinct, and well defined, juſt touched a ſouth and north line, which I had marked upon the ground: at that inſtant I began my reckoning, and followed the ſhadow with my eye in its progreſs, counting ſeconds all the while by the clock, until I had reckoned up 15 ſeconds; then I obſerved exactly where the foreſaid edge of the ſhadow was.

"This experiment I repeated ten times in half an hour, and ſeldom found the difference of a ſecond in the time which different clouds took to move over the ſame ſpace. On the 5th of May current, I repeated the trial four different times, the ſun being alſo near the meridian, the wind in the weſt, with light clouds floating in a clear ſky as formerly; and found that the ſhadows of different clouds took ſome of them 44, and others 45 ſeconds, to paſs over the ſame ſpace which they had moved over in 15 ſeconds in the former trials.

Feet
This ſpace meaſures exactly 1384 = ſpace paſſed over in 15″
which multiplied by 4
gives 5536 = ſpace paſſed over in 1 m.
which multiplied by 60
gives 332,160 = ſpace paſſed over in 1 h.

"Which ſpace is = 62.9 Engliſh miles *per* hour, the velocity of the wind in March 1763.

"One third of this (or 21 miles nearly) ſhows the velocity of the wind on May the 6th, when it blew a freſh gale.

"This day, May 12, there was a ſmall weſterly breeze, the velocity of which I meaſured upon the ſame line, the ſun being 10 minutes paſt the meridian, and found that the ſhadow took 95 ſeconds to paſs over the above ſpace; which gives the velocity of the wind at the rate of 9.9 Engliſh miles *per* hour.

"Thus, by having ſeveral lines in different directions of a known length marked upon the ground, one may eaſily (and with great accuracy, I imagine) meaſure the velocity of the wind. If a perſon was provided with an inſtrument for meaſuring the force of the wind, it would perhaps be worth while to obſerve whether, when the velocities of different winds were the ſame (or nearly ſo) the force of theſe winds did not vary with the ſeaſons of the year, the points of the compaſs from which the wind blows, and alſo with the different ſtate of the barometer and thermometer; ſince the momentum of the wind depends not only upon its velocity, but alſo upon its denſity."

WIND *Sails*, a ſort of wide tube or funnel of canvas, employed to convey a ſtream of freſh air downward into the lower apartments of a ſhip.

This machine is uſually extended by large hoops ſituated in different parts of it height. It is let down perpendicularly through the hatches, being expanded at the lower end like the baſe of a cone; and having its upper ſide open on the ſide which is placed to windward, ſo as to receive the full current of wind; which entering the cavity, fills the tube, and ruſhes downwards into the lower regions of the ſhip. There are generally three or four of theſe in our capital ſhips of war, which, together with the ventilators, contribute greatly to preſerve the health of the crew.

WINDLASS, a machine uſed to raiſe huge weights withal, as guns, ſtones, anchors, &c.

It is very ſimple, conſiſting only of an axis or roller, ſupported horizontally at the two ends by two pieces of wood and a pulley: the two pieces of wood meet at top, being placed diagonally ſo as to prop each other; the axis or roller goes through the two pieces, and turns in them. The pulley is faſtened at top where the pieces join. Laſtly, there are two ſtaves or handſpikes which go through the roller, whereby it is turned, and the rope which comes over the pulley is wound off and on the ſame.

WINDLASS, in a ſhip, is an inſtrument in ſmall ſhips, placed upon the deck, juſt abaft the fore maſt. It is made of a piece of timber ſix or eight feet ſquare, in form of an axle-tree, whoſe length is placed horizontally upon two pieces of wood at the ends thereof, and upon which it is turned about by the help of handſpikes put into holes made for that purpoſe. This inſtrument ſerves for weighing anchors, or hoiſting of any weight in or out of the ſhip, and will purchaſe much more than any capſtan, and that without any danger to thoſe that heave; for if in heaving the windlaſs about, any of the handſpikes ſhould happen to break, the windlaſs would pall of itſelf.

WINDOW, an aperture or open place in the wall of a houſe, to let in the wind and light. See ARCHITECTURE, n° 83.

The word is Welch, *Uynt Dor*, ſignifying the paſſage for the wind. Window is yet provincially denominated *windor* in Lancaſhire; i. e. *wind-door*, or the paſſage for air, as that for people was peculiarly called *the door*.

Before the uſe of glaſs became general, which was not till towards the end of the 12th century, the windows in Britain ſeem generally to have been compoſed of paper. Properly prepared with oil, this forms no contemptible defence againſt the intruſions of the weather, and makes no incompetent opening for the admiſſion of the light. It is ſtill uſed by our architects for the temporary windows of unfiniſhed houſes, and not unfrequently for the regular ones of our workſhops. But ſome of the principal buildings we may reaſonably ſuppoſe to have been windowed in a ſuperior manner. They could however be furniſhed merely with lattices of wood or ſheets of linen, as theſe two remained the only furniture of our cathedrals nearly to the eighth century. And the lattices continued in ſome of the meaner towns of Lancaſhire to the 18th; and in many diſtricts of Wales, and many of the adjoining parts of England, are in uſe even to the preſent moment.——Theſe ſeem all to have been fixed in frames that were called *capſamenta*, and now therefore *caſements* in Wales and Lancaſhire.

WINDSOR, a borough-town of Berkſhire, 20 miles weſt of London, moſt remarkable for the magnificent palace or caſtle ſituated there on an eminence, which commands the adjacent country for many miles, the river Thames running at the foot of the hill. The knights of the garter are inſtalled in the royal chapel here. It ſends two members to parliament.

WINDWARD, in the ſea-language, denotes any thing towards that point from whence the wind blows, in reſpect of a ſhip: thus windward-tide, is the tide which runs againſt the wind.

WINE, a briſk, agreeable, ſpirituous, and cordial liquor, drawn from vegetable bodies, and fermented.

All ſorts of vegetables, fruits, ſeeds, roots, &c. afford wine; as grapes, currants, mulberries, alder-berries, cherries, apples, pulſe, beans, peaſe, turneps, radiſhes, and even graſs itſelf. Hence under the claſs of wines, or vinous liquors, come not only wines abſolutely ſo called, but alſo ale, cyder, &c.

Wine in France is diſtinguiſhed, from the ſeveral degrees and ſteps of its preparation, into, 1. *Mere goutte*, mother-drop, which is the virgin wine, or that which runs of itſelf out at the top of the vat wherein the grapes are laid, before the vintager enters to tread or ſtamp the grapes. 2. Muſt, ſurmuſt, or ſtum, which is the wine or liquor in the vat, after the grapes have been trod or ſtamped. 3. Preſſed wine, being that ſqueezed with a preſs out of the grapes half bruiſed by the treading. The huſks left of the grapes are called *rope*, *murk*, or *mark*; by throwing water upon which, and preſſing them afreſh, they make a liquor for ſervants uſe, anſwerable to our cyderkin, and called *boiſſon*. 4. Sweet wine, is that which has not yet worked nor fermented. 5. Bouru, that which has been prevented working by caſting in cold water. 6. Worked wine, that which has been let work in the vat, to give it a colour. 7. Boiled wine, that which has had a boiling before it worked, and which by that means ſtill retains its native ſweetneſs. 8. Strained wine, that made by ſteeping dry grapes in water, and letting it ferment of itſelf. Wines are alſo diſtinguiſhed with regard to their colour into white wine, red wine, claret wine, pale wine, roſe, or black wine; and with regard to their country, or the ſoil that produces them, into French wines, Spaniſh wines, Rheniſh wines, Hungary wines, Greek wines, Canary wines, &c, and more particularly into Port wine, Madeira wine, Burgundy wine, Champain wine, Falernian wine, Tockay wine, Schiras wine, &c.

Method of Making, Fining, &c. WINE. In the ſouthern parts of France, their way is with red wines to tread or ſqueeze the grapes between the hands, and to let the whole ſtand, juice and huſks, till the tincture be to their liking; after which they preſs it. But for white wines, they preſs the grapes immediately; when preſſed, they tun the muſt and ſtop up the veſſel, only leaving the depth of a foot or more to give room for it to work. At the end of ten days they fill this ſpace with ſome other proper wine, that will not provoke it to work again. This they repeat from time to time, new wine ſpending itſelf a little before it comes to perfection.

The uſual method of fining down wines, ſo as to render them expeditiouſly bright, clear, and fit for uſe, is this: Take an ounce of iſinglaſs, beat it into thin ſhreads with a hammer, and diſſolve it, by boiling, in a pint of water; this when cold becomes a ſtiff jelly. Whiſk up ſome of this jelly into a froth with a little of the wine intended to be fined, then ſtir it well among the reſt in the caſk, and bung it down tight; by this means the wine will become bright in eight or ten days. This method, however, is found to be beſt ſuited to the white wines; for the red ones, the wine-coopers commonly uſe the whites of eggs beat up to a froth, and mixed in the ſame manner with their wines.

They fine it down alſo by putting the ſhavings of green beech into the veſſel, having firſt taken off all the rind, and boiled them an hour in water to extract their rankneſs, and afterwards dried them in the ſun, or in an oven. A buſhel of theſe ſerve for a tun of wine; and being maſhed, they ſerve again and again, till almoſt quite conſumed.

For Engliſh wine, the method recommended by Mortimer, is firſt to gather the grapes when very dry, to pick them from the ſtalks, then to preſs them, and let the juice ſtand 24 hours in a vat covered. Afterwards to draw it off from the groſs lees, and then put it up in a caſk, and to add a pint or quart of ſtrong red or white port to every gallon of juice, and let the whole work, bunging it up cloſe, and letting it ſtand till January; then bottle it in dry weather. Bradley chooſes to have the liquor when preſſed, ſtand with the huſks and ſtalks in the vat, to ferment for 15 days. The method of converting white-wine into red, ſo much practiſed by the modern wine-coopers, Dr Shaw obſerves is this: Put four ounces of turneſole rags into an earthen veſſel, and pour upon them a pint of boiling water; cover the veſſel cloſe, and leave it to cool; ſtrain off the liquor, which will be of a fine deep red, inclining to purple. A ſmall portion of this colours a large quantity of wine. This tincture might be either made in brandy, or mixed with it, or elſe made into a ſyrup, with ſugar, for keeping. A common way with the wine-coopers is to infuſe the rags cold in wine for a night or more, and then wring them out with their hands; but the inconveniency of this method is, that it gives the wine a diſagreeable taſte, or what is commonly called the *taſte of the rag;* whence the wines thus coloured uſually paſs among judges for preſſed wines, which have all this taſte from the canvas rags in which the lees are preſſed. The way of extracting the tincture, as here directed, is not attended with this inconvenience, but it loads the wine with water; and if made into a ſyrup, or mixed in brandy, it would load the wine with things not wanted, ſince the colour alone is required. Hence the colouring of wines has always its inconveniencies. In thoſe countries which do not produce the tinging grape, which affords a blood-red juice, wherewith the wines of France are often ſtained, in defect of this, the juice of alder-berries is uſed, and ſometimes logwood is uſed at Oporto.

The colour afforded by the method here propoſed, gives wine the tinge of the Bourdeaux red, not the port; whence the foreign coopers are often diſtreſſed for want of a proper colouring for red wines in bad years. This might perhaps be ſupplied by an extract made by boiling ſtick-lack in water. The ſkins of tinging grapes might alſo be uſed, and the matter of the turneſole procured in a ſolid form, not imbibed in rags.

Stahl obſerves, that it is a common accident, and a diſeaſe in wines, to be kept too hot; which is not eaſy to cure when it has been of any long continuance, otherwiſe it may be cured by introducing a ſmall artificial fermentation, that new ranges the parts of the wine, or rather recovers their former texture: but the actual expoſing of wine to the fire, or the ſun, preſently diſpoſes it to turn eager; and the making it boiling hot, is one of the quickeſt ways of expediting the proceſs of making of vinegar.

On the other hand, wine kept in a cool vault, and well ſecured from the external air, will preſerve its texture entire in all the conſtituent parts, and ſufficiently ſtrong for many years, as appears not only from old wines, but other foreign fermented liquors, particularly thoſe of China, prepared from a decoction of rice; which being well cloſed down in a veſſel, and buried deep under ground, will continue for a long ſeries of years rich, generous, and good, as the hiſtories of that country univerſally agree in aſſuring us.

The moſt general remedy hitherto known for all the diſeaſes of wines, is a prudent uſe of tartarized ſpirit of wine, which not only enriches, but diſpoſes all ordinary wines to grow fine.

If either by fraud or accident a larger portion of water is mixed with wine than is proper for its conſiſtence, and no way neceſſary or eſſential, this ſuperfluous water does not only deprave the taſte, and ſpoil the excellence of the wine, but alſo renders it leſs durable; for humidity in general, and much more a ſuperfluous aqueous humidity, is the primary and reſtleſs inſtrument of all the changes that are brought on by fermentation. It may doubtleſs therefore be uſeful, and ſometimes abſolutely neceſſary, to take away this ſuperfluous water from the other part which ſtrictly and properly conſtitutes the wine. This has been agreed upon all hands as a thing proper, but the manner of doing it has not been well agreed on: ſome have propoſed the effecting it by means of heat and evaporation, others by percolation, and others by various other methods, all found unſucceſsful when brought to the trial; but the way propoſed by Dr Shaw from Stahl, is the moſt certain and commodious; this is done by a concentration of the wine, not by means of heat, but of cold.

If any kind of wine, but particularly ſuch as has never been adulterated, be in a ſufficient quantity, as that of a gallon or more, expoſed to a ſufficient degree of cold in froſty weather, or be put into any place where ice continues all the year, as in our ice-houſes, and there ſuffered to freeze, the ſuperfluous water that was originally contained in the wine will be frozen into ice, and will leave the proper and truly eſſential part of the wine unfrozen, unleſs the degree of cold ſhould be very intenſe, or the wine but weak and poor. This is the principle on which Stahl founds his whole ſyſtem of condenſing wines by cold. When the froſt is moderate, the experiment has no difficulty, becauſe not above a third or a fourth part of the ſuperfluous water will be froze in a whole night; but if the cold be very intenſe, the beſt way is, at the end of a few hours when a tolerable quantity of ice is formed, to pour out the remaining fluid liquor, and ſet it in another veſſel to freeze again by itſelf. If the veſſel, that thus by degrees receives the ſeveral parcels of the condenſed wine, be ſuffered to ſtand in the cold freezing place where the operation is performed, the quantity lying thin in the pouring out, or otherwiſe, will be very apt to freeze anew; and if it be ſet in a warm place, ſome of this aqueous part thaws again, and ſo weakens the reſt. The condenſed wine therefore ſhould be emptied in ſome place of a moderate degree as to cold or heat, where neither the ice may diſſolve, nor the vinous ſubſtance mixed among it be congealed. But the beſt expedient of all is to perform the operation with a large quantity of wine, or that of ſeveral gallons, where the utmoſt exactneſs, or the danger of a trifling waſte, need not be regarded.

By this method, when properly performed, there firſt freezes about one third part of the whole liquor; and this is properly the more purely aqueous part of it, inſomuch that when all the vinous fluid is poured off to be again expoſed to a concentration, the ice remaining behind from this firſt freezing being ſet to thaw in a warm place, diſſolves into a pure and taſteleſs water. The frozen part, or ice, conſiſts only of the watery part of the wine, and may be thrown away, and the liquid part retains all the ſtrength, and is to be preſerved. This will never grow ſour, muſty, or mouldy afterwards, and may at any time be reduced to wine of the common kind again, by adding to it as much water as will make it up to the quantity that it was before.

Wines in general may by this method be reduced to any degree of vinoſity or perfection.

The benefit and advantage of this method of congelation, if reduced to practice in the large way in the wine countries, muſt be evident to every body. Concentrated wines in this manner might be ſent into foreign countries inſtead of wine and water, which is what is uſually now ſent, the wines they export being loaded, and in danger of being ſpoiled by three or four times their own quantity of unneceſſary, ſuperfluous, and prejudicial water.

An eaſy method of recovering pricked wines may be learned from the following experiment: Take a bottle of red port that is pricked, add to it half an ounce of tartarized ſpirit of wine, ſhake the liquor well together, and ſet it by for a few days, and it will be found very remarkably altered for the better.

This experiment depends upon the uſeful doctrine of acids and alkalies. All perfect wines have naturally ſome acidity, and when this acidity prevails too much, the wine is ſaid to be pricked, which is truly a ſtate of the wine tending to vinegar: but the introduction of a fine alkaline ſalt, ſuch as that of tartar, imbibed by ſpirit of wine, has a direct power of taking off the acidity, and the ſpirit of wine alſo contributes to this, as a great preſervative in general of wines. If this operation be dexterouſly performed, pricked wines may be abſolutely recovered by it, and remain ſaleable for ſome time; and the ſame method may be uſed to malt liquors juſt turned ſour.

The age of wine is properly reckoned by leaves; thus they ſay wine of two, four, or ſix leaves, to ſignify wine of two, four, or ſix years old; taking each new leaf put forth by the vine ſince the wine was made for a year.

WINE is alſo a denomination applied in medicine and pharmacy to divers mixtures and compoſitions, wherein the juice of the grape is a principal ingredient. See the article VINUM.

With regard to the medical uſes of wines, it is obſerved, that among the great variety of wines in common uſe among us, five are employed in the ſhops as menſtrua for medicinal ſimples; that is, the *vinum album hiſpanicum*, or Mountain wine; the *vinum album gallicum*, or French white wine; the Canary wine, or ſack, the Rheniſh wine, and the red port. The effects of theſe liquors on the human body are, to chear the ſpirits, warm the habit, promote perſpiration, render the veſſels full and turgid, raiſe the pulſe, and quicken the circulation. The effects of the full bodied wines are much more durable than thoſe of the thinner: all ſweet wines, as Canary, abound with a glutinous, nutritious ſubſtance, whilſt the others are not nutrimental, or only accidentally ſo, by ſtrengthening the organs employed in digeſtion. Sweet wines, in general, do not paſs off freely by urine; and they heat the conſtitution more than an equal quantity of any other, though containing full as much ſpirit: red port, and moſt of the red wines, have an aſtringent quality, by which they ſtrengthen the tone of the ſtomach, and thus prove ſerviceable for reſtraining immoderate ſecretions; thoſe which are of an acid nature, as Rheniſh, paſs freely by the kidneys, and gently looſen the belly. It is ſuppoſed that theſe laſt exaſperate and occaſion gouty calculous diſorders, and that new wines of every kind have this effect.

WINE-*Spirit*, a term uſed by our diſtillers, and which may ſeem to mean the ſame thing with the phraſe of ſpirit of wine: but they are taken in very different ſenſes in the trade.

Spirit of Wine is the name given to the common malt ſpirit when reduced to an alcohol or totally inflammable ſtate; but the phraſe *wine-ſpirit* is uſed to expreſs a very clean and fine ſpirit, of the ordinary proof ſtrength, and made in England from wines of foreign growth.

The way of producing it is by ſimple diſtillation, and it is never rectified any higher than common bubble proof. The ſeveral wines of different natures yield very different proportions of ſpirit; but, in general, the ſtrongeſt yield one fourth, the weakeſt in ſpirits one eighth, part of proof ſpirit; that is, they contain from a ſixteenth to an eighth part of their quantity of pure alcohol.

Wines that are a little ſour ſerve not at all the worſe for the purpoſes of the diſtiller; they rather give a greater vinoſity to the produce. This vinoſity is a thing of great uſe in the wine-ſpirit, whoſe principal uſe is to mix with another that is tartarized, or with a malt-ſpirit, rendered alkaline by the method of rectification. All the wine-ſpirits made in England, even thoſe from the French wines, appear very greatly different from the common French brandy; and this has given our diſtillers a notion that there is ſome ſecret art practiſed in France, for the giving the agreeable flavour to that ſpirit: but this is without foundation.

WING, that part of a bird, inſect, &c. whereby it is enabled to fly. See Bird and Ornithology.

Wings, in military affairs, are the two flanks or extremes of an army, ranged in form of a battle; being the right and left ſides thereof.

WINTER, one of the four ſeaſons or quarters of the year. See Season, &c.

Winter commences on the day when the ſun's diſtance from the zenith of the place is greateſt, and ends on the day when its diſtance is at a mean between the greateſt and leaſt.

Under the equator, the winter as well as other ſeaſons return twice every year; but all other places have only one winter in the year; which in the northern hemiſphere begins when the ſun is in the tropic of Capricorn, and in the ſouthern hemiſphere when in the tropic of Cancer; ſo that all places in the ſame hemiſphere have their winter at the ſame time.

WIRE, a piece of metal drawn through the hole of an iron into a thread of a fineneſs anſwerable to the hole it paſſed through.

Wires are frequently drawn ſo fine as to be wrought along with other threads of ſilk, wool, flax, &c.

The metals moſt commonly drawn into wire, are gold, ſilver, copper, and iron. Gold-wire is made of cylindrical ingots of ſilver, covered over with a ſkin of gold, and thus drawn ſucceſſively through a vaſt number of holes, each ſmaller and ſmaller, till at laſt it is brought to a fineneſs exceeding that of a hair. That admirable ductility which makes one of the diſtinguiſhing characters of gold, is no where more conſpicuous than in this gilt wire. A cylinder of 48 ounces of ſilver, covered with a coat of gold, only weighing one ounce, as Dr Halley informs us, is uſually drawn into a wire, two yards of which weigh no more than one grain; whence 98 yards of the wire weigh no more than 49 grains, and one ſingle grain of gold covers the 98 yards; ſo that the ten thouſandth part of a grain is above one-eighth of an inch long.

Wire *of Lapland*. The inhabitants of Lapland have a ſort of ſhining ſlender ſubſtance in uſe among them on ſeveral occaſions, which is much of the thickneſs and appearance of our ſilver-wire, and is therefore called, by thoſe who do not examine its ſtructure or ſubſtance, *Lapland wire*. It is made of the ſinews of the rein-deer; which being carefully ſeparated in the eating, are, by the women, after ſoaking in water and beating, ſpun into a ſort of thread, of admirable fineneſs and ſtrength, when wrought to the ſmalleſt filaments; but when larger, is very ſtrong, and fit for the purpoſes of ſtrength and force. Their wire, as it is called, is made of the fineſt of theſe threads, covered with tin. The women do this buſineſs; and the way they take is to melt a piece of tin, and placing at the edge of it a horn, with a hole through it, they draw theſe ſinewy threads, covered with the tin, through the hole, which prevents their coming out too thick covered. This drawing is performed with their teeth; and there is a ſmall piece of bone placed at the top of the hole, where the wire is made flat; ſo that we always find it rounded on all ſides but one, where it is flat. This wire they uſe in embroidering their cloaths as we do gold and ſilver; they often ſell it to ſtrangers, under the notion of its having certain magical virtues.

WISDOM, uſually denotes a higher and more refined notion of things immediately preſented to the mind, as it were, by intuition, without the aſſiſtance of ratiocination.

Sometimes the word is more immediately uſed, in a moral ſenſe, for what we call *prudence*, or *diſcretion*, which conſiſts in the ſoundneſs of the judgment, and a conduct anſwerable thereto.

WIT is a quality of certain thoughts and expreſſions: the term is never applied to an action nor to a paſſion, and as little to an external object.

However difficult it may be, in every particular inſtance, to diſtinguiſh a witty thought or expreſſion from one that is not ſo; yet in general it may be laid down, that the term *wit* is appropriated to ſuch thoughts and expreſſions as are ludicrous, and alſo occaſion ſome degree of ſurpriſe by their ſingularity. Wit alſo, in a figurative ſenſe, expreſſes that talent which ſome men have of inventing ludicrous thoughts or expreſſions: we ſay commonly, *a witty man*, or *a man of wit*.

Wit, in its proper ſenſe, as explained above, is diſtinguiſhable into two kinds; wit in the thought, and wit in the words or expreſſion. Again, wit in the thought is of two kinds; ludicrous images, and ludicrous combinations of things that have little or no natural relation.

Ludicrous images that occaſion ſurpriſe by their ſingularity, as having little or no foundation in nature, are fabricated by the imagination: and the imagination is well qualified for the office; being of all our faculties the moſt active, and the leaſt under reſtraint. Take the following example.

> *Shylock*. You knew (none ſo well, none ſo well as you) of my daughter's flight.
>
> *Salino*. That's certain. I, for my part, knew the taylor that made the wings ſhe flew withal.
>
> *Merchant of Venice, act* 3. *ſc.* 1.

The image here is undoubtedly witty. It is ludicrous: and it muſt occaſion ſurpriſe; for having no natural foundation, it is altogether unexpected.

The other branch of wit in the thought, is that only which is taken notice of by Addiſon, following Locke, who defines it "to lie in the aſſemblage of ideas; and putting thoſe together, with quickneſs and variety, wherein can be found any reſemblance or congruity, thereby to make up pleaſant pictures and agreeable viſions in the fancy." It may be defined more curtly, and perhaps more accurately, a junction of things by diſtant and fanciful relations, which ſurpriſe becauſe they are unexpected." The following is a proper example:

> We grant although he had much wit,
> H' was very ſhy of uſing it,
> As being loth to wear it out;
> And therefore bore it not about,
> Unleſs on holidays, or ſo,
> As men their beſt apparel do.
>
> *Hudibras, canto* 1.

Wit is of all the moſt elegant recreation: the image enters the mind with gaiety, and gives a ſudden flaſh which is extremely pleaſant. Wit thereby gently elevates without ſtraining, raiſes mirth without diſſoluteneſs, and relaxes while it entertains.

Wit, in the expreſſion, commonly called *a play of words*, being a baſtard ſort of wit, is reſerved for the laſt place. We proceed to examples of wit in the thought; and firſt of ludicrous images.

Falſtaff, ſpeaking of his taking Sir John Colevile of the Dale:

> Here he is, and here I yield him; and I beſeech your grace, let it be book'd with the reſt of this day's deeds; or, by the Lord, I will have it in a particular ballad elſe, with mine own picture on the top of it, Colevile kiſſing my foot: to the which courſe if I be enforced, if you do not all ſhew like gilt twopences to me; and I, in the clear ſky of fame, o'erſhine you as much as the full moon doth the cinders of the element, which ſhew like pins' heads to her: believe not the word of the noble. Therefore let me have right, and let deſert mount.
>
> *Second Part, Henry* IV. *act* 4. *ſc.* 6.

> I knew, when ſeven juſtices could not take up a quarrel, but when the parties were met themſelves, one of them thought but of an *if;* as, if you had ſaid ſo, then I ſaid ſo; and they ſhook hands, and ſwore brothers. Your *if* is the only peace-maker; much virtue is in *if.* *Shakeſpear.*

> For there is not through all nature another ſo callous and inſenſible a member as the world's poſteriors, whether you apply to it the toe or the birch. *Preface to a Tale of a Tub.*

The other branch of wit in the thought, viz. ludicrous combinations and oppoſitions, may be traced through various ramifications. And, firſt, fanciful cauſes aſſigned that have no natural relation to the effects produced.

> *Lancaſter.* Fare you well, Falſtaff; I, in my condition, ſhall better ſpeak of you than you deſerve. [*Exit.*
>
> *Falſtaff.* I would you had but the wit; 'twere better than your dukedom. Good faith, this ſame young ſober-blooded boy doth not love me; nor a man cannot make him laugh: but that's no marvel, he drinks no wine. There's never any of theſe demure boys come to any proof; for thin drink doth ſo overcool their blood, and making many fiſh-meals, that they fall into a kind of male green-ſickneſs; and then, when they marry, they get wenches. They are generally fools and cowards; which ſome of us ſhould be too, but for inflammation. A good ſherris-ſack hath a twofold operation in it: it aſcends me into the brain; dries me there all the fooliſh, dull, and crudy vapours which environ it; make it apprehenſive, quick, forgetive, full of nimble, fiery, and delectable ſhapes; which delivered o'er to the voice, the tongue, which is the birth, becomes excellent wit. The ſecond property of your excellent ſherris is, the warming of the blood; which before cold and ſettled, left the liver white and pale; which is the badge of puſillanimity and cowardice: but the ſherris warms it, and makes it courſe from the inwards to the parts extreme; it illuminateth the face, which, as a beacon, gives warning to all the reſt of this little kingdom, man, to arm; and then the vital commoners and inland petty ſpirits muſter me all to their captain, the heart; who, great and puffed up with his retinue, doth any deed of courage: and thus valour comes of ſherris. So that ſkill in the weapon is nothing without ſack, for that ſets it a-work; and learning a mere hoard of gold kept by a devil, till ſack commences it, and ſets it in act and uſe. Hereof comes it that Prince Harry is valiant; for the cold blood he did naturally inherit of his father, he hath, like lean, ſteril, and bare land, manured, huſbanded, and till'd with excellent endeavour of drinking good and good ſtore of fertile ſherrris, that he is become very hot and valiant. If I had a thouſand ſons, the firſt human principle I would teach them, ſhould be to forſwear thin potations, and to addict themſelves to ſack.
>
> *Second Part of Henry* IV. *act* 4. *ſc.* 7.

> The trenchant blade, toledo truſty,
> For want of fighting was grown ruſty,
> And ate into itſelf, for lack
> Of ſome body to hew and hack.
> The peaceful ſcabbard where it dwelt
> The rancor of its edge had felt:
> For of the lower end two handful
> It had devoured, t'was ſo manful;
> And ſo much ſcorn'd to lurk in caſe,
> As if it durſt not ſhew its face.
>
> *Hudibras, canto* 1.

To account for effects by ſuch fantaſtical cauſes, being highly ludicrous, is quite improper in any ſerious compoſition. Therefore the following paſſage from Cowley, in his poem on the death of Sir Henry Wooton, is in a bad taſte.

> He did the utmoſt bounds of knowledge find,
> He found them not ſo large as was his mind.
> But, like the brave Pellæan youth, did moan,
> Becauſe that art had no more worlds than one.
> And when he ſaw that he through all had paſt,
> He dy'd, leſt he ſhould idle grow at laſt.

Fanciful reaſoning:

> *Falſtaff.* Imbowell'd!—if thou imbowel me today, I'll give you leave to powder me, and eat me to-morrow! S'blood, 'twas time to counterfeit, or that hot termagant Scot had paid me ſcot and lot too. Counterfeit? I lie, I am no counterfeit: to die is to be a counterfeit; for he is but the counterfeit of a man, who hath not the life of a man; but to counterfeit dying, when a man thereby liveth, is to be no counterfeit, but the true and perfect image of life indeed.
>
> *Firſt Part Henry* IV. *act* 1. *ſc.* 10.

> *Clown.* And the more pity that great folk ſhould have countenance in this world to drown or hang themſelves, more than their even Chriſtians.
>
> *Hamlet, act* 5. *ſc.* 2.

> *Pedro.* Will you have me, Lady?
>
> *Beatrice.* No, my Lord, unleſs I might have another for working days. Your Grace is too coſtly to wear every day.
>
> *Much ado about Nothing, act* 2. *ſc.* 5.

> *Jeſſica.* I ſhall be ſaved by my huſband; he hath made me a Chriſtian.
>
> *Launcelot.* Truly the more to blame he; we were Chriſtians enough before, e'en as many as could well live by one another: this making of Chriſtians will raiſe the price of hogs; if we grow all

all to be pork-eaters, we ſhall not have a raſher on the coals for money.

Merchant of Venice, act 3. *ſc.* 6.

But Hudibras gave him a twitch,
As quick as lightning, in the breech,
Juſt in the place where honour's lodg'd,
As wiſe philoſophers have judg'd;
Becauſe a kick in that part, more
Hurts honour, than deep wounds before.

Hudibras, canto 3.

Ludicrous junction of ſmall things with great, as of equal importance:

This day black omens threat the brighteſt fair
That e'er deſerv'd a watchful ſpirit's care:
Some dire diſaſter, or by force or flight:
But what, or where, the fates have wrapt in night:
Whether the nymph ſhall break Diana's law;
Or ſome frail china jar receive a flaw:
Or ſtain her honour, or her new brocade;
Forget her pray'rs, or miſs a maſquerade;
Or loſe her heart, or necklace, at a ball;
Or whether Heav'n has doom'd that Shock muſt fall.

Rape of the Lock, canto ii. 101.

One ſpeaks the glory of the Britiſh Queen,
And one deſcribes a charming Indian ſcreen.

Ibid. canto iii. 13.

Then flaſh'd the living lightning from her eyes,
And ſcreams of horror rend th' affrighted ſkies.
Not louder ſhrieks to pitying heav'n are caſt,
When huſbands, or when lap-dogs, breathe their laſt;
Or when rich china veſſels, fall'n from high,
In glittering duſt and painted fragments lie!

Ibid. canto iii. 155.

Not youthful kings in battle ſeiz'd alive,
Not ſcornful virgins who their charms ſurvive,
Not ardent lovers robb'd of all their bliſs,
Not ancient ladies when refus'd a kiſs,
Nor tyrants fierce that unrepenting die,
Nor Cynthia when her manteau's pinn'd awry,
E'er felt ſuch rage, reſentment, and deſpair,
As thou, ſad virgin! for thy raviſh'd hair.

Ibid. canto iv. 3.

Joining things that in appearance are oppoſite. As for example, where Sir Roger de Coverley, in the Spectator, ſpeaking of his widow,

That he would have given her a coal-pit to have kept her in clean linen; and that her finger ſhould have ſparkled with one hundred of his richeſt acres.

Premiſſes that promiſe much and perform nothing. Cicero upon this article ſays,

Sed ſcitis eſſe notiſſimum ridiculi genus, cum aliud expectamus, aliud dicitur: hic nobiſmetipſis noſter error riſum movet. *De oratore, l.* 2. *c.* 63.

Beatrice.——With a good leg and a good foot, uncle, and money enough in his purſe, ſuch a man would win any woman in the world, if he could get her good will.

Much ado about Nothing, act. 2. *ſc.* 1.

Beatrice. I have a good eye, uncle, I can ſee a church by day-light.

Having diſcuſſed wit in the thought, we proceed to what is verbal only, commonly called *a play of words.* This ſort of wit depends, for the moſt part, upon chooſing a word that hath different ſignifications: by this artifice, hocus-pocus tricks are played in language; and thoughts plain and ſimple take on a very different appearance. Play is neceſſary for man, in order to refreſh him after labour; and accordingly man loves play: he even reliſhes a play of words: and it is happy for us, that words can be employed, not only for uſeful purpoſes, but alſo for our amuſement. This amuſement accordingly, though humble and low, is reliſhed by ſome at all times, and by all at ſome times, in order to unbend the mind.

It is remarkable, that this low ſpecies of wit has, at one time or other, made a figure in moſt civilized nations, and has gradually gone into diſrepute. So ſoon as a language is formed into a ſyſtem, and the meaning of words is aſcertained with tolerable accuracy, opportunity is afforded for expreſſions, which, by the double meaning of ſome words, give a familiar thought the appearance of being new; and the penetration of the reader or hearer is gratified, in detecting the true ſenſe diſguiſed under the double meaning.—That this ſort of wit was in England deemed a reputable amuſement, during the reigns of Elizabeth and James I. is vouched by the works of Shakeſpear, and even by the writings of grave divines. But it cannot have any long endurance: for as language ripens, and the meaning of words is more and more aſcertained, words held to be ſynonymous diminiſh daily; and when thoſe that remain have been more than once employed, the pleaſure baniſheth with the novelty.

We proceed to examples, which, as in the former caſe, ſhall be diſtributed into different claſſes.

A ſeeming reſemblance from the double meaning of a word:

Beneath this ſtone my wife doth lie;
She's now at reſt, and ſo am I.

A ſeeming contraſt from the ſame cauſe, termed *a verbal antitheſis,* which hath no deſpicable effect in ludicrous ſubjects:

Whilſt Iris his coſmetic waſh would try
To make her bloom revive, and lovers die.
Some aſk for charms, and others philters chuſe,
To gain Corinna, and their quartans loſe.

Diſpenſary, canto 2.

And how frail nymphs, oft, by abortion, aim
To loſe a ſubſtance, to preſerve a name.

Ibid. canto 3.

While nymphs take treats, or aſſignations give.

Rape of the Lock.

Other ſeeming connections from the ſame cauſe:

Will you employ your conqu'ring ſword,
To break a fiddle and your word?

Hudibras, canto 2.

To whom the knight with comely grace
Put off his hat to put his caſe.

Hudibras, part 3. *canto* 3.

Here Britain's ſtateſman oft the fall foredoom
Of foreign tyrants, and of nymphs at home;
Here thou, great Anna! whom three realms obey,
Doſt ſometimes counſel take—and ſometimes tea.

Rape of the Lock, canto 3. *l.* 5.

O'er their quietus where fat judges doſe,
And lull their cough and conſcience to repoſe.

Diſpenſary, canto 1.

Wit.

Speaking of Prince Eugene:

This general is a great taker of ſnuff as well as of towns. *Pope, Key to the Lock.*

Exul mentiſque domuſque.
Metamorphoſes, lib. ix. 409.

A ſeeming oppoſition from the ſame cauſe:

Hic quieſcit qui nunquam quievit.

Again,

So like the chances are of love and war,
That they alone in this diſtinguiſh'd are;
In love the victors from the vanquiſh'd fly,
They fly that wound, and they purſue that die.
Waller.

What new-found witchcraft was in thee,
With thine own cold to kindle me?
Strange art; like him that ſhould deviſe
To make a burning-glaſs of ice. *Cowley.*

Wit of this kind is unſuitable in a ſerious poem; witneſs the following line in Pope's Elegy to the memory of an unfortunate lady:

Cold is that breaſt which warm'd the world before.

This ſort of writing is finely burleſqued by Swift:

Her hands, the ſofteſt ever felt,
Though cold would burn, though dry would melt.
Strephon and Chloe.

Taking a word in a different ſenſe from what is meant, comes under wit, becauſe it occaſions ſome ſlight degree of ſurpriſe:

Beatrice. I may ſit in a corner, and cry *Heigh ho!* for a huſband.

Pedro. Lady Beatrice, I will get you one.

Beatrice. I would rather have one of your father's getting. Hath your Grace ne'er a brother like you? Your father got excellent huſbands, if a maid could come by them.
Much ado about Nothing, act 2. *ſc.* 5.

Falſtaff. My honeſt lads, I will tell you what I am about.

Piſtol. Two yards and more.

Falſtaff. No quips now, Piſtol: indeed I am in the waſte two yards about: but I am now about no waſte; I am about thrift.
Merry Wives of Windſor, act 1. *ſc.* 7.

Lo. Sands.——By your leave, ſweet ladies,
If I chance to talk a little wild, forgive me:
I had it from my father.
Anne Bullen. Was he mad, Sir?
Sands. O, very mad, exceeding mad, in love too?
But he would bite none—— *K. Henry* VIII.

An aſſertion that bears a double meaning, one right, one wrong, but ſo connected with other matters as to direct us to the wrong meaning, is a ſpecies of baſtard wit which is diſtinguiſhed from all others, by the name *pun*. For example,

Paris.——Sweet Helen, I muſt woo you
To help unarm our Hector: his ſtubborn buckles,
With theſe your white enchanting fingers touch'd,
Shall more obey, than to the edge of ſteel,
Or force of Greekiſh ſinews; you ſhall do more
Than all the iſland kings, diſarm great Hector.
Troilus and Creſſida, act 3. *ſc.* 2.

The pun is in the cloſe. The word *diſarm* has a double meaning: it ſignifies to take off a man's armour, and alſo to ſubdue him in fight. We are directed to the latter ſenſe by the context; but with regard to Helen, the word holds only true in the former ſenſe. We go on with other examples:

Eſſe nihil dicis quicquid petis, improbe Cinna:
Si nil, Cinna, petis, nil tibi, Cinna, nego.
Martial, l. 3. *epigr.* 61.

Chief Juſtice. Well! the truth is, Sir John, you live in great infamy.

Falſtaff. He that buckles him in my belt cannot live in leſs.

Chief Juſtice. Your means are very ſlender, and your waſte is great.

Falſtaff. I would it were otherwiſe: I would my means were greater, and my waſte ſlenderer.
Second Part Henry IV. *act* 1. *ſc.* 5.

Celia. I pray you bear with me, I can go no further.

Clown. For my part, I had rather bear with you than bear you: yet I ſhould bear no croſs if I did bear you; for I think you have no money in your purſe. *As you like it, act* 2. *ſc.* 4.

He that impoſes an oath makes it,
Not he that for convenience takes it.
Then how can any man be ſaid
To break an oath he never made?
Hudibras, part 2. *canto* 2.

The ſeventh ſatire of the firſt book of Horace is purpoſely contrived to introduce at the cloſe a moſt execrable pun. Talking of ſome infamous wretch whoſe name was *Rex Rupilius,*

Perſius exclamat, Per magnos, Brute, deos te
Oro, qui reges conſueris tollere, cur non
Hunc regem jugulas? Operum hoc, mihi crede,
tuorum eſt.

Though playing with words is a mark of a mind at eaſe, and diſpoſed to any ſort of amuſement, we muſt not thence conclude that playing with words is always ludicrous. Words are ſo intimately connected with thought, that if the ſubject be really grave, it will not appear ludicrous even in this fantaſtic dreſs. We are, however, far from recommending it in any ſerious performance: on the contrary, the diſcordance between the thought and expreſſion muſt be diſagreeable: witneſs the following ſpecimen:

He hath abandoned his phyſicians, Madam, under whoſe practices he hath perſecuted time with hope; and finds no other advantage in the proceſs, but only the loſing of hope by time.
All's well that ends well, act 1. *ſc.* 1.

K. Henry. O my poor kingdom, ſick with civil broils!
When that my care could not with-hold thy riots,
What wilt thou do when riot is thy care?
Second part Henry IV.

If any one ſhall obſerve, that there is a third ſpecies of wit, different from thoſe mentioned, conſiſting in ſounds merely, we are willing to give it place. And indeed it muſt be admitted, that many of Hudibras's double rhymes come under the definition of wit given in the beginning of this article: they are ludicrous, and their ſingularity occaſions ſome degree of ſurpriſe. Swift is not leſs ſucceſsful than Butler in this ſort of wit; witneſs the following inſtances: *Goddeſs—Boddice. Pliny—Nicolini. Iſcariots—Chariots. Mitre—Nitre. Dragon—Suffragan.*

A repartee may happen to be witty: but it cannot be conſidered as a ſpecies of wit; becauſe there are many repartees extremely ſmart, and withal extremely ſerious. We give the following example: A certain petulant Greek, objecting to Anacharſis that he was a Scythian: "True (ſays Anacharſis) my country diſgraces me, but you diſgrace your country." This fine turn gives ſurpriſe; but it is far from being ludicrous.

WIT (John de), a celebrated penſioner of Holland, and one of the greateſt politicians of his time, was the ſon of Jacob de Wit, burgomaſter of Dort, and was born in 1625. He became well ſkilled in civil law, politics, mathematics, and other ſciences; and wrote a treatiſe on the Elements of Curved Lines, publiſhed by Francis Schooten. Having taken his degree of doctor of law, he travelled into foreign courts, where he became eſteemed for his genius and prudence. At his return to his native county in 1650, he became penſionary of Dort, then counſellor-penſionary of Holland and Weſt-Frieſland, intendant and regiſter of the fiefs, and keeper of the great ſeal. He was thus at the head of affairs in Holland; but his oppoſition to the re-eſtabliſhment of the office of ſtadtholder, which he thought a violation of the freedom and independence of the republic, coſt him his life, when the prince of Orange's party prevailed. He and his brother Cornelius were aſſaſſinated by the populace at the Hague in 1674, aged 47.

WITCHCRAFT, a kind of ſorcery, eſpecially in women. See SORCERY.

WITENA MOT, or WITENA *Gemot*, among the Anglo Saxons, was a term which literally ſignified the aſſembly of the wiſe men; and wasa pplied to the great council of the nation, of latter days called the *parliament*.

WITHERS *of a* HORSE, the juncture of the ſhoulder-bones at the bottom of the neck and mane, towards the upper part of the ſhoulder.

WITNESS, in law, a perſon who gives evidence in any cauſe, and is ſworn to ſpeak the truth, the whole truth, and nothing but the truth.

Trial by WITNESSES, a ſpecies of trial without the intervention of a jury. This is the only method of trial known to the civil law, in which the judge is left to form in his own breaſt his ſentence upon the credit of the witneſſes examined: but it is very rarely uſed in our law, which prefers the trial by jury before it in almoſt every inſtance. Save only that when a widow brings a writ of dower, and the tenant pleads that the huſband is not dead; this being looked upon as a dilatory plea, is in favour of the widow, and for greater expedition allowed to be tried by witneſſes examined before the judges: and ſo, ſaith Finch, ſhall no other caſe in our law. But Sir Edward Coke mentions ſome others: as to try whether the tenant in a real action was duly ſummoned, or the validity of a challenge to a juror: ſo that Finch's obſervation muſt be confined to the trial of direct and not collateral iſſues. And in every caſe Sir Edward Coke lays it down, that the affirmative muſt be proved by two witneſſes at the leaſt.

WITSIUS (Herman), a learned and eminent divine of North Holland, born at Enckhuiſen in 1626. He was profeſſor of divinity ſucceſſively at Franeker, Utrecht, and Leyden; and applied himſelf ſucceſsfully to oriental learning, of which his capital work *Ægyptiaca* affords ſufficient proof. His Oeconomy of the Covenants between God and Man, is warmly recommended by Mr Hervey in his Theron and Aſpaſio. He died in 1708.

WITTENBERG, a city of Germany, capital of the circle of Upper Saxony, 50 miles north of Dreſden. It is under immediate vaſſalage, and the ſeat of an aulic judicatory, a general ſuperintendency, an inſpection and conſiſtory. The town is not large; but is well fortified, and contains a famous univerſity, in which Melancthon was a profeſſor. In this place Martin Luther firſt began to preach againſt the pope's indulgences; and in the cathedral of All Saints he is ſaid to have been buried. In the old citadel of this town the ancient Saxon electors uſed to reſide. Beſides the univerſity, there is a Latin ſchool in the town, with ſix maſters. The library belonging to the univerſity is ſaid to be very valuable. In 1756 the Pruſſians being maſters of the town, deſtroyed a part of its fortifications.

WOAD, in botany. See ISATIS.

Woad not only affords a laſting and ſubſtantial blue, which, according to the ſcale of the dyers, may be reduced into many different ſhades, but is alſo of great uſe in dyeing and fixing many other colours. But notwithſtanding this, and its being a commodity of our own, the uſe of it is very much declined ſince the introduction of indigo; for the purchaſe of which large ſums go annually out of the nation. The reaſon of this is, that indigo affords a more lively and pleaſing colour, is managed with more eaſe by the dyers, and does their buſineſs more expeditiouſly. Yet with all theſe advantages, it is univerſally acknowledged, that the colour which indigo affords is inferior to that of woad in many reſpects, and particularly in permanency: for which reaſon, they are frequently uſed in conjunction; woad to give ſolidity and ſubſtance, and indigo to give brightneſs and colour. But the worſt conſequence that has attended the uſe of indigo, is not barely leſſening the conſumption, but abating the price and depreciating the intrinſic value of woad; ſo that leſs care is taken in the management of it; to which in a great meaſure the inferiority of its colour, at leaſt in ſome places, is at preſent owing. The declenſion in its conſumption is not the caſe here only, but alſo in other countries; for it was once the great ſtaple of Languedoc, and was cultivated alſo in Normandy, and in other provinces of France; as it alſo is in Spain, Portugal, the Azores, and Canary iſlands, Switzerland, in the neighbourhood of Geneva, in different parts of Germany, and in Sweden.

Our own woad was allowed to be ſuperior to any that we imported; and yet before indigo had ſo great an aſcendant, it was thought neceſſary to lay high duties upon foreign woad, for the encouragement of the growing and manufacturing it here; which duties ſtill ſubſiſt. If we conſider, that this is a commodity in which agriculture is as much intereſted as our manufacturers, one cannot well doubt that the preſerving and reſtoring it deſerves great attention here, as well as in other countries in Europe, where the ſupport of it has been very ſeriouſly conſidered, from the bad effects that have attended its decline. An idea has been entertained, that by an alteration in the manner of curing of it, the inconveniences that are ſuppoſed to attend the uſe of it might be removed, and that woad might be brought to anſwer all the purpoſes of indigo; which, if it could be accompliſhed, would be moſt certainly a great advantage, and an advantage which every true lover of his country would wiſh ſhould take place here rather than any where elſe. The author of the Natural Hiſtory of Languedoc ſuggeſts, that woad, if cured in the ſame manner as indigo, might produce as lively a colour; and adds, that from ſome experiments made by himſelf, he is convinced the method would effectually anſwer. The celebrated Mr Du Hamel du Monceau informs us, that having propoſed to Mr Fontenelle, a phyſician in Louviſiana, the cultivating the paſtel there in the manner of indigo, that gentleman acquainted him, that by treating indigo after the manner of paſtel, he had obtained a very beautiful green; but he did not ſay whether it was a ſolid and permanent as well as a lively colour.

WOLAW, a town in Germany, in Sileſia, and capital of a duchy of the ſame name. It is ſurrounded with ſtrong walls and a moraſs, and one part of the houſes are built with ſtone. The caſtle is alſo encompaſſed with deep ditches, and the greateſt part of the inhabitants are employed in a woollen manufactory. In 1709 a Proteſtant church was allowed to be built here. It is ſeated on the river Oder, 20 miles north-weſt of Breſlau, and 32 ſouth-eaſt of Glogau. E. Long. 16. 48. N. Lat. 51. 16.

WOLD, WELD, or *Dyers Weed.* See RESEDA.

WOLF, in zoology. See CANIS.

WOLF-*Fiſh*, or *Sea-Wolf.* See ANARHICAS.

WOLFE (Major-general James), was the ſon of lieutenant-general Edward Wolfe, and born at Weſterham, in Kent, about the year 1726. He ſeemed formed for military greatneſs: his memory was retentive, his judgment deep, his comprehenſion quick and clear, his courage was uniform; and he had a ſtrength, ſteadineſs, and activity of mind, which no difficulties could obſtruct, nor dangers deter. He betook himſelf, when very young, to the profeſſion of arms, and was at the battle of Lafeldt when ſcarce 20 years of age; on which occaſion he behaved ſo as to obtain the higheſt encomiums from the great officer at the head of the army. During the whole war he was preſent in every engagement, and never paſſed undiſtinguiſhed; and even after the peace cultivated the arts of war, and introduced the utmoſt regularity and exactneſs of diſcipline into his corps. So that as long as the ſix Britiſh battalions on the plains of Minden are recorded in the annals of Europe, ſo long will Kingſley's, of which he was lieutenant-colonel, ſtand among the foremoſt of that day. He was afterwards at the attack of Rochefort, and at the taking of Louiſburg, from whence he was ſcarcely returned when he was appointed to command the important expedition againſt Quebec; where, in ſpite of many unforeſeen difficulties from the nature of the ſituation, the great ſuperiority of numbers, the ſtrength of the place, and his own bad ſtate of health, he at laſt formed and executed that great, that neceſſary plan, which drew out the French to their defeat, and muſt give him the title of *Conqueror of Canada.* But when the victory was almoſt obtained, he received a ball through his wriſt; which immediately wrapping up with his handkerchief, he went on with his uſual alacrity, animating his troops by precept and example: but in a few minutes after, a ſecond ball through his body obliged him to be carried off to a ſmall diſtance in the rear; where, rouſed from fainting by the cry of "They run! They run!" He eagerly aſked who ran? and being told the French, and that they were defeated, he ſaid, "Then I thank God, I die contented;" and almoſt inſtantly expired. Thus died the brave general Wolfe in 1759. His body was brought to Portſmouth, and from thence carried with great funeral pomp to Greenwich, where it was depoſited in the burying-place belonging to the family.

WOLFF (Chriſtian), baron of the Roman empire, privy counſellor to the king of Pruſſia, and chancellor of the univerſity of Halle in Saxony, was born at Breſlau in 1679. After ſtudying philoſophy and mathematics at Breſlau and Jena, he obtained permiſſion to give lectures at Leipſic; which in 1703, he opened with a diſſertation called *Philoſophia practica univerſalis, methodo mathematica conſcripta:* which ſerved greatly to enhance the reputation of his talents. He publiſhed two other diſſertations the ſame year; the firſt *De rotis dentatis*, the other *De algorithmo infiniteſimali differentiali.* He now obtained the profeſſorſhip of mathematics at Halle, and was admitted into the ſociety at Leipſic, at that time engaged in publiſhing the *Acta Eruditorum.* The king of Pruſſia, in 1721, made him counſellor to the court with conſiderable appointments, and he was choſen a member of the Royal Society of London. Wolff, however, in the midſt of all this proſperity, raiſed an eccleſiaſtical ſtorm directed againſt his own head, by a Latin oration he delivered in praiſe of the Chineſe philoſophy: every pulpit immediately reſounded againſt his tenets, and the faculty of theology, who entered into a ſtrict examination of his productions, reſolving that the doctrine he taught was dangerous to the laſt degree, an order was obtained in 1723 for diſplacing him, and commanding him to leave Halle in 24 hours. Wolff now retired to Caſſel, where he obtained the profeſſorſhip of mathematics and philoſophy in the univerſity of Marbourg, with the title of *counſellor to the landgrave of Heſſe;* and it was in this retreat he publiſhed the chief parts of his extenſive works. The king of Pruſſia however recovering at length from the prejudices he had been made to conceive againſt Wolff, wanted to re-eſtabliſh him at Halle; which Wolff for a time choſe to decline, but at laſt ſubmitted: he returned therefore in 1741, inveſted with the characters of privy counſellor, vice chancellor, and profeſſor of the law of nature and of nations. After the death of Ludwig, the king raiſed him to the dignity of chancellor of the univerſity; and the elector of Bavaria created him a baron of the empire of his own free accord. He died at Halle in 1754, after leading a life filled up with a train of actions as wiſe and ſyſtematical as his writings; and of theſe he publiſhed a great number.

WOLFEMBUTTLE, a conſiderable town of Germany, in the circle of Lower Saxony, and duchy of Brunſwick, with a caſtle where the duke of Brunſwick

Wolfembuttle reſides. It is one of the ſtrongeſt places in Germany, though the fortifications want repairing in ſeveral places. There is an excellent library, kept in a building lately erected for that purpoſe, conſiſting of 116,000 printed books, and 2000 uncommon books, with a cabinet of curioſities, relating to natural hiſtory. It is ſeated on the river Ocker, five miles ſouth of Brunſwick, and 30 weſt of Halberſtadt. E. Long. 10. 40. N. Lat. 22. 15.

WOLFSPERG, a town of Germany, in Lower Carinthia, with a caſtle, on which the diſtrict about it depends, which is 20 miles in length, and 10 in breadth. It is ſeated on the river Lavand, at the foot of a mountain covered with wood, and full of wolves, from whence the town took its name. It is 36 miles eaſt of Clagenfurt. E. Long. 15. 20. N. Lat. 47. 6.

WOLGA, a river of Ruſſia, and thought to be the greateſt in Europe. It riſes in a ſmall lake of the ſame name, in the duchy of Reſchow, near the confines of Lithuania, and running north-eaſt to the confines of the duchy of Muſcovy, runs directly north till it reaches that of Bielegezoto; and from thence runs eaſt-by-ſouth to Caſan; whence it proceeds directly ſouth, forming ſeveral large iſlands, till it comes to Aſtracan; and below it falls into the Caſpian Sea. In its courſe it paſſes by Twer Jeriſlaw, where it is a mile and a half in breadth. From thence it runs on to Niſi-Novogorod, where it is three miles in breadth; thence it paſſes to Caſan, Samara, Saratof, Tzaritza, Tzenowar, and Aſtracan, as before. It runs a courſe of above 2000 miles, and is deep enough the greateſt part of the way to carry large ſhips. At the mouth of this river near Aſtracan, are prodigious large ſturgeons; and it is confidently affirmed, that one of their roes will weigh 300 pounds. Of theſe they make caviar, ſo well known in moſt parts of Europe.

WOLGAST, a pretty conſiderable town of Germany, in the circle of Upper Saxony, and in Pomerania, capital of a territory of the ſame name, with a caſtle, and one of the beſt and largeſt harbours on the Baltic Sea. It is a well-built place, ſubject to Sweden, and ſeated on the river Pfin. E. Long. 14. 10. N. Lat. 54. 8.

WOLLASTON (William), deſcended of an ancient family in Staffordſhire, was born in 1659. He was in 1674 admitted a penſioner in Sidney college, Cambridge, where, notwithſtanding ſeveral diſadvantages, he acquired a great degree of reputation. In 1682, ſeeing no proſpect of preferment, he became aſſiſtant to the head maſter of Birmingham ſchool. Some time after, he got a ſmall lecture about two miles diſtant, but did the duty the whole Sunday; which, together with the buſineſs of a great free-ſchool for about four years, began to break his conſtitution. During this ſpace he likewiſe underwent a great deal of trouble and uneaſineſs, in order to extricate two of his brothers from ſome inconveniences, to which their own imprudence had ſubjected them. In 1688 affairs took a new turn. He found himſelf by a couſin's will intitled to a very ample eſtate; and came to London that ſame year, where he ſettled; chooſing a private, retired, and ſtudious life. Not long before his death, he publiſhed his treatiſe, intitled *The Religion of Nature Delineated;* a work for which ſo great a demand was made, that more than 10,000 were ſold in a very few years. He had ſcarcely completed the publication of it, when he unfortunately broke an arm; and this adding ſtrength to diſtempers that had been growing upon him for ſome time, accelerated his death: which happened upon the 29th of October 1724. He was a tender, humane, and in all reſpects worthy man; but is repreſented to have had ſomething of the iraſcible in his conſtitution and temperament. His Religion of Nature Delineated expoſed him to ſome cenſure, as if he had put a ſlight upon Chriſtianity by laying ſo much ſtreſs, as he does in this work, upon the obligations of truth, reaſon, and virtue; and by making no mention of revealed religion. But the cenſure, upon ſuch ground, ſeems unjuſt; ſince it was not eſſential to the plan of the work to meddle with revealed religion.

WOLSEY (Thomas), a famous cardinal and archbiſhop of York, is ſaid to have been the ſon of a butcher at Ipſwich. He ſtudied at Magdalen college, Oxford, where he became acquainted with the learned Eraſmus; and in the year 1500 became rector of Lymington, in Somerſetſhire: he was afterwards made chaplain to king Henry VIII. and obtained ſeveral preferments. Having gradually acquired an entire aſcendency over the mind of Henry VIII. he ſucceſſively obtained ſeveral biſhoprics, and at length was made archbiſhop of York, lord high-chancellor of England, and prime miniſter; and was for ſeveral years the arbiter of Europe. Pope Leo X. created him cardinal in 1515, and made him legate à latere; and the emperor Charles V. and the French king Francis I. loaded him with favours, in order to gain him over to their intereſt: but after having firſt ſided with the emperor, he deſerted him to eſpouſe the intereſt of France. As his revenues were immenſe, his pride and oſtentation were carried to the greateſt height. He had 500 ſervants; among whom were 9 or 10 lords, 15 knights, and 40 eſquires. His ambition to be pope, his pride, his exactions, and his political delay of Henry's divorce, occaſioned his diſgrace. He was the patron of learned men; a judge and munificent encourager of the polite arts. Many remains of his magnificent ideas in architecture ſtill exiſt. He died in 1530.

WOLVERENE, in zoology. See URSUS.

WOLVES-TEETH, of a horſe. See FARRIERY, § xxxiv.

WOMAN, the female of the human ſpecies. See HOMO.

WOMB, or UTERUS. See ANATOMY, n° 372, g.

WOOD (Anthony), an eminent biographer and antiquarian, was the ſon of Thomas Wood, bachelor of arts and of the civil law, and was born at Oxford in 1632. He ſtudied at Merton college, and in 1655 took the degree of maſter of arts. He wrote, 1. The Hiſtory and Antiquities of the Univerſity of Oxford; which was afterwards tranſlated into Latin by Mr Waſe and Mr Peers, under the title of *Hiſtoria & Antiquitates Univerſitatis Oxonienſis*, 2 vols folio. 2. *Athenæ Oxonienſis;* or an exact Account of all the Writers and Biſhops who have had their Education in the Univerſity of Oxford, from the Year 1500 to 1600, 2 vols folio; which was greatly enlarged in a ſecond edition publiſhed in 1721 by biſhop Tanner. Upon the firſt publication of this work the author was attacked by the univerſity, in defence of Edward earl of Clarendon, lord high-chancellor of England, and chancellor of the univerſity, and was likewiſe animadverted upon by biſhop Burnet; upon which he publiſhed a Vindication of the Hiſtoriographer of the Univerſity of Oxford. He died at Oxford of a retention of urine in 1695.

WOOD, a ſolid ſubſtance, whereof the trunks and branches of trees conſiſt. The wood is all that part of a tree included between the bark and the pith. For the ſtructure of the pith, bark, and wood of plants, ſee the article PLANT.

Compoſition for preſerving WOOD. See CHEMISTRY, n° 112, 149.

Staining or Dyeing of WOOD *for inlaying*, &c. Red, is done by boiling the wood in water and alum; then taking it out, adding brazil to the liquor, and giving the wood another boil in it. Black, by bruſhing it over with logwood boiled in vinegar, hot; then waſhing it over with a decoction of galls and copperas till it be of the hue required. Any other colour may be given by ſqueezing out the moiſture of horſe-dung through a ſieve, mixing it with diſſolved roch-alum and gum arabic; and to the whole adding green, blue, or any other colour deſigned. After ſtanding two or three days, pear-tree or other wood, cut to the thickneſs of half a crown, is put into the liquor boiling hot, and ſuffered to remain till it be ſufficiently coloured.

WOOD, (*ſylva*), in geography, a multitude of trees extended over a large continued track of land, and propagated without culture. The generality of woods only conſiſt of trees of one kind.

The ancient Saxons had ſuch a veneration for woods, that they made them ſanctuaries.

It is ordained, that none ſhall deſtroy any wood, by turning it into tillage or paſture, &c. where there are two acres or more in quantity, on pain of forfeiting 40s. an acre, by 35 Henry VIII. c. 17. All woods that are felled at 14 years growth, are to be preſerved from deſtruction for eight years; and no cattle put into the ground till five years after the felling thereof, &c. 13 Eliz. c. 25. The burning of woods, or underwood, is declared to be felony; alſo thoſe perſons that maliciouſly cut or ſpoil timber-trees, or any fruit-trees, &c. ſhall be ſent to the houſe of correction, there to be kept three months, and whipt once a month.

WOOD-*Cock*, in ornithology. See SCOLOPAX.

WOOD-*Louſe*. See ONISCUS.

WOOD-*Pecker*. See PICUS.

WOODSTOCK, a town of Oxfordſhire, in England, pleaſantly ſeated on a riſing ground, and on a rivulet; a well compacted borough-town, and ſends two members to parliament; but is chiefly noted for Blenheim-houſe, a fine palace, built in memory of the victory obtained by the duke of Marlborough over the French and Bavarians in Auguſt 1704. It was erected at the public expence, and is one of the nobleſt ſeats in Europe. One of the paſſages to it is over a bridge with one arch, 190 feet in diameter, reſembling the Rialto at Venice. The gardens take up 100 acres of ground; and the offices, which are very grand, have room enough to accommodate 300 people. The apartments of the palace are magnificently furniſhed; and the ſtaircaſes, ſtatues, paintings, and tapeſtry, ſurpriſingly fine. The town is about half a mile from the palace, having ſeveral good inns; and a manufacture of ſteel chains for watches, and excellent gloves. It is 8 miles north of Oxford, and 60 weſt-north-weſt of London. W. Long. 1. 17. N. Lat. 51. 50.

WOODWARD (Dr John), was born in 1665, and educated at a country ſchool, where he learned the Latin and Greek languages, and was afterwards ſent to London, where he is ſaid to have been put apprentice to a linen-draper. He was not long in that ſtation, till he became acquainted with Dr Peter Barwick, an eminent phyſician, who took him under his tuition and into his family. Here he proſecuted with great vigour and ſucceſs the ſtudy of philoſophy, anatomy, and phyſic. In 1692, Dr Stillingfleet quitting the place of profeſſor of phyſic in Greſham college, our author was choſen to ſucceed him, and the year following was elected F. R. S. In 1695 he obtained the degre of M. D. by patent from archbiſhop Tenniſon; and the ſame year he publiſhed his Eſſay toward a natural Hiſtory of the Earth. He afterward wrote many other pieces, which have been well received by the learned world. He founded a lecture in the univerſity of Cambridge, to be read there upon his Eſſay, &c. and handſomely endowed it. He died in 1728.

WOOF, among manufacturers, the threads which the weavers ſhoot acroſs with an inſtrument called the *ſhuttle*. See CLOTH.

WOOL, the covering of ſheep. See OVIS.

While the wool remains in the ſtate it was firſt ſhorn off the ſheep's back, and not ſorted into its different kinds, it is called *fleece*.

Each fleece conſiſts of wool of divers qualities and degrees of fineneſs, which the dealers therein take care to ſeparate.

The French and Engliſh uſually ſeparate each fleece into three ſorts, viz. 1. Mother-wool, which is that of the back and neck. 2. The wool of the tails and legs. 3. That of the breaſt and under the belly.

The Spaniards make the like diviſion into three ſorts, which they call *prime*, *ſecond*, and *third*; and for the greater eaſe, denote each bale or pack with a capital letter, denoting the ſort. If the triage or ſeparation be well made, in 15 bales there will be 12 marked R, that is, refine, or prime; two marked F, for fine, or ſecond; and one S, for thirds.

The wools moſt eſteemed are the Engliſh, chiefly thoſe about Leominſter, Cotſwold, and the Iſle of White; the Spaniſh, principally thoſe about Segovia; and the French, about Berry: which laſt are ſaid to have this peculiar property, that they will knot or bind with any other ſort; whereas the reſt will only knot with their own kind.

Among the ancients, the wools of Attica, Megara, Laodicea, Apulia, and eſpecially thoſe of Tarentum, Parma, and Altino, were the moſt valued. Varro aſſures us, the people there uſed to clothe their ſheep with ſkins, to ſecure the wool from being damaged.

WOOLSTON (Thomas), an Engliſh divine, was born at Northampton in 1669, and educated at Cambridge. His firſt appearance in the learned world was in 1705, in a work intitled, The old Apology for the Truth of the Chriſtian Religion againſt the Jews and

Gentiles revived. He afterward wrote many pieces: but what made the moſt noiſe, are his Six Diſcourſes on the Miracles of Chriſt; which occaſioned a great number of books and pamphlets upon the ſubject, and raiſed a proſecution againſt him. At his trial in Guildhall, before the lord chief-juſtice Raymond, he ſpoke ſeveral times himſelf; and urged, that "he thought it very hard that he ſhould be tried by a ſet of men, who, though otherwiſe very learned and worthy perſons, were no more judges of the ſubjects on which he wrote, than himſelf was a judge of the moſt crabbed points of the law." He was ſentenced to a year's impriſonment, and to pay a fine of 100 l. He purchaſed the liberty of the rules of the King's-bench, where he continued after the expiration of the year, being unable to pay the fine. The greateſt obſtruction to his deliverance from confinement was, the obligation of giving ſecurity not to offend by any future writings, he being reſolved to write again as freely as before. He died in 1733.

WOOLWICH, a town in Kent, with a market on Fridays, but no fair. It is ſeated on the river Thames, and of great note for its fine docks and yards, where men of war are built; as alſo for its vaſt magazines of great guns, mortars, bombs, cannon-balls, powder, and other warlike ſtores. It has likewiſe an academy, where the mathematics are taught, and young officers inſtructed in the military art. It is nine miles eaſt of London. E. Long. 0. 10. N. Lat. 51. 30.

WORCESTER, in Latin *Wigornia*, the capital of a county of England of the ſame name, ſtands on the river Severn, but ſo low that it can hardly be ſeen till one is cloſe upon it. It is ſuppoſed to be the Branonium of Antoninus, the Branogenium of Ptolemy, and to have been built by the Romans to awe the Britons on the other ſide of the Severn. It was made an epiſcopal ſee about the year 680 by Sexulphus biſhop of the Mercians; but the preſent cathedral was begun by Wulſton in the year 1084. The town hath been ſeveral times burnt down: firſt, in 1041, by Hardicanute, who alſo maſſacred the citizens; ſecondly, not long after William Rufus's time; and a third time, when king Stephen beſieged and took it. Here, in latter times, was fought that battle, in which Charles II. with his Scots army, was defeated by Cromwell. In a garden, near the ſouth gate of the city, where the action was hotteſt, the bones of the ſlain are often dug up. It had formerly ſtrong walls and a caſtle; but theſe have been demoliſhed long ago. It is now a large city, the ſtreets broad and well paved, and ſome of them very regular and well built, particularly Foregate-ſtreet; ſo that in general it is a very agreeable place. The cathedral is a ſtately edifice, and among other monuments in it are thoſe of king John, of Arthur, elder brother to Henry VIII. and of the counteſs of Saliſbury, who gave occaſion to the inſtitution of the order of the Garter. There are ſeven or eight hoſpitals in and about the city; of which that built and endowed by Robert Berkley of Spetchley, eſq; is a very noble one. There is a ſchool founded by Henry VIII. three other ſchools, and ſix charity ſchools. The Guildhall, and the workhouſe, are ſtately ſtructures. The churches, St Nicholas and All-Saints, have been lately rebuilt, and are very handſome edifices. The city carries on a great trade; for which it is chiefly indebted to its ſituation upon the Severn. A prodigious number of people are employed in and about it in the manufacture of broad-cloth and gloves. The Welch inhabit a part of it, and ſpeak their own language. Its market is well ſupplied with proviſions, corn, and cattle, and its quay is much frequented by ſhips. By a charter from James I. it is governed by a mayor, ſix aldermen, who are juſtices of the peace, and choſen out of 24 capital citizens, a ſheriff, the city being a county of itſelf, a common council, conſiſting of 48 other citizens, out of which two chamberlains are yearly choſen, a recorder, town-clerk, two coroners, a ſword bearer, 13 conſtables, and four ſerjeants at mace. Of the biſhops of this ſee, there have been, it is ſaid, one pope, four ſaints, ſeven lord high-chancellors, 11 archbiſhops, two lord treaſurers, one chancellor to the queen, one lord preſident of Wales, and one vice-preſident. The city at preſent gives title of earl and marquis to the duke of Beaufort.

WORCESTERSHIRE, a county of England, bounded by Warwickſhire on the eaſt, by Gloceſterſhire on the ſouth, by the counties of Hereford and Salop on the weſt, and on the north by Staffordſhire. According to Templeman, it is 36 miles in length, 28 in breadth, and about 130 in circumference, within which it contains 700, and a part of two others, 11 market towns, of which three are boroughs, one city, namely *Worceſter*, 152 pariſhes, about 540,000 acres, and 103,000 inhabitants.

This being an inland county, well cultivated, and free from lakes, marſhes, or ſtagnant waters, the air is very ſweet and wholeſome all over it. The ſoil in general is very rich, producing corn, fruit, eſpecially pears, of which they make a great deal of perry, hops, and paſture. The hills are covered with ſheep, and the meadows with cattle. Hence they have wool, cloth, ſtuffs, butter, and cheeſe in abundance. They are alſo well ſupplied with fuel, either wood or coal, and ſalt from their brine pits and ſalt ſprings. Of the laſt they have not only enough for themſelves, but export large quantities by the Severn; which noble river, to the great convenience and emolument of the inhabitants, runs from north to ſouth through the very middle of the county, enriching the ſoil, and yielding it plenty of fiſh, and an eaſy expeditious conveyance of goods to and from it. The other rivers by which it is watered are the Stour, Avon, Teme, &c. It ſends nine members to parliament, viz. two for the county, two for the city of Worceſter, two for Droitwich, two for Eveſham, and one for Bewdley; and lies in the dioceſe of Worceſter, and Oxford circuit.

WORD, in language, an articulate ſound deſigned to repreſent ſome idea. See GRAMMAR and LANGUAGE. See alſo LOGIC, Part I. chap. 1.

WORD, or *Watch-Word*, in military affairs, is ſome peculiar word or ſentence, by which the ſoldiers know and diſtinguiſh one another in the night, &c. and by which ſpies and deſigning perſons are diſcovered. It is uſed alſo to prevent ſurpriſes. The word is given out in an army every night to the lieutenant, or major-general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it firſt to the field-officers, and afterwards to a ſerjeant of each company, who carry it to the ſubalterns. In garriſons it is given after the gate is ſhut to the town-major, who gives it to the adjutants, and they to the ſerjeants.

Words *of Command.* See Exercise and Manual.

Signals by the Drum, made uſe of in exerciſing of the Army, inſtead of the Word *of Command, viz.*

Signals by the drum.	*Operations.*
A ſhort roll,	To caution.
A flam,	To perform any diſtinct thing.
To arms,	To form the line or battalion.
The march,	To advance, except when intended for a ſalute.
The quick march,	To advance quick.
The point of war,	To march and charge.
The retreat,	To retreat.
Drum ceaſing,	To halt.
Two ſhort rolls,	To perform the flank firing.
The dragoon march,	To open the battalion.
The grenadier march,	To form the column.
The troop,	To double diviſions.
The long roll,	To form the ſquare.
The grenadier march,	To reduce the ſquare to the column.
The preparative,	To make ready and fire.
The general,	To ceaſe firing.
Two long rolls,	To bring or lodge the colours.

WORLD, the aſſemblage of parts which compoſe the globe of the earth. See Geography and Astronomy.

WORM, in gunnery, a ſcrew of iron, to be fixed on the end of a rammer, to pull out the wad of a firelock, carabine, or piſtol, being the ſame with the wad-hook, only the one is more proper for ſmall arms, and the other for cannon.

Worm, in chemiſtry, is a long, winding pewter pipe, placed in a tub of water, to cool and condenſe the vapours in the diſtillation of ſpirits.

Blind-Worm, or *Slow*-Worm. See Anguis, n° 2.

Earth-Worm. See Lumbricus.

Glow-Worm. See Glow-*Worm*.

Silk-Worm. See Silk-*Worm*.

WORMS, Vermes, in natural hiſtory. See Zoology.

Worms in the human body. See Medicine, n° 493, and p. 4868.

Worms, in horſes. See Farriery, § xv. and the article Blatta.

Worms, in dogs. See Dog, art. 4.

Worms for bait. See Fishing.

WORMS, an ancient, large, and famous city of Germany, in the palatinate of the Rhine, with a biſhop's ſee, whoſe biſhop is a ſovereign and prince of the empire. It is a free and imperial city, and the inhabitants are proteſtants. In the war of 1689, it was taken by the French, who almoſt reduced it to aſhes.—The biſhop lately built a new palace in it; and it is famous for a diet held here in 1521, at which Luther aſſiſted in perſon. The Proteſtants have lately built a handſome church, where Luther is repreſented as appearing at the diet. It is noted for the excellent wine that grows in the neighbourhood, which they call *our Lady's milk*. In the campaign of 1743, king Geo. II. took up his quarters in this city, and lodged at the biſhop's palace after the battle of Dettingen. It is ſeated on the weſtern bank of the Rhine, 14 miles N. W. of Heidelburg, 20 S. E. of Mentz, and 32 S. W. of Francfort. E. Long. 8. 27. N. Lat. 40. 34.

WORMING of dogs. All ſpaniels have certain ſtrings under their tongues, by moſt called *a worm*; this muſt be taken out when they are about two months old, with the help of a ſharp knife to ſlit it, and a ſhoemaker's awl to raiſe it up; you muſt be careful to take all out, or elſe your pains is to little purpoſe; for till then he will be hardly ever fat and right, in regard the worm or ſtring will grow foul and troubleſome, and hinder his reſt and eating. This operation is generally recommended as a preventative of madneſs in dogs, or at leaſt as diſabling them, if mad, from biting in that condition.

WORMIUS (Olaus), a learned Daniſh phyſician, born in 1588 at Arhuſen in Jutland. After beginning his ſtudies at home, he ſtudied at ſeveral foreign univerſities, and travelled to various parts of Europe for improvement. He returned to his native country in 1613, and was made profeſſor of the belles lettres in the univerſity of Copenhagen. In 1615, he was tranſlated to the chair of the Greek profeſſor; and in 1624 to the profeſſorſhip of phyſic, which he held to his death. Theſe occupations did not hinder him from practiſing in his profeſſion, and from being the faſhionable phyſician: the king and court of Denmark always employed him; and Chriſtian IV. as a recompenſe for his ſervices, conferred on him a canonry of Lunden. He publiſhed ſome pieces on ſubjects relating to his profeſſion, ſeveral works in defence of Ariſtotle's philoſophy, and ſeveral concerning the antiquities of Denmark and Norway; for which latter he is principally regarded, as they are very learned, and contain many curious particulars. He died in 1654.

WORMWOOD, in botany. See Artemisia.

WORSHIP, the offering up of adoration, prayer, praiſe, thankſgiving, and confeſſion to God, as our Creator, Benefactor, Lawgiver, and Judge. See Morals, n° 174—176.

WORT, the infuſion of malt, of which beer is made.—The uſes of this infuſion in common affairs is well known. By Dr M'Bride it has lately been found to have a ſtrong antiſeptic virtue, and to be uſeful in preventing the ſcurvy and other diſeaſes to which ſailors are liable; which was confirmed by capt. Cook in his late voyages. See *Means of preſerving the health of* Seamen.

WOTTON (Sir Henry), an eminent writer, was the ſon of Thomas Wotton, eſq; and was born in 1568. He ſtudied for ſome time at New-college, Oxford, whence he removed to Queen's-college, where he made a great progreſs in logic and philoſophy; wrote a tragedy for the uſe of that college, called *Tancredo*; and afterwards received the degree of maſter of arts. After this, leaving the univerſity, he travelled into France, Germany, and Italy; and having ſpent about nine years abroad, he returned to England, and became ſecretary to Robert earl of Eſſex, with whom he continued till that earl was apprehended for high-treaſon. He then retired to Florence, where he became known to the grand duke of Tuſcany, who ſent him privately with letters to James VI. king of Scotland, under the name of *Octavio Baldi*, to inform that king of a deſign againſt his life. Some months after, he went back to Florence; but king James coming to the poſſeſſion of the crown of England, Mr Wotton returned home, was knighted by his majeſty, and ſent ambaſſador to the republic of Venice; and afterwards was employed in many other embaſſies to that and other courts; but the only reward he obtained for theſe ſervices was his having the provoſtſhip of Eton conferred upon him about the year 1623, which he kept till his death, which happened in 1639. After his deceaſe ſome of his manuſcripts and printed tracts were publiſhed together in a volume, intitled, *Reliquiæ Wottonianæ*.

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each company, who carry it to the ſubalterns. In garriſons it is given after the gate is ſhut to the town-major, who gives it to the adjutants, and they to the ſerjeants.

WORDS *of Command*. See EXERCISE and MANUAL.

Signals by the Drum, made uſe of in exerciſing of the Army, inſtead of the WORD *of Command, viz.*

Signals by the drum.	*Operations.*
A ſhort roll,	To caution.
A flam,	To perform any diſtinct thing.
To arms,	To form the line or battalion.
The march,	To advance, except when intended for a ſalute.
The quick march,	To advance quick.
The point of war,	To march and charge.
The retreat,	To retreat.
Drum ceaſing,	To halt.
Two ſhort rolls,	To perform the flank firing.
The dragoon march,	To open the battalion.
The grenadier march,	To form the column.
The troop,	To double diviſions.
The long roll,	To form the ſquare.
The grenadier march,	To reduce the ſquare to the column.
The preparative,	To make ready and fire.
The general,	To ceaſe firing.
Two long rolls,	To bring or lodge the colours.

WORLD, the aſſemblage of parts which compoſe the globe of the earth. See GEOGRAPHY and ASTRONOMY.

WORM, in gunnery, a ſcrew of iron, to be fixed on the end of a rammer, to pull out the wad of a firelock, carabine, or piſtol, being the ſame with the wad-hook, only the one is more proper for ſmall arms, and the other for cannon.

WORM, in chemiſtry, is a long, winding pewter pipe, placed in a tub of water, to cool and condenſe the vapours in the diſtillation of ſpirits.

Blind-WORM, or *Slow*-WORM. See ANGUIS, n° 2.

Earth-WORM. See LUMBRICUS.

Glow-WORM. See GLOW-*Worm*.

Silk-WORM. See SILK-*Worm*.

WORMS, VERMES, in natural hiſtory. See ZOOLOGY.

WORMS in the human body. See MEDICINE, n° 493, and p. 4868.

WORMS, in horſes. See FARRIERY, § xv. and the article BLATTA.

WORMS, in dogs. See DOG, art. 4.

WORMS for bait. See FISHING.

WORMS, an ancient, large, and famous city of Germany, in the palatinate of the Rhine, with a biſhop's ſee, whoſe biſhop is a ſovereign and prince of the empire. It is a free and imperial city, and the inhabitants are proteſtants. In the war of 1689, it was taken by the French, who almoſt reduced it to aſhes.—The biſhop lately built a new palace in it; and it is famous for a diet held here in 1521, at which Luther aſſiſted in perſon. The Proteſtants have lately built a handſome church, where Luther is repreſented as appearing at the diet. It is noted for the excellent wine that grows in the neighbourhood, which they call *our Lady's milk*. In the campaign of 1743, king Geo. II. took up his quarters in this city, and lodged at the biſhop's palace after the battle of Dettingen. It is ſeated on the weſtern bank of the Rhine, 14 miles N. W. of Heidelburg, 20 S. E. of Mentz, and 32 S. W. of Francfort. E. Long. 8. 27. N. Lat. 40. 34.

WORMING of dogs. All ſpaniels have certain ſtrings under their tongues, by moſt called *a worm*; this muſt be taken out when they are about two months old, with the help of a ſharp knife to ſlit it, and a ſhoemaker's awl to raiſe it up; you muſt be careful to take all out, or elſe your pains is to little purpoſe; for till then he will be hardly ever fat and right, in regard the worm or ſtring will grow foul and troubleſome, and hinder his reſt and eating. This operation is generally recommended as a preventative of madneſs in dogs, or at leaſt as diſabling them, if mad, from biting in that condition.

WORMIUS (Olaus), a learned Daniſh phyſician, born in 1588 at Arhuſen in Jutland. After beginning his ſtudies at home, he ſtudied at ſeveral foreign univerſities, and travelled to various parts of Europe for improvement. He returned to his native country in 1613, and was made profeſſor of the belles lettres in the univerſity of Copenhagen. In 1615, he was tranſlated to the chair of the Greek profeſſor; and in 1624 to the profeſſorſhip of phyſic, which he held to his death. Theſe occupations did not hinder him from practiſing in his profeſſion, and from being the faſhionable phyſician: the king and court of Denmark always employed him; and Chriſtian IV. as a recompenſe for his ſervices, conferred on him a canonry of Lunden. He publiſhed ſome pieces on ſubjects relating to his profeſſion, ſeveral works in defence of Ariſtotle's philoſophy, and ſeveral concerning the antiquities of Denmark and Norway; for which latter he is principally regarded, as they are very learned, and contain many curious particulars. He died in 1654.

WORMWOOD, in botany. See ARTEMISIA.

WORSHIP, the offering up of adoration, prayer, praiſe, thankſgiving, and confeſſion to God, as our Creator, Benefactor, Lawgiver, and Judge. See MORALS, n° 174—176.

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ſhore, they ſhall not be forfeited as wreck. The ſtatute further ordains, that the ſheriff of the county ſhall be bound to keep the goods a year and a day (as in France for one year, agreeably to the maritime laws of Oleron, and in Holland for a year and a half), that if any man can prove a property in them, either in his own right or by right of repreſentation, they ſhall be reſtored to him without delay; but if no ſuch property be proved within that time, they then ſhall be the king's. If the goods are of a periſhable nature, the ſheriff may ſell them, and the money ſhall be liable in their ſtead. This revenue of wrecks is frequently granted out to lords of manors as a royal franchiſe; and if any one be thus intitled to wrecks in his own land, and the king's goods are wrecked thereon, the king may claim them at any time, even after the year and day.

It is to be obſerved, that in order to conſtitute a legal wreck, the goods muſt come to land. If they continue at ſea, the law diſtinguiſhes them by the barbarous and uncouth appellations of *jetſam*, *flotſam*, and *ligan*. Jetſam is where goods are caſt into the ſea, and there ſink and remain under water: flotſam is where they continue ſwimming on the ſurface of the waves: ligan is where they are ſunk in the ſea, but tied to a cork or buoy, in order to be found again. Theſe are alſo the king's, if no owner appears to claim them; but if any owner appears, he is intitled to recover the poſſeſſion. For even if they be caſt overboard, without any mark or buoy, in order to lighten the ſhip, the owner is not by this act of neceſſity conſtrued to have renounced his property: much leſs can things ligan be ſuppoſed to be abandoned, ſince the owner has done all in his power to aſſert and retain his property. Theſe three are therefore accounted ſo far a diſtinct thing from the former, that by the king's grant to a man of wrecks, things jetſam, flotſam, and ligan will not paſs.

Wrecks, in their legal acceptation, are at preſent not very frequent: for if any goods come to land, it rarely happens, ſince the improvement of commerce, navigation, and correſpondence, that the owner is not able to aſſert his property within the year and day limited by law. And in order to preſerve this property entire for him, and if poſſible to prevent wrecks at all, our laws have made many very humane regulations; in a ſpirit quite oppoſite to thoſe ſavage laws, which formerly prevailed in all the northern regions of Europe, and a few years ago were ſtill ſaid to ſubſiſt on the coaſts of the Baltic ſea, permitting the inhabitants to ſeize on whatever they could get as lawful prize; or, as an author of their own expreſſes it, "*in naufragorum miſeria et calamitate tanquam vultures ad prædam currere.*" For by the ſtatute 27 Edw. III. c. 13. if any ſhip be loſt on the ſhore, and the goods come to land (which cannot, ſays the ſtatute, be called *wreck*), they ſhall be preſently delivered to the merchants, paying only a reaſonable reward to thoſe that ſaved and preſerved them, which is intitled *ſalvage*. Alſo by the common law, if any perſons (other than the ſheriff) take any goods ſo caſt on ſhore, which are not legal wreck, the owners might have a commiſſion to inquire and find them out, and compel them to make reſtitution. And by ſtatute 12 Ann. ſt. 2. c. 18. confirmed by 4 Geo. I. c. 12. in order to aſſiſt the diſtreſſed, and prevent the ſcandalous illegal practices on ſome of our ſea coaſts (too ſimilar to thoſe on the Baltic), it is enacted, that all head-officers and others of towns near the ſea, ſhall, upon application made to them, ſummon as many hands as are neceſſary, and ſend them to the relief of any ſhip in diſtreſs, on forfeiture of 100 l. and in caſe of aſſiſtance given, ſalvage ſhall be paid by the owners, to be aſſeſſed by three neighbouring juſtices. All perſons that ſecrete any goods ſhall forfeit their treble value: and if they wilfully do any act whereby the ſhip is loſt or deſtroyed, by making holes in her, ſtealing her pumps, or otherwiſe, they are guilty of felony, without benefit of clergy. Laſtly, by the ſtatute 26 Geo. II. c. 19. plundering any veſſel, either in diſtreſs or wrecked, and whether any living creature be on board or not (for whether wreck or otherwiſe, it is clearly not the property of the populace), ſuch plundering, or preventing the eſcape of any perſon that endeavours to ſave his life, or wounding him with intent to deſtroy him, or putting out falſe lights in order to bring any veſſel into danger, are all declared to be capital felonies; in like manner as the deſtroying of trees, ſteeples, or other ſtated ſea-marks, is puniſhed by the ſtatute 8 Eliz. c. 13. with a forfeiture of 100 l. or outlawry. Moreover, by the ſtatute of Geo. II. pilfering any goods caſt aſhore is declared to be petty larciny; and many other ſalutary regulations are made, for the more effectually preſerving ſhips of any nation in diſtreſs.

By the civil law, to deſtroy perſons ſhipwrecked, or prevent their ſaving the ſhip, is capital. And to ſteal even a plank from a veſſel in diſtreſs, or wrecked, makes the party liable to anſwer for the whole ſhip and cargo. The laws alſo of the Wiſigoths, and the moſt early Neapolitan conſtitutions, puniſhed with the utmoſt ſeverity all thoſe who neglected to aſſiſt any ſhip in diſtreſs, or plundered any goods caſt on ſhore.

WREN, in ornithology. See MOTACILLA.

WREN (Sir Chriſtopher), a great philoſopher, and one of the moſt learned and moſt eminent architects of his age, was the ſon of Chriſtopher Wren dean of Windſor, and was born in 1632. He ſtudied at Wadham college in Oxford; where he took the degree of maſter of arts in 1653, and was choſen fellow of All-Souls college there. When very young, he diſcovered a ſurpriſing genius for the mathematics; in which ſcience he made great advances before he was ſixteen years old. In 1657, he was made profeſſor of aſtronomy at Greſham college, London; which he reſigned in 1660, on his being choſen to the Savilian profeſſorſhip of aſtromony in Oxford: he was the next year created doctor of laws, and in 1663 was elected fellow of the Royal Society. He was one of the commiſſioners for the reparation of St Paul's; and in 1665 travelled into France, to examine the moſt beautiful edifices there, when he made many curious obſervations. At his return to England, he drew a noble plan for rebuilding the city of London after the fire, which he preſented to parliament; and upon the deceaſe of Sir John Denham in 1668, was made ſurveyor-general of his majeſty's works; and from this time had the direction of a great number of public edifices, by which he acquired the higheſt reputation. He built the magnificent theatre at Oxford:

Wreſtling ‖ Writs.

St Paul's cathedral, the churches of St Stephen Walbrook, and St Mary-le-Bow, the Monument, the modern part of the palace of Hampton Court, Chelſea college, one of the wings of Greenwich hoſpital, and many other beautiful edifices. He was preſident of the Royal Society, one of the commiſſioners of Chelſea college, and twice member of parliament, firſt for Plymouth in Devonſhire, and then for Melcomb Regis in the ſame county; but in 1718 was removed from his place of ſurveyor-general. He died in 1723, and was interred in the vault under St Paul's.

This great man alſo diſtinguiſhed himſelf by many curious inventions and diſcoveries in natural philoſophy; and, among many others, contrived an inſtrument for meaſuring the quantity of rain that falls on any ſpace of land for a year; invented many ways of making aſtronomical obſervations more accurate and eaſy; and was the firſt author of the anatomical experiment of injecting liquors into the veins of animals, &c. He tranſlated into Latin Mr Oughtred's *Horologiographica Geometrica;* and wrote a Survey of the cathedral church of Saliſbury, and other pieces. Since his death his poſthumous works and draughts have been publiſhed by his ſon.

WRESTLING, a kind of combat or engagement between two perſons unarmed, body to body, to prove their ſtrength and dexterity, and try which can throw his opponent to the ground.

Wreſtling is an exerciſe of very great antiquity and fame. It was in uſe in the heroic age; witneſs Hercules, who wreſtled with Antæus.

It continued a long time in the higheſt repute, and had conſiderable rewards and honours aſſigned it at the Olympic games. It was the cuſtom for the Athletæ to anoint their bodies with oil, to give the leſs hold to their antagoniſt.

Lycurgus ordered the Spartan maids to wreſtle in public, quite naked, in order, as it is obſerved, to break them of their too much delicacy and niceneſs, to make them appear more robuſt, and to familiarize the people, &c. to ſuch nudities.

WRIST, in anatomy. See there n° 53.

WRIT, in law, ſignifies, in general, the king's precept in writing under ſeal, iſſuing out of ſome court, directed to the ſheriff, or other officer, and commanding ſomething to be done in relation to a ſuit or action, or giving commiſſion to have the ſame done. And, according to Fitzherbert, a writ is ſaid to be a formal letter of the king in parchment, ſealed with his ſeal, and directed to ſome judge, officer, or miniſter, &c. at the ſuit of a ſubject, for the cauſe briefly expreſſed, which is to be determined in the proper court according to law.

Writs, in civil actions, are either original or judicial: original, are ſuch as are iſſued out of the court of chancery for the ſummoning of a defendant to appear, and are granted before the ſuit is commenced, in order to begin the ſame; and judicial writs iſſue out of the court where the original is returned, after the ſuit is begun. See Process.

The original writ is the foundation of the ſuit. See Suit.

When a perſon hath received an injury, and thinks it worth his while to demand a ſatisfaction for it, he is to conſider with himſelf, or take advice, what redreſs the law has given for that injury; and thereupon is to make application or ſuit to the crown, the fountain of all juſtice, for that particular ſpecific remedy which he is determined or adviſed to purſue. As for money due on bond, an action of debt; for goods detained without force, an action of *detinue* or *trover;* or, if taken with force, an action of *treſpaſs vi et armis;* or, to try the title of lands, a writ of entry or action of treſpaſs in ejectment; or, for any conſequential injury received, a ſpecial action on the caſe. To this end he is to ſue out, or purchaſe by paying the ſtated fees, an *original* or original writ, from the court of chancery, which is the *officina juſtitiæ*, the ſhop or mint of juſtice, wherein all the king's writs are framed. It is a mandatory letter from the king in parchment, ſealed with his great ſeal, and directed to the ſheriff of the county wherein the injury is committed, or ſuppoſed ſo to be, requiring him to command the wrong-doer or party accuſed, either to do juſtice to the complainant, or elſe to appear in court, and anſwer the accuſation againſt him. Whatever the ſheriff does in purſuance of this writ, he muſt return or certify to the court of common-pleas, together with the writ itſelf: which is the foundation of the juriſdiction of that court, being the king's warrant for the judges to proceed to the determination of the cauſe. For it was a maxim introduced by the Normans, that there ſhould be no proceedings in common-pleas before the king's juſtices without his original writ; becauſe they held it unfit that thoſe juſtices, being only the ſubſtitutes of the crown, ſhould take cognizance of any thing but what was thus expreſsly referred to their judgment. However, in ſmall actions, below the value of forty ſhillings, which are brought in the court-baron or county court, no royal writ is neceſſary; but the foundation of ſuch ſuits continue to be (as in the times of the Saxons) not by original writ, but by plaint; that is, by a private memorial tendered in open court to the judge, wherein the party injured ſets forth his cauſe of action: and the judge is bound of common right to adminiſter juſtice therein, without any ſpecial mandate from the king. Now indeed even the royal writs are held to be demandable of common right, on paying the uſual fees: for any delay in the granting them, or ſetting an unuſual or exorbitant price upon them, would be a breach of magna carta, c. 29. "nulli vendemus, nulli negabimus, aut differemus juſtitiam vel rectum."

Writs.

Original writs are either optional or peremptory; or, in the language of our law, they are either a *præcipe*, or a *ſi te fecerit ſecurum*. The *præcipe* is in the alternative, commanding the defendant to do the thing required, or ſhow the reaſon wherefore he hath not done it. The uſe of this writ is where ſomething certain is demanded by the plaintiff, which is in the power of the defendant himſelf to perform; as, to reſtore the poſſeſſion of land, to pay a certain liquidated debt, to perform a ſpecific covenant, to render an account, and the like: in all which caſes the writ is drawn up in the form of a *præcipe* or command, to do thus, or ſhow cauſe to the contrary; giving the defendant his choice, to redreſs the injury or ſtand the ſuit. The other ſpecies of original writs is called a *ſi fecerit te ſecurum*, from the words of the writ; which directs the ſheriff to cauſe the defendant to appear in court, Writing, Wurtemburg.

without any option given him, provided the plaintiff gives the ſheriff ſecurity effectually to proſecute his claim. This writ is in uſe where nothing is ſpecifically demanded, but only a ſatisfaction in general; to obtain which, and miniſter complete addreſs, the intervention of ſome judicature is neceſſary. Such are writs of treſpaſs, or on the caſe, wherein no debt or other ſpecific thing is uſed for in certain, but only damages to be aſſeſſed by a jury. For this end the defendant is immediately called upon to appear in court, provided the plaintiff gives good ſecurity of proſecuting his claim. Both ſpecies of writs are teſted, or witneſſed, in the king's own name; "witneſs ourſelf at Weſtminſter," or wherever the chancery may be held.

The ſecurity here ſpoken of, to be given by the plaintiff for proſecuting his claim, is common to both writs, though it gives denomination only to the latter. The whole of it is at preſent become a mere matter of form; and John Doe and Richard Doe are always returned as the ſtanding pledges for this purpoſe.—The ancient uſe of them was to anſwer for the plaintiff, who in caſe he brought an action without cauſe, or failed in the proſecution of it when brought, was liable to an amercement from the crown for raiſing a falſe accuſation; and ſo the form of the judgment ſtill is. In like manner, as by the Gothic conſtitutions no perſon was permitted to lay a complaint againſt another, *niſi ſub ſcriptura aut ſpecificatione trium teſtium, quod actionem vellet perſequi:* and, as by the laws of Sancho I, king of Portugal, damages were given againſt a plaintiff who proſecuted a groundleſs action.

The day on which the defendant is ordered to appear in court, and on which the ſheriff is to bring in the writ, and report how far he has obeyed it, is called the *return of the writ;* it being then returned by him to the king's juſtices at Weſtminſter. And it is always made returnable at the diſtance of at leaſt 15 days from the date or teſte, that the defendant may have time to come up to Weſtminſter, even from the moſt remote parts of the kingdom; and upon ſome day in one of the four terms, in which the court ſits for the diſpatch of buſineſs.

WRITING, the art or act of ſignifying and conveying our ideas to others, by letters or characters viſible to the eye. See Composition, Grammar, and Language.

WURTEMBURG, or Wirtenburg, a ſovereign duchy of Germany, in Suabia; bounded on the north by Franconia, the archbiſhopric of Mentz, and the palatinate of the Rhine; on the eaſt by the county of Oeting, the marquiſate of Burgau, and the territory of Ulm; on the ſouth by the principality of Hoen-Zollern, Furſtenburg, and the marquiſate of Hohenburg; and on the weſt by the palatinate of the Rhine, the marquiſate of Baden, and the Black Foreſt. It is 65 miles in length, and as much in breadth, and the river Neckar runs almoſt through the middle of it from S. to N. Though there are many mountains and woods, yet it is one of the moſt populous and fertile countries in Germany, producing plenty of paſtures, corn, fruits, and a great deal of wine towards the confines of the palatinate. There are alſo mines, and ſalt ſprings, with plenty of game and fiſh. It contains 645 villages, 88 towns, and 26 cities, of which Stutgard is the capital.

Wurtſburg ‖ Wyat.

WURTSBURG, the biſhopric of a large country of Germany, comprehending the principal part of Franconia. It is bounded by the county of Henneburg, the duchy of Coburg, the abbey of Fuld, the archbiſhopric of Mentz, the marquiſate of Anſpach, the biſhopric of Bamberg, and the county of Wertheim; being about 65 miles in length, and 50 in breadth, and divided into 50 bailiwicks. The ſoil is very fertile, and produces more corn and wine than the inhabitants conſume. The territories of the biſhop comprehend above 400 towns and villages, of which he is ſovereign, being one of the greateſt eccleſiaſtic princes of the empire.

WURTZBURG, a large and handſome city of Germany, and one of the principal in the circle of Franconia. It is defended with good fortifications, and has a magnificent palace. There is a handſome hoſpital, in which are generally 400 poor men and women. The caſtle is at a ſmall diſtance from the city, and commands it, as it ſtands upon an eminence. It communicates with the city by a ſtone-bridge, on which are 12 ſtatues, repreſenting as many ſaints.—The arſenal and the cellars of the biſhops deſerve the attention of the curious. There is alſo an univerſity, founded in 1403. It is ſeated on the river Maine, E. Long. 10. 5. N. Lat. 49. 44.

WYAT (Sir Thomas), an accompliſhed writer in the reign of Henry VIII. was the ſon of Sir Henry Wyat of Allington caſtle in Kent. He was born in the year 1503, and educated at St John's college, Cambridge. He then viſited foreign countries, and probably ſpent ſome years abroad; for, at his return to England, he was exceedingly accompliſhed, and perfectly acquainted with the languages, and polite literature of thoſe times. King Henry VIII. charmed with his abilities, and delighted with his vivacity and wit, immediately took him into favour, honoured him with knighthood, gave him lands, and employed him in ſeveral embaſſies. Nevertheleſs Wyat fell into diſgrace, and was twice impriſoned. It is evident, however, that he regained the favour and confidence of the king; for he was afterwards ſent ambaſſador to the emperor, and died in the execution of his majeſty's commiſſion. The nature of this commiſſion is differently related. Be it what it might, it proved fatal. Riding poſt in the heat of ſummer, he was attacked by a violent fever, and died at Shirebourn, in Dorſetſhire, in 1541. Sir Thomas Wyat was cotemporary with Henry Howard, earl of Surrey, and his intimate friend, with whom he ſhares the honour of poliſhing our language, and of introducing the numbers uſed by the Italian poets. Camden calls him *ſplendide doctus;* and Aſcham ſays, he was one of the beſt tranſlators of the Latin poets. His oration on his trial (lately publiſhed in Miſcellaneous Antiquities) ſhows him to have been a man of conſiderable ability, and an orator. Leland publiſhed a collection of elegies on his death, under the title *Nænia;* which Cibber, in his Lives of the Poets, miſtakes for a collection of his works. To this book there is prefixed a portrait of Sir Thomas, with a long beard, from a painting of Holbein. His Songs and Poems, among the ſonnets of the earl of Surrey, were printed in 1565, 1587, 8vo.

WYCHERLEY (William), an eminent Engliſh comic poet, was born about 1640. A little before the reſtoration of king Charles II. he became a gentleman commoner of Queen's-college Oxford, where he was reconciled by Dr Barlow to the proteſtant religion, which he had a little before abandoned in his travels. He afterward entered himſelf in the Middle-temple, but ſoon quitted the ſtudy of the law for purſuits more agreeable to his own genius, as well as to the taſte of the age. Upon writing his firſt play, intitled, *Love in a Wood*, or *St James's Park*, which was acted in 1672, he became acquainted with ſeveral of the celebrated wits both of the court and town, and likewiſe with the ducheſs of Cleveland. Some time after appeared his comedies, called *The Gentleman-Dancing-Maſter*, his *Plain Dealer*, and his *Country Wife*; all which were acted with applauſe. George duke of Buckingham had a very high eſteem for him, and beſtowed on him ſeveral advantageous poſts.—King Charles alſo ſhowed him ſignal marks of favour; and once gave him a proof of his eſteem, which perhaps never any ſovereign prince before had given to a private gentleman. Mr Wycherley being ill of a fever, at his lodgings in Bow-ſtreet, the king did him the honour of a viſit. Finding him extremely weakened, he commanded him to take a journey to the ſouth of France, and aſſured him, at the ſame time, that he would order him 500 l. to defray the charges of the journey. Mr Wycherley accordingly went into France; and having ſpent the winter there, returned to England entirely reſtored to his former vigour. The king, ſhortly after his arrival, told him, that he had a ſon, who he was reſolved ſhould be educated like the ſon of a king, and that he could not chooſe a more proper man for his governor than Mr Wycherley; for which ſervice 1500 l. per annum ſhould be ſettled upon him.

Mr Wycherley, however, ſuch is the uncertain ſtate of all human affairs, loſt the favour of the king by the following means: Immediately after he had received the gracious offer above mentioned, he went down to Tunbridge, where, walking one day upon the Wells-walk, with his friend Mr Fairbeard of Gray's-Inn, juſt as he came up to the bookſeller's ſhop, the counteſs of Drogheda, a young widow, rich, noble, and beautiful, came there to inquire for *The Plain Dealer*; “Madam,” ſays Mr Fairbeard, “ſince you are for the Plain Dealer, there he is for you;” puſhing Mr Wycherley towards her. “Yes,” ſays Mr Wycherley, “this lady can bear plain dealing; for ſhe appears to be ſo accompliſhed, that what would be a compliment to others, would be plain dealing to her.” “No, truly, Sir,” ſaid the counteſs, “I am not without my faults, any more than the reſt of my ſex; and yet, notwithſtanding, I love plain dealing, and am never more fond of it than when it tells me of them.” “Then, madam,” ſays Mr Fairbeard, “you and the Plain Dealer ſeem deſigned by Heaven for each other.”—In ſhort, Mr Wycherley walked a turn or two with the counteſs, waited upon her home, viſited her daily at her lodgings while ſhe ſtaid at Tunbridge, and at her lodgings in Hatton-garden after ſhe went to London; where in a little time he married her, without acquainting the king. By this ſtep, which was looked upon as a contempt of his majeſty's orders, he forfeited the royal favours. The counteſs of Drogheda ſettled her whole fortune upon him; but his title being diſputed after her death, he was ſo reduced by the expences of the law, and other incumbrances, as to be unable to ſatisfy the impatience of his creditors, who threw him into priſon; and the bookſeller who printed his Plain Dealer, by which he got almoſt as much money as the other gained reputation, was ſo ungrateful as to refuſe to lend him 20 l. in his extreme neceſſity. In that confinement he languiſhed ſeven years: but at length king James going to ſee the above play, was ſo charmed with it, that he gave immediate orders for the payment of his debts, and even granted him a penſion of 200 l. per annum. But that prince's bountiful intentions were in a great meaſure defeated merely through Mr Wycherley's modeſty, he being aſhamed to tell the earl of Mulgrave, whom the king had ſent to demand it, a true ſtate of his debts. He laboured under the weight of theſe difficulties till his father died, who left him 600 l. a-year. But this eſtate was under uneaſy limitations, he being only a tenant for life, and not being allowed to raiſe any money for the payment of his debts. However, he took a method of doing it which few ſuſpected to be his choice; and this was making a jointure. He had often declared, that he was reſolved to die married, though he could not bear the thoughts of living in that ſtate again: accordingly, juſt at the eve of his death, he married a young gentlewoman with 1500 l. fortune, part of which he applied to the uſes he wanted it for. Eleven days after the celebration of theſe nuptials, in December 1715, he died, and was interred in the vault of Covent-garden church.

Beſides his plays above mentioned, he publiſhed a volume of poems in folio. In 1728 his poſthumous works in proſe and verſe were publiſhed by Mr Theobald. He was intimate with Mr Pope, Mr Gay, and the other great poets of his time.

WYNDHAM (Sir William), deſcended of an ancient family, was born about the year 1687, and ſucceeded young to the title and eſtate of his father. On his return from his travels, he was choſen member for the county of Somerſet; in which ſtation he ſerved in the three laſt parliaments of queen Anne, and as long as he lived: after the change of the miniſtry in 1710, he was appointed ſecretary at war; and in 1713, was raiſed to be chancellor of the exchequer. Upon the breach between the earl of Oxford and lord Bolingbroke, he adhered to the intereſts of the latter. He was removed from his employment on the acceſſion of George I. and falling under ſuſpicion on the breaking out of the rebellion in 1715, was apprehended. He made his eſcape; a reward was publiſhed for apprehending him; he ſurrendered, was committed to the Tower, but never brought to a trial. After he regained his liberty, he continued in oppoſition to the ſeveral adminiſtrations under which he lived; and died in 1740.

WYKEHAM (William of). See William.

WYE, a river of Wales, which riſing on the confines of Cardiganſhire, and running ſouth-eaſt, divides the counties of Radnor and Brecknock; then croſſing Herefordſhire, it runs ſouth and falls into the mouth of the Severn at Chepſtow.

X.

X, or x, is the 22d letter of our alphabet, and a double conſonant. It was not uſed by the Hebrews or ancient Greeks; for as it is a compound letter, the ancients, who uſed great ſimplicity in their writings, made uſe of, and expreſſed this letter by its component letters *cs*. Neither have the Italians this letter, but expreſs it by *ſſ*. X begins no word in our language but ſuch as are of Greek original; and is in few others but what are of Latin derivation; as *perplex*, *reflexion*, *defluxion*, &c. We often expreſs this ſound by ſingle letters, as *cks*, in *backs*, *necks*; by *ks*, in *books*, *breaks*; by *cc*, in *acceſs*, *accident*; by *ct*, in *action*, *unction*, &c. The Engliſh and French pronounce it like *cs* or *ks*; the Spaniards like *c* before *a*, viz. *Alexandro*, as if it were *Alecandro*. In numerals it expreſſeth 10, whence in old Roman manuſcripts it is uſed for *denarius*; and as ſuch ſeems to be made of two V's placed one over the other. When a daſh is added over it, thus $\overline{\text{x}}$, it ſignifies 10,000.

XANTHIUM, Ditch *Bur*; a genus of the pentandria order, belonging to the monœcia claſs of plants. There are three ſpecies; of which the moſt remarkable is the ſtrumarium, or leſſer burdock, growing naturally on dunghills in many places of Britain. The leaves are bitter and aſtringent. A decoction of the whole plant affords a ſhowy yellow colour, but it is better if only the flowers are uſed. Horſes and goats eat it; cows, ſheep, and ſwine refuſe it.

XANTHOXYLUM. See ZANTHOXYLUM.

XEBEC, a ſmall three-maſted veſſel, navigated in the Mediterranean Sea, and on the coaſts of Spain, Portugal, and Barbary. See Plate CCLXV.

The ſails of the xebec are in general ſimilar to thoſe of the poleacre, but the hull is extremely different from that and almoſt every other veſſel. It is furniſhed with a ſtrong prow; and the extremity of the ſtern, which is nothing more than a ſort of railed platform or gallery, projects further behind the counter and buttock than that of any European ſhip.

Being generally equipped as a corſair, the xebec is conſtructed with a narrow floor, to be more ſwift in purſuit of the enemy; and of a great breadth, to enable her to carry a great force of ſail for this purpoſe without danger of overturning. As theſe veſſels are uſually very low built, their decks are formed with a great convexity from the middle of their breadth towards the ſides, in order to carry off the water which falls aboard more readily by their ſcuppers. But as this extreme convexity would render it very difficult to walk thereon at ſea, particularly when the veſſel rocks by the agitation of the waves, there is a platform of grating extending along the deck from the ſides of the veſſel towards the middle, whereon the crew may walk dry-footed whilſt the water is conveyed through the grating to the ſcuppers.

When a xebec is equipped for war, ſhe is occaſionally navigated in three different methods, according to the force or direction of the wind.

Thus, when the wind is fair, and nearly aſtern, it is uſual to extend ſquare-ſails upon the main-maſt; and indeed frequently on the fore-maſt: and as thoſe ſails are rarely uſed in a ſcant wind, they are of an extraordinary breadth.

When the wind is unfavourable to the courſe, and yet continues moderate, the ſquare yards and ſails are removed from the maſts, and laid by, in order to make way for the large lateen yards and ſails, which ſoon after aſſume their place: but if the foul wind increaſes to a ſtorm, theſe latter are alſo lowered down and diſplaced; and ſmall lateen yards with proportional ſails are extended on all the maſts.

The xebecs, which are generally armed as veſſels of war by the Algerines, mount from 16 to 24 cannon, and carry from 300 to 450 men, two thirds of whom are generally ſoldiers.

By the very complicated and inconvenient method of working theſe veſſels, it will be readily believed what one of their captains of Algiers acquainted Mr Falconer, *viz.* That the crew of every xebec has at leaſt the labour of three ſquare-rigged ſhips, wherein the ſtanding ſails are calculated to anſwer every ſituation of the wind.

XENOCRATES, one of the moſt illuſtrious philoſophers of ancient Greece, was born in Chalcedon, and became early a diſciple of Plato. He ſtudied under this great maſter at the ſame time with Ariſtotle, but was not poſſeſſed of the ſame talents; he wanting a ſpur, and the other a bridle. However, if Xenocrates, by the heavineſs of his genius, was greatly inferior to Ariſtotle, he excelled him very much in practical philoſophy. There was ſomething extraordinary in the rectitude of his morals. He was abſolute maſter of his paſſions; and was not fond of pleaſure, riches, or applauſe. So great was his reputation for ſincerity and probity, that he was the only perſon whom the magiſtrates of Athens diſpenſed from confirming his teſtimony with an oath. There was nothing graceful in the behaviour of Xenocrates, but a ſeriouſneſs and ſeverity were always ſeen in his deportment; for which reaſon Plato frequently exhorted him to ſacrifice to the Graces. Notwithſtanding this ſevere caſt of mind, he yet was extremely compaſſionate. He was fond of the mathematics; and permitted none of his ſcholar's to be ignorant of them. It is ſurpriſing that a philoſopher of ſo much merit ſhould have been ſo ill treated by the Athenians, as to be ſold becauſe he could not pay the poll-tax laid on foreigners. Demetrius Phalereus bought Xenocrates, ſet him immediately at liberty, and paid the Athenians the debt. Xenocrates died 314 B. C. at about 90 years of age, by accidentally ſtriking his forehead againſt a kettle in the night. He compoſed, at Alexander's ander's deſire, a Treatiſe on the Art of Reigning; ſix books on Nature; ſix books on Philoſophy; one on Riches, &c. but none of theſe works have been handed down to us. Our philoſopher's theology was but poor ſtuff: Cicero refutes him in the firſt book of the Nature of the Gods.

XENOPHANES, a Greek philoſopher, born in Colophon, was, ſay ſome authors, the diſciple of Archelaus; according to which he muſt have been contemporary with Socrates. Others relate, that he taught himſelf all he knew, and that he lived at the ſame time with Anaximander. By this account he muſt have flouriſhed before Socrates, and about the 60th Olympiad, as Diogenes Laertius affirms. He wrote ſeveral poems on philoſophical ſubjects; as alſo a great many on the foundation of Colophon, and on that of the colony of Elea. His opinion with regard to the nature of God does not differ much from that of Spinoza. He wrote againſt Homer and Heſiod. When he ſaw the Egyptians pour forth lamentations during their feſtivals, he thus adviſed them: "If the objects of your worſhip are Gods, do not weep; if they are men, offer not ſacrifices to them." He was baniſhed from his country, withdrew to Sicily, and lived in Zanche and Catana. He founded the Eleatic ſect. The anſwer Xenophanes made to a man, with whom he had refuſed to play at dice, is highly worthy of a philoſopher. This man calling him a coward, "Yes, (replied he) I am exceſſively ſo with regard to all ſhameful actions."

XENOPHON, a celebrated general, philoſopher, and hiſtorian, was born at Athens, and became early a diſciple of Socrates, who is ſaid by Strabo to have ſaved his life in battle. About the 50th year of his age he engaged in the expedition of Cyrus, and accompliſhed his immortal retreat in the ſpace of 15 months. The jealouſy of the Athenians baniſhed him from his native city for engaging in the ſervice of Sparta and Cyrus. On his return therefore he retired to Scillus, a town of Elis, where he built a temple to Diana, which he mentions in his Epiſtles, and devoted his leiſure to philoſophy and rural ſports. But commotions ariſing in that country, he removed to Corinth, where he is ſuppoſed to have written his Grecian Hiſtory, and to have died at the age of 90, in the year 360 before Chriſt. By his wife Phileſia he had two ſons, Diodorus and Gryllus. The latter rendered himſelf immortal by killing Epaminondas in the famous battle of Mantinea, but periſhed in that exploit, which his father lived to record. The beſt editions of his works are thoſe of Franckfort in 1674, and of Oxford, in Greek and Latin, in 1703, 5 vols, 8vo. Separately have been publiſhed his *Cyropædia*, Oxon 1727, 4to, and 1736, 8vo. *Cyri Anabaſis*, Oxon 1735, 4to, and 1747, 8vo. *Memorabilia Socratis*, Oxon 1741, 8vo. His *Cyropædia* has been admirably tranſlated into Engliſh by Mr Spelman.

XENOPHON the *Younger*, a Greek writer, ſo called to diſtinguiſh him from the celebrated Xenophon, was born at Epheſus, and lived, according to ſome authors, before Heliodorus, that is, about the beginning of the 4th century. He is only known by his *Epheſiaca*, a Greek romance, in five books, which is eſteemed, and contains the amours or adventures of Abracomes and Anthia. This romance was printed at London, in Greek and Latin, in 1724, 4to.

XERXES I. the fifth king of Perſia, memorable for the vaſt army he is ſaid to have carried into the field againſt Leonidas king of Sparta; conſiſting, according to ſome hiſtorians, of 800,000 men, while others make it amount to 3,000,000, excluſive of attendants. The fleet that attended this prodigious land force is likewiſe made to conſiſt of 2000 ſail; and all the ſucceſs they met with was the taking and burning the city of Athens; for the army was ſhamefully repulſed near the ſtraights of Thermopylæ by Leonidas, with only 4000 choſen Spartans, and the fleet was diſperſed and partly deſtroyed by Themiſtocles at the ſtraights of Salamis, who had only 380 ſail under his command. Xerxes was aſſaſſinated by Artabanes, chief captain of his guards, and his diſtinguiſhed favourite.

XIMENES (Francis), a juſtly celebrated cardinal, biſhop of Toledo, and prime miniſter of Spain, was born at Torrelaguna, in Old Caſtile, in 1437, and ſtudied at Alcola and Salamanca. He then went to Rome; and being robbed on the road, brought nothing back but a bull for obtaining the firſt vacant prebend: but the archbiſhop of Toledo refuſed it him, and threw him in priſon. Being at length reſtored to liberty, he obtained a benefice in the dioceſe of Siguença, where cardinal Gonzales de Mendoza, who was the biſhop, made him his grand vicar. Ximenes ſome time after entered among the Franciſcans of Toledo; but being there troubled with viſits, he retired to a ſolitude named *Caſtanel*, and applied himſelf to the ſtudy of divinity and the Oriental tongues. At his return to Toledo, queen Iſabella of Caſtile choſe him for her confeſſor, and afterwards nominated him archbiſhop of Toledo; which, next to the papacy, is the richeſt dignity in the church of Rome. "This honour (ſays Dr Robertſon) he declined with a firmneſs, which nothing but the authoritative injunction of the pope was able to overcome. Nor did this height of promotion change his manners. Though obliged to diſplay in public that magnificence which became his ſtation, he himſelf retained his monaſtic ſeverity. Under his pontifical robes he conſtantly wore the coarſe frock of St Francis, the rents of which he uſed to patch with his own hands. He at no time uſed linen; but was commonly clad in haircloth. He ſlept always in his habit, moſt frequently on the floor, or on boards, and rarely in a bed. He did not taſte any of the delicacies which appeared at his table, but ſatisfied himſelf with that ſimple diet which the rule of his order preſcribed. Notwithſtanding theſe peculiarities, ſo oppoſite to the manners of the world, he poſſeſſed a thorough knowledge of its affairs, and diſcovered talents for buſineſs which rendered the fame of his wiſdom equal to that of his ſanctity." His firſt care was to provide for the neceſſities of the poor; to viſit the churches and hoſpitals; to purge his dioceſe of uſurers and places of debauchery; to degrade corrupt judges, and place in their room perſons whom he knew to be diſtinguiſhed by their probity and diſintereſtedneſs. He erected a famous univerſity at Alcala; and in 1499 founded the college of St Ildephonſo. Three years after he undertook the Polyglot Bible; and for that purpoſe ſent for many learned men to come to him at Toledo, purchaſed ſeven copies in Hebrew for 4000 crowns, and gave a great price for Latin and Greek manuſcripts. At this

Bible they laboured above 12 years. It contains the Hebrew text of the Bible; the verſion of the Septuagint, with a literal tranſlation; that of St Jerom, and the Chaldee paraphraſes of Onkelos; and Ximenes added to it a dictionary of the Hebrew and Chaldee words contained in the Bible. This work is called *Ximenes's Polyglot*. In 1507 pope Julius II. gave him the cardinal's hat, and king Ferdinand the Catholic entruſted him with the adminiſtration of affairs. Cardinal Ximenes was from this moment the ſoul of every thing that paſſed in Spain. He diſtinguiſhed himſelf at the beginning of his miniſtry by diſcharging the people from the burdenſome tax called *acavale*, which had been continued on account of the war againſt Granada; and laboured with ſuch zeal and ſucceſs in the converſion of the Mahometans, that he made 3000 converts, among whom was a prince of the blood of the kings of Granada. This great multitude he baptized in a ſpacious ſquare; where having made them bring all the books of the Koran, he had them publicly burnt. The day in which this was performed is annually ſolemnized as a feſtival in Spain. In 1509 cardinal Ximenes extended the dominions of Ferdinand, by taking the city of Oran in the kingdom of Algiers. He undertook this conqueſt at his own expence, and marched in perſon at the head of the Spaniſh army cloathed in his pontifical ornaments, and accompanied by a great number of eccleſiaſtics and monks. Some time after, foreſeeing an extraordinary ſcarcity, he erected public granaries at Toledo, Alcala, and Torrelaguna, and had them filled with corn at his own expence; which gained the people's hearts to ſuch a degree, that to preſerve the memory of this noble action they had an elogium upon it cut on marble, in the hall of the ſenate-houſe at Toledo, and in the market-place. King Ferdinand dying in 1516, left cardinal Ximenes regent of his dominions; and the archduke Charles, who was afterwards the emperor Charles V. confirmed that nomination. The cardinal immediately made a reform of the officers of the ſupreme council and of the court, and put a ſtop to the oppreſſion of the grandees. He vindicated the rights of the people againſt the nobility; and as by the feudal conſtitution the military power was lodged in the hands of the nobles, and men of inferior condition were called into the field only as their vaſſals, a king with ſcanty revenues depended on them in all his operations. It was with their forces he attacked his enemies, and with them he defended his own kingdom; and while at the head of troops attached only to their own lords, and accuſtomed to obey no other command, his authority was precarious, and his efforts feeble. From this ſtate Ximenes reſolved to deliver the crown; and iſſued a proclamation, commanding every city in Caſtile to inroll a certain number of its burgeſſes, and teach them military diſcipline, he himſelf engaging to provide officers to command them at the public expence. This was vigorouſly oppoſed by the nobles; but by his intrepidity and ſuperior addreſs he carried his point. He then endeavoured to diminiſh the poſſeſſions of the nobility, by reclaiming all the crown-lands, and putting a ſtop to the penſions granted by the late king Ferdinand. This addition made to the revenues enabled him to diſcharge all the debts of Ferdinand, and to eſtabliſh magazines of warlike ſtores. The nobles, alarmed at theſe repeated attacks, uttered loud complaints; but before they proceeded to extremities, appointed ſome grandees of the firſt rank to examine the powers, in conſequence of which he exerciſed acts of ſuch high authority. Ximenes received them with cold civility, produced the teſtament of Ferdinand, by which he was appointed regent, together with the ratification of that deed by Charles. To both theſe they objected; and he endeavoured to eſtabliſh their validity. As the converſation grew warm, he led them inſenſibly to a balcony, from which they had a view of a large body of troops under arms, and of a formidable train of artillery. "Behold (ſays he, pointing to theſe, and raiſing his voice) the powers which I have received from his Catholic majeſty. With theſe I govern Caſtile; and with theſe I will govern it, till the king, your maſter and mine, takes poſſeſſion of his kingdom." A declaration ſo bold and haughty ſilenced them, and aſtoniſhed their aſſociates. They ſaw that he was prepared for his defence, and laid aſide all thoughts of a general confederacy againſt his adminiſtration. He alſo founded two magnificent monaſteries; one for the pious education of a great number of ladies of quality, who had no fortunes, and the other an aſylum for poor girls. He was at great expence in embelliſhing his native town Torrelaguna, with a fountain of running water, which he cauſed to be brought through rocks and mountains, and with ſeveral other public works. At length, from the repeated entreaties of Ximenes, and the impatient murmurs of the Spaniſh miniſtry, Cha. V. embarked and landed in Spain, accompanied by his favourites. Ximenes, who conſidered the preſence of the king as the greateſt bleſſing to his dominions, was advancing to the coaſt to meet him; but at Bos Equillos was ſeized with a violent diſorder, which his followers conſidered as the effects of poiſon, but could not agree whether the crime ought to be imputed to the hatred of the Spaniſh nobles, or to the malice of the Flemiſh courtiers. This accident obliging Ximenes to ſtop, he wrote to the king, and with his uſual boldneſs adviſed him to diſmiſs all the ſtrangers in his train, whoſe number and credit already gave offence to the Spaniards, and earneſtly deſired to have an interview with him, that he might inform him of the ſtate of the nation, and the temper of his ſubjects. To prevent this, not only the Flemings, but the Spaniſh grandees, employed all their addreſs to keep Charles at a diſtance from Aranda, the place to which the cardinal had removed. His advice was now ſlighted and deſpiſed. Ximenes, conſcious of his own integrity and merit, expected a more grateful return from a prince, to whom he delivered a kingdom more flouriſhing than it had been in any former age, and a more extenſive authority than the moſt illuſtrious of his anceſtors had ever poſſeſſed; and lamented the fate of his country, about to be ruined by the rapaciouſneſs and inſolence of foreign favourites. While his mind was agitated by theſe paſſions, he received a letter from the king; in which, after a few cold and formal expreſſions of regard, he was allowed to retire to his dioceſe; and he expired a few hours after reading it, in 1517, in the 81ſt year of his age.

This famous cardinal ought not to be confounded with

Roderic XIMENES, archbiſhop of Toledo, in the

13th century, who wrote a Hiſtory of Spain in nine books; nor with ſeveral other Spaniſh writers of the name of *Ximenes*.

XIPHIAS, the Sword-fish; a genus belonging to the order of apodes. The upper jaw terminates in a long ſword-ſhaped roſtrum, from which it is called the *ſword-fiſh:* there are no teeth in the mouth; the gill-membrane has eight rays; and the body is ſomewhat cylindrical. There is but one ſpecies, viz. the gladius, found in the European ocean.

This fiſh ſometimes frequents our coaſts, but is much more common in the Mediterranean ſea, eſpecially in the part that ſeparates Italy from Sicily, which has been long celebrated for it: the promontory Pelorus, now Capo di Faro, was a place noted for the reſort of the xiphias, and poſſibly the ſtation of the ſpeculatores, or the perſons who watched and gave notice of the approach of the fiſh.

The ancient method of taking them is particularly deſcribed by Strabo, and agrees exactly with that practiſed by the moderns.

A man aſcends one of the cliffs that overhangs the ſea: as ſoon as he ſpies the fiſh, he gives notice, either by his voice or by ſigns, of the courſe it takes. Another, that is ſtationed in a boat, climbs up the maſt, and on ſeeing the ſword-fiſh, directs the rowers towards it. As ſoon as he thinks they are got within reach, he deſcends, and taking a ſpear in his hand, ſtrikes it into the fiſh; which, after wearying itſelf with its agitation, is ſeized and drawn into the boat. It is much eſteemed by the Sicilians, who buy it up eagerly, and at its firſt coming into ſeaſon give about ſixpence Engliſh *per* pound. The ſeaſon laſts from May till Auguſt. The ancients uſed to cut this fiſh into pieces, and ſalt it; whence it was called *Tomus Thurianus*, from Thurii, a town in the bay of Tarentum, where it was taken and cured.

The ſword-fiſh is ſaid to be very voracious, and that it is a great enemy to the tunny, who (according to Belon) are as much terrified with it as ſheep are at the ſight of a wolf. It is a great enemy to the whales, and frequently deſtroys them. See Balæna.

XYLO-ALOES, or Aloe-wood. See Aloe.

This drug is diſtinguiſhed into three ſorts; the calambac, the common lignum aloes, and calambour.

The calambac, or fineſt aloes-wood, called by authors *lignum aloes præſtantiſſimum*, and by the Chineſe *ſukhiang*, is the moſt reſinous of all the woods we are acquainted with: it is of a light ſpongy texture, very porous, and its pores ſo filled up with a ſoft and fragrant reſin, that the whole may be preſſed and dented by the fingers like wax, or moulded about by chewing in the mouth, in the manner of maſtich. This kind, laid on the fire, melts in great parts like reſin, and burns away in a few moments, with a bright flame and perfumed ſmell. Its ſcent, while in the maſs, is very fragrant and agreeable; and its taſte acrid and bitteriſh, but very aromatic and agreeable: it is ſo variable in its colour, that ſome have divided it into three kinds; the one variegated with black and purple; the ſecond, with the ſame black, but with yellowiſh inſtead of purple; and the third, yellow alone like the yolk of an egg: this laſt is the leaſt ſcented of the three; the ſubſtance, however, in them all, is the ſame in every reſpect, except their colour. It is brought from Cochinchina.

The lignum aloes vulgare is the ſecond in value. This is of a more denſe and compact texture, and conſequently leſs reſinous than the other; there is ſome of it, however, that is ſpongy, and has the holes filled up with the right reſinous matter; and all of it, when good, has veins of the ſame reſin in it. We meet with it in ſmall fragments, which have been cut and ſplit from larger: theſe are of a tolerably denſe texture in the more ſolid pieces, and of a duſky brown colour, variegated with reſinous black veins. It is in this ſtate very heavy, and leſs fragrant than in thoſe pieces which ſhow a multitude of little holes, filled up with the ſame blackiſh matter that forms the veins in others. The woody part of theſe laſt pieces is ſomewhat darker than the other, and is not unfrequently purpliſh, or even blackiſh. The ſmell of the common aloe-wood is very agreeable, but not ſo ſtrongly perfumed as the former. Its taſte is ſomewhat bitter and acrid, but very aromatic. This wood is alſo brought from Cochinchina, and ſometimes from Sumatra.

The calambour, or, as ſome write it, calambouc, is alſo called *agallochum ſylveſtre*, and *lignum aloes mexicanum*. It is a light and friable wood, of a duſky and often mottled colour, between a duſky green black and a deep brown. Its ſmell is fragrant and agreeable, but much leſs ſweet than that of either of the others; and its taſte bitteriſh, but not ſo much acrid or aromatic as either of the two former. We meet with this very frequent, and in large logs; and theſe ſometimes entire, ſometimes only the heart of the tree, the cortical part being ſeparated. This is brought from the iſland of Timor, and is the aloe-wood uſed by the cabinet-makers and inlayers.

The Indians uſe the calambac by way of incenſe, burning ſmall pieces of it in the temples of their gods; and ſometimes their great people burn it in their houſes in times of feaſting. It is eſteemed a cordial taken inwardly; and they ſometimes give it in diſorders of the ſtomach and bowels, and to deſtroy the worms. A very fragrant oil may be procured from it by diſtillation; which is recommended in paralytic caſes, from five to fifteen drops. It is at preſent, however, but little uſed; and would ſcarce be met with any where in the ſhops, but that it is an ingredient in ſome of the old compoſitions.

XYNOECIA, in Grecian antiquity, an anniverſary feaſt, obſerved by the Athenians in honour of Minerva, upon the ſixteenth of Hecatombæon, in memory that, by the perſuaſion of Theſus, they left their country-ſeats, in which they lay diſperſed here and there in Attica, and united together in one body.

XYSTARCHA, in antiquity, the maſter or director of the xyſtus. In the Greek gymnaſium, the xyſtarcha was the ſecond officer, and the gymnaſiarcha the firſt; the former was his lieutenant, and preſided over the two xyſti, and all exerciſes of the athletæ therein.

XYSTUS, among the Greeks, was a long portico, open or covered at the top, where the athletæ practiſed wreſtling and running: the gladiators, who practiſed therein, were called *xyſtici*.

Among the Romans, the xyſtus was only an alley, or double row of trees, meeting like an arbour, and forming a ſhade to walk under.

Y.

Y, or y, the 23d letter of our alphabet: its ſound is formed by expreſſing the breath with a ſudden expanſion of the lips from that configuration by which we expreſs the vowel *u*. It is one of the ambigenial letters, being a conſonant in the beginning of words, and placed before all vowels, as in *yard*, *yield*, *young*, &c. but before no conſonant. At the end of words it is a vowel, and is ſubſtituted for the ſound of *i*, as in *try*, *deſcry*, &c. In the middle of words it is not uſed ſo frequently as *i* is, unleſs in words derived from the Greek, as in *chyle*, *empyreal*, &c. though it is admitted into the middle of ſome pure Engliſh words, as in *dying*, *flying*, &c. The Romans had no capital of this letter, but uſed the ſmall one in the middle and laſt ſyllables of words, as in *coryambus*, *onyx*, *martyr*. Y is alſo a numeral, ſignifying 150, or, according to Baronius, 159; and with a daſh a-top, as $\overline{\text{Y}}$, it ſignified 150,000.

YACHT, a veſſel of ſtate, uſually employed to convey princes, ambaſſadors, or other great perſonages from one kingdom to another.

As the principal deſign of a yacht is to accommodate the paſſengers, it is uſually fitted with a variety of convenient apartments, with ſuitable furniture, according to the quality or number of the perſons contained therein.

The royal yachts are commonly rigged as ketches, except the principal one reſerved for the ſovereign, which is equipped with three maſts like a ſhip. They are in general elegantly furniſhed, and richly ornamented with ſculpture; and always commanded by captains in his majeſty's navy.

Beſides theſe, there are many other yachts of a ſmaller kind, employed by the commiſſioners of the exciſe, navy, and cuſtoms; or uſed as pleaſure-boats by private gentlemen.

YAMS. See DIOSCOREA.

YAMBOO. See EUGENIA.

YARDS *of a* SHIP, a long piece of timber ſupended upon the maſts of a ſhip, to extend the ſails to the wind. See MAST and SAIL.

All yards are either ſquare or lateen; the former of which are ſuſpended acroſs the maſts at right angles; and the latter obliquely.

The ſquare yards (fig. 1. Plate CCLX.) are nearly of a cylindrical ſurface. They taper from the middle, which is called the *ſlings*, towards the extremities which are termed the *yard arms*; and the diſtance between the ſlings and the yard-arms on each ſide, is, by the artificers, divided into quarters, which are diſtinguiſhed into the firſt, ſecond, third quarters, and yard-arms. The middle quarters are formed into eight ſquares, and each of the end parts is figured like the fruſtum of a cone. All the yards of a ſhip are ſquare except that of the mizen.

The proportions for the length of yards, according to the different claſſes of ſhips in the Britiſh navy, are as follows:

			Guns.
1000 : gun-deck : :	560 :	main-yard expreſſed by *d*, *d*, fig 1. Plate CCLX.—*Note*, the figure repreſents the yard and ſails of a ſhip of 74 guns.	100
	559 :		90 80
	570 :		70
	576 :		60
	575 :		50
	561 :		44
1000 : main-yard : :	880 :	fore yard.	100 90 80
	874 :		all the reſt.

To apply this rule to practice, ſuppoſe the gun-deck 144 feet. The proportion for this length is as 1000 is to 575, ſo is 144 to 83; which will be the length of the main-yard in feet, and ſo of all the reſt.

			Guns.
1000 main-yard : :	820 :	mizen-yd.	100 90 80 60 44
	847 :		70
	840 :		24
1000 : main yard : :	726 :	main topſail-yard *e*.	24
	720 :		all the reſt.
1000 : fore-yard : :	719 :	fore topſail-yard	70,
	726 :		24
	715 :		all the reſt.
1000 : main topſail-yard : :	690 :	main top gall.-yard	all the rates.
1000 fore topſail yard : :	696 :	fore top-gall.-yard *f*.	70
	690 :		all the reſt.
1000 : fore topſail yard : :	768 :	mizen topſail-yard	70
	750 :		all the reſt.

Croſs-jack and ſprit-ſail yards equal to the fore topſail-yard.

Sprit-topſail-yard equal to the fore top-gallant-yard.

The diameters of yards are in the following proportions to their length.

The main and fore yards five ſevenths of an inch to one yard. The topſail, croſs-jack, and ſprit-ſail yards, nine fourteenths of an inch to one yard. The top-gallant, mizen top-ſail, and ſprit-ſail topſail yards, eight thirteenths of an inch to one yard.

The mizen-yard five ninths of an inch to one yard.

All ſtuding-ſail booms and yards half an inch to one yard in length.

The lifts of the main-yard are exhibited in the above figure, by *g*; the horſes and their ſtirrups, by *h*, *i*; the reef-tackles and their pendents, by *k*, *l*; and the braces and brace-pendents, by *m*, *n*.

The lateen-yards evidently derive their names from having been peculiar to the ancient Romans. They are uſually compoſed of ſeveral pieces faſtened together by woodings, which alſo ſerve as ſteps whereby the ſailors climb to the peek or upper extremity, in order to furl or caſt looſe the ſail.

The mizen-yard of a ſhip, and the main-yard of a bilander, are hung obliquely on the maſt, almoſt in the ſame manner as the lateen-yard of a xebec, ſettee, or polacre.

YARD, a meaſure of length uſed in Britain and Spain, conſiſting of three feet, chiefly to meaſure cloth, ſtuffs, &c.

YARD-*Arm* is that half of the yard that is on either ſide of the maſt, when it lies athwart the ſhip.

YARDS alſo denotes places belonging to the navy, where the ſhips of war, &c. are laid up in harbour.—There are belonging to his majeſty's navy ſix great yards, viz. Chatham, Deptford, Woolwich, Portſmouth, Sheerneſs, and Plymouth; theſe yards are fitted with ſeveral docks, wharfs, lanches, and graving places, for the building, repairing, and cleaning of his majeſty's ſhips; and therein are lodged great quantities of timber, maſts, planks, anchors, and other materials: there are alſo convenient ſtore houſes in each yard, in which are laid up vaſt quantities of cables, rigging, ſails, blocks, and all other ſorts of ſtores needful for the royal navy.

YARE, among ſailors, implies ready or quick: as, be yare at the helm; that is, be quick, ready, and expeditious at the helm. It is ſometimes alſo uſed for bright by ſeamen: as, to keep his arms yare; that is, to keep them clean and bright.

YARE, a river of Norfolk, which runs from weſt to eaſt through that county, paſſing by Norwich, and falling into the German ſea at Yarmouth.

YARMOUTH, a ſea-port town of Norfolk, with a market on Wedneſdays and Saturdays, and a fair on Friday and Saturday in Eaſter-week for petty chapmen. It is ſeated on the river Yare, where it falls into the ſea, and is a place of great ſtrength, both by art and nature, being almoſt ſurrounded with water; and there is a draw-bridge over the river. It is eſteemed the key of this coaſt, and is a clean handſome place, whoſe houſes are well built, it being a conſiderable town for trade. It has one large church, and a neat chapel, and the ſteeple of St Nicholas's is ſo high, that it ſerves for a ſea-mark. It is governed by a mayor. The harbour is a very fine one, though it is very dangerous for ſtrangers in windy weather; and it has for its ſecurity a pretty ſtrong fort. It is 27 miles eaſt of Norwich, and 123 north-eaſt of London. E. Long. 2. 0. N. Lat. 52. 45.

YARMOUTH, a town of the Iſle of Wight, in Hampſhire, with a market on Fridays, and one fair on July 25th for toys. It is ſeated on the weſtern part of the iſland, on the ſea-ſhore, and is encompaſſed with water; for not many years ago a channel was cut through the peninſula, over which there is a draw-bridge, and it is defended by a ſtrong caſtle on the quay. It is a handſome place, whoſe houſes are chiefly built with ſtone, and covered with ſlate; and it ſends two members to parliament. The market is now diſuſed.

YARN, wool or flax ſpun into thread, of which they weave cloth. See CLOTH.

YAWNING, an involuntary opening of the mouth, occaſioned by a vapour or ventoſity endeavouring to eſcape, and generally witneſſing an irkſome wearineſs, or an inclination to ſleep. Yawning, according to Boerhaave, is performed by expanding at one and the ſame time all the muſcles capable of ſpontaneous motion; by greatly extending the lungs; by drawing in gradually and ſlowly a large quantity of air; and gradually and ſlowly breathing it out, after it has been retained for ſome time and rarified; and then reſtoring the muſcles to their natural ſtate. Hence the effect of yawning is to move, accelerate, and equally diſtribute all the humours through all the veſſels of the body, and conſequently to qualify the muſcles and organs of ſenſation for their various functions.

Sanctorius obſerves, that a great deal is inſenſibly diſcharged, when nature endeavours to get rid of the retained perſpirable matter, by yawning and ſtretching of the limbs. To theſe a perſon is moſt inclined juſt after ſleep, becauſe, a greater quantity going off by the pores of the ſkin than at other times, whenſoever a perſon wakes, the increaſed contraction that then happens cloſes a great deal of the perſpirable matter in the cutaneous paſſages, which will continually give ſuch irritations as excite yawning and ſtretching; and ſuch motions, by ſhaking the membranes of the whole body, and ſhifting the contacts of their fibres, and the incloſed matter, by degrees throw it off. Hence we ſee the reaſon why healthful ſtrong people are moſt inclined to ſuch motions, becauſe they perſpire moſt in time of ſleep, and therefore have more of the perſpirable matter to lodge in the pores, and greater irritations thereunto. The advantages of ſome little exerciſe juſt after waking in a morning are conſiderable, as it throws off all the perſpirable matter that is ready for its exit out of the body. When yawning is troubleſome, Hippocrates ſays, that long deep reſpiration, or drawing in the air at long intervals, cures it.

YEAR, in aſtronomy and chronology. See ASTRONOMY, n° 289—296.

YELL, one of the iſlands of Shetland, lying northeaſt from the main land, and divided from it by an arm of the ſea, called *Yell Sound*. By ſome it is thought to have been the *Thule* of the ancients. In the old deſcriptions it is ſaid to be 20 miles long, and eight broad. It is very mountainous and full of moſs; but there are pretty conſiderable paſtures in which they feed a great many ſheep; and it alſo affords plenty of peat. It has eight large harbours, which would not be thought deſpicable in other countries. Anciently it ſeems to have been pretty populous, ſince there are in it three churches, 20 chapels, and many brughs or Pictiſh forts.

YELLOW, one of the original colours of light.

YELLOW-*Colour for Houſe-painting*. See CHEMISTRY, n° 148.

Naples YELLOW, a beautiful colour much uſed by painters, formerly thought to be prepared from arſenic, but now diſcovered to have lead for its baſis.

YELLOW *Hammer*, in ornithology. See FRINGILLA.

YELLOW-*Fever*. See MEDICINE, n° 416, 417, 434.

YEOMAN, the firſt or higheſt degree among the plebians of England, next in order to the gentry.

The Yeomen are properly freeholders, who having land of their own, live on good huſbandry.

YEOMAN is alſo a title of office in the king's houſehold, of a middle place or rank between an uſher and a groom.

YEOMAN *of the Guard* were anciently 250 men of the beſt rank under gentry, and of larger ſtature than ordinary, each being required to be ſix feet high.

At preſent there are but 100 yeomen in conſtant duty, and 70 more not in duty; and as any of the 100 dies, his place is ſupplied out of the 70.

They go dreſſed after the manner of king Henry

VIII's time. They formerly had diet as well as wages when in waiting; but this was taken off in the reign of queen Anne.

YEOVIL, a market-town of Somerſetſhire, ſituated 18 miles ſouth of Wells.

YEST, a head or ſcum riſing upon beer or ale, while working or fermenting in the vat. See BREWING.

It is uſed for a leaven or ferment in the baking of bread, as ſerving to ſwell or puff it up very conſiderably in a little time, and to make it much lighter, ſofter, and more delicate. See BAKING, BREAD, and BARM.

The making of yeſt was formerly a great deſideratum in the arts; but of late Mr Henry has publiſhed a proceſs, by which he ſays it can be originally produced without any previous fermentation. The proceſs conſiſts in impregnating a mixture of molaſſes and flour with fixed air; and this mixture is afterwards found to act as a ferment to other ſubſtances.

YEW, in botany. See TAXUS.

YLA, one of the weſtern iſlands of Scotland, ſituated in the Iriſh ſea, weſt of Cantire. See ILA.

YNCA, an appellation anciently given to the kings of Peru, and the princes of their blood; the word literally ſignifying lord, king, emperor, and royal blood.

YOAK, or YOKE, in agriculture, a frame of wood, fitted over the necks of oxen, whereby they are coupled together, and harneſſed to the plough.

YOAK *of land* in our ancient cuſtoms, was the ſpace which a yoke of oxen, that is, two oxen, may plow in one day.

YOLK, the yellow part in the middle of an egg. See EGG. The yolk is endued with an anodyne, maturating, digeſting, and relaxing virtue. Hence it is very often an ingredient in clyſters, and mixed with a little ſalt, is commonly applied, in a walnut ſhell, to the navels of infants, in order to looſen the belly.

YONNE, a river in France, which riſing in Burgundy, and running north through Nivernois and Champaign, falls into the Seyne at Monterau ſur Yonne.

YORK, in Latin *Eboracum*, the capital of Yorkſhire in England. This city is ſo ancient that the origin of it is uncertain. In the time of the Romans a legion was ſtationed here, it being then the capital of the Brigantes; and here died the emperor Severus, and Flavius Valerius Conſtantius Chlorus, father of Conſtantine the Great. There was then alſo a temple of Bellona here, and no leſs than three military ways went from hence. In the time of the Saxons it was erected into an archbiſhopric by pope Honorius, to which are now ſubject the biſhoprics of Cheſter, Durham, Carliſle, and the Iſle of Man; though anciently 12 biſhoprics in England, and all Scotland, were. A horn is ſtill kept in the minſter, by which Ulphius, one of the Saxon princes, beſtowed all his lands and revenues upon the church.

This city ſuffered very much during the ravages of the Danes; but, after the conqueſt, it began to flouriſh again. The cathedral, which coſt a long time and a great deal of money in building, is a moſt ſtately Gothic pile. Its chapter-houſe is particularly admired for its painted glaſs, its fine marble ſtalls, its pillars of alabaſter, and curious contrivance. In it is the following line in gold letters:

Ut Roſa, flos florum, ſic eſt Domus iſta Domorum.

The choir is remarkable for its fine carvings, particularly the ſtatues of all the Engliſh monarchs; and the windows are exquiſitely painted with the hiſtory of the Bible. The lanthorn ſteeple is 70 feet ſquare, and 188 high, and the windows are 45. At the ſouth end is a circular light, called the *marigold window* from the colour of its glaſs; and at the north end is a very large one, whoſe painting repreſents embroidery.—Here, in the reign of Richard I. was a barbarous maſſacre of the Jews; and Henry III. had, in this place, an interview with Alexander king of Scots. Several parliaments were held here in the reigns of Edward I. and II. A tribunal, not unlike the parliaments of France, was eſtabliſhed at York by Henry VIII. to decide all cauſes in theſe northern parts, according to the rules of equity.

This city, as hath been already obſerved, is a county of itſelf; and its juriſdiction extends over 36 villages and hamlets in the neighbourhood. It is generally reckoned the ſecond city in England; but though it ſtands upon more ground, it is inferior in trade, wealth, and number of people, to Briſtol. It is ſituate in a fine plain, in the middle of the ſhire, on both ſides the Ouſe, walled, and divided into four wards, containing 28 pariſhes. It enjoys large privileges and immunities, conferred upon it by a ſucceſſion of kings from Henry II. and its chief magiſtrate has the title of *lord-mayor*, which is an honour peculiar to it and London. Richard II. made it a county of itſelf. The conſervancy of moſt of the rivers of the county, within certain limits, belongs to the lord-mayor and aldermen. The middle arch of the bridge here over the Ouſe, is thought to equal the Rialto at Venice, in architecture, height, and breadth, the diameter being 81 feet, and the height 51. Though this city is 60 miles diſtant from the ſea, yet ſhips of 70 tons burden come up the river to it. The town-houſe, or Guildhall, ſtands upon the bridge, and is ſuperior in all reſpects to that of London. In the Popiſh times there were nine abbeys here, and a vaſt number of churches; but of the latter there are only 17 now. The ſteeple of that of Allhallows, is reckoned the fineſt in England. The archbiſhop has a fine palace; and the aſſembly-room, deſigned by the earl of Burlington, is very noble. Here are plays, aſſemblies, concerts, and the like entertainments, at ſome houſe or other, almoſt every night in the week. In the old caſtle, built originally by William the Conqueror, and repaired in 1701, the aſſizes are kept. It ſerves alſo for the county goal, which is the neateſt and pleaſanteſt in England, with an area larger than that of the King's-bench, and has a handſome chapel in it, with a good allowance for a preacher. This city has long given the title of *duke* to ſome branch of the royal family, and lately to his royal highneſs Edward, next brother to his preſent majeſty George III. who was carried off by a violent fever at Monaco in Italy, in the flower of his age, to the great grief of the nation and the royal family.

The plenty and cheapneſs of proviſions induces many perſons of ſmall fortune, or that would live frugally, Yorkſhire, York.

to take up their abode here; and the venerable remains of Roman antiquities, and thoſe of a latter date, as abbeys, churches, and caſtles, procure this city a viſit, from every curious traveller. Many Roman altars urns, coins, inſcriptions, &c. have been found; and Saxon coins are ſtill extant that have been ſtruck here. The members for this city have precedence of all others, except thoſe of London, in the houſe of commons. An infirmary, after the manner of thoſe of Bath, Briſtol, &c. hath been erected in it; and a cotton manufacture eſtabliſhed, and brought to great perfection. Beſides four weekly markets, it has a great many fairs; one, in particular, every other Thurſday, for cattle and ſheep.

YORKSHIRE, the largeſt county of England, bounded on the ſouth by Derbyſhire, Nottinghamſhire, and Lincolnſhire; on the north by Durham and Weſtmoreland; on the eaſt by the German ocean; and on the weſt by Lancaſhire, and a part of Cheſhire.—It is upwards of 80 miles in length from eaſt to weſt, near as much in breadth, and about 360 in circumference, containing, in the whole, 26 hundreds or wapentakes, 49 market-towns, 563 pariſhes, 242 vicarages, with many chapels of eaſe, and 2330 villages. Its area is computed by ſome at 4684 ſquare miles, by others at 3,770,000 acres, and its inhabitants at upwards of 530,000. It is divided into three parts, or ridings, viz. the Weſt, Eaſt, and North; ſo denominated from their ſituation, in reſpect of the city of York. Each of theſe is as large, if not larger, than any ordinary county. There are other diviſions, as Richmondſhire, Allertonſhire, Howdenſhire, Hallanſhire, Craven, Cleveland, Marſhland, Holderneſs, &c.

As the ſoil and face of the country vary greatly, ſo does the air. In the hilly parts the air is good, but the ſoil very indifferent; of the lower, ſome are marſhy, others drier, and the ſoil of both rich; but the air of the former is more foggy and unhealthy than that of the latter.

The manufactures of this county are cutlery and hard-wares; particularly knives, bits, and ſpurs; but the principal are ſtockings and woollen cloth, with which it ſupplies, in a great meaſure, Germany and the North. As to the produce, it abounds in corn, cattle, horſes, lead, and iron, coal, wood, lime, liquorice, alum, jet, &c. It lies wholly in the northern circuit, and much the greater part of it in the dioceſe of York; that only which is called *Richmondſhire*, belonging to the dioceſe of Cheſter. The members it ſends to parliament are 30; of which two are for the ſhire, and 28 for the towns.

York (*New*), one of the United States of America. It is bounded on the eaſt by New-England; on the north by Canada; on the ſouth by New-Jerſey; and on the weſt by Delawar river. It produces corn, abounds in cattle, and has a good breed of horſes; but the inhabitants are chiefly employed in fiſheries. They ſupply the Carribbee iſlands with flour, ſalt-beef, pork, ſalt-fiſh, horſes, and timber. They export a great deal of dried and ſalted fiſh to Europe; as alſo logwood, train oil, and whalebone. There are ſome forts on the north to defend them againſt the native Americans.

York (*New*), the capital of the province of New-York, in North-America, ſeated in an iſland at the mouth of Hudſon's river. It ſtands on an eminence, and is ſurrounded with a wall, and has other fortifications. It has a ſpacious harbour, with commodious quays, as well as warehouſes. It is frequented by a great number of ſhips employed in trade, and in the fiſheries. W. Long. 74. 40. N. Lat. 39. 40.

Young.

YOUNG (Dr Edward), was the ſon of a clergyman of the ſame name, and was born about the year 1679. When ſufficiently qualified, he was matriculated into All-Souls college, Oxford; and deſigning to follow the civil law, he took a degree in that profeſſion. In this ſituation he wrote his poems called *The Laſt Day*, publiſhed in 1704; which coming from a layman gave univerſal ſatisfaction: this was ſoon after followed by another, intitled *The Force of Religion, or Vanquiſhed Love*. Theſe productions gained him a reſpectable acquaintance; he was intimate with Addiſon, and thus became one of the writers of the Spectator: but the turn of his mind leading him to the church, he took orders, was made one of the king's chaplains, and obtained the living of Welwyn in Hartfordſhire, worth about 500 l. *per annum*, but he never roſe to higher preferment. For ſome years before the death of the late prince of Wales, Dr Young attended his court pretty conſtantly; but upon his deceaſe, all his hopes of church preferment vaniſhed; however, upon the death of Dr Hales, he was taken into the ſervice of the princeſs dowager of Wales, and ſucceeded him as her privy chaplain. When pretty far advanced in life, he married the lady Elizabeth Lee, daughter of the late earl of Litchfield. This lady was a widow, and had an amiable ſon and daughter, who both died young. What he felt for their loſs, as well as for that of his wife, is finely expreſſed in his Night Thoughts, in which the young lady is characteriſed under the name of Narciſſa; her brother by that of Philander; and his wife, though nameleſs, is frequently mentioned: and he thus, in an apoſtrophe to death, deplores the loſe of all the three:

> Inſatiate archer, could not once ſuffice!
> Thy ſhaft flew thrice, and thrice my peace was ſlain,
> And thrice ere thrice yon moon renew'd her horn.

He wrote three tragedies, *The Revenge*, *Buſiris*, and *The Brothers*. His ſatires, called *Love of Fame the univerſal Paſſion*, are by many eſteemed his principal performance; though Swift ſaid the poet ſhould have been either more angry or more merry: they have been characteriſed as a ſting of epigrams written on one ſubject, that tire the reader before he gets through them. His *Complaint, or Night Thoughts*, exhibit him as a moral and melancholy poet, and are eſteemed his maſter-piece. They form a ſpecies of poetry peculiarly his own, and in which he has been unrivalled by all thoſe who attempted to write in this manner. They were written under the recent preſſure of his ſorrow for the loſs of his wife, daughter, and ſon-in-law; they are addreſſed to Lorenzo, a man of pleaſure and the world, and who, as it is inſinuated by ſome, is his own ſon, but then labouring under his father's diſpleaſure. As a proſe-writer he arraigned the prevailing manners of his time, in a work called *The Centaur not Fabalous*; and when he was above 80 years of age, publiſhed *Conjectures on Original Compoſition*. He publiſhed ſome other pieces; and the whole of his works are collected in 4 and 5 vols 12mo.

Young
‖
Ypres.

Dr Young's turn of mind was naturally ſolemn; and he uſually, when at home in the country, ſpent many hours of the day walking in his own church-yard among the tombs. His converſation, his writings, had all a reference to the life after this; and this turn of diſpoſition mixed itſelf even with his improvements in gardening. He had, for inſtance, an alcove with a bench, ſo painted near his houſe, that at a diſtince it looked as a real one, which the ſpectator was then approaching. Upon coming up near it, however, the deception was perceived, and this motto appeared, *Inviſibilia non decipiunt*, "The things unſeen do not deceive us." Yet, notwithſtanding this gloomineſs of temper, he was fond of innocent ſports and amuſement; he inſtituted an aſſembly and a bowling-green in the pariſh of which he was rector, and often promoted the gaiety of the company in perſon. His wit was generally poignant, and ever levelled at thoſe who teſtified any contempt for decency and religion. His epigram, ſpoken extempore upon Voltaire, is well known; who happening in his company to ridicule Milton, and the allegorical perſonages of Death and Sin, Young thus addreſſed him:

> Thou art ſo witty, profligate, and thin,
> You ſeem a Milton with his Death and Sin.

One Sunday preaching in office at St James's, he found, that though he ſtrove to make his audience attentive, he could not prevail. Upon which his pity for their folly got the better of all decorums, and he ſat back in the pulpit, and burſt into a flood of tears. Towards the latter part of life, he knew his own infirmities, and ſuffered himſelf to be in pupilage to his houſe-keeper; for he conſidered that, at a certain time of life, the ſecond childhood of age demanded its wonted protection. His ſon, whoſe boyiſh follies were long obnoxious to paternal ſeverity, was at laſt forgiven in his will; and our poet died regretted by all, having performed all that man could do to fill his poſt with dignity. His death happened in 1765.

YOUTH, that ſtate of man, in which he approaches towards his greateſt perfection of body.—— In this ſtate, according to Dr Cullen, rigidity and ſtrength are now greater, but ſtill, with reſpect to the middle point, laxity prevails; a leſs proportion of fluids, with reſpect to the veſſels, but ſtill prevailing humidity; increaſed cellular ſubſtance, on which the growth of the body chiefly depends till the acme, and long after; heart leſs in proportion to the ſyſtem than formerly, and more in a balance with it; the arteries are diminiſhed, in ſome meaſure, with reſpect to the veins, but ſtill exceed them; the whole viſcera are larger, and particularly the lungs; and, as the veſſels are more rigid, conſequently a greater determination of fluids to that organ, which explains the diſeaſes incident to the ſtage of life, hæmoptoiſis, peripneumony, &c. The ſame ſenſibility and irritability continue, perhaps, as before, but the former is more accurate, from the tenſion of the veſſels, and conſequently the fibres. The latter is rather encreaſed, and hence iraſcibility more frequently appears at this period. There is alſo great mobility, but with much leſs levity.

YPRES, a handſome, large, and populous town of the Auſtrian Netherlands, with a biſhop's ſee. It has a conſiderable manufactory in cloth and ſerges, and every year in Lent there is a conſiderable fair. It is one of the barrier towns, but was beſieged and taken by the French in 1744. It is ſeated on a fertile plain on the river Ypre, in E. Long. 2. 58. N. Lat. 50. 51.

Yucca.

YUCCA, ADAM'S NEEDLE; a genus of the monogynia order belonging to the hexandria claſs of plants.

Species. 1. The glorioſa, or common Adam's needle; riſes with an erect, ligneous, thick ſtem two or three feet high, having very long, narrow, ſtiff, entire leaves ending in a long, ſharp, black-ſpine, garniſhing the ſtem almoſt to the bottom and in a large tuft at top; and from the centre of the top leaves riſes a long branching peduncle, ſuſtaining a panicle of bell-ſhaped white and purple flowers.

2. The filamentoſa, or Virginia yucca; riſes with an upright, thick, ligneous ſtem two or three feet high, adorned at top with a tuft of very long, ſpear-ſhaped, ſtiff, blunt-pointed, ſawed filamentoſe leaves, emitting long threads from the ſides, hanging downward; and from the top of the ſtem amidſt the leaves an erect peduncle or flower-ſtalk, ſeveral feet high, garniſhed with many large, white, and purple-ſtriped leaves. Both theſe ſpecies flower in Auguſt and September, and make an ornamental appearance, but are not ſucceeded by ſeeds in this country. They are natives of North America, the former that of Canada, and the latter of Virginia, and are both tolerably hardy.

3. The aloifolia, or aloe-leaved yucca; riſes with an erect, thick, fleſhy ſtem, eight or ten feet high, crowned with a large tuft of long narrow, ſtiff, crenated, aloe-like leaves, ending in ſharp ſpines; and from the centre of the crown of leaves come out the flower-ſtalk, branching pyramidally two or three feet high, having all the branches terminating in a ſpike of flowers, purple without and white within, appearing in Auguſt and September.

4. Draconis, or tree-leaved yucca; riſes with an upright, thick, brown ſtem, three feet high, crowned with long, narrow, ſerrated leaves ending in ſpines and nod downward; and in the centre of the leaves ariſe the flower-ſtalk very branchy, with all the branches terminating in ſpikes of fleſh-coloured flowers in Auguſt and September.

All theſe four ſpecies of yucca, being of ſingularly curious growth, are worthy of culture in every good collection, keeping ſome of all the ſorts in pots, to move to ſhelter of a green-houſe in winter, as they will afford a conſpicuous and entertaining variety in this collection: ſome plants of the two firſt ſorts may alſo, after attaining a little ſtrength and gradually hardened, be planted out in the full ground in ſome dry warm ſituation, ſheltered by adjacent ſhrubs and trees. As all the ſorts are of a ſucculent nature, they ſhould always be planted in a light dry ſoil; if ſomewhat ſandy the better. The propogation of all the ſorts is by off-ſets and ſuckers, from the root and head of the plants; alſo by ſeed. The two laſt kinds being tender, cannot bear the open air.

Uſes. A kind of bread is made from the roots of this plant by the Indians, which much reſembles that from the Caſſada. See JATROPHA.

Z.

Z, or z, the twenty-fourth and laſt letter, and the nineteenth conſonant of our alphabet; the ſound of which is formed by a motion of the tongue from the palate downwards and upwards to it again, with a ſhutting and opening of the teeth at the ſame time. This letter has been reputed a double conſonant, having the ſound *ds*; but ſome think with very little reaſon; and, as if we thought otherwiſe, we often double it, as in *puzzle*, *muzzle*, &c. Among the ancients, Z was a numeral letter, ſignifying two thouſand, and with a daſh added a-top, Z̄ ſignified two thouſand times two thouſand, or four millions.

In abbreviations this letter formerly ſtood as a mark for ſeveral ſorts of weights; ſometimes it ſignified an ounce and a half, and very frequently it ſtood for half an ounce; ſometines for the eighth part of an ounce, or a dram Troy weight; and it has in earlier times been uſed to expreſs the third part of an ounce, or eight ſcruples. ZZ were uſed by ſome of the ancient phyſicians to expreſs myrrh, and at preſent they are often uſed to ſignify zinziber, or ginger.

ZAARA, ZAPARA, or SAHARA, a barren and deſert country of Africa, ſtretches itſelf from the Atlantic Ocean on the weſt, to the deſert of Barca and Nubia on the eaſt; that is, from the eighth degree of weſt to the twenty-ſixth of eaſt longitude; and from Biledulgerid on the north to Negroland on the ſouth; or from the fifteenth degree of latitude quite to the tropic of Cancer, and even beyond; ſo that it will be about 400 or 500 miles in breadth, from north to ſouth; and above 1500 in length, from eaſt to weſt. The river Niger is its boundary to the ſouth. It was known to the ancients by the name of Libya Interior, or Libya Deſerta; and is ſuppoſed to have been then inhabited by the Getuli. At preſent it is moſtly inhabited by Arabs, who, for the generality, are an ignorant, brutiſh, and ſavage people, who lead a wandering life, and live chiefly on the milk of their flocks, with a little barley-meal, and ſome dates. The poorer ſort go naked, except the females, who commonly wrap a clout about their middle, and wear a kind of bonnet on their head; but the wealthier ſort have a kind of looſe gown, made of blue callicoe, with large ſleeves, that is brought them from Negroland. Both ſexes are very ſwarthy; the men tall and thin, but the women fat and luſty. When they move from one place to another for freſh paſture, water, or prey, moſt of them ride on camels, which have generally a ſort of ſaddle between the bunch and the neck, with a ſtring or ſtrap run through their noſtrils, which ſerves for a bridle; and inſtead of ſpurs they uſe a ſharp bodkin. Their tents or huts are covered with a coarſe ſtuff, made of camels hair, and a kind of wool or moſs that grows on the palm trees. Theſe Arabs live here under the government of their ſheiks or cheyks, as in Arabia, Egypt, and other places. Beſides theſe Arabs, there is a people here who live in ſettled habitations, and are more civil and hoſpitable, carrying on a kind of commerce with ſtrangers. The religion of both is a kind of Mohammediſm.

ZABULON (anc. geog.), one of the twelve tribes, bounded on the north by the tribes of Aſher and Naphthali, on the eaſt by the ſea of Galilee, on the ſouth by the tribe of Iſſachar, or the brook Ciſon, which ran between both, on the weſt by the Mediterranean; ſo that it touched two ſeas, or was bimarous.

ZABULON (anc. geog.), a very ſtrong town in the tribe of that name, on the Mediterranean, ſirnamed *of men*, near Ptolemais: its vicinity to which makes it probable that it was alſo Chabulon, unleſs either name is a faulty reading in Joſephus; diſtant about 60 ſtadia from Ptolemais.

ZACYNTHUS (anc. geog.), an iſland to the ſouth of Cephalenia 60 ſtadia, but nearer to Peloponneſus, in the Ionian ſea, formerly ſubject to Ulyſſes, in compaſs above 160 ſtadia, woody and fruitful, with a conſiderable cognominal town, and a port. The iſland lies over againſt Elis, having a colony of Acheans from Peloponneſus, over-againſt the Corinthian Gulf. Both iſland and town are now called *Zante*, to the weſt of the Morea, and ſouth of Cephalonia. E. Long. 21. 30. N. Lat. 37. 50.

ZAFFRE, or SAFFRE, is the reſiduum of cobalt, after the ſulphur, arſenic, and other volatile matters of this mineral have been expelled by calcination. It is therefore a kind of calx of cobalt, of a grey or reddiſh colour. The uſe of cobalt is to produce a very fine blue colour, when it is melted with fuſible and vitrifiable matters. This blue colour produced by the vitrification of zaffre proceeds from the earth or calx of a ſemi-metallic ſubſtance contained in cobalt, called by chemiſts *regulus of cobalt*. This is proved by melting zaffre with a reducing flux, like any other roaſted ore; by which means the above-mentioned ſemi-metallic regulus of cobalt will be obtained. The ſcoria in this fuſion has alſo a blue colour, which proceeds from a portion of the calx of this regulus that is not reduced, but is vitrified along with the ſcoria. The calx therefore or metallic earth of the regulus of cobalt is the ſole cauſe of the blue colour produced by zaffre. But as the quantity of regulus contained in cobalt is variable, therefore ſome zaffres furniſh more blue than others. The heterogeneous fixed matters contained in cobalts, contribute, according to their quantity, not only to the greater or leſs intenſity of the blue colour, but alſo to its luſtre and beauty. For which reaſon, thoſe who manufacture zaffre from cobalt, make frequent eſſays of the roaſted ore, by mixing it with vitreous matters, to diſcover the intenſity and beauty of the blue colour. Good cobalts calcined would form too deep a blue, and almoſt a black glaſs, if they were not previouſly mixed with a certain quantity of vitreous fritt. In the manufacture of zaffre, therefore, the calx of cobalt, the ſtrength of which has been previouſly determined by eſſays, is mixed with ſuch a quantity of ſand, or of powdered flints and quartz, that with the addition of ſome ſaline flux, a deep blue glaſs may be formed. The zaffre that is commonly ſold, and which comes from Saxony, is a mixture of calx of cobalt with ſome vitrifiable earth, as we have ſaid. It is of a grey colour, as all calxes of cobalt are before vitrification. Some zaffres are dearer than others, according to the intenſity of the colour which they are capable of producing. Zaffre is employed in the manufacture of pottery and of porcelain, for painting the ſurface of the pieces of ware upon which it is applied together with ſome ſaline flux, previouſly to the baking or glazing, that the ſame fire may alſo vitrify this colouring material.

The blue of zaffre is the moſt ſolid and fixed of all the colours that can be employed in vitrification. It ſuffers no change from the moſt violent fire. It is ſucceſsfully employed to give ſhades of blue to enamels, and to the cryſtal-glaſſes made in imitation of ſome opake and tranſparent precious ſtones, as the lapis lazuli, the turquois, the ſaphire, and others of this kind.

ZALEUCUS, a famous legiſlator of the Locrians, and the diſciple of Pythagoras, flouriſhed 500 years B.C. He made a law, by which he puniſhed adulterers with the loſs of both their eyes; and his ſon offending, was not abſolved from this puniſhment: yet, to ſhow the father as well as the juſt law-giver, he put out his own right, and his ſon's left eye. This example of juſtice and ſeverity made ſo ſtrong an impreſſion on the minds of his ſubjects, that no inſtance was found of the commiſſion of that vice during the reign of that legiſlator. It is added, that Zaleucus forbad any wine being given to the ſick on pain of death, unleſs it was preſcribed by the phyſicians; and that he was ſo jealous of his laws, that he ordered that whoever was deſirous of changing them, ſhould be obliged, when he made the propoſal, to have a cord about his neck, in order that he might be immediately ſtrangled, if thoſe alterations were eſteemed no better than the laws already eſtabliſhed. Diodorus Siculus attributes the ſame thing to Charondas, legiſlator of the Sybarites.

ZALUSKI (Andrew Chryſoſtom), biſhop of Plocſko, and afterwards of Varnia, and grand chancellor of Poland, was the ſon of Alexander Zaluſki, waiwode of Rava. He had a great ſhare in all the important affairs of the ſtate, and died in 1711, aged 61. His principal work is a curious collection of Latin Letters, printed in 1709 and 1711, in 3 vols, folio. Theſe letters contain the hiſtory of Poland, and intereſting memoirs of Europe, during his own time.

ZAMA (anc. geog.), a town of Chamane, a diſtrict of Cappadocia, of unknown ſituation.—Another Zama, of Meſopotamia, on the Saocoras, to the ſouth of Niſibis.—A third, of Numidia, diſtant five days journey to the weſt of Carthage: it was the other royal reſidence of the kings of Numidia, hence called *Zama Regia*. It ſtood in a plain; was ſtronger by art than nature; richly ſupplied with every neceſſary; and abounding in men, and every weapon both of defence and annoyance.

The laſt of theſe is remarkable for the deciſive battle fought between the two greateſt commanders in the world, Hannibel the Carthaginian and Scipio Africanus. Of this engagement, the moſt important perhaps that ever was fought, Mr Hooke gives us the following account.

“ Scipio drew up his army after the Roman manner, except that he placed the cohorts of the Principes directly behind thoſe of the Haſtati, ſo as to leave ſufficient ſpace for the enemy's elephants to paſs thro' from front to rear. C. Lælius was poſted on the left wing with the Italian horſe, and Maſiniſſa with his Numidians on the right. The intervals of the firſt line Scipio filled up with his Velites, or light-armed troops, ordering them, upon a ſignal given, to begin the battle; and in caſe they were repulſed, or broke by the elephants, to run back through the lanes before mentioned, and continue on their flight till they were got behind the Triarii. Thoſe that were wounded, or in danger of being overtaken, were to turn off to the right and left through the ſpaces between the lines, and that way eſcape to the rear.

“ The army thus drawn up, Scipio went from rank to rank, urging his ſoldiers to conſider the conſequences of a defeat, and the rewards of victory: on the one hand, certain death or ſlavery, (for they had no town in Africa ſtrong enough to protect them), on the other, not only a laſting ſuperiority over Carthage, but the empire of the reſt of the world.

“ Hannibal ranged all his elephants, to the number of above 80, in one front. Behind theſe he placed his mercenaries, conſiſting of 12,000 men, Ligurians, Gauls, Baleares, and Mauritanians.

“ The new levies of Carthaginians and other Africans, together with 4000 Macedonians, under a general named Sopater, compoſed the ſecond line. And in the rear of all, at the diſtance of about a furlong, he poſted his Italian troops, in whom he chiefly confided. The Carthaginian horſe formed his right wing, the Numidians his left.

“ He ordered their ſeveral leaders to exhort their troops, not to be diſcouraged by their own weakneſs, but to place the hope of victory in him and his Italian army; and particularly directed the captains of the Carthaginians to repreſent to them what would be the fate of their wives and children if the event of this battle ſhould not prove ſucceſsful. The general himſelf, walking through the ranks of his Italian troops, called upon them to be mindful of the 17 campaigns in which they had been fellow-ſoldiers with him; and of that conſtant ſeries of victories, by which they had extinguiſhed in the Romans all hope of ever being conquerors. He urged them to remember, above all, the battles of Trebia, Thraſymenus, and Cannæ; with any of which the approaching battle was in no wiſe to be compared, either with reſpect to the bravery, or the number of the enemy. “ The Romans were yet unfoiled, and in the height of their ſtrength when you firſt met them in the field; nevertheleſs you vanquiſhed them. The ſoldiers now before us are either the children of the vanquiſhed, or the remains of thoſe whom you have often put to flight in Italy. Maintain therefore your general's glory and your own, and eſtabliſh to yourſelves the name of invincible, by which you are become famous throughout the world.”

“ When the Numidians of the two armies had ſkirmiſhed a while, Hannibal ordered the managers of the elephants to drive them upon the enemy. Some of the beaſts, frightened at the noiſe of the trumpets, and other inſtruments of war, which ſounded on all ſides, immediately ran back amongſt the Numidians of the Carthaginian left wing, and put them into confuſion; which Maſiniſſa taking advantage of, entirely routed them. Great deſtruction was made of the Velites by the reſt of the elephants, till theſe alſo being terrified, ſome of them ran through the void ſpaces of the Roman army which Scipio had left for that purpoſe; others falling in among the cavalry of the enemy's right wing, gave Lælius the ſame opportunity againſt the Carthaginian horſe as had been given to Maſiniſſa againſt the Numidian, and of which the Roman did not fail to make the ſame uſe. After this the infantry of the foremoſt lines joined battle. Hannibal's mercenaries had the advantage in the beginning of the conflict; but the Roman Haſtati, followed and encouraged by the Principes, who exhorted them to fight manfully, and ſhowed themſelves ready to aſſiſt them, bravely ſuſtained the attack, and at length gained ground upon the enemy. The mercenaries not being ſeaſonably ſupported by their ſecond line, and therefore thinking themſelves betrayed, they in their retreat fell furiouſly upon the Africans; ſo that theſe, the Haſtati coming up, were obliged to fight for ſome time both againſt their own mercenaries and the enemy. When the two Carthaginian lines had ceaſed their mutual rage, they joined their ſtrength; and though now but a mere throng of men, broke the Haſtati: but then the Principes advancing to the aſſiſtance of the latter, reſtored the battle; and moſt of the Africans and mercenaries were here cut off. Hannibal did not advance to their relief, the Roman Triarii not having yet engaged, and the Principes being ſtill in good order: and leſt the routed Africans and mercenaries ſhould break the ranks of his Italian ſoldiers, he commanded theſe to preſent their ſpears at thoſe who fled to them for protection, which obliged the runaways to move off to the right and left.

“ The ground over which the Romans muſt march before they could attack Hannibal, being ſtrewed with heaps of dead bodies and weapons, and being ſlippery with blood, Scipio feared that the order of his battalions would be broke, ſhould he paſs it haſtily. To avoid this miſchief, he commanded the Haſtati to give over the purſuit, and halt where they were, oppoſite to the enemy's centre: after which, having ſent all his wounded to the rear, he advanced leiſurely with the Principes and Triarii, and placed them on the wings of the Haſtati. Then followed a ſharp engagement, in which victory was long and eagerly diſputed. It would ſeem that the Romans, though ſuperior in number, were once upon the point of loſing the day; for Polybius tells us, that Maſiniſſa and Lælius came very ſeaſonably, and as if ſent from heaven, to their aſſiſtance. Theſe generals being returned from the purſuit of the cavalry, fell ſuddenly upon the rear of Hannibal's men, moſt of whom were cut off in their ranks; and of thoſe that fled, very few eſcaped the horſe, the country all around being a plain.

“ There died of the Carthaginians in the fight above 20,000, and almoſt the like number were taken priſoners. The loſs on the ſide of the Romans amounted to about 2000 men. Hannibal eſcaped with a few horſe to Adrumetum, having performed every thing in the engagement which could be expected from a great general. His army (ſays Polybius) could not have been more ſkilfully drawn up. For as the order of the Roman battalions makes it extremely difficult to break them, the Carthaginian wiſely placed his elephants in the front, that they might put the enemy in confuſion before the armies ſhould engage. In his firſt line he placed the mercenaries; men bold and active, but not well diſciplined, that by their impetuoſity he might give a check to the ardour of the Romans. The Africans and Carthaginians, whoſe courage he doubted, he poſted in the middle between the mercenaries and his Italian ſoldiers, that they might be forced to fight, or at leaſt that the Romans, by ſlaughtering them, might fatigue themſelves and blunt their weapons. Laſt of all, he drew up the troops he had diſciplined himſelf, and in whom he chiefly confided, at a good diſtance from the ſecond line, that they might not be broken by the route of the Africans and mercenaries, and kept them in reſerve for a vigorous attack upon a tired and weakened enemy.”

ZANGUEBAR, a country in Africa, lying on the eaſtern coaſt, between 3 degrees of north latitude, and 18 ſouth. It includes ſeveral petty kingdoms, in which the Portugueſe have various ſettlements. The inhabitants, except thoſe converted by the Portugueſe, are all Mahometans or Idolaters; and the latter much the more numerous. The names of the principal territories are *Mombaza, Lamon, Melinda, Quiola,* and *Moſambique.* The Portugueſe have built ſeveral forts in Mombaza and Moſambique, and have ſettled ſeveral colonies there. They trade with the Negroes for ſlaves, ivory, gold, oſtrich-feathers, wax, and drugs. The productions are much the ſame as in other parts of Africa between the tropics.

ZANTE, an iſland of the Mediterranean, near the coaſt of the Morea, 17 miles ſouth-eaſt of the iſland of Cephalonia, belonging to the Venetians. It is about 24 miles in length, and 12 in breadth, and very pleaſant and fertile; but its principal riches conſiſt in currants, with which it greatly abounds. They are cultivated in a very large plain, under the ſhelter of mountains on the ſhore of this iſland; for which reaſon the ſun has greater power to bring them to perfect maturity. Here are alſo the fineſt peaches in the world, each of which weigh 8 or 10 ounces. Here are alſo cucumbers and excellent figs, and a great deal of very good oil. The town called *Zante* may contain near 20,000 inhabitants. The houſes are low, on account of the frequent earthquakes, for ſcarce a year paſſes without one; however, they do no great damage. The natives ſpeak both Greek and Italian. There are very few Roman Catholics among them; but they have a biſhop as well as the Greeks. This place has no fortifications, but there is a fortreſs upon an eminence planted with cannon. In one part of this iſland is a place which ſhakes when trod upon like a quagmire; and a ſpring which throws out a great deal of bitumen, eſpecially at the time of an earthquake. It ſerves inſtead of pitch to pay the bottoms of the ſhips, and about 100 barrels in a year are uſed for this purpoſe. There are about 50 villages in the iſland; but no other

Zapata, Zea.

large town beſide Zante. It is ſeated on the eaſtern ſide of the iſland, and has a good habour. The Engliſh and Dutch have each a factory and conſul here. E. Long. 21. 15. N. Lat. 37. 57.

ZAPATA, a kind of feaſt or ceremony held in Italy, in the courts of certain princes, on St Nicholas's day; wherein people hide preſents in the ſhoes or ſlippers of thoſe they would do honour to, in ſuch a manner as may ſurpriſe them on the morrow when they come to dreſs; being done in imitation of the practice of St Nicholas, who uſed in the night-time to throw purſes of money in at the windows, to marry poor maids withal.

ZEA, INDIAN CORN, in botany, a genus of the monoecia triandria claſs. There are three ſpecies, *viz.*

1. The Americana grows naturally in the iſlands of the Weſt Indies, with a very large ſtrong ſtalk, which riſes to the height of 10 or 12 feet. The leaves are long, broad, and hang downward; they have a broad white midrib. When the ſeeds of this ſort are ripe, the ſpikes or ears are nine or ten inches long, and ſometimes a foot; but theſe rarely ripen in England.

2. The alba is cultivated in Italy, Spain, and Portugal. The ſtalks of this ſort are ſlenderer than thoſe of the former, and ſeldom riſe more than ſix or ſeven feet high. The leaves are narrower than thoſe of the firſt ſort, and are hollowed like the keel of a boat, and their tops hang downwards. The grains of this ſort do not come to maturity in England, unleſs the ſeaſon proves very warm, and the grains are planted early and in a warm ſoil and ſituation.

3. The vulgare is cultivated in the northern parts of America, and alſo in Germany. The ſtalks of this are ſlender, and ſeldom riſe more than four feet high. The leaves are ſhorter and narrower than thoſe of the two former; they are hollowed like the keel of a boat, and their tops hang down. The ſpikes of male flowers are ſhort, and the ears or ſpikes of grain are ſeldom more than four or five inches long. This ſort ripens its grain perfectly well in England, in as little time as barley, ſo may be cultivated here to advantage.

There are ſeveral varieties of the two laſt ſpecies, which differ in the colour of their grain. The moſt common colour is that of a yellowiſh white; but there are ſome with deep yellow, others with purple, and ſome with blue grains; and when the different colours are planted near each other, the farina will mix, and the ears will have grains of ſeveral colours intermixed; but when the grains of the different varieties are planted at a proper diſtance from each other, the produce will be the ſame with the grains which were ſown.

Theſe plants are ſeldom cultivated in England.—In Italy, Germany, and in many parts of North America, they are treated in the following manner:

They firſt dig the ground well in the ſpring; and after having made it level, they draw a line acroſs the whole piece intended to be planted; then they raiſe little hills at about three or four feet diſtance, into each of which they put two or three good ſeeds, covering them about an inch thick with earth; then they move the line four feet farther, continuing to do the ſame through the whole ſpot of ground, ſo that the rows may be four feet aſunder, and the hills three or four feet diſtance. Six quarts of this ſeed is generally allowed to an acre of land, which, if the ſoil be good, will commonly produce 50 buſhels of corn.

Zeal, Zealand.

When the corn is ripe, they cut off the ſtalks cloſe to the ground, and after having gathered off the ſpikes of grain, they ſpread the ſtalks in the ſun, to harden and dry, which they afterward uſe in the ſame manner as reeds in England for making fences, covering ſheds, &c. for which purpoſe they are very uſeful to the inhabitants of warm countries; and when there is a ſcarcity of forage, they feed their cattle with them green, as faſt as the corn is gathered off.

The corn is ground to flour, and the pooreſt ſort of people in America, and alſo in Italy and Germany, make their bread of this flour; and in many of the warmer countries, the inhabitants roaſt the whole ſpikes, and dreſs them many different ways, making ſeveral diſhes of it; but this grain ſeldom agrees with thoſe who have not been accuſtomed to eat it: however, in times of ſcarcity of other grain, this would be a better ſubſtitute for the poor than bean-flour, or other ſorts, which have been uſed in England, and at all times will be found a hearty food for cattle, hogs, and poultry; ſo that in light ſandy lands, where beans and peaſe ſucceed not well, this grain may be cultivated to anſwer both purpoſes to advantage.

If this grain is cultivated by the horſe-hoeing huſbandry, it may be done at leſs expence than in any other method; for this is one of the plants which is more particularly adapted to this huſbandry.

The time for ſowing it is about the ſame as for barley.

ZEAL, the exerciſe of a warm animated affection, or paſſion, for any thing.

ZEALAND, the chief of the Daniſh iſlands, is ſituated at the entrance of the Baltic Sea, bounded by the Schaggerrac Sea on the north; by the Sound, which ſeparates it from Schonen, on the eaſt; by the Baltic Sea on the ſouth; and by the ſtrait called the *Great Belt*, which ſeparates it from the iſland of Funen, on the weſt; being of a round figure, near 200 miles in circumference: the chief town is Copenhagen.

ZEALAND, is alſo a province of the United Netherlands, conſiſting of eight iſlands, which lie in the mouth of the river Scheld, bounded by the province of Holland, from which they are ſeparated by a narrow channel, on the north; by Brabant on the eaſt; by Flanders, from which they are ſeparated by one of the branches of the Scheld, on the ſouth; and by the German ocean on the weſt.

New ZEALAND, a country of Aſia, in the South Pacific Ocean, firſt diſcovered by Taſman, the Dutch navigator, in the year 1642, who gave it the name of *Staten Land*, though it has been generally diſtinguiſhed in our maps and charts by the name of *New Zealand*, and was ſuppoſed to be part of a ſouthern continent: but it is now known, from the late diſcoveries of Captain Cook, who ſailed round it, to conſiſt of two large iſlands, divided from each other by a ſtrait four or five leagues broad. They are ſituated between the latitudes of 34 and 48 degrees ſouth, and between the longitudes of 166 and 180 degrees eaſt from Greenwich. One of theſe iſlands is for the moſt part mountainous, rather barren, and but thinly inhabited; but the other is much more fertile, and of a better appearance. In the opinion of Sir Joſeph

Banks, and of Dr Solander, every kind of European fruits, grain, and plants, would flouriſh here in the utmoſt luxuriance. From the vegetables found here, it is ſuppoſed that the winters are milder than thoſe in England, and the ſummers not hotter, though more equally warm; ſo that it is imagined, that if this country were ſettled by people from Europe, they would, with moderate induſtry, be ſoon ſupplied, not only with the neceſſaries, but the luxuries of life, in great abundance. Here are foreſts of vaſt extent, filled with very large timber trees; and near 400 plants were found here that had not been diſcribed by the naturaliſts. The inhabitants of New Zealand are ſtout and robuſt, and equal in ſtature to the largeſt Europeans. Their colour in general is brown, but in few deeper than that of the Spaniard who has been expoſed to the ſun, and in many not ſo deep; and both ſexes have good features. Their dreſs is very uncouth, and they mark their bodies in a manner ſimilar to the inhabitants of Otaheite, and which is called *tattowing*. Their principal weapons are lances, darts, and a kind of battle-axes; and they have generally ſhown themſelves very hoſtile to the Europeans who have viſited them.

ZEALOTS, an ancient ſect of the Jews, ſo called from their pretended zeal for God's law, and the honour of religion.

ZEBRA, in zoology. See Equus.

ZECHARIAH, a canonical book of the Old Teſtament, containing the predictions of Zechariah, the ſon of Barachia, and grandſon of Iddo. He is the eleventh of the 12 leſſer prophets. Zechariah entered upon the prophetic office at the ſame time with Haggai, and was ſent to the Jews upon the ſame meſſage, to reprove them for their backwardneſs in erecting the temple and reſtoring divine worſhip; but eſpecially for the diſorder of their lives and manners, which could not but derive a curſe upon them. By ſeveral notable viſions and types, he endeavours to confirm their faith, and eſtabliſh their aſſurance concerning God's providence with them, and care over them; and as a proof and demonſtration of this, he interſperſes the moſt comfortable promiſes of the coming of the kingdom, the temple, the prieſthood, the victory, the glory of Chriſt the Branch. Nor does he forget to aſſure them of the ruin of Babylon, their moſt implacable enemy. This prophet is the longeſt and moſt obſcure of all the leſſer prophets, his ſtyle being interrupted and without connection.

ZEDOARY, in the materia medica, a root, the ſeveral pieces of which differ ſo much from one another in ſhape, that they have been divided into two kinds, as if two different things, under the names of the *long* and *round* zedoary, being only the ſeveral parts of the ſame root.

Zedoary is to be choſen freſh, ſound, and hard, in large pieces; it matters not as to ſhape, whether long or round; of a ſmooth ſurface, and of a ſort of fatty appearance within, too hard to be bitten by the teeth, and of the briſkeſt ſmell that may be: ſuch as is friable, duſty, and worm eaten, is to be rejected.

Zedoary, both of the long and round kind, is brought us from China; and we find by the Arabians that they alſo had it from the ſame place. The round tubera are leſs frequent than the long, and ſome of them have therefore ſuppoſed them the produce of a different and more rare plant; but this is not ſo probable as that the general form of the root is long, and the round tubera are only luſus naturæ, and leſs frequent in it.

Zedoary, diſtilled with common water, affords a thick and denſe eſſential oil, which ſoon concretes of itſelf into a kind of camphor; and on this oil its virtues principally depend. It is a ſudorific, and is much recommended by ſome in fevers, eſpecially of the malignant kinds. It is alſo given with ſucceſs as an expectorant in all diſorders of the breaſt, ariſing from a tough phlegm, which it powerfully incides and attenuates; it is alſo good againſt flatulences, and in the cholic; it ſtrengthens the ſtomach, and aſſiſts digeſtion; and finally, is given with ſucceſs in nervous caſes of all kinds.

ZELL, a city of Germany, in the circle of Lower Saxony, capital of the duchies of Zell and Lunenburg, ſituated at the confluence of the rivers Aller and Fuhſe, 30 miles north of Hanover, and 40 ſouth of Lunenburg. E. Long. 10. N. Lat. 52. 52.

ZEND, or ZENDAVESTA, a book containing the religion of the Magians, or worſhippers of fire, who were diſciples of the famous Zoroaſter. See MAGI.

This book was compoſed by Zoroaſter during his retirement in a cave, and contained all the pretended revelations of that impoſtor. The firſt part contains the liturgy of the Magi, which is uſed among them in all their oratories and fire-temples to this day; they reverence it as the Chriſtians do the Bible, and the Mahometans the Alcoran. There are found many things in the Zend taken out of the ſcriptures of the Old Teſtament, which Dr Prideaux thinks is an argument that Zoroaſter was originally a Jew. Great part of the Pſalms of David are inſerted: he makes Adam and Eve to have been the firſt parents of mankind, and gives the ſame hiſtory of the creation and deluge as Moſes does, and commands the ſame obſervances about clean and unclean beaſts, the ſame law of paying tythes to the ſacerdotal order, with many other inſtitutions of Jewiſh extraction. The reſt of its contents are an hiſtorical account of the life, actions, and prophecies of its author, with rules and exhortations to moral living. The Mahometans have a ſect which they call *Zendikites*, who are ſaid to be the Sadducees of Mahometaniſm, denying providence and the reſurrection, believing the tranſmigration of ſouls, and following the Zend of the Magi.

ZENITH, in aſtronomy, the vertical point; or a point in the heavens directly over our heads.

ZENO ELEATES, or of *Elea*, one of the greateſt philoſophers among the ancients, flouriſhed about the 504th year before the Chriſtian æra. He was the diſciple of Parmenides, and even, according to ſome writers, his adopted ſon. Ariſtotle aſſerts, that he was the inventor of logic; but his logic ſeems to have been calculated to perplex all things, and not to clear up any thing. For Zeno employed it only to diſpute againſt all comers, and to ſilence his opponents, whether they argued right or wrong. He propoſed very embarraſſing arguments with reſpect to the exiſtence of motion; and Ariſtotle, in the ſixth book of his Phyſics, has preſerved ſome of them, which are extremely ſubtile, eſpecially the famous argument named *Achilles*.

As he lived long before Diogenes the Cynic, it is certain that thoſe who have ſaid that this laſt philoſopher refuted Zeno's arguments againſt motion, by taking a turn or two up and down his ſchool, are miſtaken. He flew into a violent paſſion with a man who railed at him; and it being thought ſtrange that he ſhould feel ſuch indignation, he replied, "Were I inſenſible to cenſure, I ſhould be equally ſo with reſpect to praiſe." He ſhowed great courage in ſuffering pain; for having undertaken to reſtore liberty to his country, which groaned under the oppreſſion of a tyrant, and the enterpriſe being diſcovered, he ſupported with extraordinary firmneſs the ſharpeſt torments. It is ſaid that he had the courage to bite off his tongue, and ſpit in the tyrant's face, for fear of being forced, by the violence of his torments, to diſcover his accomplices. Some ſay that he was pounded alive in a mortar.

ZENO, a celebrated Greek philoſopher, was born at Citium, in the iſle of Cyprus, and was the founder of the ſect of the Stoics, This ſect had its name from that of a portico at Athens, where this philoſopher choſe to hold his diſcourſes. He was caſt upon that coaſt by ſhipwreck; and he ever after regarded this as a great happineſs, praiſing the winds for having ſo happily driven him into the port of Piræum. Zeno was the diſciple of Crates, and had a great number of followers. He made the ſovereign good conſiſt in living in conformity to nature, guided by the dictates of right reaſon. He acknowledged but one God; and admitted an inevitable deſtiny over all events. His ſervant taking advantage of this laſt opinion, cried, while he was beating him for his diſhoneſty, "I was deſtined to ſteal." To which Zeno replied, "Yes; and to be beaten." This philoſopher was accuſtomed to ſay, "That if a wiſe man ought not to be in love, as ſome pretended, none would be more miſerable than beautiful and virtuous women, ſince they would have none for their admirers but fools." He alſo ſaid, "That a part of knowledge conſiſts of being ignorant of ſuch things as ought not to be known: that a friend is another ſelf; that a little matter gives perfection to a work, though perfection is not a little matter." He compared thoſe who ſpoke well and lived ill, to the money of Alexandria, which was beautiful, but compoſed of bad metal. It is ſaid, that being hurt by a fall, he laid violent hands on himſelf about 264 B. C. Cleanthes, Cryſippus, and the other ſucceſſors of Zeno maintained, that with virtue we might be happy in the midſt even of diſgrace and the moſt dreadful torments. They admitted the exiſtence of only one God, the ſoul of the world, which they conſidered as his body, and both together forming a perfect being. It muſt be confeſſed, that of all the ſects of the ancient philoſophers, this was one of thoſe which produced the greateſt men.

We ought not to confound the two Zenos already mentioned, with

ZENO a celebrated Epicurean philoſopher, born at Sidon, who had Cicero and Pomponius Atticus for his diſciples, and who wrote a book againſt the mathematics, which, as well as that of Poſſidonius's refutation of it, is loſt; nor with ſeveral other *Zenos* mentioned in hiſtory.

ZENOBIA, queen of Palmyra. See PALMYRA.

ZEPHANIAH, a canonical book of the Old Teſtament, containing the predictions of Zephaniah the ſon of Cuſhi, and grandſon of Gedaliah; being the ninth of the 12 leſſer prophets. He propheſied in the time of king Joſiah, a little after the captivity of the ten tribes, and before that of Judah; ſo that he was cotemporary with Jeremiah. He freely publiſhes to the Jews, that what increaſed the divine wrath againſt them, was their contempt of God's ſervice, their apoſtacy, their treachery, their idolatry, their violence and rapine, and other enormities: ſuch high provocations as theſe, rendered their deſtruction terrible, univerſal, and unavoidable; and then, as moſt of the prophets do, he mingles exhortations with repentance, as the only expedient in theſe circumſtances.

ZEPHYR, the WEST-*Wind*, or that which blows from the cardinal point of the horizon oppoſite to the eaſt.

ZEPHYRUS, one of the pagan deities, was repreſented as the ſon of Aurora, and the lover of the nymph Chloris, according to the Greeks, or of Flora, according to the Romans; and as preſiding over the growth of fruits and flowers. He is deſcribed as giving a refreſhing coolneſs to the air by his ſoft and agreeable breath, and as moderating the heat of ſummer by fanning the air with his ſilken wings. He is depictured under the form of a youth, with a very tender air, with wings reſembling thoſe of the butterfly, and with his head crowned with a variety of flowers. As the poets of Greece and Rome lived in a warm climate, they are laviſh in the praiſe of this beneficent deity, and under his name deſcribe the pleaſure and advantage they received from the weſtern breezes.

ZEST, the woody thick ſkin, quartering the kernel of a walnut; preſcribed by ſome phyſicians, when dried and taken with white wine, as a remedy againſt the gravel.

Zeſt is alſo uſed for a chip of orange or lemon peel; ſuch as is uſually ſqueezed into ale, wine, &c. to give it a flavour; or the fine ethereal oil which ſpurts out of that peel on ſqueezing it.

ZEUGMA, a figure in grammar, whereby an adjective or verb which agrees with a nearer word, is alſo, by way of ſupplement, referred to another more remote.

ZEUS, in ichthyology, a genus belonging to the order of thoracici. The head is compreſſed, and declines, the upper lip being vaulted over by a tranſverſe membrane; the tongue is ſubulated; there are ſeven rays in the gill membrane; and the body is compreſſed.—The ſpecies are four; of which the moſt remarkable is the faber, or doree. It is of a hideous form, its body is oval, and greatly compreſſed on the ſides; the head large; the ſnout vaſtly projecting; the mouth very wide; the teeth very ſmall; the eyes great, the irides yellow; the lateral line oddly diſtorted, ſinking at each end, and riſing near the back in the middle; beneath it on each ſide is a round black ſpot. The tail is round at the end, and conſiſts of 15 branched rays. The colour of the ſides is olive, varied with light blue and white, and while living is very reſplendent, and as if gilt; for which reaſon it is called the *doree*. The largeſt fiſh we have heard of weighed 12 pounds.

Superſtition hath made the doree rival to the haddock, for the honour of having been the fiſh out of whoſe mouth St Peter took the tribute-money, leaving on its ſides thoſe inconteſtible proofs of the identity of the fiſh, the marks of his finger and thumb. It is rather difficult at this time to determine on which part to decide the diſpute; for the doree likewiſe aſſerts an origin of its ſpots of a ſimilar nature, but of a much earlier date than the former. St Chriſtopher, in wading through an arm of the ſea, having caught a fiſh of this kind *en paſſant*, as an eternal memorial of the fact, left the impreſſions on its ſides to be tranſmitted to all poſterity. In our own country it was very long before this fiſh attracted our notice, at leaſt as an edible one. We are indebted to the late Mr Quin for adding a moſt delicious fiſh to our table, who overcoming all the vulgar prejudices on account of its deformity, has effectually eſtabliſhed its reputation. This fiſh was ſuppoſed to be found only in the ſouthern ſeas of this kingdom, but it has been diſcovered laſt year on the coaſt of Angleſea. Thoſe of the greateſt ſize are taken in the Bay of Biſcay, off the French coaſts; they are alſo very common in the Mediterranean: Ovid muſt therefore have ſtyled it *rarus faber*, on account of its excellency, not its ſcarcity.

ZEUXIS, a celebrated painter of antiquity, flouriſhed about 400 years before Chriſt. He was born at Heraclea; but as there have been many cities of that name, it cannot be certainly determined which of them had the honour of his birth. Some learned men however conjecture, that it was the Heraclea near Crotona in Italy. He carried painting to a much higher degree of perfection than Apollodorus had left it; diſcovered the art of properly diſpoſing of lights and ſhades, and particularly excelled in colouring. He amaſſed immenſe riches; and then reſolved to ſell no more of his pictures, but gave them away; ſaying very frankly, "That he could not ſet a price on them equal to their value." Before this time he made people pay for ſeeing them; and nobody was admitted to ſee his Helena without ready money, which occaſioned the wags calling his picture *Helen the Courtezan*. It is not known whether this Helen of Zeuxis was the ſame with that which was at Rome in Pliny's time, or that which he painted for the inhabitants of Crotona to be hung up in the temple of Juno: this laſt he painted from five beautiful girls of that city, copying from each her greateſt excellencies. Pliny obſerves, that this admirable painter, diſputing for the prize of painting with Parrhaſius, painted ſome grapes ſo naturally, that the birds flew down to peck them. Parrhaſius, on the other hand, painted a curtain ſo very artfully, that Zeuxis miſtaking it for a real one that hid his rival's work, ordered the curtain to be drawn aſide, to ſhow what Parrhaſius had done; but having found his miſtake, he ingenuouſly confeſſed himſelf vanquiſhed, ſince he had only impoſed upon birds, while Parrhaſius had deceived even a maſter of the art. Another time he painted a boy loaded with grapes; when the birds alſo flew to this picture, at which he was vexed; and confeſſed, that this work was not ſufficiently finiſhed, ſince had he painted the boy as perfectly as the grapes, the birds would have been afraid of him. Archelaus, king of Macedon, made uſe of Zeuxis's pencil for the embelliſhment of his palace. One of this painter's fineſt pieces was a Hercules ſtrangling ſome ſerpents in his cradle, in the preſence of his affrighted mother: but he himſelf chiefly eſteemed his Athleta, or Champion, under which he placed a Greek verſe that afterwards became very famous, and in which he ſays, "That it was eaſier to criticiſe than to imitate the picture." He made a preſent of his Alcmena to the Agrigentines. Zeuxis did not value himſelf on ſpeedily finiſhing his pictures; but knowing that Agatharchus gloried in his being able to paint with eaſe and in a little time, he ſaid, "That for his part he, on the contrary, gloried in his ſlowneſs; and if he was long in painting, it was becauſe he painted for eternity." Verrius Flaccus ſays, that Zeuxis having painted an old woman, he laughed ſo very heartily at the ſight of this picture, that he died: but as no other of the ancients have mentioned this particular, there is the greateſt reaſon to believe it fabulous. Carlo Dati has compoſed in Italian the Life of Zeuxis, with thoſe of Parrhaſius, Apelles, and Protogenes. This work was printed at Florence in 1667.

ZICLAG, or ZIKLAG (anc. geog.), a town of the tribe of Simeon, on the borders of the Philiſtines, (Joſhua xv. and xix.), but in the hands of the Philiſtines till David's time, (1 Sam. xxvii. and xxx.)

ZIN (anc. geog.), a wilderneſs encompaſſing Idumea, at leaſt on the ſouth and weſt, as far as Paleſtine or Canaan; but according to Wells, on the eaſt of Edom, to the north of Ezion-gaber.

ZINC. See CHEMISTRY, p. 1884, ſect. iii. 8.; MATERIA MEDICA, *Catalogue of Simples*; and PHARMACY, n° 798—801.

It is remarkable that this ſemi-metal, when united with copper even in a conſiderable proportion, diminiſhes very little the malleability of that metal, and at the ſame time renders its colour more beautiful, and more like the colour of gold. This colour varies according to the different proportions of theſe two metallic ſubſtances in the compound, which acquires different names accordingly, as braſs, tombac, ſimilor, pinchbeck, and prince's metal. The zinc for theſe compoſitions muſt be very pure, and free from other metallic bodies. The method of purifying this ſemimetal, which is principally founded upon its property of not uniting with ſulphur, is thus deſcribed by Mr Macquer:—When zinc is melted in a large crucible, ſuet and ſulphur alternately, and the latter in larger quantities than the former, muſt be thrown upon it. If the zinc is pure, the ſulphur burns freely on its ſurface; but if it is allayed, the ſulphur combines with the other metals, and forms with them a kind of ſcoria, which muſt be taken off. This alternate projection of ſuet and ſulphur upon zinc is continued till the ſulphur be burnt on the ſurface of the melted zinc without forming any ſcoria; the zinc thus purified, may be ſucceſsfully employed for making of braſs or metallic mixtures in imitation of gold.

ZINZENDORFF (Nicholas Lewis), count, was the noted founder of the German religious ſect called *Moravians*, or *Herrnhuters*. From his own narrative it appears, that when he came of age in 1721, his thoughts were wholly bent on gathering together a little ſociety of believers, among whom he might live, and who ſhould entirely employ themſelves in exerciſes of devotion under him. He accordingly purchaſed an eſtate at Bertholſdorff in Upper Luſatia, where being joined by ſome followers, he gave the curacy of the village to a man of his own complexion; and Bertholſdorff ſoon became talked of for a new mode of piety. One Chriſtian David, a carpenter, brought a few proſelytes from Moravia; they began a new town about half a league from the village, where count Zinzendorff fixed his reſidence among them, and where great numbers of Moravians flocked and eſtabliſhed themſelves under his protection: ſo that in 1732 their number amounted to 600. An adjacent hill, called the *Huthberg*, gave occaſion to theſe coloniſts to call their new ſettlement *Huth des Herrn*, and afterward *Herrnhuth;* which may be interpreted “The guard or protection of the Lord:” and from this the whole ſect have taken their name. The count ſpared neither pains nor art to propagate his opinions; he went himſelf all over Europe, and at leaſt twice to America; and ſent his miſſionaries throughout the world. In 1733 a Herrnhut was eſtabliſhed even in Greenland; the ſociety poſſeſſes Bethlehem in Penſylvania, and has a ſettlement among the Hottentots: China, it is reported, has admitted them; and we know what progreſs they have made in our own country as well as on the continent. Their diſcipline is very rigid, and therefore ſubmiſſion to the will of their ſuperiors is inculcated as the will of their Saviour: hence the language they talk in is, “Jeſus will have it ſo; the Lamb commands it:” a language not uncommon in the mouth of ſpiritual taſkmaſters. As to the doctrine taught by the Moravians, it may be obſerved, that enthuſiaſtic devotees in all ages, have been apt to ſuffer their heavenly affections to ſtray down to carnal objects; but it was reſerved for count Zinzendorff to frame a religious ſyſtem upon obſcene principles. Thus he ſays, “What is called in the Bible by the hideous name *pudendum*, or a thing to be aſhamed of on account of the fall, is changed by the Saviour into *verendum*, or a thing to be worſhipped.” “I conſider (ſays he) the parts for diſtinguiſhing both ſexes in Chriſtians, as the moſt honourable of the whole body, my Lord and God having partly inhabited them and partly worn them himſelf.” In conformity to theſe ideas, he and his followers eſteem the conjugal embrace as the higheſt act of devotion. “Jeſus (we are told) is the ſpouſe of all the ſiſters; the huſbands, in the proper ſenſe, are his procurators or agents, and may therefore be called *vice-chriſts*, or *vice-gods:* all ſouls are of the feminine gender; the male quality adapted to bodies at their formation being detached as ſoon as it is interred.” Their diſcourſes and hymns contain a deal of nonſenſe about the five wounds of Chriſt; particularly the ſide hole. Count Zinzendorff died in 1760. Thoſe who wiſh to know more of the Moravian tenets may conſult Rimius's account of them, tranſlated in 1753.

ZISCA (John), a famous general of the forces of the Huſſites, in the 15th century, was a gentleman educated at the court of Bohemia, in the reign of Wenceſlaus. He entered very young into the army, and after diſtinguiſhing himſelf on ſeveral occaſions, loſt an eye in a battle, whence he was called *Ziſca*, or *One-eyed.* At length the Reformation, begun by John Huſs, ſpreading through almoſt all Bohemia, Ziſca placed himſelf at the head of the Huſſites, and had ſoon under his command a body of 40,000 men. With this army he gained ſeveral victories over thoſe of the Romiſh religion, who carried on a kind of cruſade againſt them; and built a town in an advantageous ſituation, to which he gave the name of *Tabor;* whence the Huſſites were afterwards called *Taborites.* Ziſca loſt his other eye by an arrow at the ſiege of the city of Rubi; but this did not prevent his continuing the war, his fighting battles, and gaining ſeveral great victories, among which was that of Auſig on the Elbe, in which 9000 of the enemy were left dead on the field. The emperor Sigiſmund, alarmed at his progreſs, cauſed very advantageous propoſals to be offered to him; which he readily accepted, and ſet out to meet Sigiſmund, but died on the road. He ordered that his body ſhould be left a prey to the birds and wild beaſts; and that a drum ſhould be made of his ſkin, being perſuaded that the enemy would fly as ſoon as they heard its ſound. It is added, that the Huſſites executed his will; and that the news of this order made ſuch an impreſſion on the diſturbed imaginations of the German Papiſts, that in many battles they actually fled at the beat of the drum with the utmoſt precipitation, leaving their baggage and artillery behind them.

ZINZIBER, or ZINGIBER, in botany. See AMOMUM and GINGER.

ZION, or SION (anc. geog.), a very famous mountain, ſtanding on the north ſide of the city of Jeruſalem, (Pſal. xlviii. 2.); containing the upper city, built by king David; and where ſtood the royal palace, (Joſephus). A part of Zion, ſituate at its extremity, was called *Millo*, of, or in the city of David, (2 Chron xxxii. 5.) Modern travellers, who have been upon the ſpot, ſay, that Zion is the whole of the mountain, on which Jeruſalem ſtands at this day, though not to the extent in which it anciently ſtood on the ſame mountain, as appears Pſal. ix. 12. 15. lxv. 1. lxxxvii. 2, 3. Iſ. lxii. 1. ſwelled into ſeveral eminences or tops; as Moriah, Acra Bezetha, and Zion, a particular eminence of mount Zion Proper, &c. encompaſſed on three ſides, eaſt, weſt, and ſouth, with one continued very deep and ſteep valley; by means of which it was impregnable on theſe three ſides, and always attacked and taken, according to Joſephus, by the enemy on the north ſide, where mount Zion becomes level, and the vales of Gihon and Jehoſophat gradually loſe themſelves. This deep and ſteep valley inconteſtibly conſtitutes the compaſs of the old Jeruſalem on thoſe three ſides, as plainly appears to any perſon who has been upon the ſpot. On that particular top of the mount called *Zion*, ſtood the fortreſs of the Jebuſites; which being afterwards taken by David, came to be called the *city of David*, where he had his royal reſidence, and kept his court. That part of the valley which lay to the eaſt was called *Jehoſophat's*, having mount Olivet lying beyond it; that to the ſouth, *Gehinnon;* and that to the weſt, *Gihon*, from cognominal mountains lying beyond them. At the weſt end of Gihon, without the city, ſtood Golgotha or Calvary. The pretended Golgotha, ſhown at this day within the walls, is the ſpurious brat of intereſted and fraudulent monks, (Korte). There is another Zion, the ſame with HERMON.

ZIPH, or SIPH (anc. geog.), the name of a wilderneſs or deſart in the tribe of Judah, where David was a fugitive; lying to the ſouth-eaſt of Hebron; ſo called from Ziph or Siph, a twofold town in this tribe; the one more to the ſouth towards Idumea, on the confines of Eleutheropolis, (Jerome); the other 8 miles to the eaſt of Hebron, towards the Dead Sea, inclining ſouthwards, becauſe near mount Carmel. Here was a mountain, mentioned 1 Sam. xxiii. 14. in which David abode, ſaid by Jerome to be rugged, diſmal, and always overcaſt. *Ziphim*, *Ziphæi*, or *Ziphenſes*, the inhabitants of Ziph, ver. 19.

ZIRCHNITZER-see, otherwiſe called the *lake of Czirknitz*, in Carniola, is about one German or four Engliſh miles in length, and half as much in breadth, contains three beautiful iſlands, and is encompaſſed at ſome diſtance with mountains and foreſts. But what is moſt remarkable is, that it diſappears generally once a-year, about St John or St James's day, running off through holes or pits in the bottom; ſometimes it will diſappear twice or thrice a-year, and ſometimes even in winter, if the weather be dry. On the other hand, it has been known to continue two or three years without running off. Of the holes or pits, there are five much larger than the reſt, each of which ſucceſſively, when the water runs off, ſtands empty five days; ſo that the whole lake becomes dry in 25. As ſoon as the beginning of the ebb is obſerved, the fiſhing in the pits begin, which belong to five ſeigniories. The fiſh, which are carp, tench, pike, eels, and two other ſorts, called *ſchleien* and *ruten*, are caught by laying nets over the holes. Mr Keyſler tells us, that upon the ringing of a bell at Zirknitz, when the waters begin to fall, the peaſants, both men and women, run to the pools quite naked, notwithſtanding both the clergy and magiſtrates have uſed their utmoſt endeavours to ſuppreſs ſo indecent a cuſtom. When the water runs off early in the year, in about three weeks after it is gone there is good graſs on the bottom, which is mowed down, and the bottom afterwards ploughed, and ſowed with millet. If the water runs not off early, nothing can be ſown; and if it returns ſoon, the ſeed is loſt. With reſpect to its return, the water at firſt burſts out of ſome pits on the ſouth ſide with great violence, a little rain always falling at the ſame time; but afterwards (when the rain falls heavier, and it thunders at the ſame time ſo loud as to ſhake the earth) it breaks out through all the apertures with great force, inſomuch that the lake is filled in 18 or 24 hours, at which time it is in a manner covered with wild fowl; ſuch as geeſe, ducks, &c. After the millet-harveſt, all manner of game is hunted, caught, or killed in it. On the ſouth ſide are two caverns, out of which, when it thunders, water iſſues with aſtoniſhing violence; and if it happens in harveſt, a great many naked, black, and blind, but fat ducklings, are brought up with the water, which in 14 days receive their ſight, and are covered with feathers.

ZODIAC, in aſtronomy, a faſcia, or broad circle, whoſe middle is the ecliptic, and its extremes two circles parallel thereto, at ſuch a diſtance from it as to bound or comprehend the excurſions of the ſun and planets. See Astronomy, n° 204.

ZODIACAL light. See Aurora *Borealis*.

ZONE, in geography and aſtronomy, a diviſion of the terraqueous globe with reſpect to the different degrees of heat found in the different parts thereof.

A zone is the fifth part of the ſurface of the earth, contained between two parallels.

The zones are denominated torrid, frigid, and temperate.

The torrid zone is a faſcia, or band, ſurrounding the terraqueous globe, and terminated by the two tropics. Its breadth is 46. 58. The equator, running through the middle of it, divides it into two equal parts, each containing 23. 29. The ancients imagined the torrid zone uninhabitable.

The temperate zones are two faſciæ, or bands, environing the globe, and contained between the tropics and the polar circles. The breadth of each is 43. 2.

The frigid zones are ſegments of the ſurface of the earth, terminated, one by the antarctic, and the other by the artic circle. The breadth of each is 46. 58.

ZOOLOGY

IS that part of Natural Hiſtory which relates to *Animals*. It is neceſſary to mention in this place, that we have given the deſcriptions and characters of animals under their proper names. The ſcientific part of the ſubject, therefore, or the method of inveſtigating the genera or ſpecies of animals, by means of natural or artificial arrangement, only remains to be explained.

In order to abridge the ſtudy of zoology, many methods of reducing animals to claſſes, genera, and ſpecies, have been invented. But as that of Linnæus is undoubtedly the beſt, the moſt extenſive, and the moſt generally adopted, we ſhall give a brief account of it.

Linnæus divides the whole animal kingdom into ſix claſſes. The characters of theſe ſix claſſes are taken from the internal ſtructure of animals, in the following manner:

Claſs I. MAMMALIA, includes all animals that ſuckle their young. The characters of this claſs are theſe:—The *heart* has two ventricles and two auricles; the *blood* is red and warm; and the animals belonging to it are *viviparous*.

Claſs II. AVES, or Birds. The characters are the ſame with thoſe of Claſs I. excepting that the animals belonging to it are *oviparous*. See Bird, and Ornithology.

Claſs III. AMPHIBIA, or Amphibious Animals. The *heart* has but *one ventricle* and one *auricle*; the *blood* is red and cold; and the animals belonging to this claſs have the command of their *lungs*, ſo that the intervals between *inſpiration* and *expiration* are in ſome meaſure *voluntary*. See Amphibious.

Claſs IV. PISCES, or Fishes. The *heart* has the ſame ſtructure, and the *blood* the ſame qualities with thoſe of the *Amphibia*; but the animals belonging to this claſs are eaſily diſtinguiſhed from the Amphibia, by having no ſuch voluntary command of their *lungs*, and by having external *branchiæ* or *gills*. See Fish.

Claſs V. INSECTA, or Insects. The *heart* has *one ventricle*, but no *auricle*; the *blood* is cold and white ; and the animals are furniſhed with *antennæ* or *feelers*. See Insect.

Class VI. VERMES, or Worms. The characters are the ſame with thoſe of Claſs V. only the animals have no antennæ, and are furniſhed with *tentaculo*.

The *Firſt Claſs*, MAMMALIA, is ſubdivided into ſeven Orders ; the characters of which are taken from the number, ſtructure, and ſituation of the Teeth.

Order I. The Primates have four inciſores, or *fore-teeth*, in each jaw, and one *dog-tooth*. N. B. By *one* dog-tooth, Linnæus means one on each ſide of the fore-teeth in both jaws.—This order includes four genera, *viz*. Homo, Simia, Lemur, Veſpertilio. See theſe articles.

Order II. The Bruta have no *fore-teeth* in either jaw. This order includes ſix genera, *viz*. Elephas, Trichechus, Bradypus, Myrmecophaga, Manis, Daſypus. See theſe articles.

Order III. The Feræ have, for the moſt part, ſix *conical fore-teeth* in each jaw. This order includes 10 genera, *viz*. Phoca, Canis, Felis, Viverra, Muſtela, Urſus, Didelphus, Talpa, Sorex, Erinaceus. See theſe articles.

Order IV. The Glires, have two fore-teeth in each jaw, and no *dog-teeth*—This order includes 6 genera, *viz*. Hyſtrix, Lepus, Caſtor, Mus, Sciurus, Noctilio. See theſe articles.

Order V. The Pecora, have no *fore-teeth* in the upper-jaw, but 6 or 8 in the under-jaw.—This order includes 6 genera, *viz*. Camelus, Moſchus, Cervus, Capra, Ovis, Bos. See theſe articles.

Order VI. The Belluæ, have *obtuſe fore-teeth* in each jaw.—This order includes 4 genera, *viz*. Equus, Hippopotamus, Sus, Rhinoceros. See theſe articles.

Order VII. The Cete, or *whale kind*, have no uniform character in their teeth, being very different in the different genera; but are ſufficiently diſtinguiſhed from the other orders of Mammalia, by living in the ocean, having pectoral fins, and a fiſtula or ſpiraculum upon the head.—This order includes 4 genera, *viz*. Monodon, Balæna, Phyſeter, Delphinus. See theſe articles, and Cetaceous.

The *generic* characters of the Mammalia are, like thoſe of the orders, almoſt entirely taken from the Teeth, excepting the Veſpertilio, which, beſides the character of the order derived from the teeth, has this farther mark, that there is a membrane attached to the feet and ſides, by means of which the creature is enabled to fly;—the Hyſtrix, whoſe body is covered with ſharp ſpines;—and the whole order of Pecora, whoſe genera, beſides the characters taken from the teeth, are diſtinguiſhed into thoſe which have *horns*, thoſe which have *no horns*, and by peculiarities in the horns themſelves.

The *ſpecific* characters are very various, being taken from any part of the body which poſſeſſes a peculiar uniform mark of diſtinction. As examples of theſe characters are to be found under the proper name of each genus; it is unneceſſary to ſay any thing further concerning them in this place.

The *Second Claſs*, AVES, is ſubdivided into ſix Orders, the characters of which are taken chiefly from the ſtructure of the bill.

Order I. The Accipitres, have a hooked bill, the ſuperior mandible, near the baſe being extended on each ſide beyond the inferior; and in ſome, the ſuperior mandible is armed with *teeth*.—This order includes 4 ſpecies, *viz*. Vultur, Falco, Strix, Lanius. See theſe articles.

Order II. The Picæ, have a convex, compreſſed bill, reſembling a knife.—This order contains 22 genera, *viz*. Buphaga, Certhia, Corvus, Cuculus, &c. See theſe articles.

Order III. The Anseres, have an obtuſe bill, gibbous at the baſe, broadeſt at the point, covered with a ſmooth ſkin, and furniſhed with teeth : The *tongue* is fleſhy ; and the toes are palmated, or webbed—This order includs 12 genera, *viz*. Alca, Anas, Colymbus, Diomedia, &c. See theſe articles.

Order IV. The Grallæ, have a long, obtuſe, and ſomewhat cylindrical bill : The *tongue* is undivided, and fleſhy ; and the *thighs* are naked. This order contains 18 genera, *viz*. Ardea, Fulica, Tringa, Charadrius, &c. See theſe articles.

Order V. The Gallinæ, have a convex bill ; the ſuperior mandible is vaulted over the inferior, and the margin of the ſuperior mandible folds over the inferior one : The *noſtrils* are half covered with a convex cartilaginous membrane : The *rectrices*, or principal quill-feathers of the tail, are always more than 12 in number ; and the *feet* are divided, but connected at the inmoſt joint.—This order contains 7 genera, *viz*. Didas, Phaſianus, Meleagris, Pavo, &c. See theſe articles.

Order VI. The Passeres, have a conical ſharp-pointed bill; and the *noſtrils* are oval, wide, and naked.—This order contains 15 genera, *viz*. Caprimulgus, Alauda, Calumba, &c. See theſe articles.

The *generic* characters of this claſs are taken from peculiarities in the *bill*, the *noſtrils*, the *tongue*, the *feet*, the *feathers*, the *face*, the *figure* of the *body*, &c.

The characters which ſerve to diſtinguiſh the *ſpecies* are very various : For example, the *colour* of particular *feathers* or parts of *feathers* ; *creſts* of feathers on the head, diſpoſed in different manners; the colour of the *cere* or *wax*; the colour of the *feet* ; the ſhape and length of the *tail* ; the number, ſituation, &c. of the *toes* ; the colour and figure of the *bill*; &c.

The *Third Claſs*, AMPHIBIA, is divided into four Orders.

Order I. The Reptiles, have *legs*, and breathe by the *mouth*.—This order contains 4 genera, *viz*. Teſtudo, Draco, Lacerta, Rana. See theſe articles.

Order II. The Serpentes, have no *legs*, and breathe

Piſces, Inſecta.

breathe by the *mouth*.—This order contains 6 genera, *viz.* Crotalus, Boa, Coluber, Anguis, Amphiſbæna, Cœcilia. See theſe articles.

ORDER III. The NANTES, are furniſhed with *lungs*, and at the ſame time breathe by lateral *gills;* and the rays of their fins are cartilaginous.—This order contains 14 genera, *viz.* Accipenſer, Baliſtes, &c. See theſe articles.

ORDER IV. The MEANTES, have both *lungs* and *gills;* and the *feet* are furniſhed with *toes* and *claws*.—This order contains but one genus, *viz.* the Siren. See SIREN.

The *generic* characters of this claſs are taken from the general figure of the *body;* from their having *tails* or *no tails;* being covered with a *ſhell;* having *teeth*, or *no teeth*, in the *mouth;* being furniſhed with *wings;* having *covered* or *naked* bodies; from the number, ſituation, and figure of the *ſcuta* and *ſcales;* from the number and ſituation of the *ſpiracula;* from the ſituation of the *mouth*, &c.

The *ſpecific* characters are ſo very various, that it would be ſuperfluous to enumerate them.

The *Fourth Claſs*, PISCES, is ſubdivided into four ORDERS, the characters of which are taken from the ſituation of the *belly-fins*.

ORDER I. The APODES, have no *belly-fins*.—This order contains 8 genera, *viz.* Ammodytes, Anarrhicas, Muræna, &c. See theſe articles.

ORDER II. The JUGULARES, have the *belly-fins* placed before the *pectoral fins*.—This order includes 5 genera, *viz.* Callionymus, Blennius, Gadus, &c. See theſe articles.

ORDER III. The THORACICI, have the *belly-fins* placed *under* the *pectoral fins*.—This order comprehends 17 genera, *viz.* Gobius, Labrus, Sparus, &c. See theſe articles.

ORDER IV. The ABDOMINALES, have the *belly-fins* placed *behind* the *pectoral fins*.—This order contains 17 genera, *viz.* Fiſtularia, Eſox, Clupea, Cyprinus, &c. See theſe articles.

The *generic* characters of this claſs are taken from peculiarities in the *head*, the *mouth*, the *teeth*, the *noſtrils*, the *rays* in the *membrane of the gills*, the *eyes*, the general *figure* of the *body*, the figure of the *tail*, the ſituation of the *ſpiracula*, &c.

The *ſpecific* characters are taken from peculiarities in all the parts above enumerated, and many others.

See further the articles FISH in *Encycl.* and ICHTHYOLOGY in the APPENDIX.

The *Fifth Claſs*, INSECTA, is ſubdivided into 7 ORDERS, the characters of which are taken from the wings. See the article INSECT.

ORDER I. The COLEOPTERA, have *four wings*, the two ſuperior ones being cruſtaceous, and furniſhed with a *ſtraight ſuture*.—This order comprehends 40 genera, *viz.* Attelabus, Scarabæus, Coccinella, Meloë, &c. See theſe articles.

ORDER II. The HEMIPTERA have *four wings*, the two ſuperior ones being *ſemicruſtaceous*, and *incumbent*, i. e. the *interior edges* lie above one another—This order includes 12 genera, *viz.* Blatta, Gryllus, Cicada, &c. See theſe articles.

Inſecta, Vermes.

ORDER III. The LEPIDOPTERA, have *four wings*, all of them imbricated with *ſcales*.—This order contains 3 genera, *viz.* Papilio, Sphinx, Phalæna. See theſe articles.

ORDER IV. The NEUROPTERA, have *four wings*, interwoven with veins, like a piece of *net-work*, and no *ſting* in the *anus*.—This order includes 7 genera, *viz.* Libella, Ephemera, Hemerobius, &c. See theſe articles.

ORDER V. The HYMENOPTERA, have the ſame characters with the former, only the *anus* is armed with *a ſting*. But this mark is peculiar to the *females* and *neuters;* for the *males* have no *ſting*.—This order comprehends 10 genera, *viz.* Apis, Formica. Veſpa, &c. See theſe articles.

ORDER VI. The DIPTERA, have *two wings*, and two *clavated halteres* or *balances* behind each wing.—This order contains 10 genera, *viz.* Bombylius, Aſilus, Tipula, &c. See theſe articles.

ORDER VII. The APTERA, have *no wings*. This order contains 14 ſpecies, *viz.* Acarus, Aranea, Pediculus, &c. See theſe articles.

See further the article INSECT in the *Encycl.* and the articles ENTOMOLOGY and INSECT in APPENDIX.

The *Sixth Claſs*, VERMES, is divided into five ORDERS.

ORDER I. The INTESTINA, are the moſt *ſimple animals*, being perfectly *naked*, and without *limbs* of any kind—This order contains 7 genera, *viz.* Lumbricus, Spinunculus, Faſciola, Gordius, Aſcaris, Hirudo, Mycine. See theſe articles.

ORDER II. The MOLLUSCA, are likewiſe *ſimple naked animals*, without any *ſhell;* but they are *brachiated*, or furniſhed with a kind of *limbs*.—This order comprehends 18 genera, *viz.* Aſcidia, Limax, Doris, Tethys, Aphrodita, Sepia, &c. See theſe articles.

ORDER III. The TESTACEA, have the ſame characters with thoſe of Order II. but are covered with a *ſhell*.—This order includes 39 genera, *viz.* Anomia, Cardium, Argonauta, Bulla, Buccinum, &c.

ORDER IV. The LITHOPHYTA, are *compound animals*, fixed upon a *calcareous baſe* conſtructed by the creatures *themſelves*.—This order includes the corals, of which there are 4 genera, *viz.* Tubipora, Madrepora, &c. See theſe articles.

ORDER V. The ZOOPHYTA, are *compound animals*, furniſhed with a kind of *flowers*, and having a vegetating *root* and *ſtem*.—This order contains 15 genera, *viz.* Spongia, Gorgonia, Tubularia, Hydra, &c. See theſe articles.

This ſhort explanation will enable any perſon who underſtands the Latin language to peruſe the Syſtema Naturæ of Linnæus without the aſſiſtance of a maſter.—For more particular information concerning the ſeveral branches and ſubjects of zoology, he may conſult the various articles above referred to.

ZOOPHYTE, in natural hiſtory, a kind of intermediate body partaking of the nature of a ſenſitive and a vegetable. See ZOOLOGY.

ZOOTOMY, the art of diſſecting animals or living creatures, being the ſame with anatomy. See ANATOMY, and COMPARATIVE *Anatomy*.

ZOROASTER, or ZERDUSHT, a celebrated Perſian philoſopher, ſaid to have been the reformer of the religion of the magi, and to have lived in the reign of Darius Hyſtaſpes. Others place him above 500 years before that æra: in ſhort, authors differ ſo much with reſpect to him, that nothing certain can be affirmed on the ſubject.

ZOSIMUS, an ancient hiſtorian who lived at the end of the fourth and beginning of the fifth centuries. There are ſix books of his hiſtory extant; in the firſt of which he runs over the Roman affairs in a very ſuccinct manner from Auguſtus to Diocleſian; the other five are written more diffuſively. Zoſimus was a zealous Pagan; whence we find him frequently inveighing with great bitterneſs againſt the Chriſtian princes, particularly againſt Conſtantine the Great, and the elder Theodoſius. His hiſtory has been publiſhed with the Latin verſion of Leunclavius at Frankfort, 1590, with the other minor hiſtorians of Rome, in folio; and at Oxford in 8vo. 1679.

ZUCCHERO (Taddeo), an Italian painter, born in the duchy of Urbino in 1529, was initiated in the art by his father, an ordinary painter; but at the age of 14 was placed at Rome under Pietro Calabro. He excelled in a florid invention, and a genteel manner of deſigning; but was not much admired for his colouring, which rather reſembled that of ſtatues than the life. He left many pieces unfiniſhed, being ſnatched away in his prime in 1566.

ZUCCHERO (Frederico), an eminent painter, the brother of Taddeo, was born in 1543; and being carried to the jubilee at Rome in 1550, was placed under his brother there. He afterwards finiſhed many of his brother's pieces. Pope Gregory XIII. employed him; but having a difference with ſome of his officers, he drew a picture of Slander, that was afterward engraved by Cornelius Cort, in which he repreſented thoſe who had offended him, decorated with aſſes ears. For this he was obliged to leave Rome: he then worked in France for the cardinal of Lorrain, and in the Eſcurial for Philip II. without contenting either of them; but was more fortunate in England, where he drew a picture of queen Elizabeth, and did ſome other pieces that were much commended. At length returning to Italy, and working at Venice, pope Gregory recalled and pardoned him. Soon after he received a brief from the pope for erecting an academy of painting; of which being choſen the firſt prince, he built a noble apartment for their meeting. He afterwards went to Venice, to print ſome books he had written on painting, and from thence paſſed into Savoy; but in a journey to Loretto died at Ancona, in the year 1609. In his ſtyle and manner of painting, he differed but little from his brother, though he far excelled him in ſculpture and architecture.

ZUG, a canton of Switzerland, bounded on the eaſt and north by that of Zurich, on the ſouth by Schweiz and Lucern, and on the weſt by the canton of Lucern and the Freye-Amt, or Free Provinces. It is not above 12 miles either way; but very populous and fruitful, yielding wine, wheat, cheſnuts and other fruits, in its vales, and excellent paſture on its mountains. The inhabitants of this canton are ſtaunch Roman Catholics. It lies in the dioceſe of Conſtance, and its government is democratical. There are two lakes in it, abounding in fiſh, particularly large carps, pikes, and a ſpecies of trouts, called *rotels*; as well as ſeveral woods, full of game. Zug, which gives name to it, and is its capital, ſtands on the eaſt ſide of a lake of the ſame name, about ſeven miles long, and is a ſtrong neat town, containing a priory, and two convents.

ZUINGLIUS (Ulricus), an able and zealous reformer, who laid the foundation of a ſeparation from Rome in Switzerland, at the ſame time that Luther did the like in Saxony, was born at Wildehauſen in 1487. While he officiated as preacher at Zurich, a Franciſcan ſent by Leo X. came to publiſh indulgences there; againſt which Zuinglius, after the example of Luther, declaimed powerfully. In the courſe of this oppoſition he ſtarted a new doctrine, which he called *Evangelical Truth*; and from the beginning of 1519 to 1523, he preached not only againſt indulgences, but againſt other articles of the Romiſh church. But though Zuinglius made no leſs progreſs than Luther, he yet conducted himſelf with more moderation and prudence; and wiſhing to have the concurrence of the civil powers, procured two aſſemblies to be called at Zurich: by the firſt, he was authoriſed to proceed as he had begun; and by the ſecond, the outward worſhip and ceremonies of the church of Rome were aboliſhed. During theſe tranſactions, Zuinglius publiſhed ſeveral books in defence of his doctrines; but treating of the euchariſt, and preſcribing a form of celebrating the Lord's ſupper, different from Luther, he was involved in violent diſputes with the reſt of his reforming brethren. The remainder of the Swiſs cantons diſallowing the proceedings of that of Zurich, other aſſemblies were called, and things tending to tumult, both ſides had recourſe to arms; when Zuinglius, who began as a preacher, died in arms as a ſoldier, in 1531. His works amount to four vols folio: his doctrines were afterward ſpread, with ſome alterations, by Calvin, Beza, and others, whoſe followers were called *Calviniſts*, while the diſciplines of Zuinglius retained the name of *Sacramentarians*.

ZURICH, a canton of Switzerland, bounded to the north by Swabia and the canton of Schaffhauſen; to the ſouth by the town and territory of Rapperſchweil and the cantons of Switz and Zug; to the eaſt by the Thurgau, Toggenburg, and Utznach; and to the weſt by the free bailiages and county of Baden. It is about 60 miles from north to ſouth, and 48 from eaſt to weſt. With reſpect to its face, air, and ſoil, it is ſaid to be an epitome of all Switzerland, as containing in it hills, valleys, plains, corn-lands, vineyards, lakes, and rivers. Their wines have a tartneſs at firſt, but the longer they are kept the more agreeable they are. The other products are excellent fruits, corn, paſture, fine clay, chalk, ſeveral coloured earths, pit-coal, turf, and ſulphur. There are alſo ſome mineral ſprings in the canton; and of the lakes, that of Zurich is the moſt conſiderable. The reformation was introduced here by Zuinglius, in the year

1517. This canton is the firſt in rank, and inferior only to that of Bern in extent, power, and wealth; in conſequence of which, its repreſentatives preſide in the general diets, when held in any place belonging in common to the cantons; and the affairs relating to the whole confederacy are tranſacted in its offices. Its quota, for the defence of the ſeveral members of the confederacy, is 1400 men. Of one of the two armies raiſed on theſe occaſions, it nominates one of the commanders in chief, as Lucern does the other. Its revenue is ſaid to be about 150,000 crowns a-year; of which, one year with another, two thirds are expended in the charges of government, and the reſt laid up in the treaſury. It can bring 50,000 fighting men into the field at a very ſhort warning.

ZURICH, the capital of a canton of the ſame name in Switzerland, ſtands in a pleaſant country, near where the river Aa iſſues from the lake that takes its name from the town, 23 miles from Schaffhauſen, and 114 from Geneva. After having been ruined by Attila, the Hun, it is ſaid to have been reſtored by Thuricus, ſon of Theodoric king of the Goths, from whom it took the name of *Thuricum*, corrupted afterwards into that of *Zurich*. The river divides it into two parts, and has two bridges over it. It is fortified in the modern way, and has wide ditches, faced with free ſtone. There are five arſenals in it, well ſtored with arms and artillery; an academy or college, having 15 profeſſors; a muſeum, or chamber of rarities; a ſtately town-houſe, the pilars in the front of which are of black marble, ſtreaked with white; and a town library. The ſovereignty and adminiſtration of all affairs are lodged in the greater and leſſer council, out of which are choſen the city-officers, as the councils are out of the 13 companies of burghers. There are ſeveral other councils or colleges, each of which has its particular department. Here are a great variety of ſilk, woollen, linen, cotton, and other manufactures, this being the place of the greateſt trade in all Switzerland. Before the reformation, there was an abbey for ladies in this town, whoſe abbeſs had the title of princeſs; the large revenues of which are now applied moſtly to pious and charitable uſes. The town is well ſupplied with proviſions by and from its lake. The ſtreets are neat, and houſes well built, but not magnificent. The college here hath produced ſome learned men, particularly Zuinglius and Bullinger. In the town-library are ſeveral letters to Bullinger from lady Jane Gray daughter to the duke of Suffolk. In one of the arſenals is the figure of William Tell, dreſſed and armed in the ancient Swiſs manner, with the croſs-bow, whence he ſhot the arrow that ſtruck the apple off his child's head. The unmarried women here are diſtinguiſhed from the married, by a particular knot of ribbons on their heads, and the men are generally dreſſed in black; for the young only are allowed to wear coloured ſtuffs, and thoſe quite plain, gold, ſilver, and jewels, being forbid, and luxury and vanity of every kind carefully guarded againſt. When they go to church, the men all wear bands, and, when in mourning, bonnets made of paſteboard covered with crape.

Both men and women are ſo fond of muſic, that there are few of them that cannot play on ſome inſtrument. If a burgher goes out of town, or a peaſant enters it, without a ſword, they are liable to be fined. No perſons, whatever their rank or office may be, are exempted from the ſumptuary laws. The burgomaſters, who are the ſame as the advoyers at Bern, have the title of excellence. The hoſpitals here are very neat and well endowed; but they do not affect the ridiculous vanity of lodging the poor in palaces. Not only in this town and canton, and other parts of Switzerland, but alſo among the Griſons, the miniſters all preach covered. The country about the town is very pleaſant and fruitful; for both which it is not a little indebted to the lake, that extends 24 miles in length, and about two or three in breadth. The water is of a green colour, ſuppoſed to be owing to the melted ſnow that falls into it from the adjacent mountains. That part of it next Zurich is called the *Lower Lake*, and the other end the *Upper*. The cathedral, or great church here, is collegiate. The preſent city is ſaid to owe its origin to a nunnery, founded by the emperor Lewis I. near where the ancient Tigurum ſtood.

ZUTPHEN, a ſtrong and conſiderable town of the United Provinces, in Guelderland, and capital of a county of the ſame name. It has a magnificent church, and is ſurrounded with walls. It was taken by the French in 1672, who in 1674 delivered it up to the States General. It is ſeated at the confluence of the rivers Berkel and Yeſſel, nine miles ſouth-eaſt of Deventer, and 55 eaſt by ſouth of Amſterdam.—E. Long. 6. 13. N. Lat. 52. 12.

ZUIDER-ZEE, a great gulph or bay of the German ocean, which extends from ſouth to north in the United Provinces, between Frieſland, Over-Yeſſel, Guelderland, and Holland. It is ſo called from its ſituation towards the ſouth, and is ſaid formerly to have been a lake, and that the land is ſwallowed up which united North-Holland with Frieſland.

ZYGOMA, in anatomy, a bone of the head, or rather an union or aſſemblage of two proceſſes or eminences of bones; the one from the os temporis, the other from the os malæ: theſe proceſſes are hence termed the *zygomatic proceſſes*, and the ſuture that joins them together is denominated the *zygomatic ſuture*.

ZYGOMATICUS, in anatomy, a muſcle of the head, ariſing from the *Os* ZYGOMA, whence its name, and terminating at the angle of the lips.

ZYGOPHYLLUM, BEAN CAPER; a genus of the monogynia order belonging to the decandria claſs of plants. There are eight ſpecies, partly ſhrubby and partly herbaceous plants, all natives of warm climates, though ſome of them are hardy enough to endure the open air in this country.

APPENDIX:

CONTAINING
ARTICLES OMITTED,
AND
OTHERS (marked *Encycl.*) further EXPLAINED or IMPROVED;
TOGETHER WITH
Corrections of ERRORS and of WRONG REFERENCES.

A.

ABATEMENT. For n° 12. l. read p. 3587. art. 2. par. *ult.*

ABERDEEN, line 9. dele *This;* and read *Two very antique ſpires.*

ABERRATION, in optics. For n° 19—22. read, *See* LIGHT *in the Index ſubjoined to* OPTICS.

ABIES. At the end, for n° 61. read *Catalogue of Simples*, p. 4483.

ABORTION. For n° 12. read p. 5010. chap. viii.

ABROTANUM. In the marginal note, dele *Filago;* and for n° 62, 63. read p. 4483.

ABSINTHIUM. For n° 64, 65, 66. read *Catalogue of Simples*, p. 4483.

ABSORBENT MEDICINES. For marginal note, read *See* MATERIA MEDICA, p. 4475. col. 1.

ABSORBENT *Veſſels.* In the marginal note, dele "*See* MEDICINE, *Part I.* n° 11, &c." And at the end of the article, for n° 21, 50. read p. 6203, *et ſeq.*

ABSTINENCE. In the marginal note, for P. vi. n° 328, &c. read n° 499, 500.

ACANTHUS. Dele the marginal note.

ACCELERATOR. For n° 176. read *Table of the Muſcles.*

ACER, the MAPLE TREE, (*Encycl.*) The pſeudoplatanus, or baſtard ſycamore, by tapping yields a liquor not unlike that of the birch-tree, from which the Highlanders in Scotland ſometimes make an agreeable and wholeſome wine.

ACETOSA. In the marginal note, for n° 69. read *Catalogue of Simples*, p. 4483.

ACETUM. For n° 71, &c. read *Catalogue of Simples*, p. 4483.

ACETUM *Diſtillatum.* For n° 682. read 679.

ACHOR. On the margin, for n° 762, 913. read n° 760, 1009.

ACHRAS, a genus of the monogynia order, belonging to the hexandria claſs of plants. There are three ſpecies; the moſt remarkable of which are, 1. The ſapota, with oblong oval leaves, and ſmooth turbinated fruit. 2. The mammoſa, with ſpear-ſhaped leaves, and large oval fruit. The firſt is common about Panama, and ſome places in the Spaniſh Weſt Indies, but is not to be found in any of the Britiſh ſettlements in America. The ſecond ſort is very common in Jamaica, Barbadoes, and moſt of the Weſt India iſlands, where the trees are planted in the gardens for their fruit, which is by many perſons greatly eſteemed. It grows to the height of 35 or 40 feet, having a ſtraight trunk covered with an aſh-coloured bark. The branches are produced on every ſide, forming a regular head; and are beſet with leaves near a foot long, and almoſt three inches broad in the middle. The flowers are of a cream colour; and are ſucceeded by large oval fruit covered by a browniſh ſkin, incloſing a thick pulp of a ruſſet colour, very luſcious, and called *natural marmalade*, from its reſemblance to that of quinces.—Theſe trees being natives of very hot climates, cannot be preſerved in this country except in the warmeſt ſtoves.

ACHROMATIC TELESCOPES. For OPTICS, n° 20. read p. 5597.

ACIDS, (*Encycl.*) Acids form one of the general claſſes into which Salts are uſually divided, the other two being called *alkalies* and *neutrals*. The moſt common and eaſy method of diſtinguiſhing acids is by their peculiar taſte; but there are many other properties which equally diſtinguiſh them, the principal of which are: 1. With water they combine into a fluid, whoſe ſpecific gravity is not a medium betwixt the weight of the water and acid ſeparately taken. 2. With ſpirit of wine they unite into a ſubſtance very different from either of the component parts, called *ether*. 3. They unite with abſorbent earths, alkalies, animal, metallic, and ſometimes with pure argillaceous earths, from which they cannot afterwards be ſeparated without conſiderable difficulty. 4. They change the blue colour of vegetables to red, and heighten the red colour of thoſe which are ſo already. 5. If mixed with a fermentable liquor, they will prevent that proceſs from taking place; or if the fermentation has already begun, the acid will put a ſtop to it. 6. They cannot be frozen but in a degree of cold conſiderably below 32°, the freezing point of water.

To two of theſe rules, however, there is an exception; *viz.* the volatile ſulphureous acid, which will neither unite with abſorbent earths, nor change the colour of vegetable infuſions. But this is not to be attributed to the nature of the acid itſelf. It ariſes from the phlogiſton with which the volatile ſulphureous acid is ſtill combined; for the pure ſulphureous acid is not different from that called the *vitriolic*, and is exceedingly ſtrong.

By ſome philoſophers acids have been reckoned ſimple chemical elements, and by others they have been thought to be formed of water and earth. The former opinion, however, is refuted by ſome experiments which prove the deſtructibility of certain acids; and the latter ſeems not at all probable. We have no inſtance of an acid being formed out of theſe two ingredients; nor can we conceive how two ſubſtances, ſeemingly ſo inſipid and inactive, can produce a third with properties ſo exceedingly different from both. The vegetable acids can all of them be deſtroyed by means of fire; in which caſe they yield a great quantity of fixed air, thereby ſhowing that it is properly their element, or that from which they are formed. What are the conſtituent parts of fixed air, we know not. Dr Prieſtley ſuppoſes it to be a modification of the nitrous acid: but from the great quantities of dephlogiſticated air yielded by the latter, this opinion ſeems alſo improbable; nor indeed can any thing concerning the origin of fixed air be deduced with certainty from ſuch experiments as have yet been made.

The vitriolic and marine acids are reſolved into a kind of air peculiar to themſelves; ſo that we have few or no data to gueſs at their compoſition. In their action upon bodies, acids greatly reſemble cold, as alkalies do heat; the former always tending to preſerve, or even increaſe, the coheſion of ſuch bodies as they do not chemically diſſolve, and conſequently to keep them from putrefaction; while alkalis, on the other hand, diſſolve the coheſion, and thus ſooner bring on the effects of putrefaction.

But although acids thus produce the effects of cold, this is only to be underſtood of them in a very diluted ſtate; for when concentrated, they are ſo far from producing cold, that with ſome bodies a moſt violent heat, and even flame itſelf, is ingendered. Thus a mixture of the vitriolic and nitrous acid will ſet on fire oil of turpentine; the nitrous acid alone will kindle oil of cloves, ſaſſafras, and ſome others. In this concentrated ſtate they prove a violent and corroſive poiſon if taken into the body; though when diluted, they not only may be taken with ſafety, but in many caſes prove medicines of great efficacy; particularly in fevers, where they are uſeful by their property of allaying thirſt, as well as by their tonic and antiſeptic qualities.

The acids are divided into three claſſes expreſſive of their origin, *viz.* the mineral, vegetable, and animal. The *mineral* are, the vitriolic, the nitrous, and marine acids; to which we may now add that of arſenic. The *vegetable* are, the acetous acid, that of tartar, the acid juices of fruits, the acids obtained from woods by diſtillation, and the acid of ſugar. The *animal* acids are, that of phoſphorus, the acid of ants, waſps, bees, &c.

All or moſt of the acids, as already mentioned, will unite themſelves with alkaline ſalts, earths, and metals; but ſome of them have theſe properties in a much ſtronger degree than others. The mineral acids particularly excel in this reſpect; though even among theſe there are conſiderable differences. The vitriolic is reckoned the ſtrongeſt; though it is probably inferior to the acid of arſenic. Of this laſt, however, the properties are not yet generally known.

The *vitriolic*, or, as it is ſometimes called, the *univerſal acid*, when very pure and ſtrong, appears like a clear oil, having twice the ſpecific gravity of water, or even more; in which ſtate it is called *oil of vitriol*, though improperly, for it has not the leaſt oily quality, but on the contrary mixes with water ſo violently that a great heat immediately takes place. In this ſtate the ſmalleſt quantity of an inflammable ſubſtance, ſuch as a bit of cork or ſtraw, falling into it, gives a browniſh or black colour; and as this frequently happens to thoſe who ſell the acid in ſmall quantities, we very often buy it thus diſcoloured.

This acid was originally named the *vitriolic*, from its being diſtilled from vitriol or copperas; and the name is ſtill retained, though this method of diſtillation is univerſally ſuperſeded by that of obtaining it from the fumes of burning ſulphur. It is found almoſt univerſally. It exiſts in vaſt quantity in ſulphur; ſo that it can be extracted from it with profit even when great part of the acid fumes are loſt. In the waters of the ocean it is found combined with calcareous earth, and with the earth called *magneſia*. In the former caſe, it ſubſides to the bottom of the ſalt-pans, forming what is called *pan-ſcratch;* and in the latter, it produces the bitter purging ſalt called *Epſom ſalt*.—In the earth it is found in vaſt quantities united with calcareous matter, and cryſtallized in the large maſſes called *gypſum*, *alabaſter*, *Paris plaſter*, or *ſtucco*. It is alſo found in many kinds of hard water united with the ſame earth, and ſometimes with iron; in which caſe it forms what are called *chalybeate mineral waters*. In clay of all kinds it exiſts, moſt frequently combined with calcareous earth, but ſometimes with the argillaceous or ſubſtance of the clay itſelf. In this laſt caſe the compound formed by the union is *alum*. This acid exiſts alſo in great plenty in the pyrites, or hard heavy lumps called *braſſes*, found in coal-mines. Here it is combined with inflammable matter, and the compound is *ſulphur;* but by expoſure to the air the inflammable part flies off, and the acid partly ſaturates itſelf with iron, which theſe ſubſtances alſo contain in plenty, and partly appears in its proper form. Hence the water which waſhes pyrites thus expoſed contains partly a green vitriol formed by the union of the acid with the metal; and partly a looſe acid, which if it could be concentrated would become pure oil of vitriol.—Hence probably the origin of vitriolic and acid waters.—It is alſo frequently found in or near copper mines; and then makes its appearance in a very acrid poiſonous water of a bluiſh colour, from which the blue copperas or vitriol is extracted.

The vitriolic acid is of very conſiderable uſe in many different mechanical arts. In tanning of leather, it is uſed to give conſiſtency to the leather after it has been almoſt diſſolved by the lime. In dyeing, it is of uſe for fixing and brightening of various colours, eſpecially if combined with the argillaceous earth into the compound called *alum.* In bleaching, it is alſo exceedingly uſeful for diſſolving the impurities which cannot be extracted by fixed alkali, whence the cloth acquires a clearer colour than if no acid was uſed. In medicine it is a good antiſeptic and corroborant. It is uſeful in many other caſes, ſo that the conſumpt of it is very great; and though ſeveral manufactories of vitriolic acid have been erected, the market cannot be overſtocked.

The *nitrous acid*, commonly called *aquafortis*, when pure, is a limpid liquor conſiderably lighter than oil of vitriol, its weight being to that of water as 19 to 12. A very ſmall quantity of inflammable matter communicates to a large portion of this acid a deep orange or reddiſh colour, and cauſes it emit very denſe fumes of a red colour and ſuffocating nature. It is obtained only by diſtilling the neutral ſalt called *ſaltpetre* with oil of vitriol. Concerning its origin there have been great diſputes; ſome aſſerting that it is naturally contained in the air; others, that it is the effect of putrefaction; ſome, that it is only the vitriolic acid altered by having been mixed with putrefying vegetable and animal ſubſtances; and laſtly, which is the moſt probable opinion, it has been aſſerted, that the nitrous acid is naturally found in vegetables, and conſequently that its being procured in large quantities from putrefied vegetables is not a ſign of its being produced, but only expoſed to view by that proceſs; and in confirmation of this hypotheſis, it is obſerved, that almoſt all thoſe ſalts called *eſſential* by the chemiſts, are no other than the nitrons acid combined with volatile alkali. In the earth, this acid is alſo found in various parts and in many different proportions; but the accounts we have of its production, notwithſtanding their being ſo often repeated by different authors, are ſtill ſo confuſed and uncertain, that very little confidence can be put in them.

The uſes of aquafortis in dyeing, and in other mechanic arts, is very conſiderable. It affords one method of ſeparating gold from ſilver, being endowed with a power of diſſolving the latter, but not the former. It is alſo of conſiderable uſe in chemiſtry and medicine, particularly in the making of gun-powder; for to this we muſt aſcribe the whole power exerted by the exploſion of that compoſition. In this caſe, however, it is not made uſe of in its pure ſtate, but in conjunction with a fixed alkali, forming the neutral ſalt called *nitre* or *ſaltpetre*.

Though the nitrous acid is weaker than the vitriolic, in point of chemical affinity and quantity of acid power, yet it acts much more briſkly upon all ſubſtances than the former; and by its means the vitriolic acid may be made to diſſolve many which it cannot do by itſelf. Being uſed for ſo many purpoſes, the conſumption of nitre is immenſe.

The *marine acid*, muriatic acid, or acid of ſea-ſalt, has its name from being found in the waters of the ocean, forming our common ſalt in conjunction with the foſſile fixed alkali. Beſides this, and the foſſile or rock-ſalt, which is of the ſame nature with the ſalt of the ocean, the marine-acid has no other origin excepting the bitter liquor which remains after the extraction of ſea-ſalt. Here it is found in combination with the earth called *magneſia*, forms a liquor very pungent to the taſte, which cannot be cryſtallized; and if evaporated to dryneſs, ſoon attracts moiſture from the air ſufficient to reduce it again to a fluid ſtate.

The marine acid is the weakeſt and the lighteſt of all the mineral acids. In its moſt concentrated ſtate it is of a lemon-colour, continually exhaling denſe white fumes which ſpread to a great diſtance, and are of a very ſuffocating nature. The marine acid is ſcarce ever concentrated equally with the other two, on account of its being much more volatile; and therefore its ſpecific gravity cannot well be aſcertained. The marine acid diſſolves metals with leſs heat and ebullition, and fewer vapours, than the other two, but adheres to them with much more obſtinacy; ſo that almoſt all the metals, even gold itſelf, become volatile, and ariſe with this acid in form of a ſublimate. The uſes of marine acid, except what is employed in ſea-ſalt, are very limited, and therefore there is no great demand for it. However, it is uſeful in the ſolution of ſome metals, particularly gold; in which caſe it is mixed with a proportion of aquafortis, and then forms a compound called *aqua regia*.

The VEGETABLE acids moſt generally uſed are *vinegar* or the acetous acid, and the *acid of tartar*. The former is produced by a kind of fermentation; the latter from wine which is long kept, and ſeems to be a kind of eſſential ſalt. The uſes of vinegar as an article of food are very extenſive. It is alſo the baſis of ſome elegant and uſeful medicines. Cream of tartar makes no inconſiderable article in the materia medica, and is alſo uſed in ſome of the mechanic arts. The other vegetable acids are but little known or made uſe of, the acid juices of fruits excepted, which are almoſt entirely confined to culinary purpoſes.

With regard to the ANIMAL acids, that of phoſphorus excepted, they have been very little the ſubject of inveſtigation. The phoſphoric acid, however, is not entirely confined to the animal kingdom. It is obtained by diſtillation from muſtard, and ſome other vegetables. By means of the vitriolic acid alſo, it may be had in great quantity from calcined bones and other animal earths. The only ſubſtance from which it can be had without the trouble of diſtillation, is urine.—By ſimple evaporation, a kind of ſalt compoſed of phoſphoric acid and volatile alkali is obtained. The phoſphoric acid being uſed only for matters of curioſity, the conſumption of it is inconſiderable.

ACIDUM PINGUE, an imaginary acid, which ſome German chemiſts ſuppoſed to be contained in fire, and by combining with alkalies, lime, &c. to give them their cauſtic properties; an effect which is found certainly to depend on the loſs of their fixed air. See the article AIR, (*Encycl.*) n° 16. *et ſeq.*

ACONITUM, (*Encycl.*) See alſo MONKSHOOD, (*Encycl.*)

ACORUS. On the margin, for n° 194. read *Catalogue of Simples*.

ACOUSTICS. In the foot-note, p. 57. line 3. from the bottom, for FIRE, read ATMOSPHERE, n° 8.

ACRIDS. For 25. read 45.

ACRIMONY, MORBIFIC. For 127—132, 163. read 215—227.

ACROSPIRE. For n° 5. read n° 1.

ACT, in dramatic poetry. For CHAP. II. read PART II. ſect. i.

ACTINIA, in zoology, a genus belonging to the order of vermes molluſca. The body is oblong and ſmooth, attaching itſelf firmly by its baſis to rocks or other ſolid ſubſtances, having a dilatable apex hooked within. The mouth is furniſhed with crooked teeth, the roſtrum cylindrical and radiated. There are five ſpecies, ſome of which make a beautiful appearance, and are called *Animal Flowers*, *Sea Anemonies*, and *Urtica Marina*. See Animal *Flower*.

ACTION, in law, (*Encycl.*) See alſo Suit, (*Encycl.*)

Action, among phyſicians. In the marginal note, dele *chap. iii. iv. v.*

ADANSONIA, (*Encycl.*) See alſo Baobab, (*Encycl.*)—Line 8 and 9. dele *and South America*.

ADDER-wort. For n° 170. read *Catalogue of Simples*.

ADIANTHUM. In the marginal note, for n° 73. read *Catalogue of Simples*.

ADMIRALTY islands, lie in about 2° 18′ S. Lat and 146° 44′ E. Long. There are between twenty and thirty iſlands ſaid to be ſcattered about here, one of which alone would make a large kingdom. Captain Carteret, who firſt diſcovered them, was prevented touching at them, although their appearance was very inviting, on account of the condition of his ſhip, and of his being entirely unprovided with the articles of barter which ſuit an Indian trade. He deſcribes them as clothed with a beautiful verdure of woods, lofty and luxuriant, interſperſed with ſpots that have been cleared for plantations, groves of cocoa-nut trees, and houſes of the natives, who ſeem to be very numerous. The largeſt of theſe iſlands is eighteen leagues long in the direction of eaſt and weſt. The diſcoverer thinks it highly probable that theſe iſlands produce ſeveral valuable articles of trade, particularly ſpices, as they lie in the ſame climate and latitude as the Moluccas.

ADVOCATE, (*Encycl.*) Advocates in the Engliſh courts, are more generally called *counſel*. See the article Counsel, (*Encycl.*)

ADVOWSON, (*Encycl.*) See alſo Patronage, (*Encycl.*)

ÆRA. In the marginal note, dele 1, 6, 7, 8.

ÆTIOLOGY. In the marginal note, for *Chap.* 11, &c. read *paſſim*.

AFFECTIONS *and* Passions. For n° 153. read *paſſim*.

AGALOCHUM. For Materia Medica, read Xylo-Aloes.

AGARICUS. In the marginal note, for n° 76. read *Catalogue of Simples*.

AGE. In the marginal note, for 242. read 2—7.

AGUE. For n° 424—426. read n° 122, 136, 148, 156.

AIR, (*Encycl.*) The general maſs of fluid which goes by the name of air, however ſimple and homogeneous it may have been thought in former times, is ſo far from poſſeſſing the ſimplicity of an element, that it is the receptacle of all kinds of effluvia produced from terreſtrial ſubſtances either naturally or artificially. Hence, whatever may be the nature of the aerial fluid when abſolutely pure, that which we breathe, and commonly goes under the name of *air*, muſt be conſidered as an exceedingly heterogeneous mixture, various at various times, and which it is by no means poſſible to analyſe with accuracy.

Though, in this view, air ſeems to be a kind of ſink or common ſewer, where all the poiſonous effluvia ariſing from putrid and corrupted matters are depoſited; yet it has a wonderful facility of purifying itſelf, and one way or other of depoſiting theſe vapours contained in it; ſo that it never becomes noxious except in particular places, and for a ſhort time, the general maſs remaining upon all occaſions pretty much the ſame. The way in which this purification is effected is different, according to the nature of the vapour with which the air is loaded. That which moſt univerſally prevails is water; and from experiments it appears, that the quantity of aqueous vapour contained in the atmoſphere is immenſe. Dr Halley, from an experiment on the evaporation from a fluid ſurface heated to the ſame degree with that given by our meridian ſun, has calculated, that the evaporation from the Mediterranean ſea alone is ſufficient to yield all the water of the rivers which run into it. Dr Watſon, in his Chemical Eſſays, has given an account of ſome experiments made with a view to determine the quantity of the water raiſed from the earth itſelf in time of drought; and calculates, that, when there had been no rain for above a month, and the graſs was become quite brown and parched, the evaporation from an acre was not leſs than 1600 gallons in 24 hours. Making afterwards two experiments, when the ground had been wetted by a thunder-ſhower the day before, the one gave 1973, the other 1905, gallons in 12 hours. From this the air is every moment purified by the aſcent of the vapour, which continually flies off into the clouds, thus leaving room for the exhalation of freſh quantities; ſo that as the vapour is conſiderably lighter than the common atmoſphere, and of conſequence aſcends with great velocity, the air during all this time is ſaid to be *dry*, notwithſtanding the vaſt quantity of aqueous fluid that paſſes through it.

Nor is it only from the aqueous vapour that the air is purified at this time. Much of that vapour ariſing from decayed and putrid animal and vegetable ſubſtances, and which by modern philoſophers is called *phlogiſton*, attaches itſelf to the aqueous vapour, and aſcends along with it. Another part is abſorbed by vegetables; for the phlogiſtic vapour, as has been ſhown under Agriculture, n° 5. is probably the food of plants. The phlogiſtic vapours which aſcend along with the aqueous ones, probably continue there and deſcend along with the rain; whence the fertilizing qualities of rain-water above thoſe of any other. Thus we may ſee why a dry air, whether cold or hot, muſt always be wholeſome; but as the atmoſphere cannot always *receive* vapours, it is obvious, that when great rains come on, eſpecially if attended with heat, the lower regions of the air muſt be overloaded with vapours both of the aqueous and phlogiſtic kind, and of conſequence be very unwholeſome.

But beſides the aqueous and phlogiſtic vapours, both of which are ſpecifically lighter than common air, there are others, which, being ſpecifically heavier, cannot be carried off in this manner. Hence theſe groſs vapours contaminate certain places of the atmoſphere, rendering them not only unhealthy, but abſolutely poiſonous. Of theſe are, 1. Sulphureous, acid, and metalline exhalations. Theſe are produced principally by volcanoes; and as they deſcend in conſequence of their ſpecific gravity, they ſuffocate and ſpread deſtruction all around them, poiſoning not only animals, but vegetables alſo. 2. The vapours ariſing from houſes where lead and other metals are ſmelted, have the ſame pernicious qualities; inſomuch that the men who breathe them, the cattle who eat the graſs, and the fiſhes who inhabit the waters on which they fall, are poiſoned by them if taken into the body in a certain proportion. 3. Of the ſame kind are the *moſetes*, or emanations of fixed air which ſometimes proceed from old lavas, or perhaps from ſome other places even of the ſurface. From all theſe the air ſeems not capable of purifying itſelf, otherwiſe than either by diſperſing them by winds, or by letting them ſubſide by their ſuperior gravity, till they are abſorbed either by the earth or water, according as it is their nature to unite with one or other of theſe elements. 4. Of this kind alſo ſeem to be thoſe vapours which are called properly *peſtilential*. The contagion of the plague itſelf ſeems to be of an heavy ſluggiſh nature, incapable of ariſing in the air †, but attaching itſelf to the walls of houſes, bed-cloaths, and wearing apparel. Hence ſcarce any conſtitution of the atmoſphere can diſpel theſe noxious effluvia; nor does it ſeem probable that peſtilential diſtempers ever ceaſe until the contagion has operated ſo long, and been ſo frequently communicated from one to another, that, like a ferment much expoſed to the atmoſphere, it becomes vapid, communicates a milder infection, and at laſt loſes its ſtrength altogether.

† See *Medicine*, nº 140.

Mechanical Properties of the AIR.—In common with water, the air we breathe poſſeſſes *gravity*, and conſequently will perform every thing which water can do, making allowance for the great difference between the ſpecific gravity of water and of air. This difference indeed is exceedingly great, and has been variouſly calculated. Ricciolus eſtimates the gravity of air to be to that of water as 1 to 1000; Merſennus, as 1 to 1300, or 1 to 1356; Lana, as 1 to 640; and Galileo, only as 1 to 400. But Mr Boyle, by more accurate experiments, makes the air at London to be to water as 1 to 938; and thinks, that, all things conſidered, the proportion of 1 to 1000 may be taken as a medium. But by three experiments made ſince that time before the Royal Society, the ſpecific gravity of the air was determined to be to that of water as 1 to 840, 852, and 860. By a very accurate experiment, Mr Haukſbee fixed the proportion as 1 to 885. But as all theſe experiments were made when the barometer was at 29½ inches, Dr Jurin ſuppoſes, that, at a medium between heat and cold, when the barometer is 30 inches high, the proportion between the two fluids may be taken as 1 to 800; and this agrees with the obſervations of the Hon. Mr Cavendiſh, made when the barometer was at 29½ inches, and the thermometer at 50.

By means of its gravity, the air preſſes with great force upon all bodies, according to the extent of their ſurface. M. Paſcal has computed the quantity of this preſſure to be no leſs than 2232 pounds upon every ſquare foot of ſurface, or upwards of 15 pounds on every ſquare inch. According to ſome experiments made by M. Amontons and de la Hire, a column of air on the ſurface of the earth, and 36 fathoms high, is equal in length to three lines depth of mercury. From the barometer, however, we know that the whole preſſure of the atmoſphere is very different; ſometimes being equal only to a column of 28 inches, and varying from thence to 31 inches. The whole quantity of preſſure muſt thus be immenſe, and has been computed equal to a globe of lead 60 miles in diameter.

By means of its gravity, the atmoſphere accompliſhes many uſeful purpoſes in nature. It prevents the arterial veſſels of animals and the ſap-veſſels of plants from being too much diſtended by the expanſive power (whatever it is), which has a perpetual tendency to ſwell them out. Thus we ſee, that, in the operation of cupping, where the preſſure of the air is taken off from a particular part, the expanſive force inſtantly acts, and ſwells out the veſſels to a great degree. Hence alſo, when animals are put into an air-pump, their whole bodies ſwell.

By its gravity alſo, the air promotes the union of fluid bodies, which would inſtantly ceaſe *in vacuo*. Thus oils and ſalts, which remain united in air, ſeparate as ſoon as that fluid is extracted. Hence alſo, when hot water is put under an exhauſted receiver, it boils violently; becauſe, the preſſure of the air being now taken off, the particles of ſteam, which exiſted inviſibly among the water, and which the gravity of the atmoſphere prevented from flying off ſo ſoon, are now hurried up with great velocity, by means of the exceſſive comparative gravity of the aqueous fluid.

On the gravity of the air depend the aſcent of water in pumps, ſyphons, &c. and likewiſe all the phenomena of the barometer.

Beſides its gravity, which the air has in common with water and other fluids, there is another, which it has only in common with ſteam or vapour. This is called its *elaſticity*; by which, like a ſpring, it allows itſelf to be compreſſed into a ſmaller bulk, and then returns again to its original ſize upon removing the preſſure.

This property of the air was firſt aſcertained by ſome experiments of lord Bacon, who, upon this principle, conſtructed his *vitrum calendare*, the firſt thermometer. Of this power we have numerous proofs. Thus, a blown bladder being ſqueezed in the hand, we find the included air ſenſibly reſiſt; ſo that, upon ceaſing to compreſs, the cavities or impreſſions made in its ſurface are readily expanded again and filled up.

On this property of elaſticity the ſtructure and office of the AIR-*Pump* depend. Every particle of air always exerts this niſus or endeavour to expand, and thus ſtrives againſt an equal endeavour of the ambient particles; whoſe reſiſtance happening by any means to be weakened, it immediately diffuſes into an immenſe extent. Hence it is that thin glaſs bubbles, or bladders filled with air, and exactly cloſed, being included in the exhauſted receiver of an air-pump, burſt by the force of the included air. So a bladder quite flaccid, containing only the ſmalleſt quantity of air, ſwells in the receiver and appears quite full. The ſame effect is alſo found, by carrying the flaccid bladder to the top of an high mountain.

It has been queſtioned among philoſophers, whether this elaſtic power of the air is capable of being deſtroyed or diminiſhed. Mr Boyle made ſeveral experiments with a view to diſcover, how long air brought to the greateſt degree of expanſion to which he could reduce it in his air-pump, would retain its ſpring; and could never obſerve any ſenſible diminution. Deſaguliers found, that air, after having been incloſed for half a year in a wind-gun, had loſt none of its elaſticity; and Roberval, after preſerving it in the ſame manner for 16 years, obſerved, that its expanſive projectile force was the ſame as if it had been recently condenſed. Nevertheleſs, Mr Haukſbee concludes, from a latter experiment, that the ſpring of the air may be ſo diſturbed by a violent preſſure, as to require ſome time to return to its natural tone. Dr Hales inferred, from a number of experiments, that the elaſticity of the air is capable of being impaired and diminiſhed by a variety of cauſes.

The weight or preſſure of the air, it is obvious, has no dependence on its elaſticity; but would be the ſame whether the air had ſuch a property or not. But the air, being elaſtic, is neceſſarily affected by the preſſure, which reduces it into ſuch a ſpace, as that the elaſticity, which re-acts againſt the compreſſing weight, is equal to that weight. In effect, the law of this elaſticity is, that it increaſes as the denſity of the air increaſes; and the denſity increaſes as the force increaſes by which it is preſſed. Now there muſt neceſſarily be a balance between the action and re-action; i. e. the gravity of the air which tends to compreſs it, and the elaſticity of the air which endeavours to expand it, muſt be equal. Hence the elaſticity increaſing, or diminiſhing univerſally, as the denſity increaſes or diminiſhes, i. e. as the diſtance between the particles diminiſhes or increaſes, it is no matter whether the air be compreſſed and retained in ſuch ſpace by the weight of the atmoſphere, or by any other means; it muſt endeavour in either caſe to expand with the ſame force. And hence, if air near the earth be pent up in a veſſel, ſo as to cut off all communication with the external air, the preſſure of the incloſed air will be equal to the weight of the atmoſphere. Accordingly, we find mercury ſuſtained to the ſame height, by the elaſtic force of air incloſed in a glaſs veſſel, as by the whole atmoſpherical preſſure. On the ſame principle air may be artificially condenſed; and hence the ſtructure of the Air-*Gun*.

The utmoſt limits to which air of the denſity which it poſſeſſes at the ſurface of the earth, is capable of being compreſſed, have not been aſcertained. Mr Boyle made it 13 times more denſe; Dr Halley ſays that he has ſeen it compreſſed ſo as to be 60 times denſer than in its natural ſtate, which is farther confirmed by M. Papin, and M. Huygens. Dr Hales, by means of a preſs, condenſed it 38 times; and by forcing water in an iron ball or globe, into 1551 times leſs ſpace than it naturally occupies. However, Dr Halley has aſſerted, in the Philoſophical Tranſactions, Abr. vol. ii. p. 17. that from the experiments made at London, and by the academy del Cimento at Florence, it might be ſafely concluded, that no force whatever is able to reduce air into 800 times leſs ſpace than that which it naturally poſſeſſes on the ſurface of our earth. In anſwer to which, M. Amontons, in the Memoirs of the French Academy, maintains, that there is no fixing any bounds to its condenſation; that greater and greater weights will ſtill reduce it into leſs and leſs compaſs; that it is only elaſtic in virtue of the fire which it contains; and that as it is impoſſible ever abſolutely to drive all the fire out of it, it is impoſſible ever to make the utmoſt condenſation.

The dilatation of the air, by virtue of its elaſtic force, is found to be very ſurpriſing; and yet Dr Wallis ſuggeſts, that we are far from knowing the utmoſt of which it is capable. In ſeveral experiments made by Mr Boyle, it dilated firſt into 9 times its former ſpace; then into 31 times; then into 60; then into 150. Afterwards it was brought to dilate into 8000 times its ſpace, then into 10000, and even at laſt into 13679 times its ſpace; and this altogether by its own expanſive force, without the help of fire. On this depend the ſtructure and uſe of the Manometer.

Hence, it appears, that the air we breathe near the ſurface of the earth, is compreſſed by its own weight into at leaſt the 13679th part of the ſpace it would poſſeſs *in vacuo*. But if the ſame air be condenſed by art, the ſpace it will take up when moſt dilated, to that it poſſeſſes when condenſed, will be, according to the ſame author's experiments, as 550000 to 1.

M. Amontons, and others, we have already obſerved, attribute the rarefaction of the air wholly to the fire contained in it; and therefore, by increaſing the degree of heat, the degree of rarefaction may be carried ſtill farther than its ſpontaneous dilatation. Air is expanded one-third of its bulk by boiling water.

Dr Hales found, that the air in a retort, when the bottom of the veſſel was juſt beginning to be red-hot, was expanded through twice its former ſpace; and in a white, or almoſt melting heat, it occupied thrice its former ſpace; but Mr Robins found, that air was expanded by the heat of iron, juſt beginning to be white, to four times its former bulk. On this principle depend the ſtructure and office of the Thermometer.

M. Amontons firſt diſcovered that air will expand in proportion to its denſity, with the ſame degree of heat. On this foundation the ingenious author has a diſcourſe, to prove "that the ſpring and weight of the air, with a moderate degree of warmth, may enable it to produce even earthquakes, and other of the moſt vehement commotions of nature."

According to the experiments of this author, and M. de la Hire, a column of air on the ſurface of the earth 36 fathoms high, is equal in weight to three lines depth of mercury; and it is found, that equal quantities of air poſſeſs ſpaces reciprocally proportional to the weights with which they are preſſed: the weight of the air, therefore, which would fill the whole ſpace poſſeſſed by the terreſtrial globe, would be equal to a cylinder of mercury, whoſe baſe is equal to the ſurface of the earth, and its height containing as many times three lines as the atmoſpherical ſpace contains orbs equal in weight to 36 fathoms of that wherein the experiment was made.—Hence, taking the denſeſt of all bodies, *e. g.* gold, whoſe gravity is about 14630 times greater than that of air in our orb, it is eaſy to compute that this air would be reduced to the ſame denſity as gold, by the preſſure of a column of mercury 14630 times 28 inches high, i. e. 409640 inches: ſince the bulks of air in that caſe would be in the reciprocal ratio of the weights by which they are preſſed. Theſe 409640 inches, therefore, expreſs the height at which the barometer muſt ſtand, where the air would be as heavy as gold, and the number $2\frac{51632}{409640}$ lines, the thickneſs to which our column of 36 fathoms of air would be reduced in the ſame place. Now, we know that 43528 fathoms, which is the depth where the above preſſure and conſequent reduction take place, are only the 74th part of the ſemi-diameter of the earth; and therefore, beyond that depth, whatever matter exiſts, it muſt be heavier than gold. It is not improbable, therefore, that the remaining ſphere of 6451538 fathoms diameter may be full of denſe air, heavier by many degrees than the heavieſt bodies which we know. Hence again, as it is proved, the more air is compreſſed, the more does the ſame degree of fire increaſe the force of its ſpring, and render it capable of a proportionably greater effect; we may infer, that a degree of heat, which in our orb can only produce a moderate effect, may have a very violent one in ſuch lower orb; and that, as there may be many degrees of heat in nature beyond that of boiling-water, it is probable there may be ſome whoſe violence thus aſſiſted by the weight of the air, may be ſufficient to tear aſunder the ſolid globe. See the article EARTHQUAKE.

The elaſtic power of the air is the ſecond great ſource of the effects of this important fluid. By means of this it inſinuates into the pores of bodies poſſeſſing this prodigious faculty of expanding, which is ſo eaſily excited that it muſt neceſſarily put the particles of bodies into which it inſinuates itſelf into perpetual oſcillations. Indeed, the degree of heat, and the air's gravity and denſity, and conſequently its elaſticity and expanſion, never remaining the ſame for the leaſt ſpace of time, there muſt be an inceſſant vibration or dilatation and contraction in all bodies.

We obſerve this reciprocation in ſeveral inſtances, particularly in plants, the trachea or air-veſſels of which do the office of lungs; for the contained air alternately expanding and contracting, as the heat increaſes or diminiſhes, by turns preſſes the veſſels and eaſes them again, and thus promotes a circulation of their juices.

Hence we find, that no vegetation or germination will proceed *in vacuo*. Indeed, beans have been obſerved to grow a little tumid therein; and this has led ſome to attribute that to vegetation which was really owing to no other cauſe than the dilatation of the air within them. The air is very inſtrumental in the production and growth of vegetables, not only by invigorating their ſeveral juices while in an elaſtic active ſtate, but alſo by greatly contributing in a fixed ſtate to the union and firm connection of their ſeveral conſtituent parts.

From the ſame cauſe it is, that the air contained in bubbles of ice, by its continual action, burſts the ice; and thus glaſſes and other veſſels frequently crack when their contained liquors are frozen. Thus alſo, entire columns of marble ſometimes cleave in the winter time, from ſome little bubble of included air's acquiring an increaſed elaſticity. From the ſame principle ariſe all putrefaction and fermentation; neither of which will proceed, even in the beſt diſpoſed ſubjects, *in vacuo*.

Since we find ſuch great quantities of elaſtic air generated in the ſolution of animal and vegetable ſubſtances, a good deal muſt conſtantly ariſe from the diſſolution of theſe elements in the ſtomach and bowels, which is much promoted by it.

In reality, all natural corruption and alteration ſeem to depend on air; and metals, particularly gold, only ſeem to be durable and incorruptible, in virtue of their not being pervious to air.

AIR, *effects of the different ingredients of it*.—Air not only acts by its common properties of gravity and elaſticity, but there are numerous other effects ariſing from the peculiar ingredients of which it conſiſts.

Thus, 1. It not only diſſolves and attenuates bodies by its preſſure and attrition, but as a chaos containing all kinds of menſtrua, and conſequently poſſeſſing powers for diſſolving all bodies. It is known that iron and copper readily diſſolve and become ruſty in air, unleſs well defended with oil. Boerhaave aſſures us, that he has ſeen pillars of iron ſo reduced by air, that they might be crumbled to duſt between the fingers; and as for copper, it is converted by the air into a ſubſtance much like the verdigreaſe produced by vinegar.

Mr Boyle relates, that in the ſouthern Engliſh colonies the great guns ruſt ſo faſt, that after lying in the air for a few years, large cakes of crocus martis may be ſeparated from them. Acoſta adds, that in Peru the air diſſolves lead, and conſiderably increaſes its weight. Yet gold is generally eſteemed indiſſoluble by air, being never found to contract ruſt, though expoſed to it ever ſo long. The reaſon may be, that ſea-ſalt, which is the only menſtruum capable of acting on gold, being very difficult to volatilize, there is but a ſmall proportion of it in the atmoſphere. In the laboratories of chemiſts, where aqua regia is prepared, the air becoming impregnated with an unuſual quantity of this ſalt, gold contracts a ruſt like other bodies.

Stones alſo undergo the changes incident to metals. Thus Purbeck ſtone, of which Saliſbury cathedral conſiſts, is obſerved gradually to become ſofter, and to moulder alway in the air; and Mr Boyle gives the ſame account of Blackington ſtone. He adds, that air may have a conſiderable operation on vitriol, even when a ſtrong fire could act no farther upon it. And he has found, that the fumes of a corroſive liquor work more ſuddenly and manifeſtly on a certain metal when ſuſtained in the air, than the menſtruum itſelf did, which emitted fumes on thoſe parts of the metal which it covered; referring to the effects of the effluvia of vinegar on copper.

The diſſolving power of air is increaſed by heat, and by other cauſes. It combines with water; and by acceſs of cold, depoſits part of the matter which was kept diſſolved in it by a greater degree of heat. Hence, the water, by being depoſited and condenſed upon any cold body, ſuch as glaſs, &c. in windows, forms fogs, and becomes viſible. Air, likewiſe, by means of its diſſolving power, accelerates evaporation and diſtillation.

2. Air volatilizes fixed bodies. Thus, ſea-ſalt being firſt calcined, then fuſed by the fire, and when fuſed expoſed to the air to liquefy; when liquified ſet to dry, and then fuſed again, repeating the operation; will by degrees be almoſt wholly evaporated, nothing but a little earth remaining. Helmont mentions it as an arcanum in chemiſtry, to render fixed ſalt of tartar volatile: but this is eaſily effected by air alone; for,

if ſome of this ſalt be expoſed to the air, in a place replete with acid vapours, the ſalt draws the acid to itſelf, and, when ſaturated with it, is volatile.

3. Air alſo fixes volatile bodies. Thus, though ſpirit of nitre or aquafortis readily evaporate by the fire, yet if there be any putrefied urine near the place, the volatile ſpirit will be fixed, and fall down in form of aqua ſecunda.

4. Air brings many quieſcent bodies into action; i. e. excites their latent powers. Thus, if an acid vapour be diffuſed through the air, all the bodies of which that is the proper menſtruum, being diſſolved by it, are brought into a ſtate proper for action.

In the various operations of chemiſtry, air is a very neceſſary and important agent; the reſult of particular proceſſes depending on its preſence or abſence, on its being open or incloſed. Thus, the parts of animals and vegetables can only be calcined in open air; in cloſe veſſels they never become any other than black coals. And theſe operations are affected by the changes to which the air is liable. Many inſtances might be adduced to this purpoſe. Let it ſuffice to obſerve, that it is very difficult to procure oil of ſulphur, *per campanum*, in a clear dry atmoſphere; but in a thick moiſt air it may be obtained with greater eaſe, and in larger quantities. So pure well-fermented wine, if it be carried to a place where the air is repleniſhed with the fumes of new wine then fermenting, will begin to ferment afreſh.

The changes in the air ariſe from various cauſes, and are obſervable, not only in its mechanical properties, ſuch as gravity, denſity, &c. but in the ingredients that compoſe it. Thus, at Faſhlun in Sweden, noted for copper-mines, the mineral exhalations affect the air in ſuch a manner as to diſcolour the ſilver coin in purſes; and the ſame effluvia change the colour of braſs. In Carniola, Campania, &c. where are mines of ſulphur, the air ſometimes becomes very unwholeſome, which occaſions frequent epidemic diſeaſes, &c.

The effluvia of animals alſo have their effect in varying the air; as is evident in contagious diſeaſes, plagues, murrains, and other mortalities, which are ſpread by an infected air.

For the vivifying principle of air, ſee the article BLOOD, (*Encycl.*)

Different kinds of AIR. The late numerous diſcoveries and improvements relating to this ſubject have not been more intereſting to philoſophers, than uſeful to ſcience and beneficial to ſociety. Many perplexing proceſſes in chemiſtry have been explained in conſequence of thoſe diſcoveries, ſeveral have been facilitated, and a number of new and uſeful ones have been introduced. The phenomena attending metallic calcinations and reductions have been greatly elucidated. The knowledge of the uſe of the air in reſpiration; the method of aſcertaining its purity, and fitneſs for that function; the inveſtigation of dephlogiſticated air; the method of impregnating water with fixed air; are all calculated to anſwer purpoſes of the higheſt utility. The medicinal properties of fixed air have been in a great meaſure aſcertained, and its antiſeptic qualities in other reſpects promiſe to be of conſiderable advantage. The method of aſcertaining the purity of the air of a place, and the manner of ventilating an apartment, are of great uſe for thoſe concerned in public buildings. In ſhort, there is perhaps no ſtation in life where ſome knowledge of this ſubject may not be of uſe. Although, therefore, the different kinds of air have already been treated of at ſome length in various parts of this work, yet to render a ſubject ſo uſeful in itſelf, and ſo frequently agitated in converſation, more generally intelligible, a ſhort recapitulation, with neceſſary additions, ſhall here be given.

I. *Fixed* or *Fixable* AIR, or *Aerial Acid*, is perhaps the oldeſt permanently elaſtic fluid different from common air that has been known to mankind. Its pernicious qualities of ſuffocating animals and extinguiſhing flame indeed, are thoſe by which it chiefly, if not entirely manifeſted itſelf for a long time, nor have its good properties been diſcovered till very lately. By the miners, who too frequently feel the fatal effects of it, this kind of air is called the *choke-damp*. It is found, however, not only in mines, but in various caverns, wells, and cellars, or other places which have not been ventilated for a long time; and it is alſo found in various mineral waters from whence it is continually eſcaping; ſo that at theſe ſprings there is generally a ſuperincumbent body of fixed air of a conſiderable depth. It has often happened, that people who for the ſake of heat having gone to ſleep near brick-kilns, have been found dead; owing, no doubt, to the fixed air and other noxious vapours exhaling from the bricks during the time of burning. The grotto del Cani in Italy has long been famous for the ſtratum of fixed air which lies at the bottom of it, which ſuffocates ſmall animals whoſe heads cannot reach above it, or even the largeſt if their heads are held down in it for a very ſhort time. In ſome places where this kind of air is naturally produced, its generation continues only for a time, and then ceaſes. In others it is continual; but, in general, in all places where this air is found naturally, it is mixed with a conſiderable quantity of common air. Hence it ſometimes extinguiſhes flame, where it is not fatal to animals; and frequently ſome other fluids, as inflammable and phlogiſticated air are mixed with it.

Fixed air is artificially produced in three different ways; viz. by fermentation, by heat, and by acids. When vegetable or animal-ſubſtances, eſpecially the former, are fermented, they yield a great quantity of fixed air. In breweries, on the ſurface of the fermenting liquor, there is always a ſtratum of fixed air reaching as high as the edge of the vats; ſo that if theſe veſſels are deep, and the fermenting liquor much below their edges, the above-mentioned ſtratum may be ſome feet in thickneſs. The ſame phenomenon is obſervable in the fermentation of wines in general; and it is owing to the production and elaſticity of fixed air, that fermenting liquors, when put into cloſe veſſels, often burſt them with great violence. The caſe is the ſame whatever ſubſtance it is that undergoes the vinous fermentation, though the quantity of fixed air produced is not the ſame in all ſubſtances, nor even in the ſame ſubſtance at different times. From 42 cubic inches of beer, Dr Hales obtained 639 cubic inches of air in 13 days. From a quantity of ſugar undergoing the vinous fermentation, Mr Cavendiſh obtained ſo much fixed air, that out of 100 parts of the former, 57 appeared to have been volatilized and converted into fixed air.

But though a vaſt quantity of fixed air eſcapes during this proceſs of fermentation, a very conſiderable portion ſtill remains united with the fermented liquor, and to this it owes all its briſkneſs, and agreeable pungent acidulous taſte; for when the fixed air is totally evaporated, the liquor becomes entirely vapid and flat. Hence alſo we are furniſhed with a method of reſtoring the briſkneſs to theſe liquors after they have loſt it in conſequence of being expoſed to the atmoſphere, viz. by impregnating them again with fixed air, either naturally or artificially produced.

Dr Prieſtley has made ſeveral experiments in order to determine the quantity of fixed air contained in ſeveral ſorts of wine. His method was to take a glaſs vial (fitted with a ground ſtopple and tube), capable of containing 1½ ounce meaſure. This he filled with wine, plunging it into a proper veſſel of water. The whole was then put over the fire, and the water, into which the phial was plunged, ſuffered to boil. The end of the tube being placed under the mouth of an inverted receiver filled with quickſilver, the heat expelled the fixed air from the wine, which entering into the receiver aſcended in bubbles through the quickſilver to the top, puſhing out part of the metal and taking its place. The reſult of his experiments was as follows.

1½ oz. meaſure of	Madeira	contained of pure fixed air	$\frac{1}{100}$	of an ounce meaſure.
	Port of ſix years old		$\frac{1}{48}$	
	Hock of five years		$\frac{1}{24}$	
	Barrelled claret		$\frac{1}{12}$	
	Tokay of 16 years		$\frac{1}{20}$	
	Champagne of two years		2 oz. meaſures.	
	Bottled cyder of 12 years		3¼ ditto.	

During the acetous fermentation alſo, liquors emit a vapour, great part of which is fixed air, though the nature of its other component parts has not yet been thoroughly aſcertained.

Fixed air is likewiſe produced, though in no great quantity, by putrefaction. In this caſe, however, a great part of the elaſtic fluid conſiſts of inflammable and phlogiſticated air, and the fixed air itſelf ſeems to be intimately connected with a putrid offenſive effluvium. "It ſeems (ſays Dr Prieſtley) to depend in ſome meaſure upon the time and other circumſtances in the diſſolution of animal or vegetable ſubſtances, whether they yield the proper putrid effluvium, or fixed, or inflammable air."

The elaſtic fluid produced by putrefying vegetables, when kept in a moderate degree of heat, is almoſt all fixed air; while that from animal ſubſtances contains ſeveral times more inflammable than fixed air. Vegetable ſubſtances yield almoſt all the permanently elaſtic fluid in a few days, but animal bodies continue to emit it for ſeveral weeks. When the elaſtic fluid yielded by animal ſubſtances is abſorbed by water, and that water boiled, the fixed air may then be obtained without any mixture of the putrid effluvium. It is alſo to be obſerved, that the quantity of elaſtic fluid producible from animal ſubſtances is various according to the nature of the parts of the animal employed. Thus, the muſcular parts will yield leſs elaſtic fluid, and alſo leſs mixed with any putrid or offenſive effluvium, than a whole animal, or than the liver, &c. The proportion of inflammable and of fixed air is alſo various, according to the various parts employed.

In every combuſtion, except that of ſulphur or of metals, a quantity of fixed air is generated. This may be obſerved by fixing a lighted candle in an inverted receiver over a baſon of lime water, for a precipitation of the lime will preſently enſue; and the ſame precipitation (which is one of the characteriſtics of fixed air) will always enſue, whether a candle, a burning piece of wood, or, in ſhort, any other combuſtible ſubſtance, except ſulphur or metals, be made uſe of.

During this production or extrication of fixed from atmoſpherical air, the latter is always conſiderably diminiſhed. If a piece of charcoal be burned by throwing the focus of a lens upon it when contained in a glaſs receiver inverted in water, after the apparatus is cooled, the water will have mounted a ſmall way into the receiver. The diminution, however, is limited, and depends on ſeveral circumſtances. Dr Hales has obſerved, that, in equal receivers, the air ſuffers a greater diminution by burning large candles than ſmall ones; and likewiſe that, when equal candles are made uſe of, the diminution is greater in ſmall than in large receivers. The cauſe of this phenomenon probably is, that the air contained in the receiver cannot all come into contact with the flame of the candle; whence, as ſoon as the air which is neareſt the flame becomes contaminated, the candle is extinguiſhed. Thus the author of a Conciſe Treatiſe on the Various Kinds of Permanently Elaſtic Fluids, has diminiſhed the air of an inverted receiver one ſixth part, by moving the candle whilſt it burned through the different parts of the veſſel, ſo that the flame was brought into contact with a greater quantity of the confined air than if it had remained in one ſituation till it became extinct. Dr Mayow obſerved, that by the burning of a candle the air was diminiſhed of one thirtieth only; Dr Hales found it to be diminiſhed of one twenty-ſixth part; and Dr Prieſtley found it to be diminiſhed of one fifteenth or ſixteenth. Mr Cavendiſh obſerved, that air ſuffered a diminution of one-tenth of the whole quantity, by paſſing through an iron-tube filled with red-hot powder of charcoal. A candle, or any other combuſtible body, will ceaſe to burn by itſelf, and conſequently to contaminate a quantity of confined air much ſooner, than when it is, in ſome manner, forced to burn by the external application of heat. "The focus of a burning mirror," ſays Dr Prieſtley, "thrown for a ſufficient time either upon brimſtone or wood, after it has ceaſed to burn of its own accord, and has become charcoal, will have a much greater effect of the ſame kind, diminiſhing the air to its utmoſt extent, and making it thoroughly noxious." The combuſtion of the phoſphorus of urine diminiſhes air in a great degree. Mr Lavoiſier has obſerved, that by the combuſtion of phoſphorus, air may be diminiſhed of about one-fifth or one-ſixth. This accurate philoſopher has alſo obſerved, that the acid of phoſphorus thus formed, acquires the weight loſt by the diminiſhed air; finding that about three inches of air were abſorbed by every one grain of phoſphorus, when the experiment was tried with a receiver inverted in water, upon the ſurface of which a ſmall quantity of oil had been introduced; but when the receiver was inverted in quickſilver, the abſorption was conſtantly between two one-fourth and two three-fourth inches for each grain. Mr Cavallo mentions his having often repeated the experiment of burning phoſphorus in a glaſs tube inverted

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Plate CCCXIII.

Fig. 1

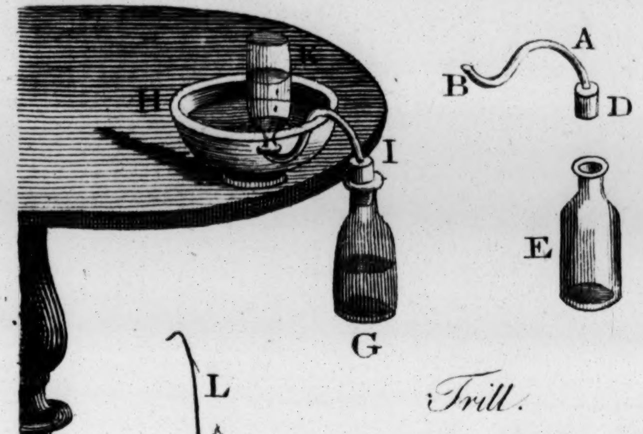


Fig. 5. Aphides

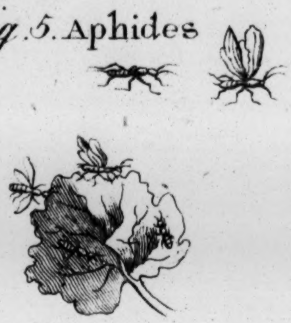


Fig. 6. Bruchus

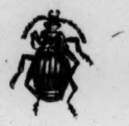


Fig. 7. Culices.

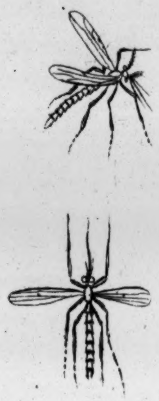


Fig. 2.

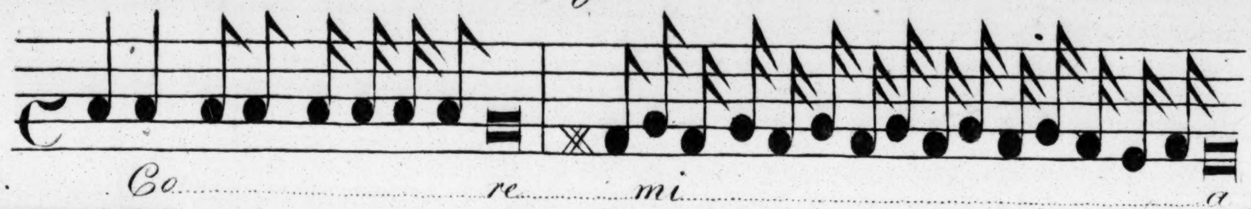


Fig. 3. Proportional COMPASSES

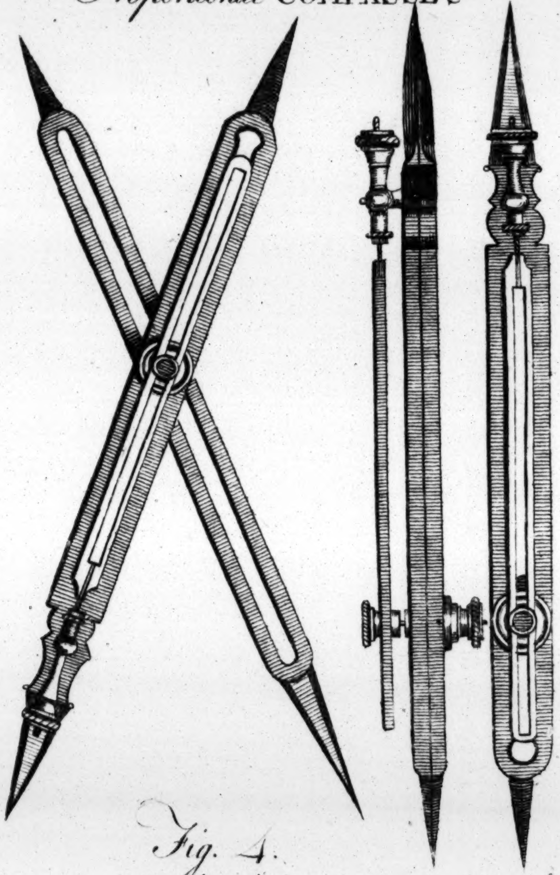


Fig. 8. Curculiones.

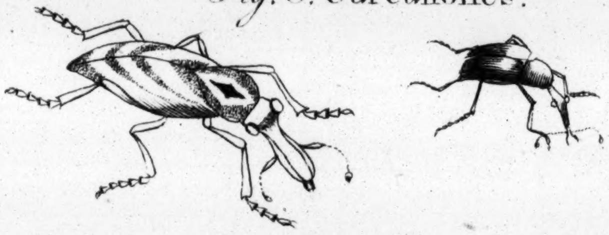


Fig. 9. Cocci.

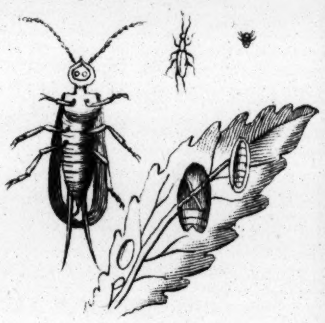


Fig. 10. Coccinellæ.

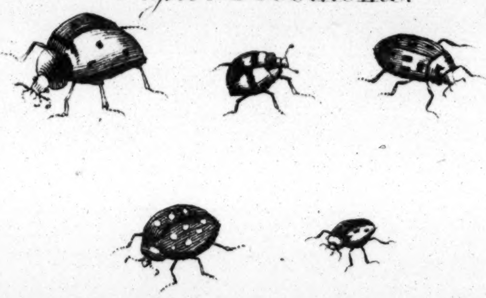


Fig. 11. Dytiſci.

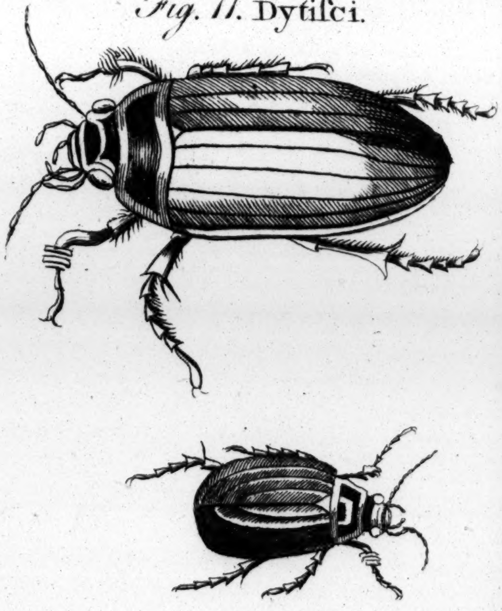


Fig. 13. Fulgora.

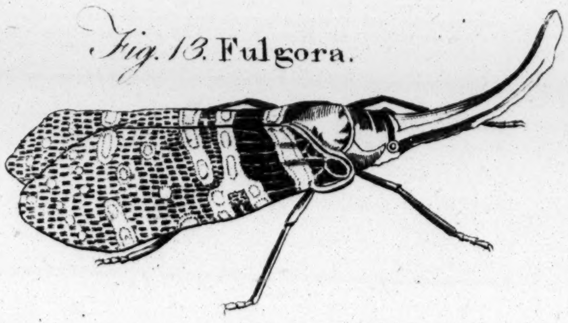


Fig. 4. Cantharis.

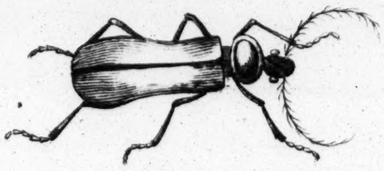


Fig. 15. Cicindela.

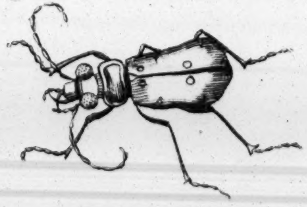


Fig. 16. Meloe.

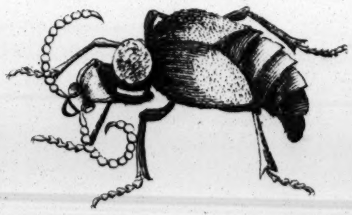


Fig. 14. Hemerobius.

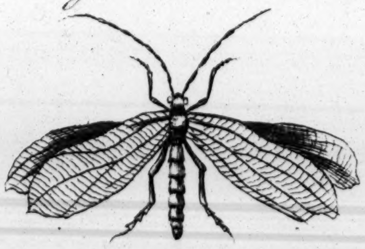


Fig. 12. Ephemeræ.

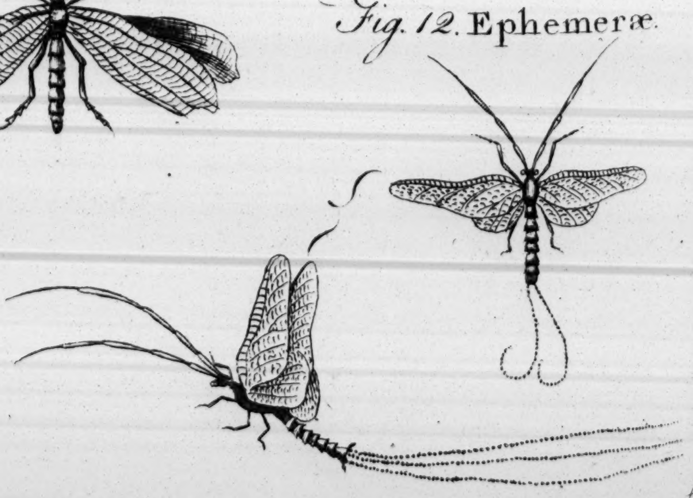
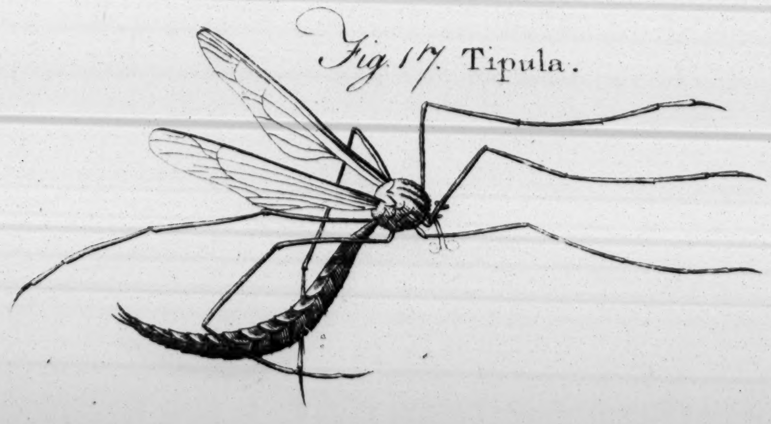


Fig. 17. Tipula.



A Bell Sculp.t

in water, by applying the cloſed part of the tube wherein the phoſphorus was contained, to a pretty ſtrong fire, when he always obſerved that the utmoſt diminution of the incloſed air effected by this means was full one-fifth.

Dr Hales remarked, that after the extinction of candles in a receiver, the air continued to diminiſh for ſeveral days after. This may be owing to the gradual abſorption of part of it by the water; it having been remarked by Dr Prieſtley, "that this diminution of air by burning is not always immediately apparent, till the air has paſſed ſeveral times thro' water; and that when the experiment was made with veſſels ſtanding in ſilver inſtead of water, the diminution was generally inconſiderable till the air had paſſed through water."

In theſe experiments of burning combuſtible bodies in a quantity of air, and meaſuring the diminution, we ſhould always remark two cauſes of miſtake, viz. the abſorption of air by the coaly reſiduum of the burned matter, which ſometimes is very conſiderable, or by the fluid in which the receiver is inverted, and the production of elaſtic fluid from the burning ſubſtances; thus gunpowder generates a great quantity of elaſtic fluid when inflamed, &c.

Even the electric ſpark ſeparates fixed air from common atmoſpherical air; for when a number of theſe ſparks are taken in a ſmall quantity of common air over lime-water, a diminution will take place, the lime will be precipitated, and if we put a blue vegetable juice inſtead of the lime-water, it will be turned red by the acidity of the fixed air depoſited upon it. Dr Prieſtley having cemented a wire into one end of a glaſs tube, the diameter of which was about one tenth of an inch, and having fixed a braſs ball to that extremity of the wire which was out of the tube, filled the lower part of it with the juice of turnſole or archil, ſo that a quantity of common air was contained in the tube between the extremity of the wire and the ſurface of the liquor. Then taking electric ſparks between the ſaid wire and liquor for about one minute, the upper part of the liquor began to look red, and in about two minutes it was manifeſtly ſo. The air, at the ſame time, was diminiſhed in proportion as the liquor became red; but when the diminution arrived to be one-fifth of the quantity of the air contained, then a longer electrization produced no ſenſible effect. "To determine," ſays the doctor, "whether the cauſe of the change of colour was in the air or in the electric matter, I expanded the air which had been diminiſhed in the tube by means of an air-pump, till it expelled all the liquor, and admitted freſh blue liquor in its place; but after that, electricity produced no ſenſible effect, either on the air or on the liquor; ſo that it was evident that the electric matter had decompoſed the air, and had made it depoſit ſomething that was of an acid nature."

The calcination of metals, as we have already obſerved, phlogiſticates, and conſequently diminiſhes common air; but does not produce any fixed air, ſince the lime-water, over which the calcination is made, does not become turbid; and when metallic calxes are expoſed to a ſufficient ſtrong heat, they in general yield ſome fixed air: ſo that it ſeems that the fixed air which is formed in the act of the calcination of metals is abſorbed by the calx. Some fixed air may be obtained from red lead, by no greater degree of heat than that of the flame of a candle applied to the phial that contains it.

Eaſy methods of obtaining Fixable Air for occaſional Experiments, &c.

1. *By Fermentation.* Mix together equal parts of brown ſugar and good yeſt of beer, to which add about twice the bulk of water. This mixture being put into a phial, to which a bent tube with a cork may be adapted, will yield a conſiderable quantity of fixed air, which may be received into a vial filled with quickſilver or water, as in the following proceſs.

Plate CCCXIII. fig. 1.

Cavallo on Air.

2. *By Acids.* Let a glaſs tube, open at both ends, be bent, by means of a blow-pipe and the flame of a candle, nearly into the ſhape of an S, as it is repreſented by AB, and fix a cork D to one of its extremities, ſo as to fit the neck of a common vial, that may hold about four or five ounces meaſure. The hole through the cork may be made with an iron wire red-hot, and the tube may be faſtened in it with a bit of ſoft wax, ſo as not to let any air go through. Fill a ſimilar vial, or any glaſs receiver K, with water, and invert it after the manner ſhown above, in a baſin HI, about half filled with water. Now put ſome chalk or marble, groſsly powdered, into the bottle E, ſo as to fill about a fourth or fifth part of it, and upon it pour ſome water, juſt enough to cover the chalk; then add ſome oil of vitriol to it, which needs not be more than about the fourth or fifth part of the water. Immediately after, apply the cork D, with the tube AB, to the bottle, and putting it in the ſituation FG, let the extremity B of the tube paſs through the water of the baſin into the neck of the bottle K, which now muſt be kept up with the hand, or other convenient ſupport, as it cannot reſt upon the bottom of the baſin. The mixture of chalk, &c. in the bottle FG, will immediately begin to effervеſce, ſhowing a frothing, and an inteſtine motion accompanied with heat, that may be felt by applying the hand to the outſide of the bottle. The elaſtic fluid called *fixed air* is copiouſly emitted from this mixture, and paſſing through the bent tube, will go into the bottle K, as appears by the bubbles which come out of the tube, and, paſſing through the water, aſcend to the top of the inverted bottle. In proportion as the elaſtic fluid fills the bottle K, the water gradually deſcends, and at laſt is quite expelled from it; the bottle K then is filled with fixed air, and being corked under water, may be removed from the baſin, and kept for uſe. Another bottle may then be filled with water, and may be inverted over the extremity of the bent tube in the place of K, which other bottle may be filled in a ſimilar manner, and ſo on till the mixture in FG has finiſhed to yield any fixed air.

If one of theſe bottles filled with fixed air be uncorked, and, holding it with the mouth upwards, a lighted wax taper, bent like L, or a ſmall piece of it affixed to the extremity of a wire, be immediately let down in it, the flame will be inſtantly extinguiſhed. The ſame thing will happen if a lighted piece of wood is let down in it.

Take a clean bowl, and putting the mouth of a bottle, filled with fixed air, in it, uncork it, and keep it in that ſituation for about a minute. The fixed air being ſpecifically heavier than common air, will come out of the bottle, and will remain at the bottom of the

ſhow

Cavallo on Air.

bowl, whilſt common air enters into the bottle; which bottle may now be removed; and, in order to ſhow the real exiſtence of the fixed air, which will immediately ſhow its being heavier than common air, put a lighted wax taper into the bowl, pretty near its bottom, which taper will be extinguiſhed immediately. The air in this experiment muſt be agitated as little as it is poſſible. That the flame of the wax taper was really extinguiſhed by the fixed air, may be eaſily proved in the following manner:—Blow once or twice into the bowl, by which means the fixed air will be expelled from it; and then, on letting down a lighted wax-taper in it as before, it will be found that it is no longer extinguiſhed, but will burn very well, the bowl being now filled with common air. This experiment never fails of ſurpriſing the ſpectators, as it clearly exhibits two remarkable properties of a fluid, which they can neither ſee nor diſtinguiſh by the feeling.

When the bottle K is about half filled with fixed air, put a mark with a bit of ſoft wax on the outſide of it, juſt coinciding with the level of the water in it, and immediately after ſhake the bottle; but taking care that its mouth be not lifted above the ſurface of the water in the baſin. After having ſhaked it for about a minute, on intermitting the agitation, it will be found that the water is above the mark; which ſhows that ſome of the fixed air has been abſorbed by it. Let this abſorption be carried on as far as poſſible, by agitating the bottle repeatedly, and allowing time to let more fixed air be produced and enter into the bottle in proportion as the water abſorbs it. Then apply the hand, or a finger, to the mouth of the bottle whilſt under water; bring the bottle out, and turn it with the mouth upwards. The water then will be found to have acquired a pleaſant acidulous taſte. The water thus impregnated with fixed air changes the blue infuſion of ſome vegetable ſubſtances into red; ſo that if a weak ſolution of heliotrope is mixed with it, or indeed if it is ſimply expoſed to fixed air, the liquor acquires a reddiſh appearance. It alſo corrodes iron, and ſome other metals, much more eaſily than common water. But the greateſt and moſt uſeful property of this acidulated water, or water impregnated with fixed air, is its being a powerful antiſeptic. As the moſt uſed mineral waters are medicinal principally on account of their being impregnated with fixed air, beſides which they generally contain ſome ſmall portion of metal or ſalt diſſolved; they may be imitated by impregnating water with fixed air, and then adding that quantity of ſalt or of metal, that by analyſis the original mineral waters are found to contain.

It is for its great property of hindering putrefaction, that fixed air by itſelf, or incorporated with various fluids, eſpecially with water; and that vegetables, ſugar, and other ſubſtances which abound with fixed air, are very powerful remedies in putrid diſeaſes *. Sir John Pringle ſuppoſes, with great probability, that the frequent uſe of ſugar and freſh vegetables, which at this time make up a conſiderable part of the diet of the European nations, prevents thoſe putrid diſeaſes and plagues which formerly were rather frequent.—Dr Macbride, ſhowing experimentally that fixed air is diſcharged by ſuch ſubſtances as form our common food, aſcribes the preſervation of the body from putrefaction in great meaſure to the fixed air, which in the ordinary proceſs of digeſtion is diſengaged from the aliment, and incorporates with the fluids of the body.

From the ſame property it may be alſo uſefully applied to ſeveral œconomical purpoſes. Mr Henry found, that fixed air can preſerve fruit incorrupt for a conſiderable time. He tried a bunch of Italian grapes, which being ſuſpended in the middle part of Dr Nooth's apparatus, and being ſupplied with plentiful ſtreams of fixed air every day, was preſerved without any ſigns of decay for about one month longer than a ſimilar bunch ſuſpended in a decanter containing common air. Strawberries and cherries he alſo found to be preſerved without decay ſome days longer in fixed than in common air. Indeed, fixed air preſerves not only fruit, but reſiſts putrefaction in general. Dr Macbride, in his elegant Eſſays on Medical and Philoſophical Subjects, has publiſhed various experiments which demonſtrate this property of fixed air. He found, that not only good meat was preſerved incorrupt for a conſiderable time, when expoſed to fixed air; but that the putrefaction of ſubſtances actually putrid was impeded by this means, and even that thoſe ſubſtances were reſtored from the putreſcent to a ſound ſtate. That putrefaction was checked by fermentation, was diſcovered by Sir John Pringle; and Dr Macbride obſerved, that this effect was owing to the fixed air produced in the act of fermentation. But it muſt be obſerved, that when the ſound, or even putrid ſubſtances, expoſe a very great ſurface to the fixed air, as is the caſe with milk, bile, and other fluids impregnated with fixed air, and alſo with ſmall bits of meat, then they are preſerved for a conſiderable time; but large pieces of ſolid animal ſubſtances, as for inſtance roundiſh pieces of fleſh of about half a pound weight, do not ſeem to remain incorrupt much longer in fixed than in common air; at leaſt the difference is inconſiderable. Sir William Lee, baronet, in two of his letters to Dr Prieſtley, informs him of his having found, that fleſh-meat, even in the hot ſeaſon, could be preſerved wholeſome for ſeveral days, by only waſhing it two or three times a-day in water impregnated with fixed air. "We have been enabled," ſays he, "to preſerve meat as perfectly ſweet and good to the extent of ten days, as at the firſt killing; and there ſeems no doubt it might be preſerved much longer." He has even recovered ſome meat that had begun to change. This uſeful diſcovery, Sir William juſtly obſerves, may be very beneficial to the public, eſpecially to butchers. "Particularly a butcher," ſays he, "who deals pretty largely, aſſures me, he found the greateſt ſucceſs from it, and only objects that the veal was a little diſcoloured, though kept perfectly ſweet."

II. *Inflammable* AIR is produced, like fixed air, both naturally and artificially. It is yielded abundantly by putrid animal and vegetable ſubſtances, and in general by thoſe inflammable bodies which part eaſily with their phlogiſton. Hence, in caverns and mines, eſpecially in coal-mines, this fluid is often found. Sometimes, when the miners break a piece of the mineral, thereby probably diſcloſing ſome hidden cavity, the inflammable air ruſhes out in great quantity. Being ſpecifically lighter than common air, it always aſcends, and eſcapes through fiſſures, except in thoſe places which are cloſely vaulted. Being generally mixed with a conſiderable quantity of common air, it is leſs noxious than fixed air; ſo that the miners breathe it with impunity; though, by reaſon of its inflammable property, it often produces terrible exploſions; from whence the miners have called it the *fire-damp*.

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* See *Medicine*, nº 498.

Inflammable air is often produced in ditches, exhaling from the ſurface of putrid water; in burying-places and houſes of office, where putrefying animal or vegetable matters are collected. It may alſo be extracted from the waters of moſt lakes and rivers wherein great quantities of fermentable and putrefying matters are thrown, as in the Thames, Severn, &c. In warm climates this kind of air is produced in much greater quantities, as the proceſſes of fermentation and putrefaction there go on much more rapidly than in colder countries. So rapid is the production of this kind of air indeed in hot climates, that if the mud at the bottom of a pond is well ſtirred, and a lighted candle immediately afterwards brought near to the ſurface of the water, the inflammable air will take fire, and a flame inſtantly ſpread over the ſurface of the pond, affording a very curious ſpectacle in the night-time. Inflammable and fixed air, as alſo phlogiſticated air, are diſcharged by our aliments in the natural courſe of digeſtion, and afterwards diſcharged from the inteſtines.

There is ſcarce any ſubſtance from which, by one proceſs or other, inflammable air may not be obtained. But to the inflammable elaſtic fluids thus obtained, perhaps no other properties in common can be aſcribed than thoſe of being inflammable, and being ſpecifically lighter than common air. In other reſpects they ſhow a material difference between each other, both in weight, ſmell, power of burning, of preſerving their properties, and the phenomena attending their combuſtion. Hence various ſpecies of this fluid might be enumerated. As yet, however, there have not been a ſufficient number of obſervations to enable us to make theſe diſtinctions properly. We ſhall therefore only remark the difference between a real inflammable gas, and that which is evidently formed by mixing a volatile inflammable fluid with the common atmoſphere. A drop of ether put into a quantity of common air, diffuſes itſelf by evaporation through the whole, taking fire at the approach of a candle like true inflammable air. In like manner Mr Cigna obſerves, that air ſaturated with volatile alkali is inflammable; and Dr Prieſtley has found, that alkaline air is itſelf weakly inflammable.

To produce Inflammable Air.

The proceſs for making this ſort of gas is the ſame as that for making fixed air: one of the materials only muſt be different, viz. iron-filings, or groſsly powdered zinc, muſt be uſed inſtead of chalk; to which filings ſome oil of vitriol and water muſt be added, in the ſame proportion as in the fixed air, or rather a little more of oil of vitriol.

N. B. Inſtead of the filings of iron, ſmall nails, or ſmall bits of iron-wire, anſwer equally well.

The inflammable elaſtic fluid produced by this mixture, has a diſpleaſing ſmell, even when mixed with a very large quantity of common air; ſo that if any conſiderable quantity of it comes out of the bottle, before the cork with the bent tube be applied to it, &c. its ſmell may be perceived all over the room in which the experiment is made; but this ſmell is not particularly offenſive.

Cavallo on Air.

When a bottle has been filled with this elaſtic fluid, ſtop the mouth of it with your thumb, or any ſtopper, and taking it out of the baſin, bring it near the flame of a candle; and when the mouth of the bottle is very near it, remove the ſtopper, and the elaſtic fluid contained in the bottle will be immediately inflamed; and if the capacity of the bottle is nearly equal to four ounces meaſure, it will continue burning quietly for about half a minute, the flame gradually deſcending lower and lower, as far as about the middle of the bottle, in proportion as the inflammable gas is conſumed.

In this experiment we ſee, that inflammable air follows the general rule of all other combuſtible ſubſtances, namely, that of burning only when in contact with common air: thus the flame of this gas, whilſt burning, is obſervable only on that ſurface of it which is contiguous to the common air; ſo that if the bottle be cloſed, the flame is put out immediately, becauſe the air is intercepted from it. But if the inflammable air were put in ſuch a ſituation as to expoſe a very great ſurface to the common air, it is plain, that by this means its combuſtion would be accelerated, ſo as to let it burn inſtantly, and go off with an exploſion, cauſed by the ſudden rarefaction of the air. In fact, this effect may be eaſily obſerved in the following manner: When the bottle is to be inverted into the baſin, in order to let it be filled with the inflammable gas, inſtead of filling it entirely with water, let half of it remain filled with common air; then invert it, and let the other half, which now is filled with water, be filled with inflammable air after the uſual manner; and when the bottle is full, remove it in the manner ſhown above, and approach it to the flame of the candle, by which means the inflammable air takes fire; but now it explodes all at once with a large flame and a conſiderable report, ſometimes breaking the bottle in which it is contained. In this caſe, the bottle being filled with equal parts of inflammable and common air, theſe two elaſtic fluids were mixed together, ſo that almoſt every particle of the one touched every particle of the other, and hence the ſudden combuſtion was occaſioned. The force of this exploſion is ſo very conſiderable, that ſome piſtols have been contrived, which are charged with a mixture of air and inflammable gas, and being fired by means of an electric ſpark, are capable to drive a leaden bullet with great violence. Sometimes thoſe piſtols are made of glaſs (but in this caſe they are not charged with a bullet), and it is very diverting to ſhow, that piſtols are charged and explode by the combuſtion of an inviſible ſubſtance.

When a ſlender pipe is tied to the neck of a bladder, and the bladder is filled with inflammable air, after the manner deſcribed in the preceding experiment (viz. when the bladder was required to be filled with fixed air), two very pleaſing experiments may be performed with it. Firſt, the inflammable gas may be inflamed by applying the flame of the candle to the extremity of the pipe; and ſqueezing at the ſame time the bladder, a ſtream of fire will be formed in the air, which will laſt as long as the bladder contains any inflammable air; for this gas coming out of the pipe with violence, will continue inflamed for a conſiderable way in the air. Secondly, the extremity of the pipe may be dipped into a ſolution of ſoap, then removing it from the ſolution, and ſqueezing the bladder very gently, a ball of ſoap-water may be formed, including inflammable air: which ball, on account of the inflammable gas being much lighter than common air, as ſoon as it is detached from the pipe will aſcend upwards, and will break by daſhing againſt the ceiling, contrary to thoſe commonly made by children, which in ſtill air go downwards.—Whilſt the ball is aſcending, if the flame of the candle be approached to it, the film of ſoap-water will be inſtantly broke, and the inflammable air will take fire; thus a flame may be ſhown to be ſeemingly produced from a ſoap-ball.

In ſtagnant waters where inflammable air is naturally produced, it may, eſpecially in the hot months, be catched in great plenty in the following manner. Fill a wide-mouthed bottle with the water of the pond, and keep it inverted therein; then with a ſtick ſtir the mud at the bottom of the pond, juſt under the inverted bottle, ſo as to let the bubbles of air which come out of it enter into the bottle: which air is inflammable. When by thus ſtirring the mud in various places, and catching the air in the bottle until this is filled, a cork or glaſs-ſtopper muſt be put over it whilſt ſtanding in water, and then the bottle may be taken home, in order to examine the contained inflammable fluid at leiſure.

Heat alone is capable to extract a good deal of inflammable air out of moſt inflammable ſubſtances, even from ſome of the metals. Dr Hales obtained inflammable air by ſimply diſtilling wax, pitch, peaſe, amber, coals, and oyſter-ſhells. Mr Fontana ſays he extracted a conſiderable quantity of inflammable air from ſpathoſe iron, by the action of fire only, applied to a matraſs. But Dr Prieſtley has obtained it from a vaſt many more ſubſtances. His method is, to introduce the required ſubſtance into a gun-barrel, to the extremity of which a tube of glaſs, or of a tobacco-pipe, was luted, and a flaccid bladder was tied to the end of this tube, which received the elaſtic fluid produced, when the gun-barrel was put into the fire. The Doctor obſerves, that in order to get a conſiderable quantity of inflammable air from various ſubſtances, the heat muſt be applied ſuddenly. "For," ſays he, "notwithſtanding the ſame care be taken in luting, and in every other reſpect, ſix or even ten times more air may be got by a ſudden heat than by a ſlow one, though the heat that is laſt applied be as intenſe as that which was applied ſuddenly. A bit of dry oak, weighing about twelve grains, will generally yield about a ſheep's bladder full of inflammable air with a briſk heat, when it will only give about two or three ounce meaſures, if the ſame heat be applied to it very gradually. To what this difference is owing, I cannot tell. Perhaps the phlogiſton, being extricated more ſlowly, may not be entirely expelled, but form another kind of union with its baſe." When the Doctor wanted to extract inflammable air from metals by means of heat only, he directed the focus of a lens upon them, whilſt they were under the exhauſted receiver of the air-pump, or were confined by quickſilver.

From pure filings of iron, and of ſteel carefully ſorted with a magnet, and confined by quickſilver in an inverted glaſs-jar, Dr Prieſtley, by means of the focus of a lens, obtained ſome permanently elaſtic fluid, which, as he obſerves, was weakly inflammable. In ſorting the ſteel-filings for this experiment, the Doctor obſerves, that care muſt be taken not to let any other ſubſtance be mixed with them, ſince the leaſt bit of wood, or any vegetable or animal matter, hardly diſcernible by the eye, will yield more inflammable air than a conſiderable quantity of iron-filings. "I found (ſays he) at this time, that eleven grains of ſteel-filings, from watch-ſprings, yielded $\frac{1}{21}$ more inflammable air, than the ſame weight of iron-filings; which agrees with the hypotheſis that ſteel contains more phlogiſton than iron."

By directing the focus of the lens upon filings of zinc or upon braſs-duſt *in vacuo*, the Doctor obtained an elaſtic fluid that was ſtrongly inflammable. But from tin he obtained an elaſtic fluid that was weakly inflammable. With other metallic ſubſtances, or with the calx of any metal whatever, the Doctor had no ſucceſs.

From a mixture of iron-filings and chalk, the Doctor obtained, by means of the lens, a plentiful mixture of fixed and inflammable air, as might be naturally expected.

The elaſtic fluid expelled from charcoal by heat only, is fixed air; but the reſiduum of it Dr Prieſtley found to be inflammable. Mr Fontana had a very elegant way to extract inflammable air from red-hot charcoal. With a pair of tongs he took a piece of charcoal, when thoroughly ignited, and plunging it in water, brought it inſtantly under a large-mouthed receiver, which was filled with and inverted in the water, in order to collect the bubbles of inflammable air that proceeded from the charcoal in the act of cooling. After the ſame manner he treated ſeveral pieces of charcoal, or the ſame piece ſeveral ſucceſſive times, until he got a quantity of inflammable air ſufficient for his purpoſe.

By means of heat in a gun-barrel, Dr Prieſtley obtained from pipe-clay, firſt inflammable, and then fixed air. But a quantity of inflammable air is obtained, together with fixed air, in various caſes, as we have already remarked.

Pit-coal, by diſtillation, yields inflammable air, which, when fired in a wide-mouthed phial, burns with a bright lambent flame, without exploſion.

By expoſing to heat, in a gun-barrel, a mixture of calx of zinc and charcoal, or Pruſſian blue, Mr de Laſſone obtained an inflammable air, which burned without exploſion.

Dr Prieſtley found, that when iron-filings and brimſtone, moiſtened with water, were confined by quickſilver, and ſuffered to ferment in a warm place, ſome inflammable air was generated. Filings of zinc and brimſtone produced the ſame effect.

By taking electric ſparks in any kind of oil, ſpirit of wine, ether, or ſpirit of ſal ammoniac, Dr Prieſtley obtained inflammable air. The oil, or other liquor, was confined in a glaſs tube by quickſilver, and a wire was cemented in the upper part of the tube, through which the ſparks being ſent, went to the quickſilver through the oil; but after that a few ſparks had been taken, a quantity of inflammable air was generated, &c. Leſt the production of inflammable air ſhould be attributed to the cement which faſtened the wire, the Doctor repeated the experiment with ether in a glaſs ſyphon; but the inflammable air was generated as before. This elaſtic fluid does not loſe its inflammability by being paſſed ſeveral times from one veſſel into another through water.

Alkaline air, by taking electric exploſions in it, is changed into inflammable air.

By means of acids, inflammable air is obtained in greater abundance, and more readily. Iron, zinc, or tin, yield plenty of inflammable air when acted on by diluted vitriolic or marine acids.

If iron is put into ſtrong vitriolic acid, the quantity of elaſtic fluid that is produced is very little, except heat be applied to the phial, for then the production of elaſtic fluid is more copious; but this elaſtic fluid is vitriolic acid air, mixed with a ſmall portion of inflammable air, the proportional quantity of it being leſs when the acid is more concentrated.

Zinc, treated after the ſame manner, produces the like effects, except that it gives more elaſtic fluid, without the application of heat, than iron does; and the greateſt part of the produced elaſtic fluid is inflammable.

In order to obtain the greateſt quantity of inflammable air from iron or zinc, the vitriolic acid muſt be diluted with much water, as about one part of ſtrong oil of vitriol to five or ſix parts of water. Dr Prieſtley found, that eleven grains of iron yielded 8¼ ounces meaſures of inflammable air. According to Mr Cavendiſh, one ounce of zinc, diſſolved either in the vitriolic or marine acid, yields a quantity of inflammable air equal to the bulk of 356 ounces of water; one ounce of iron, diſſolved by means of vitriolic acid, yields a quantity of inflammable air equal to the bulk of 412 ounces of water; and one ounce of tin yields half as much inflammable air as iron does.

The ſolutions of iron, tin, copper, lead, and zinc, in the marine acid, produce marine-acid air, and inflammable air, but in various quantities. The proportion of the former to the latter is as one to eight in iron, as one to ſix in tin, as three to one in copper and lead, and as one to ten in zinc. Regulus of antimony, diſſolved in marine acid, with the application of heat, yields a ſmall quantity of elaſtic fluid, which is weakly inflammable.

Dr Prieſtley obtained inflammable air, not only by diſſolving various ſubſtances in marine acid, but alſo by expoſing divers bodies to marine-acid air, which is probably the pureſt part of the marine acid. Having admitted iron-filings to this acid air, they were diſſolved by it pretty faſt; half of the elaſtic fluid diſappeared, and the reſt was rendered unabſorbable by water, and inflammable. The ſame effect was produced by almoſt every ſubſtance which contains phlogiſton, as by ſpirit of wine, oil of olives, ſpirit of turpentine, charcoal, phoſphorus, bees-wax, ſulphur, dry corkwood, pieces of oak, ivory, pieces of roaſted beef, and even ſome pieces of a whitiſh kind of flint.

A greater or ſmaller portion of the acid air was abſorbed, and the reſt ſometimes was all inflammable, and often was partly acid air, which was ſoon abſorbed on the admiſſion of water, and partly inflammable. In ſhort, it ſeems as if this acid air, having a great affinity with phlogiſton, ſeparates it from all thoſe ſubſtances which contain it even in ſmall quantity, and from that combination becomes inflammable.

By means of nitrous acid, inflammable air may be obtained from various ſubſtances containing phlogiſton; but it is always mixed with nitrous air, and ſometimes alſo with fixed and common or phlogiſticated air. If two parts of ſpirit of wine, mixed with one part of nitrous acid, are put into a phial with a ground-ſtopple and tube, and the flame of a candle be applied to it, ſo as to heat it gradually, the inflammable air will be produced very readily; the inflammability of which is, however, not very permanent, for by a little waſhing in water it may be annihilated. In the ſolution of moſt ſubſtances in nitrous acid, it generally happens, that the elaſtic fluid, which is obtained towards the latter end of the proceſs, poſſeſſes the property of being inflammable: thus iron, diſſolved in nitrous acid, yields nitrous air; but when the nitrous air ceaſes to be produced, if the heat of a candle be applied to the ſolution, more elaſtic fluid will be produced which is inflammable. "The nitrous acid (ſays Dr Ingenhouſz) when mixed with iron-filings in a very diluted ſtate, gives, by the aſſiſtance of a moderate degree of heat, a mixture of different airs, partly fixed, partly common air, and partly phlogiſticated air.

III. *Nitrous* Air. This is a permanently elaſtic fluid, which is never found naturally, like fixed or inflammable air, but is entirely artificial.

This elaſtic fluid conſiſts principally of nitrous acid and phlogiſton; ſo that it cannot be produced but from that acid, or, which is the ſame thing, from ſubſtances containing the nitrous acid and phlogiſton: thus, when the nitrous acid is mixed with metals, or with animal or vegetable ſubſtances which contain phlogiſton, nitrous air is generally produced; but very little or none of this ſort of elaſtic fluid is yielded when the nitrous acid is mixed with metallic calxes, with pure aſhes of vegetable ſubſtances, or, in ſhort, with any ſubſtance which contains little or nothing of phlogiſton. In this caſe, if the mixture is expoſed to a ſufficiently ſtrong degree of heat, the nitrous acid is decompoſed, and phlogiſticated air is produced; though, in ſome period of the proceſs, a little nitrous air is generally produced, which is owing to the ſmall quantity of phlogiſton which exiſts in moſt, if not in all metallic calxes, &c.

The variety of elaſtic fluids obtainable when nitrous acid is employed, may be deduced from obſerving, that the nitrous acid itſelf, by being decompoſed, may generate dephlogiſticated air; that, by joining with the phlogiſton of the ſubſtance with which it is mixed, may generate nitrous air; that, by the mixture of thoſe two elaſtic fluids, another elaſtic fluid, namely, phlogiſticated air, may be formed; and that, by its acting as an acid, it may expel one or more other elaſtic fluids from thoſe ſubſtances with which it is mixed.

All metallic ſubſtances, when mixed with the nitrous acid, yield nitrous air. Indeed gold, platina, and regulus of antimony, as they are not diſſoluble in ſimple nitrous acid, muſt be diſſolved in aqua regia, in order to obtain nitrous air from them. Although all metallic ſubſtances, by means of the nitrous acid, may be made to yield nitrous air; yet they do not produce it in equal quantities, with equal facility, and of equal goodneſs. The following are the more remarkable particulars relating to this matter:

Either ſilver, copper, braſs, iron, mercury, biſmuth, or nickel, when mixed with nitrous acid, yield nitrous air in great quantities. Some of them, eſpecially mercury, require the aid of heat in order to produce the elaſtic fluid; the flame of a candle applied to the phial is ſufficient: but others, eſpecially copper and iron, do not want the application of any heat. Gold, platina, and the regulus of antimony, when put in aqua regia, yield nitrous air pretty readily. Among the metals, lead yields nitrous air in the ſmalleſt quantity. "I poured (ſays Dr Prieſtley) ſmoking ſpirit of nitre into a phial with a ground-ſtopple and tube, containing 1¼ ounce meaſures filled with ſmall leaden ſhot, ſo as to leave no common air at all, either in the phial or in the tube; and I placed it ſo as to receive the air that might come from it in water.

"After waiting an hour, in which little or no air was produced, I applied the flame of a candle, though not very near, to it; and in theſe circumſtances I got about an ounce meaſure of air: but upon ſome water ruſhing into the phial while the candle was withdrawn, air was produced very plentifully. I collected in all about a quarter of a pint; and might probably have got much more, but that the ſalt formed by the ſolution of the lead had ſo nearly cloſed up the tube, that I thought proper to diſcontinue the proceſs. The air, both of the firſt and of the laſt produce, was of the ſame quantity; and ſo far nitrous, that two meaſures of common air, and one of this, occupied the ſpace of two meaſures only; excepting that the very firſt and very laſt produce, mixed with common air, took up a little more room than that which I got in the middle of the proceſs. When the air was produced very faſt, it was exceedingly turbid, as if it had been filled with a white powder."

Among the ſemi-metals, zinc gives the weakeſt nitrous air, when diſſolved in nitrous acid. The elaſtic fluid produced from it is moſtly phlogiſticated air. From 4 pennyweights and 17 grains of zinc, diſſolved in ſpirit of nitre diluted with an equal quantity of water, Dr Prieſtley obtained about 12 ounce meaſures of very weak nitrous air. It occaſioned a very ſlight effervescence when mixed with common air (c). The Doctor obtained nitrous air even from ſome flowers of zinc. "Having (ſays he) mixed a quantity of blue ſpirit of nitre with flowers of zinc, which were of a dull colour, and appeared from ſeveral experiments to contain a portion of phlogiſton, it yielded, with the heat of a candle applied to the phial which contained it, ſtrong nitrous air; when the common ſpirit of nitre, applied in the ſame manner, gave only phlogiſticated air; the phlogiſton of which came probably from the calx itſelf, though a ſmall portion of it might have been in the nitrous acid, which I believe is never entirely free from it.

"This experiment alſo ſeems to prove, that an earth is the baſis of nitrous air; for the ſame blue ſpirit of nitre, which gave nitrous air with theſe flowers of zinc, yielded no air at all when it was treated in the ſame manner without them."

The quantity of nitrous air that may be obtained from various metals, is difficult to be aſcertained, on account of the diverſity occaſioned by the ſtrength of the acid, the various nature of the metallic ſubſtance, and the method of performing the experiments. The following is a table of the produces of nitrous air from various metals, extracted from Dr Prieſtley's firſt volume of Experiments and Obſervations; but which, as the author himſelf intimates, is far from being very accurate.

dwt.	grs.		
6	0	of ſilver yielded	17½ ounce meaſures.
5	19	of quickſilver,	4½
1	2½	of copper,	14½
2	0	of braſs,	21
0	20	of iron,	
1	5	of biſmuth,	6
0	12	of nickel,	4

The various ſtrength of the nitrous acid produces great diverſity in the production of nitrous air. Thus, if copper is diſſolved in ſtrong nitrous acid, it will not produce the leaſt quantity of nitrous air; but when diſſolved in diluted nitrous acid, it produces a great quantity of that elaſtic fluid. The ſtrong and pale-coloured nitrous acid ſhould be diluted with at leaſt two or three parts of water to one of the acid, for the eaſy production of nitrous air from copper and mercury.

The briſkneſs of the effervescence, and the production of nitrous air, are promoted by heat, and alſo by letting the metallic ſubſtance preſent a great quantity of ſurface to the acids.

For the generality of experiments, no other degree of heat is required than that produced by the effervescence itſelf, except mercury be uſed, which requires the application of ſome heat. When the metal exhibits a very great ſurface to the acid, as is the caſe when filings are uſed, the effervescence and production of nitrous air are often much quicker than can be conveniently managed.

Copper or braſs, when clipped into flat bits, each about two or three grains in weight, and about a quarter of a ſquare inch in ſurface, and when diſſolved in nitrous acid properly diluted, yield nitrous air very equably; but if iron be uſed, the pieces of it ſhould be larger and fewer; in ſhort, it ſhould preſent a much leſs ſurface to the diluted acid; otherwiſe the increaſe of heat in the proceſs, and the rapid production of elaſtic fluid, render the operation both difficult and dangerous for the operator.

As the nitrous air is moſtly neceſſary to try the goodneſs of reſpirable air †, it is of great conſequence to make it always of one conſtant degree of goodneſs; but this object is anſwered by diſſolving ſubſtances of a very homologous nature in the nitrous acid; therefore it is plain, that the metals whoſe nature is more uniform, muſt be preferred for this purpoſe. Accordingly, braſs yields nitrous air of a more uniform nature than iron: copper is ſuperior to braſs; but pure mercury is ſtill ſuperior to copper: and indeed this is the metal which, conſidering its nature, uniformity of ſubſtance, and eaſy ſolution, is upon the whole the moſt uſeful for this purpoſe.

† See Eudiometer.

It has been generally obſerved, that ſolid vegetable ſubſtances, when diſſolved in nitrous acid, yield more nitrous air than the animal ſubſtances, though this nitrous air is not ſo pure as that obtained from metals.

Sometimes it contains ſome fixed air, and a good deal of inflammable air, which is moſtly produced towards the end of the proceſs. On the other hand, the nitrous air extracted from animal-ſubſtances generally contains a good deal of phlogiſticated air, and ſometimes ſome fixed air. In order to obtain nitrous air from the ſolution of animal and vegetable ſubſtances in nitrous acid, often ſome degree of heat muſt be applied to the phial. The acid alſo ſometimes muſt be very concentrated, and in other caſes it muſt be diluted; but it is hardly worth while, or practicable, to determine with exactneſs all thoſe particular caſes.

(c) Mr de Laſſone ſays, that zinc, when diſſolved in nitrous acid, yields fixed and not nitrous air.

To make Nitrous Air.—The metal, viz. copper, braſs, or mercury, is firſt put into the bottle, (which, as well as the whole proceſs, is the ſame as that deſcribed for *fixed Air*), ſo as to fill about one-third of the ſame; then ſome water is poured into the bottle, ſo as juſt to cover the metal-filings; and laſtly, the nitrous acid is added, the quantity of which, when ſtrong, ſhould be about one-third or half the quantity of the water. The ſmell of the nitrous gas is very penetrating and offenſive, and occaſions a red ſmoke as ſoon as it comes into contact with the common air; hence, whenever any of it eſcapes from the bottle, it may be obſerved not only by the ſmell, but alſo by the ſlight red colour.

In order to obſerve the principal property of this elaſtic fluid, which is that of diminiſhing the bulk of common air, let a glaſs tube, cloſed at one end, and about nine inches long, and half or three quarters of an inch in diameter, be filled with water, and inverted in water; then take a ſmall vial, of about half an ounce meaſure, filled with common air, and plunging it under the water contained in the ſame baſin where the inverted tube is kept, let that quantity of air enter into the tube, which will go to the top of it, the water ſubſiding accordingly. Let a mark be made, either with a file or by ſticking ſoft wax on the tube, juſt oppoſite to the ſurface of the water in it, which will mark how much of the tube is filled by that given meaſure of air. After the ſame manner, fill the ſame ſmall vial (which we ſhall call the *meaſure*) again with air; throw that air into the tube, and put a mark on the tube coinciding with the level of the water in it. In this manner let four or five meaſures be marked on the tube. Now, if three meaſures of common air are put into this tube, when filled with water and inverted, they will fill a ſpace of it as far as the third mark. The ſame thing will happen if three meaſures of nitrous inſtead of common air are put in it; but if two meaſures of common air and one meaſure of nitrous air, or one meaſure of the former and two of the latter, are introduced in it, they will fill a ſpace much ſhorter than the third mark. On the moment that theſe two kinds of elaſtic fluids come into contact, a reddiſh appearance is perceived, which ſoon vaniſhes, and the water, which at firſt nearly reaches the third mark, riſes gradually into the tube, and becomes nearly ſtationary after about two or three minutes; which ſhows that the diminution is effected gradually. See EUDIOMETER, and AIR, n° 39. (*Encycl.*)

IV. *Dephlogiſticated* AIR. This is no other than exceedingly pure atmoſpherical air, entirely free from thoſe heterogeneous vapours which contaminate the air we commonly breathe. The eaſieſt method of procuring ſome of this air is to put ſome red-lead into the bottle, together with ſome good ſtrong oil of vitriol, but without any water. Let the red-lead fill about a quarter of the bottle, and the vitriolic acid be about the ſame quantity, or very little leſs; then apply the bent tube to the bottle, and proceed in the ſame manner as above. But it muſt be remarked, that without heat this mixture of red-lead and vitriolic acid will not give any dephlogiſticated air, or it yields an inconſiderable quantity of it; for which reaſon the flame of a candle (that of a wax-taper is ſufficient) muſt be applied under the bottom of the bottle; which for this purpoſe muſt be rather thin, otherwiſe it will be eaſily cracked (D). In this manner the red-lead will yield a good quantity of elaſtic fluid, the greateſt part of which is dephlogiſticated air; but not the whole quantity of it, for a good portion of fixed air comes out with it. In order to ſeparate the fixed from the dephlogiſticated air, the inverted bottle, when filled with the compound of both, as it is emitted from the red-lead, muſt be ſhook in the baſon, for impregnating water with fixed air; by which means the water will abſorb the whole quantity of fixed air, and leave the dephlogiſticated air by itſelf.

From the firſt experiments by which this kind of air was produced, Dr Prieſtley concluded, that the nitrous acid and earth were eſſential ingredients in its compoſition †. This theory, however, ſeems to be overthrown by ſubſequent experiments, where the pureſt dephlogiſticated air was produced from ſubſtances in which no nitrous acid could be ſuppoſed to exiſt. The abbe Fontana having rendered ſome red precipitate very dry by keeping it in a ſmall degree of heat for ſeveral hours, weighed 192 grains of it, and introduced this quantity into a glaſs veſſel proper for expelling the air from it. Applying, then, a ſufficient degree of heat under it, he received the air into a glaſs-jar filled with quickſilver, and inverted into a veſſel of the ſame. Thus he procured 26½ cubic inches of very pure dephlogiſticated air, the mercury being at the ſame time revivified, and loſing 13½ grains of its weight, which is nearly the whole weight of the air emitted by it. By a ſimilar proceſs, red-lead alſo emits a very pure kind of air; and it is remarkable, that red-lead which has been kept for a long time, yields more dephlogiſticated air than ſuch as is new; the reaſon of which Mr Cavallo ſuppoſes to be, that red-lead, when newly made, is not ſuch a pure calx as after it has been kept for ſome time. From ſedative ſalt alſo, from manganeſe, lapis calaminaris, and all the vitriols, pure dephlogiſticated air has been obtained; nor was it produced from the native vitriols, which might perhaps have been ſuſpected to contain ſome nitre; but from iron, copper, and zinc, diſſolved directly in pure vitriolic acid. Mercury diſſolved in the vitriolic acid, diſtilled to dryneſs, and the reſiduum urged with a ſtrong heat, yields firſt a quantity of vitriolic acid air mixed with fixed air, and then dephlogiſticated air. "It is remarkable (ſays Dr Prieſtley) that, either by means of oil of vitriol or ſpirit of nitre, mercury yields a very great quantity of dephlogiſticated air;

† See AIR, (*Encycl.*) n° 44.

(D) In this operation the flame of the candle, when once applied, muſt be kept continually near it; and when the mixture does not produce any more elaſtic fluid, or the operation is required to be intermitted, care ſhould be taken to remove the extremity of the bent tube from the water firſt, and then to take off the flame of the candle from under the bottle; otherwiſe, if the flame of the candle be firſt removed, the materials within the bottle condenſing by cold, the water immediately enters, which in an inſtant fills the bottle, and generally breaks it.

air; but with this difference, that in the proceſs with ſpirit of nitre, almoſt the whole of it (that is, if the proceſs is conducted with care, with the loſs of not more than the 20th part of the mercury) is revivified, and therefore may be uſed again and again; whereas in the proceſs with the oil of vitriol, almoſt all the mercury is loſt." By mixing the ſame acid with manganeſe alſo, dephlogiſticated air was obtained. Mr Cavallo mentions one inſtance where dephlogiſticated air was produced by means of the muriatic acid; but in this he ſeems to have miſtaken Dr Prieſtley, whoſe authority he quotes. Minium, as already mentioned, yields a quantity of dephlogiſticated air by heat, without any addition; and it ſeems to have been only this air which was ſet looſe by the acid, and not any original production. His words are: "Spirit of ſalt, I have obſerved, diſſolves a great quantity of minium. In order to diſcover what became of the air it contains, I diſtilled a quantity of that ſolution, which was of a yellow colour, made by the firſt affuſion of the acid. When the ſolution became hot, it yielded a quantity of fixed air, ſo as to make lime-water turbid only in the ſlighteſt degree. As it boiled, no air at all was procured, nor when it was diſtilled to drineſs. I treated in the ſame manner a ſaturated ſolution of white minium, made ſo by its colour having been diſcharged by a previous affuſion of the acid. But this ſolution yielded no air at all from the beginning to the end of the proceſs; nor was the common air in the retort phlogiſticated either at the beginning or end."

From every experiment it appears, that dephlogiſticated air, if it could be readily obtained, and at a cheap rate, would be a moſt valuable manufacture. The heat communicated by means of it to burning fuel is incredible. When a lighted candle is introduced into a phial containing dephlogiſticated air, its flame not only grows larger, but becomes exceedingly bright. When the dephlogiſticated air is very pure, the candle burns with a crackling noiſe as if the air contained ſome combuſtible matter, and waſtes the wax or tallow ſurpriſingly faſt: the heat of the flame is alſo very intenſe. But the beſt method of obſerving its intenſity is the following: Fill a bladder with dephlogiſticated air, then faſten a glaſs tube to the mouth of the bladder: the outward aperture of this tube muſt be drawn to a fine point like that of an ordinary blow-pipe; then holding the extremity of the tube near the flame of a large candle or of a lamp, preſs the bladder ſo as to force the dephlogiſticated air out through the ſmall aperture of the tube, which will drive the flame of the candle into an horizontal direction, augmenting its force prodigiouſly; ſo that if ſmall bits of any metal, held upon a piece of charcoal, or upon a piece of broken crucible, are preſented to the apex of that flame, they will be preſently melted. Even grains of platina may be melted by theſe means. The heat of other fuel is equally increaſed by blowing dephlogiſticated air into it. "I put (ſays Dr Prieſtley) a quantity of Mr Bewley's pyrophorus into one of the ſmall jars which I uſe for experiments on air in quickſilver, I inverted it in a baſon of the ſame, and threw up dephlogiſticated air at different times. It always occaſioned a ſudden and vehement accenſion, like the flaſhing of gunpowder; and the air was greatly diminiſhed, as might have been foreſeen." When mixed with inflammable air, and the mixture is brought near any flaming ſubſtance, or when an electric ſpark is ſent through it, a great exploſion enſues. If an ounce glaſs vial, which for this experiment ſhould be very ſtrong, be filled with a little more than one-third dephlogiſticated, and the reſt inflammable air, when the flame of a candle is preſented to its mouth, it will explode nearly as loud as a ſmall piſtol.

It is not, however, only the advantages which might reſult from ſuch an increaſe of heat that are expected from dephlogiſticated air. It has been found by experience, that animals will live much longer in this kind of air than in an equal quantity of common air; whence it is ſuppoſed, that the breathing of it muſt be much more healthy, and contribute to longevity much more than the common atmoſphere. Nay, there are not wanting ſome who attribute the longevity of the Antediluvians to the great purity of the atmoſphere at that time; the whole maſs being afterwards tainted by the deluge, in ſuch a manner that it could never regain its former purity and ſalubrity. But all this as yet is mere conjecture; and excepting the ſingle fact, that animals live much longer in a quantity of dephlogiſticated than of common air, there is no evidence that the former contributes more to longevity than the latter. Dr Prieſtley even throws out a conjecture, that the uſe of dephlogiſticated air might perhaps wear out the ſyſtem much ſooner than common air, in the ſame manner as it conſumes fuel much faſter than common air. The great quantity, however, even of the pureſt air, which is requiſite to ſupport animal life, and the expence and trouble of the moſt ready methods of procuring it, have hitherto prevented any fair trial from being made. Yet philoſophers, conſidering the probability there is of this kind of air being ſalutary in many diſeaſes, have beſtowed ſome pains in attempting to find out methods of procuring it eaſily and in large quantity; concerning which we have the following obſervations in Cavallo's Treatiſe on Air.

"A man makes in general about 15 inſpirations in a minute, and takes in about 30 cubic inches of aerial fluid. But the air which has been once inſpired is not thereby much injured, and it may be reſpired again and again; ſo that, upon a very moderate calculation, and as appears from actual experiments often repeated, we may ſafely aſſert, that a perſon can breathe 400 cubic inches of good ordinary atmoſpheric air, at leaſt 30 times, without any inconvenience, *i. e.* it would ſerve for two minutes; after which that air, though much depraved, is ſtill in a ſtate of being breathed, but then it would occaſion ſome uneaſineſs. Now, ſuppoſing the dephlogiſticated air employed to be four times more pure than common air, 400 cubic inches of dephlogiſticated air would ſerve for at leaſt 120 reſpirations, or eight minutes.

But ſuppoſing that 30 inches of common air are completely phlogiſticated by a ſingle inſpiration, and changed for ſuch as is quite freſh, which indeed is the caſe in common reſpiration, then 450 cubic inches of common air will be requiſite for one minute's reſpiration, and 27,000 for one hour; and as dephlogiſticated air is ſuppoſed to be four times as good, the ſame quantity of it will ſerve for four hours. Indeed, if we could depend on the aſſertions of Mr Fontana, that by adding lime-water to abſorb the fixed air produced by reſpiration, an animal can live 30 times as long as without it, no doubt a much ſmaller quantity would ſerve."

But it is certain ſuch aſſertions cannot be true; becauſe, though the fixed air ſhould be abſorbed as ſoon as produced, the remaining quantity would ſtill be contaminated by phlogiſton. Nay, we are informed by Dr Prieſtley, who repeated Fontana's experiments, that animals *will not* live longer in a quantity of dephlogiſticated air when it ſtands in contact with lime-water, than they will when no lime-water is uſed *. In what manner a difference ſo enormous can take place, between philoſophers in other reſpects ſo accurate, we can by no means determine. It is plain, however, that if 27,000 inches of common air are neceſſary for a perſon in one hour, the ſame quantity of dephlogiſticated air cannot be breathed longer than four hours, nor even ſo long, with any real advantage. Mr Cavallo indeed allows only 12,000 inches for four hours; but though this might no doubt ſuſtain life for that time, the perſon muſt certainly expect nothing from it ſuperior at leaſt to the common atmoſphere, if he was not materially injured by it.

A very ready method of procuring dephlogiſticated air in large quantity, is by means of nitre; and on the ſuppoſition that 12,000 inches are ſufficient for four, (or for 40 hours, as he limits the abbe Fontana's ſuppoſition), he proceeds in the following manner: "The inſtruments neceſſary for the production of dephlogiſticated air from nitre are the following; viz. earthen retorts, or earthen veſſels with a ſtraight neck, ſomewhat in the ſhape of Florence flaſks, but with a longer neck, theſe being cheaper than the retorts, and anſwering as well;—a ſmall furnace, in which the earthen retort muſt be kept red-hot; a common chimney-fire is not ſufficient. Theſe furnaces may be very eaſily made out of large black-lead crucibles. The nitre muſt be put into the retort or other veſſel, ſo as to fill half or nearly three quarters of its belly; then a bent glaſs tube is luted to the neck of the earthen veſſel, in ſuch a manner as not to let any elaſtic fluid eſcape into the open air. The beſt lute or cement for this or ſimilar purpoſes is made by mixing together whiting and drying oil. The retort being put into the furnace, muſt be ſurrounded with lighted charcoal, which is to be ſupplied according as it waſtes: in ſhort, the belly of the retort muſt be kept quite red-hot, or rather white-hot, for about three hours at leaſt. If, inſtead of the retort, the other deſcribed earthen veſſel be uſed, care ſhould be had to place it with the neck as little inclined to the horizon as poſſible, leſt the nitre ſhould ſtop the neck and break it." The air is then to be received into large glaſs-jars, as is uſual in other experiments on air.

"The retort or other earthen veſſel that is uſed for this purpoſe cannot ſerve for more than once, becauſe it generally breaks in cooling; and beſides, the decompoſed nitre cannot eaſily be taken out of it. The retort capable of holding a pound of nitre (the quantity neceſſary for producing 12,000 cubic inches of dephlogiſticated air) for this operation, coſts at leaſt half-a-crown; the other earthen veſſels in the ſhape of Florence flaſks, but with longer necks, coſt about 18d. a-piece or 2s.; ſo that the price of theſe veſſels forms a conſiderable part of the expence. If glaſs veſſels are employed, the nitre will not yield near ſo much air, though of a purer ſort, becauſe the glaſs veſſels cannot endure ſuch a great fire as the earthen ones. The retorts of metal, or at leaſt of thoſe metals which are moſt uſually employed for this purpoſe, viz. iron and copper, phlogiſticate in a great meaſure the air as ſoon as produced. Conſidering, then, all theſe circumſtances, it appears, that when a perſon has all the uſual apparatus and furnace, the expences at preſent neceſſary in London for the production of 12,000 cubic inches of dephlogſticated air, viz. the price of one pound of nitre, of an earthen retort or other veſſel, and of charcoal, amount to about 4 s. or 4 s. 6 d.

Another method of preparing dephlogiſticated air is, by blowing that of the common atmoſphere thro' melted nitre. In this proceſs the phlogiſton contained in the atmoſphere is gradually conſumed, by detonating with the acid of the nitre, and therefore iſſues much more pure than before. This method has the appearance at firſt of being much eaſier and more commodious than the former; but as it is impoſſible to mix the atmoſpheric air ſo exactly with the melted nitre that every particle of the one may come in contact with every particle of the other, it is plain that the former method muſt be preferable; not to mention that it will be found exceedingly troubleſome to blow the air through the nitre, as the latter will be perpetually apt to cool and concrete into lumps by the cold blaſt.

V. *Vitriolic Acid* Air. This conſiſts of the vitriolic acid, united with ſome phlogiſton which volatilizes, and renders it capable of aſſuming the form of a permanently elaſtic fluid. To obtain it, ſome ſtrong concentrated vitriolic acid muſt be put into the uſual bottle, together with ſome ſubſtance capable of furniſhing phlogiſton. Olive oil anſwers very well. The oil of vitriol ſhould be about three or four times as much as the ſweet oil, and both together ſhould fill about one-third or half the bottle. A gentle degree of heat is then required, in order to let theſe materials yield any elaſtic fluid; which may be done by applying the flame of a wax-taper, as directed above for the production of dephlogiſticated air.

This elaſtic fluid has no action upon quickſilver, but is eaſily, and in great quantity, abſorbed by water; ſo that if a ſmall quantity of water be introduced into the receiver containing it, and inverted in quickſilver (E), the whole quantity of the acid air diſappears, being abſorbed by the water; from which it eſcapes very eaſily when expoſed to the open air. The water thus impregnated acquires the properties of the volatile or ſulphureous vitriolic acid.

A piece of camphor introduced into a receiver containing this kind of elaſtic fluid, is eaſily diſſolved, but by the addition of water the camphor is again recovered.

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* Cavallo, p. 832.

(E) In order to introduce water, or any other fluid, into a receiver inverted in quickſilver, let a ſmall phial be quite filled with that liquid; then holding it with the hand, ſtop its mouth with a finger, and thus plunge it into the quickſilver, and paſs it under the inverted receiver, where being unſtopped, and turned with the mouth upwards, the contained fluid will inſtantly aſcend to the top of the quickſilver in the receiver, on account of it being ſpecifically lighter than quickſilver.

If a piece of charcoal is admitted to this vitriolic acid gas, it abſorbs a good quantity of it, and acquires from it a diſagreeable and pungent ſmell. It is remarkable, that this elaſtic fluid does not act upon iron; whereas the water combined with it is a powerful ſolvent of that metal.

VI. *Marine Acid* Air, is no other than the marine acid itſelf, which without any addition becomes a permanently elaſtic fluid. In order to procure it, put ſome ſea-ſalt, or common kitchen-ſalt, into the uſual bottle in which the materials for producing elaſtic fluids are generally put, ſo as to fill about a fourth-part of it, and upon this ſalt pour a ſmall quantity of good concentrated vitriolic acid; then apply the bent tube to the bottle, and introduce it through the quickſilver into the receiver, filled with and inverted in quickſilver, after the uſual method, and the elaſtic fluid, called *marine-acid air*, is copiouſly produced.

A ſmall quantity of water introduced into a receiver, containing this ſort of elaſtic fluid, abſorbs inſtantaneouſly a prodigious quantity of it, and becomes a very ſtrong marine acid ſpirit; indeed, much ſtronger than can be obtained by any other means.

If any metallic, or in general any inflammable ſubſtance, capable of furniſhing a conſiderable quantity of phlogiſton, as ſpirit of wine, oil, &c. be introduced into a receiver filled with this elaſtic fluid, it occaſions a remarkable change; viz. the marine acid air, by acting on it, will be changed into an inflammable elaſtic fluid, that takes fire by the contact of ignited bodies.

When a ſmall quantity, as for inſtance, about a fourth-part, of marine acid air is mixed with one part of common air, and a lighted candle is introduced into the receiver containing this mixture, the flame of the candle acquires a beautiful green or bluiſh colour.

VII. *Nitrous Acid* Air. The elaſtic fluid, called *nitrous acid air*, may be obtained from heated nitrous acid, the vapour of which acquires a permanent elaſticity, and it has been found to remain uncondenſed into a viſible fluid by the cold to which it has been hitherto expoſed. The great difficulty, is to find a fluid capable of confining this acid air, becauſe it is eaſily and abundantly abſorbed by water, which is one of its properties by which it differs from nitrous air. It acts upon quickſilver, and alſo upon oils: hence its examination cannot be made but very imperfectly; for ſubſtances muſt be expoſed to it, or mixed with it, whilſt it is actually changing its nature by acting on the mercury or other fluid that confines it.

When water has abſorbed a good quantity of this elaſtic fluid, it acquires the properties of nitrous acid; and when heated, it yields a large quantity of nitrous air, viz. a quantity many times greater than that which water is wont to imbibe of it by agitation, or by any known means.

When the nitrous acid air is combined with eſſential oils, a conſiderable efferveſcence and heat is produced, nearly in the ſame manner as when the nitrous acid itſelf is poured upon thoſe oils.

VIII. *Fluor Acid* Air. Put ſome of thoſe minerals called *fluors*, or *fuſible ſpars*, pulverized, into the uſual bottle, and upon it pour ſome concentrated oil of vitriol; then adapt the bent tube, &c. The fluor acid air is at firſt produced without the help of heat; but in a ſhort time it will be neceſſary to apply the flame of a candle to the bottle, by which means a conſiderable quantity of this elaſtic fluid is obtained.

The properties of fluor acid air are nearly the ſame as thoſe of the vitriolic acid air; hence ſome excellent philoſophers are of opinion, that thoſe two acid airs are eſſentially the ſame. The principal, if not the only property by which they are diſtinguiſhed from each other, is, that when water is admitted into a receiver containing fluor acid air, the water abſorbs only a part of it; for a ſtony cruſt is formed upon the ſurface of the water which hinders the farther abſorption, and which muſt be broke before the water abſorbs any more of it.

IX. *Alkaline* Air. Let the uſual bottle be about half filled with volatile ſpirit of ſalt ammoniac; and after applying the bent tube, &c. let the flame of a candle be brought under the bottle, by which means the alkaline air will be produced copiouſly.

If a ſmall quantity of water is introduced into the receiver filled with this elaſtic fluid, the whole quantity of it is readily abſorbed by the water, which thereby becomes a ſtrong volatile alkaline ſpirit. If ſome of this gas is introduced into a receiver containing either the marine or the vitriolic acid air, a white cloud is inſtantly formed, and the two inviſible elaſtic fluids, loſing at once their elaſticity, form a viſible ſubſtance, namely, concrete ammoniacal ſalts.

The properties of this air are, that it is permanently elaſtic and unchangeable when confined in vials perfectly dry; but on the approach of moiſture, it is inſtantly abſorbed in great quantity without leaving any reſiduum. There is, however, a point of ſaturation betwixt it and water, nor can the latter be made to imbibe more than one-third of its weight of alkaline air. When the barometer is at a mean height, alkaline air is ſpecifically lighter than common air in the proportion of 7 to 15, and its elaſticity is greater in the proportion of 475 to 132 *. It deſtroys animal-life, and extinguiſhes fire, though in certain caſes it has itſelf a degree of inflammability †. When a burning candle is put into a jar full of this air, it is indeed extinguiſhed; but juſt before it goes out, the flame is enlarged by the addition of another of a pale yellow colour. Sometimes it will actually take fire when the flame of a candle approaches it, a weak flame being obſerved to ſpread conſiderably around the candle, and even through the whole body of the alkaline air. By the electric ſpark it is augmented in bulk, ſometimes to $\frac{1}{4}$ more than it was before, and then becomes ſtrongly inflammable air, without the leaſt appearance of volatile alkali. The electric ſparks taken in it are red. It diſſolves ice almoſt as readily as a hot iron, even in a very ſevere cold. It does not act on copper in its dry ſtate, though it does ſo remarkably when united with water. It readily unites with all the acid airs, forming with them ammoniacal ſalts according to their different natures. Dr Prieſtley made two ſets of experiments to determine the quantity of theſe gaſes neceſſary to ſaturate each other; but they vary ſo much in their reſult that little dependence can be placed on them. They are as follow:

First Set of Experiments.

	Meaſures.
One meaſure of marine acid air abſorbed of alkaline air,	1
One of vitriolic ditto, ...	2

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* See Volcano, (*Encycl.*)

† See Volatile Alkali, (*Encycl.*)

	Meaſures.
One of fluor acid air, ...	2
One of nitrous air, ...	5
One of fixed air, ...	3

Second Set.

One meaſure of fluor acid air ſaturated of alkaline ditto, ...	$1\frac{19}{20}$
One of vitriolic acid air, ...	2
One of marine acid air, ...	$1\frac{1}{6}$
One of fixed air, ...	$1\frac{6}{7}$

The laſt ſet, however, the Doctor looks upon as leſs accurate than the foregoing.

Table of the Specific Gravities of the different Elaſtic Fluids.

Names of elaſtic Fluids.	Their ſpecific gravities.	Weight of a cubic inch of, in grains.
Common air,	152	0,385
Dephlogiſticated air,	160	0,042
Phlogiſticated air (F),	140	0,377
Fixed air,	220	0,57
Inflammable air,	10	0,035
Nitrous air,	157	0,399
Marine-acid air,	243	0,654
Vitriolic-acid air,	300	0,778
Fluor-acid air,	450	1,24
Alkaline air.	70	0,2

X. *Hepatic* Air. A new kind of elaſtic fluid diſcovered by Mr Bergman. He obtained it from a mineral called *pſeudo-galina nigra Damnemorenſis*, an ore of zinc; and it has alſo been obtained from ſome other ores of this ſemimetal. One hundred parts of this mineral were found to contain 29 parts of ſulphur, one of arſenic, ſix of water, ſix of lead, nine of iron, 45 of zinc, and four of ſiliceous earth. When oil of vitriol is poured upon this mineral, the hepatic ſmell is immediately perceived, and a ſmall quantity of hepatic air is produced. Marine acid expels a much greater quantity of hepatic air from this mineral than the vitriolic. By means of diluted nitrous acid, nitrous air only was obtained. No other property of this kind of air is known, but that it depoſits a quantity of ſulphur when mixed with nitrous air.

Circulation of Air *in Rooms*. To render the circulation of air ſenſible, let the air of a room be heated by a ſtrong fire, whilſt the air of a contiguous room is cold; then let the door between theſe two rooms be opened, in which caſe the hot air of one room being lighter, will paſs through the upper part of the opening of the door into the cold room; and, on the contrary, the cold air of the other room being heavier, will paſs into the former room through the lower part of the opening; accordingly, it will be found, that applying a lighted candle at the top, in the middle, and at the lower part of the opening between the two rooms, a ſtrong current of air will appear to paſs from the hot into the cold room near the top; a contrary current of air will appear to paſs from the latter into the former room near the lower part of the ſaid opening; whilſt in the middle there is little or no motion at all, as may be clearly perceived by the direction of the flame of the candle.

It is for the ſame reaſon that when the fire is lighted in a chimney, a ſtrong current of air is occaſioned to enter the room, which may be felt by applying the hand near the key-hole, or other ſuch ſmall openings, if the doors and windows are ſhut; for the air over the fire being heated, becomes lighter, and aſcends into the chimney, conſequently other colder air muſt ſupply its place, which forces its way through all the ſmall openings it can find. Were a room with a fire in it to be perfectly cloſed, excepting the chimney, the air in it would ſoon become unwholeſome for reſpiration, and the fire would be ſoon extinguiſhed, beſides other inconveniences. Hence it appears, that thoſe perſons miſtake who expect to keep the air of a room ſweet and wholeſome, eſpecially for convaleſcents, by accurately ſtopping all the ſmalleſt openings that admit freſh air. When the current of air that enters into a room is on ſome ſide of it where it falls immediately upon the perſons who ſit in the room, then it may be offenſive, eſpecially to delicate conſtitutions. In that caſe, ſuch opening ſhould be cloſed: but at the ſame time another opening ſhould be made for admitting freſh air, in another more convenient part; for a circulation of air, eſpecially in rooms where a fire is kept, is not only ſalutary and uſeful, but is abſolutely neceſſary.

In an ingenious publication, intitled *A Practical Treatiſe on Chimneys*, there are the following remarks relating to the propereſt method of admitting air into a room, and of expelling the contaminated air. The author, directing to make a vent-hole near the top of the room, in order to expel the heated and contaminated air, "this," ſays he, "might be done by means of a ſmall tube opening into the room, either in or near the ceiling; which might either be carried to the top of the building, or be made to communicate with the external air by a ſmall perforation through the wall at the roof of the room; by means of either of which, a proper circulation would be eſtabliſhed, and the foul air be carried off.

"For the fire would no ſooner have warmed any particles of air within the room, than theſe would be greatly expanded, and riſe immediately upwards, ſo as to fill the higher parts of the room with rarefied air; and as other particles would be ſucceſſively heated and rarefied in their turn, by their expanſive force they would preſs upon the ſides of the apartment in every place, ſo as to force the lighteſt particles through the opening left for that purpoſe in the top of the room; by which means the fouleſt air would be gradually drawn off, without deſcending again into the lower regions to the annoyance of the company."

But in order to admit freſh air into the room, "Let," ſays he, "another opening be made in the ceiling of the room, having a communication with a ſmall pipe that ſhould lead from thence either to the outſide of the wall, or to any other part of the building that might be judged more convenient, where it ſhould be bent, and conducted downwards, till it reached the ground; where it ſhould be left open, to communicate with the external air.—In this ſituation the cool external air would be forced in at the lower opening of the tube, and made to aſcend into the apartment in proportion to the quantity that eſcaped towards the higher regions by means of the ventilator. And as that weighty air

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(F) The air was phlogiſticated by ſaturation with nitrous air.

would no ſooner enter the room, than it would tend towards the floor by its own natural gravity, it would gradually mix with the heated air in its deſcent—become, in ſome meaſure, warmed by that means, and equally diſperſed through the room, ſo as ſlowly and imperceptibly to reach the candles and the company in the room, and ſupply them with a ſufficient quantity of freſh and wholeſome air, without the inconveniences to which the company are ſubjected by the uſual way of admitting freſh air (G). For if it enters near the floor of the apartment, it is hurried along in a rapid undivided ſtream towards the fire-place, and ſtriking upon the legs and inferior parts of the body, affects them with a ſtrong ſenſation of cold. To overcome the effects of this, large fires muſt be kept; by which other parts of the body are warmed to an extraordinary degree, which is productive of moſt of thoſe diſorders that are pernicious to the young, and often prove fatal to the old, during the winter-ſeaſon, in theſe cold regions.

“ Thus might our apartments be kept conſtantly, and moderately, and equably warm, at a moderate expence, without endangering our health on the one hand, by reſpiring a confined, ſtagnant, and putrid air, or, on the other hand, by ſubjecting ourſelves to ſuch danger of catching colds, conſumptions, and rheumatic complaints, by being expoſed to ſuch exceedingly unequal degrees of heat and cold, as are unavoidable where our apartments are ſo open as to admit a ready paſſage to the external air during the winter-ſeaſon.

“ The reader will eaſily perceive, that all that has been here ſaid has a reference only to thoſe apartments in cold climates, and rigorous weather, where fire to warm them becomes neceſſary. In warmer regions, or during the ſummer-ſeaſon, there can be no objection to the wheel-ventilator in the window.—It is a ſimple contrivance, and a ſafe and effectual mean of preſerving the air in our apartments ſweet and wholeſome at that ſeaſon.”

It is a vulgar error among many people, to believe that fire purifies the contaminated air, by deſtroying the noxious particles mixed with it; and for this reaſon they think, that the fire kept in a room where the air is tainted, purifies the room, by rendering the air in it again fit for reſpiration. Indeed, a fire kept in a room or apartment where the air is tainted, as is the caſe with hoſpitals, goals, and the like, does certainly purify the apartment, and the practice is very uſeful; but this effect is only becauſe the fire promotes the circulation of the air, and dries the dampneſs of rooms, furniture, &c.: ſo that it is not the infected air that is purified, but is new, freſh, and wholeſome air, that by the action of the fire has taken the place of the infected air; which infected air, being rarefied by the heat, has been expelled from the apartment. Fire and combuſtion in general is ſo far from purifying contaminated air, that it actually contaminates a prodigious quantity of it in a ſhort time; ſo that not only a common fire, but even a lighted candle, when kept in a well-cloſed room, wherein the external air has not a free acceſs, inſtead of purifying, renders the air of that room noxious.

Inſtrument for aſcertaining the Wholeſomeneſs of Reſpirable AIR. See EUDIOMETER.

AIR *Balloons*. A general name for bags of any light ſubſtance filled with inflammable air or other permanently elaſtic fluid, whoſe ſpecific gravity is conſiderably leſs than that of common atmoſpheric air. The conſequence of their being filled in this manner is, that, if they are of any conſiderable magnitude, they aſcend in the air to an amazing height, and will not only aſcend in this manner by themſelves, but carry up great weights along with them; remaining in theſe elevated regions till the fluid eſcapes, either by burſting the bag in conſequence of part of the external preſſure being removed, or by its gradual evaporation through the pores.

By this invention, the ſchemes of tranſporting people through the atmoſphere, formerly thought chimerical, are realized; and it is impoſſible to ſay how far the art of aerial navigation may be improved, or with what advantages it may be attended. In the laſt century, a ſcheme of navigating the atmoſphere was propoſed by Mr Hook, very much reſembling that of air-balloons; but which did not ſucceed, becauſe he was unacquainted with any vapour poſſeſſing equal elaſticity with the common air, and leſs ſpecific gravity. His project was to have a very large copper-globe, ſo thin, that when it was exhauſted of air it would be ſpecifically lighter than an equal bulk of the common atmoſphere. Hence it would aſcend, and carry up bodies along with it. But it is eaſy to ſee that an invincible objection lay againſt this ſcheme from the preſſure of the external atmoſphere, which would not fail to cruſh ſuch a large globe made of ſuch thin materials.—Though inflammable air, and its great inferiority in ſpecific gravity to common atmoſpherical air, has been known for ſeveral years, yet we hear of no attempts to conſtruct air-balloons till, in the year 1782, Mr Cavallo attempted to make paper bags and bladders, filled with inflammable air, aſcend; but failed, the former being permeable to inflammable air, and the latter being too weighty in proportion to their bulk. Had he thought of varniſhing his paper, or making bags of gold-beaters ſkin, he would certainly have ſucceeded.

The honour of this invention, however, is unqueſtionably due to the brothers Stephen and Joſeph Mont-

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(G) Such readers as have been little accuſtomed to ſpeculations of this ſort, will be at a loſs to comprehend in what manner two holes, both of them in the roof of the room, and communicating with the air, without any valve, or other contrivance, for opening or cloſing of themſelves, ſhould yet anſwer the two very oppoſite purpoſes; one, of conſtantly bringing cool air into the room without emitting any warm air—and the other, of as conſtantly emitting warm and admitting no cool air. They will pleaſe to advert, that the one of theſe tubes communicates with the atmoſphere at the bottom of the houſe, and the other towards the top: the opening of the one is beneath the level of the room, that of the other above it. Now, as the air is more denſe at the ſurface of the ground than at any height above it, the warm rarefying air will naturally iſſue at that opening where it meets with leaſt reſiſtance, which muſt invariably be through that which opens to the external air at the greateſt height; and as the cool air will naturally be preſſed into the room by that opening where the air is moſt weighty, this muſt invariably be by that which is neareſt the ſurface of the earth.

Montgolfier, proprietors of a conſiderable paper-manufacture at Annonay, a town in the Vivarais, about thirty-ſix miles ſouth of Lyons: and their invention is the more to be admired, as it is not the effect of the late diſcovery of a permanently elaſtic fluid lighter than the common air, but of properties of matter long known, and in the hands of the many acute philoſophers of this and of the laſt century. They conceived, that the effect they looked for might be obtained by confining vapours lighter than common air, in an inverted bag or covering, ſufficiently compact to prevent their evaporation; and ſo light, that, when inflated, its own weight, added to that of the incloſed vapour, might fall ſomewhat ſhort of the weight of the air which its bulk diſplaces.

M. Review, Dec. 1783.

On theſe principles, they prepared matters for an experiment. They formed a bag or balloon of linen cloth, lined with paper, nearly ſpherical, and meaſuring about 35 feet in diameter; its ſolid contents were about 22,000 cubic feet, a ſpace nearly equal to that occupied by 1980 lb. of common air, of a mean temperature, on the level of the ſea. The vapour, which, by conjecture, was about half as light as common air, weighed 990 lb. The balloon, together with a wooden frame ſuſpended to the bottom, which was to ſerve as ballaſt, weighed 490 lb.; whence it appears, that the whole muſt have been about 500 lb. lighter than an equal bulk of common air. This difference of ſpecific gravity, by which theſe bodies are made to riſe, we ſhall henceforth, without warranting the propriety of the expreſſion, call their *power of aſcenſion*.

The 5th of June 1783 was fixed on for the diſplay of this ſingular experiment, The ſtates of Vivarais, who were then aſſembled at Annonay, were invited to the exhibition. The flaccid bag was ſuſpended on a pole 35 feet high; ſtraw and chopped wool were burnt under the opening at the bottom; the vapour, or rather ſmoke, ſoon inflated the bag, ſo as to diſtend it in all its parts; and, on a ſudden, this immenſe maſs aſcended in the air with ſuch a velocity, that in leſs than ten minutes it appeared to be about 1000 toiſes above the heads of the ſpectators. A breeze carried it about 1200 toiſes from the ſpot whence it departed; and then the vapour, either eſcaping through ſome loop-holes that had been accidentally left in the conſtruction, or being condenſed by the coldneſs of the circumambient air, the globe deſcended gradually on a vineyard, with ſo little preſſure, that none of the ſtakes were broken, and ſcarce any of the branches of the vines bent.

The rumour of this ſucceſsful experiment ſoon reached the metropolis, and rouſed the emulation of the Pariſian philoſophers. Without waiting for particular inſtructions from the inventors, they reflected on a method of their own; and reſolved, inſtead of vapour, to uſe inflammable air; the ſpecific weight of which, when pure, they knew to be to that of common air nearly as ten to one.

The proceſs of producing this air being very expenſive, a ſubſcription was ſet on foot; and a ſufficient ſum being ſoon raiſed, M. Charles, profeſſor of experimental philoſophy, and M. Robert a mathematical-inſtrument maker, were ſet to work: and they conſtructed a globe of luteſtring (taffetas), glazed over with elaſtic gum diſſolved in ſome kind of ſpirit or eſſential oil. After many difficulties and diſappointments, which will ever attend firſt eſſays, they ſucceeded in two days to fill this globe with inflammable air, produced from 1000 lb. of iron-filings, and 498 lb. of vitriolic acid, diluted in four times its quantity of water. This globe meaſured 12 feet 2 inches in diameter, its ſolid contents were 943 feet 6 lines cubic, and its power of aſcenſion was found equal to 35 lb.

The 27th of Auguſt 1783 having been fixed on for the exhibition of this experiment, the balloon was conveyed, in the preceding night, floating in the air, from a court near the Place des Victoires, where it had been conſtructed, to the Champ de Mars. The concourſe of people, on foot and in carriages, was ſo immenſe, that a large body of troops were drawn out to prevent diſturbances. At five o'clock in the afternoon, a ſignal having been given by the firing of a mortar, the cords that confined the globe were cut, and it roſe in leſs than two minutes to a height of near 500 toiſes. It here entered a cloud, but ſoon appeared again, aſcending to a much greater height; and at laſt it was loſt among other clouds.

In this experiment, too much inflammable air, and even ſome common air, had been introduced into the globe, which being cloſed on all ſides, left no room for the expanſion of this elaſtic fluid when it ſhould arrive to a more rarefied medium. We find, in fact, that it muſt have burſt in conſequence of this expanſion; ſince, after having floated about three quarters of an hour, it fell in a field near Goneſſe, a village about five leagues N. N. W. of the Champ de Mars. It muſt be allowed, that the mere evaporation of the air could not well have been the cauſe of its deſcending ſo ſoon. Many periodical papers have already entertained the public with ludicrous accounts of the aſtoniſhment of the peaſants who found it, and of the rough treatment it received at their hands.

It may eaſily be imagined, that theſe brilliant ſucceſſes animated the zeal of all the curious in the metropolis, and that many eſſays were made to repeat the ſame experiments upon a ſmaller ſcale. A number of ſecondary attempts accordingly were made; upon which we ſhall dwell no longer, than only to obſerve, that they ſucceeded with globes made of gold-beater's ſkin, and only 12 inches in diameter; which being thought the leaſt that could be made to aſcend, conſidering that the proportionate weight of the materials increaſe as the bulk is diminiſhed, were called *minimums*.

M. Montgolfier junior having arrived at Paris a few days before the experiment at the Champ de Mars, was deſired by the Royal Academy of Sciences to repeat the experiment of Annonay. He accordingly conſtructed, in a garden in the Fauxbourg of St Germain, a balloon of an elliptical form, 70 feet high, and 40 feet in diameter. It was lined both inſide and outſide with paper. Its power of aſcenſion was found upon calculation to be about 1250 lb. It was filled in ten minutes, by the burning of 50 lb. of ſtraw and 10 lb. of chopped wool. It was loaded with a weight of 500 lb. and aſcended, faſtened to ropes, on the 12th of September, in the preſence of the deputies of the

Royal Academy. But it proving a very rainy day, the whole apparatus was ſo eſſentially damaged, that it was not thought proper to ſet it looſe.

We come now to the experiment made on the 10th of September, in the preſence of the king and queen, the court, and all the Pariſians who could procure a conveyance to Verſailles. This balloon was 57 feet high, and 41 in diameter. Its power of aſcenſion, allowing for a wicker cage, containing a ſheep, a cock, and a duck, which was ſuſpended to it, was equal to 696 lb. As only four days had been allowed for the making this machine, it could not therefore be lined with paper. M. M. had predicted, that it would remain in the air about twenty minutes, and with a moderate wind might float to a diſtance of about 2000 toiſes. But, beſide ſome imperfection in the conſtruction, owing to the great hurry in which it had been made, a ſudden guſt of wind, while it was inflating, made two rents ſeven feet long near the top, which could not but in ſome meaſure prevent the promiſed effect. It ſwelled, however, in eleven minutes ſufficiently to raiſe it about 240 toiſes; it floated to the diſtance of nearly 1700 toiſes; and after having been in the air about eight minutes, it ſubſided gradually in the wood of Vaucreſſon. The animals in the cage were ſafely landed. The ſheep was found feeding; the cock had received ſome hurt on one of his wings, probably from a kick of the ſheep; the duck was perfectly well.

M. Montgolfier determined now to repeat the experiment under more favourable circumſtances, and more at his leiſure. He therefore made a new balloon in a garden in the Fauxbourg St Antoine, which meaſured 70 feet in height and 46 feet in diameter. A gallery of wicker was contrived round the aperture at the bottom; under which an iron grate or braſier was ſuſpended, and port-holes opened on the inſide of the gallery towards the aperture, through which any perſon *cui robur et æs triplex circa pectus fuerit*, who might venture to aſcend, might feed the fire on the grate, and thus keep up the vapour, ſmoke, or, as we rather apprehend, the *dilatation of the air*, in this vaſt cavity.

On the 15th of October, M. Pilatre de Rozier, no doubt the moſt intrepid philoſopher of the age, placed himſelf in the gallery, aſcended about 80 feet from the ground, and there kept the balloon afloat for ſome time, by repeatedly throwing ſtraw and wool upon the fire. In this experiment it was found, that the deſcent of a globe (provided no extraordinary accident happened to it) muſt neceſſarily be gradual; and that it will always light ſoftly upon the ground, ſince, in fact, in every part of its deſcent, it enters a denſer medium; whence its velocity in falling will rather be retarded than accelerated. On the 19th of October, M. P. Roſier aſcended a ſecond time about 250 feet. After continuing ſtationary about eight minutes, a guſt of wind carried the balloon among ſome trees, where it entangled itſelf ſo as to endanger its being torn to pieces: but on M. R. throwing ſome freſh ſtraw upon the fire, it immediately reaſcended, amid the loud acclamations of a vaſt multitude of people, who little expected to ſee ſo ſudden a recovery. The balloon was then hauled down, and M. Giron de Villette placed himſelf in the gallery oppoſite to M. R. They were once more let up; and for ſome time hovered over Paris, in the ſight of all its inhabitants, at the height of 324 feet.

Matters ſeemed now ripe for a *free aerial navigation*. A ſmoke balloon, very ſimilar to the one laſt deſcribed, was prepared to go off at La Muette, a royal palace in the Bois de Boulogne, where, we are informed, the king's children now uſually reſide. All things being ready, on the 21ſt of November M. Pilatre de Rozier took his poſt in the gallery, and the Marquis d'Arlandes, a major of infantry, placed himſelf on the oppoſite ſide of this gallery, as a counterpoiſe to preſerve the equilibrium of the machine. After repairing ſome damage done to the balloon in a firſt eſſay, it was, at 54 minutes after one, abſolutely abandoned to the element; and it aſcended with great rapidity.

When theſe bold adventurers were about 250 feet in the air, they waved their hats to the aſtoniſhed multitude; but they ſoon roſe too high to be diſtinguiſhed, and are thought to have ſoared to an elevation of about 3000 feet. The hiſtory of this navigation is, in fact, the hiſtory of the alarms of the Marquis d'Arlandes. When he found himſelf ſo high that he could no longer diſtinguiſh the objects upon earth, he thought both his ambition and his curioſity ſufficiently gratified, and deſired his companion to ceaſe laying ſtraw upon the fire, that they might deſcend. M. P. de Rozier, however, deaf to theſe remonſtrances, continued his operations, and the Marquis continued murmuring. At length, being at the higheſt elevation above mentioned, the latter perceived ſome holes burnt in the ſides of the balloon, and likewiſe heard ſome cracks near the top of the machine, which ſeemed to menace inſtant deſtruction. He then became outrageous; quickly clapped wet ſponges to the burning holes; and vowed, that if his companion would now deſcend, he would take upon himſelf the whole blame of having thus ſhortened their navigation. M. Roſier at length liſtened to his urgent ſolicitations: but on approaching the earth, they found that they were deſcending immediately over the Seine; and fearing leſt they might be carried away by the current of air that generally attends ſtreams of water, the Marquis was glad to aſſiſt in throwing freſh ſtraw upon the fire; and thus they roſe again to a conſiderable height. On their next approach to the earth, the Marquis ſeeing the danger they were in of being ſpitted on the weather-cock of the Invalids, haſtily threw a freſh bundle of ſtraw upon the fire, and even ſpread it, in order to raiſe a greater blaze. This carried them over a great part of Paris, where they took care to clear all the ſteeples, &c. and paſſing the Boulevard, they landed ſafely in a field near Bicêtre, without having experienced the leaſt real inconvenience. The diſtance they went was between 4 and 5000 toiſes. They were in the air about 25 minutes. The collective weight of the whole apparatus, including that of the two travellers, was between 16 and 1700 lb. and when they landed, they had two thirds of their combuſtibles ſtill left in ſtore.

A more remarkable experiment than any of theſe hitherto mentioned, was made by Meſſrs Charles and Robert. The globe prepared for this expedition was made like that of the Champ de Mars, of gores of ſilk, alternately red and white, and glazed with ſome ſort of gum. It was ſpherical, and meaſured 26 feet in diameter. It was filled with inflammable air; the making of which alone coſt 5000 livres. The expence of the whole apparatus amounted to no leſs than 10,000 livres. A net was ſpread over the upper hemiſphere, which ſupported a hoop that ſurrounded the middle. To this hoop was ſuſpended, by means of ſeveral cords, a boat, that ſwung at a ſmall diſtance below the bottom of the globe, and which was ſo finely ornamented, as to deſerve, in this reſpect, the name they gave it at Paris of a Triumphant Car. In order to prevent the burſting of the globe in a rarefied medium, an opening had been left, with a valve to it, which gave vent to the interior air, but ſuffered none of the exterior to enter. A long ſilken pipe or gut proceeded from this aperture; the farther end of which one of the navigators held in his hand, and thereby obtained a conſiderable command over the inflammable air. The car was ballaſted with ſand-bags. By theſe means they hoped, and in fact they ſucceeded, to guide themſelves in point of elevation; for by letting ſome of the air eſcape, they naturally deſcended; and on diſcharging ſome of their ballaſt, they were ſure to aſcend.

The 1ſt of December 1783 was fixed upon for this pompous diſplay. Two hundred thouſand people aſſembled in and near the garden of the Thuilleries. The apparatus ſtood on a ſcaffolding raiſed for the purpoſe, in the middle of a piece of water, to prevent its being approached by the multitude. Upon this it reſted, merely by the weight of the ballaſt in the car. The friends of the navigators had ſtored it with plenty of proviſion and cloathing; beſide which, proper inſtruments were alſo embarked. A ſmall balloon, which had been prepared for the purpoſe, was offered to M. Montgolfier, who, at the requeſt of M. Charles, cut the ſtring by which it was held, and, by this allegory, tacitly received the tributary homage due to him and his brother as the authors of the invention.

At forty minutes paſt one, Meſſrs Charles and Robert aſcended the Car. They threw out 19 lb. of ballaſt, and inſtantly roſe, with an accelerated velocity, to the height of about 300 toiſes. No acclamation, no ſound was heard; for the multitude ſtood ſilent with fear and amazement. The navigators, however, gave ſignals of their ſecurity, by frequently waving two pennants; and M. Charles appriſed his friends below that they were eaſy and happy, by a note he threw down among the crowd. After continuing a ſhort time ſtationary, they perceived themſelves moving nearly horizontally, in the direction of N. N. W. Finding that ſome of the inflammable air evaporated, they diſcharged ſome ballaſt; and ſoon after obſerving that the heat of the ſun dilated the inflammable air, they ſuffered ſome of it to eſcape; and thus they kept pretty nearly in the ſame level. In this manner they floated twice acroſs the Seine; and over many towns and villages, the ſurpriſe of whoſe inhabitants can more eaſily be conceived than deſcribed. About 56 minutes after their departure, they found themſelves out of ſight of Paris. They then deſcended ſo low as to ſkim along the ſurface of the ground, and converſed with ſeveral labourers in the fields. Seeing a hill before them, they caſt ſome of their ſuperfluous cloathing out of the car, and thus cleared the eminence. They now made a comfortable meal. Finding themſelves near the Iſle d'Adam, where the prince of Conti has a palace, they again approached the ground, inquired after the prince, and were told that he was at Paris. At 45 minutes after three, they found themſelves over Neſle, a ſmall town about nine leagues from Paris. And there, after ſliding a little way along the ſurface of the ground, they alighted gently, and without the leaſt ſhock or concuſſion, in a field.

Of a great number of thoſe who had gallopped after the balloon from the Thuilleries, only the dukes de Chartres and Fitz-James, and Mr Farrer an Engliſh gentleman, who had relays poſted in the direction of the wind, arrived a few minutes after the landing. The others either lamed or killed their horſes, or grew tired of the purſuit. After the warmeſt congratulations, an affidavit was drawn up, and ſigned by all the parties preſent.

Mr Charles now declared his intention to reaſcend alone; but to this the duke de Chartres conſented, only on condition that he would return in half an hour. M. Robert alighted; and by the diminution of his weight, the machine acquired a power of aſcenſion equal to about 100 lb.

Mr Charles's account of this ſecond aſcent we ſhall give in his own words: "Thirty peaſants held down the machine. I aſked for ſome earth to ballaſt it, having not above four or five pounds left. A ſpade was not at hand, nor were there any ſtones in the meadow where the machine had alighted. The ſun was near ſetting. I made a haſty calculation of the time requiſite for the alteration of weight, and gave a ſignal for the peaſants to quit their hold. I ſprung up like a bird. In 20 minutes I was 1500 toiſes high, out of ſight of all terreſtrial objects. I had taken the neceſſary precautions againſt the exploſion of the globe, and prepared to make the obſervations which I promiſed myſelf. In order to obſerve the barometer and thermometer placed at the ends of the chariot, without altering the centre of gravity, I kneeled down in the middle, ſtretching forwards my body and one leg, holding my watch and paper in the left, and my pen and the ſtring of the valve in my right hand, waiting for the event. The globe, which at my firſt ſetting out was rather flaccid, ſwelled inſenſibly. The air eſcaped in great quantities at the valve. I drew the valve from time to time to give it two vents; and I continued to aſcend, ſtill loſing air, which iſſued out hiſſing, and became viſible, like a warm vapour in a cold atmoſphere. The reaſon of this phenomenon is obvious. On earth the thermometer was ſeven degrees above the freezing point; after 10 minutes aſcent, it was five degrees below. The inflammable air had not time to recover the equilibrium of its temperature. Its elaſtic equilibrium being quicker than that of the heat, there muſt eſcape a greater quantity than that which the external dilatation of the air could determine by its leaſt preſſure. For myſelf, though expoſed to the open air I paſſed in 10 minutes from the warmth of ſpring to the cold of winter, I felt at firſt nothing diſagreeable in the ſudden change. When the barometer ceaſed to riſe, I marked exactly 18 inches 10 lines; the mercury ſuffering no ſenſible oſcillation. From this height I deduce an elevation of 1524 toiſes, or thereabouts, till I can be more exact in my calculation. In a few minutes more my fingers were benumbed by the cold, ſo that I could not hold my pen. I was now ſtationary, and moved only in an horizontal direction. I roſe up in the middle of the chariot, to contemplate the ſcene around me. At my ſetting out, the ſun was ſet on the vallies; but he ſoon roſe for me alone, who was the only luminous body in the horizon, and all the reſt of nature in the ſhade. The ſun himſelf preſently diſappeared; and I had the pleaſure of ſeeing him ſet twice in the ſame day. I beheld, for a few ſeconds, the circumambient air and vapours riſing from the vallies and rivers. The clouds ſeemed to riſe from the earth, and collect upon one another, ſtill preſerving their uſual form, only their colour was grey and monotonous from the want of light in the atmoſphere. The moon alone enlightened them, and ſhowed me that I was tacking about twice; and I obſerved certain currents that brought me back again. I had ſeveral ſenſible deviations, and obſerved with ſurpriſe the effects of the wind, and ſaw the ſtreamers of my banners point upwards. This phenomenon was not the effect of the aſcent or deſcent; for I then moved horizontally. At that inſtant I conceived, perhaps a little too haſtily, the idea of being able to ſteer one's own courſe. In the midſt of my tranſports, I felt a violent pain in my right ear and jaw, which I aſcribed to the dilatation of the air in the cellular conſtruction of theſe organs, as much as to that of the external air. I immediately put on a woollen cap; yet the pain did not go off but as I gradually deſcended. For ſeven or eight minutes I had ceaſed to aſcend; the condenſation of the inflammable air rather made me deſcend. I now recollected my promiſe to return in half an hour; and, pulling the upper valve, I came down. The globe was now ſo much emptied, that it appeared only an half globe. When I was between 20 and 30 toiſes from the earth, I threw out haſtily two or three pounds of ballaſt, and became for a moment ſtationary, till I deſcended gently on the field, above a league from the place whence I ſet out. The frequent deviations and turnings make me imagine that this voyage was about three leagues; and I was gone about 35 minutes."

Theſe ſucceſsful attempts ſoon produced the emulation of others. M. Montgolfier, whoſe method had been ſo ſucceſsfully tried by M. Pilatre de Roſier, undertook the conſtruction of a balloon, upon his own principles, much larger than any that had hitherto appeared; and it was given out by his friends, that with this machine he intended to ſet out from Lyons with a quantity of goods, either for Paris or Marſeilles, as the wind ſhould ſerve. This balloon was compoſed of double canvas, with three layers of paper between the folds; but, at the deſire of M. Roſier, the upper part was changed for a ſimple cotton cloth. The balloon was 100 feet in diameter tranſverſely, and 126 high, and weighed in all about 8000 pounds. The departure was announced for the 10th of January laſt; but when the attempt was then made, the globe ſwelled only partially, and could not be raiſed. Several other attempts were made on ſucceeding days, but with equally bad ſucceſs; and in one of theſe unſucceſsful attempts ,part of the canvas was burnt. This damage, however, was ſoon repaired; and on the 19th of January the projectors were ready for another trial, when the globe filled in 17 minutes. Seven perſons embarked in the machine annexed to it, and aſcended amidſt the acclamations of 100,000 ſpectators. The globe firſt took a N.W. direction, but ſoon after took to the S. E. It had not floated fifteen, or according to ſome accounts five minutes, when it deſcended with a velocity that alarmed the ſpectators, and alighted in a field not far from the place whence it was ſet off.

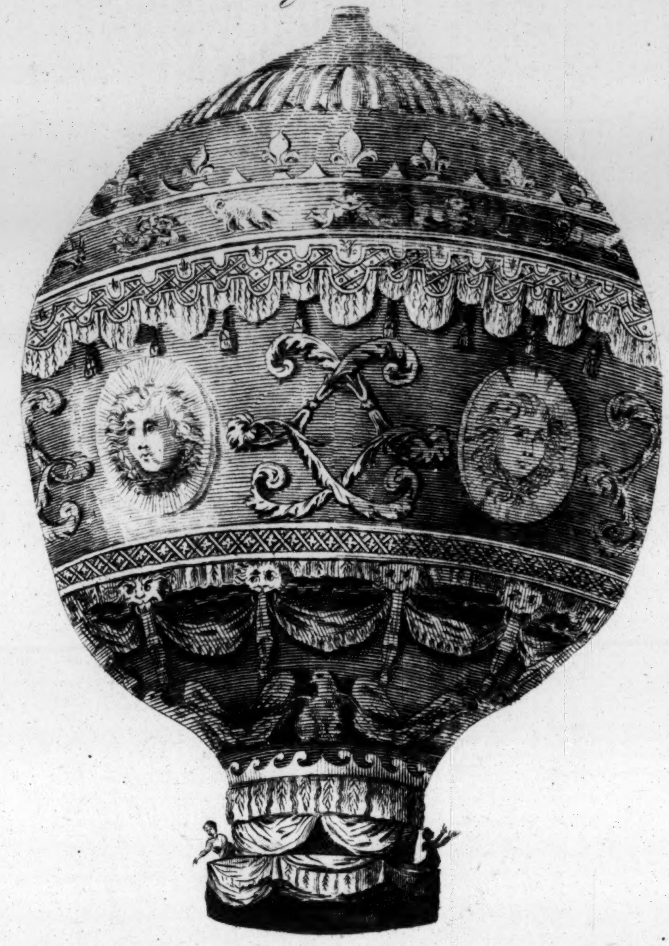
In the next experiment we have to deſcribe, an apparatus was to be applied to a balloon filled with inflammable air, for ſteering it both horizontally and vertically, and even againſt a current of air. M. Blanchard of Paris had ſome years ago announced that he was preparing wings, with which he meant ſoon to take a flight. The late diſcovery ſeemed to haſten the execution of his project. His globe is ſaid to have been only 14 feet 2 inches in diameter: but this muſt certainly be a miſtake; for the weight of air contained in ſuch a globe cannot be ſuppoſed equal to that of two people, even of the ſmalleſt dimenſions, with all their neceſſary apparatus. Be this as it will, a globe was prepared, which actually was ſufficient to raiſe the neceſſary weight. To this globe was ſuſpended a car; between the car and the globe was fixed an umbrella 12 feet in diameter, the intention of which was to break the fall in caſe of any accident: hence it was called *parachute*. To the car were adapted four wings, two on each ſide, and behind a rudder, all made of taffety diſtended by means of whalebone ribs. All this was to be worked by a machinery of M. Blanchard's invention. He was to aſcend himſelf for the purpoſe of navigating the machine; and Dom. Pech, a Benedictine, was alſo to aſcend for the purpoſe of making various aerological obſervations and experiments. Every thing was ready on the 2d of March, in the Champ de Mars. A party of M. Blanchard's friends had aſſembled at a country-houſe where he had promiſed to meet them through the air. The navigators were embarked, and ready to ſoar, when a young man, a pupil of the ecole militaire, ſuddenly ruſhed through the crowd, threw himſelf into the car, and inſiſted on ſharing in the expedition. A ſcuffle enſued, in which Blanchard was wounded in the hand, the parachute and wings deſtroyed, and the purpoſe of the experiment entirely defeated. This madman was at laſt overpowered, and the two adventurers determined to take a chance flight. They roſe accordingly; but their power of aſcenſion was not ſufficient to carry them to any height, for which reaſon they ſoon landed. Dom. Pech alighted, and Blanchard inſtantly aſcended with great rapidity. The wind being eaſt, he was carried to the weſtward. The account he gives of his navigation is, that he roſe about 2000 toiſes from the ground; that he found himſelf at times ſtationary in a perfect calm, during which the heat of the ſun was ſcorching; that he at different times felt currents of wind in different directions, in ſome of which the cold was intenſe; that during theſe cold intervals he felt an almoſt unconquerable deſire to ſleep; that clouds collected under his feet; and that it appeared to him that he was at different times carried towards different parts of the compaſs. He continued in the air one hour and a quarter; after which

AIR-Balloons.

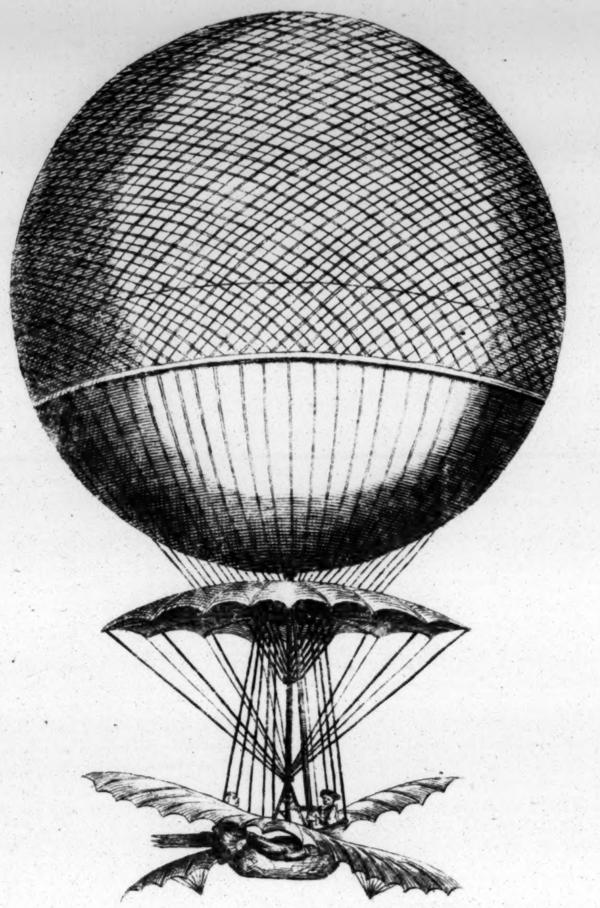
Plate CCCXIV.

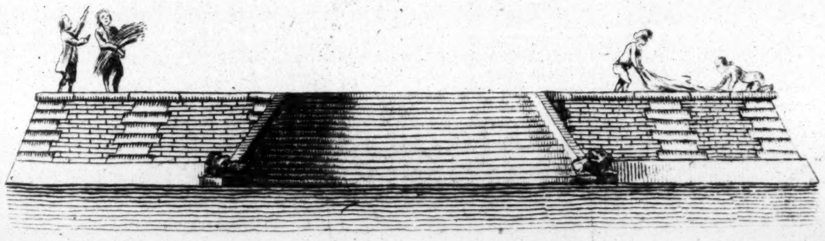
Montgolfier's B.

Fauxbourg St. Antoine.

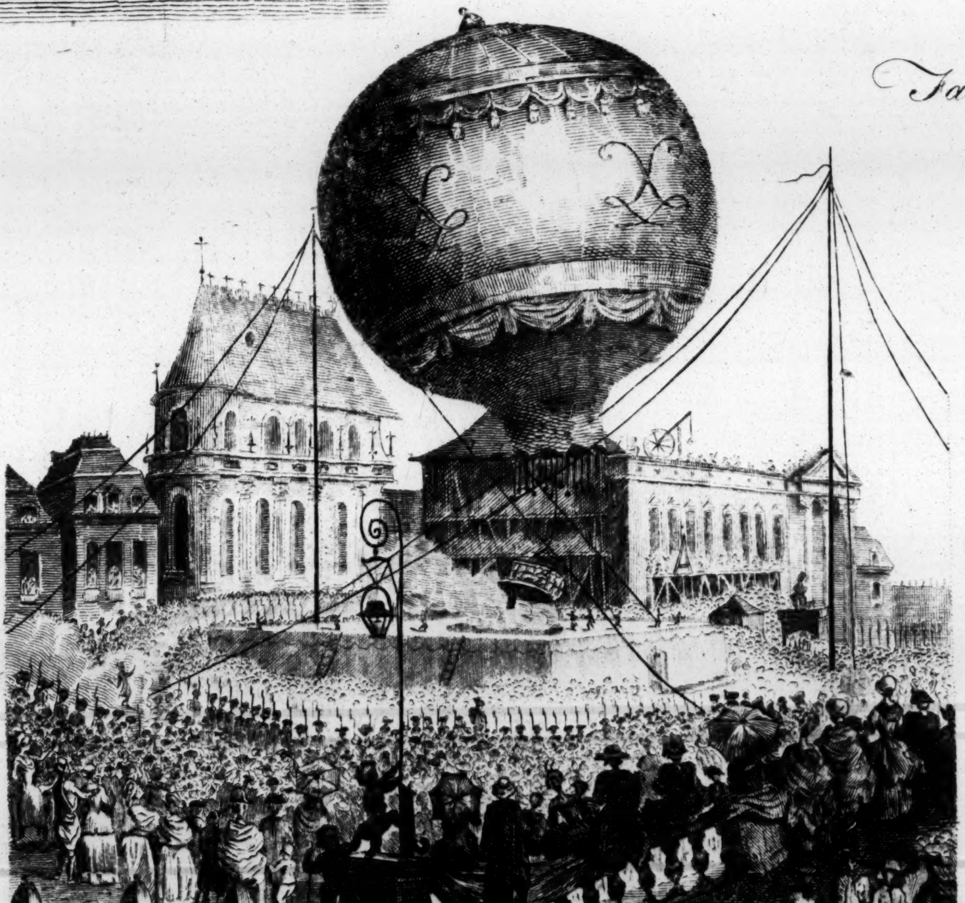


Blanchard's B.



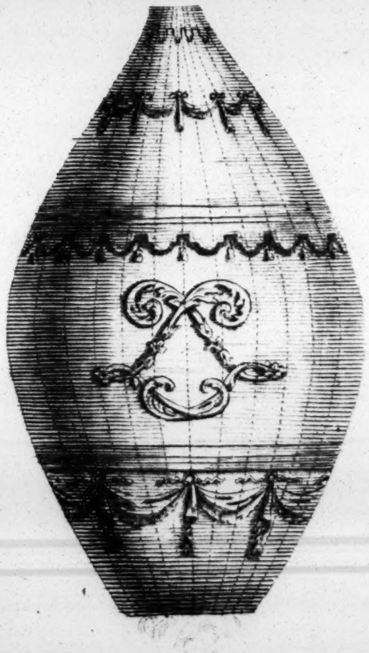


Versailles B.



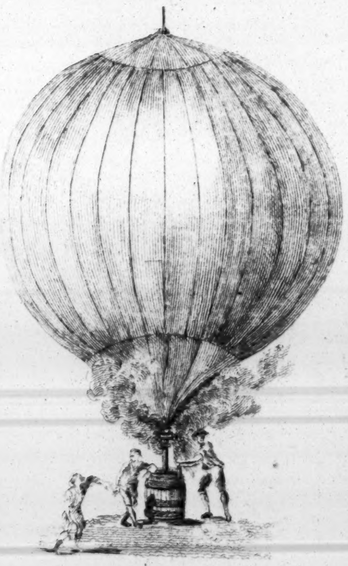
Montgolfier's B.

Fauxbourg of St. Germain.



Charles' & Roberts' B.

Champ de Mars.



A. Bell Sculpt.

3 MA 53

he landed ſafely near Seve, about five miles from the ſpot whence he aſcended.

Theſe are the moſt remarkable experiments that have yet been made with reſpect to this new and extraordinary navigation. The principles on which it is accompliſhed are thoſe of common hydroſtatics; but though the ſpecific lightneſs of inflammable air eaſily ſhows why globes filled with it ſhould riſe, the principle on which Montgolfier's balloons aſcend ſeem not to be ſo generally underſtood. In an original paper, ſaid to be written by a foreign gentleman of great learning, (Appendix to Monthly Review, vol. lxix.), we find the following reaſoning on the ſubject: "The ingredients uſed for inflating the machine that was let off at Verſailles, conſiſted of 50 pounds of ſtraw and 5 pounds of wool: and, in a work publiſhed by M. Faujas de St Fond on the ſubject, we are informed, that the *gas* which inflated the bag was *produced* by burning theſe ingredients. Now, in as far as ſimple combuſtion is here concerned, the experiments of Dr Prieſtley, ſince repeated in a thouſand different ways, plainly evince, that the effect of combuſtion is indeed at firſt to produce a very light aeriform fluid, viz. inflammable air; but that this air, meeting immediately with atmoſpheric air, takes fire by its union with the dephlogiſticated air; and that the reſiduum of this, being thus mixed with fixed air, does thereby become ſpecifically heavier than it was before. Thus all that modern chemiſtry hath hitherto taught us concerning combuſtion, can point out nothing to us as the immediate reſult of M. Montgolfier's operation, but a maſs of air ſpecifically heavier than common atmoſpheric air, mixed for an inſtant with ſome fuliginous vapours which collect into ſoot on the ſides of the bag, and ſome aqueous vapours, which likewiſe condenſe on thoſe ſides and become water. It is impoſſible therefore to diſcover *à priori*, in the proceſs of M. Montgolfier, the formation of any gas, or of any aeriform fluid, which in its nature can be ſpecifically lighter than atmoſpheric air; but, on the contrary, we perceive in his operation the cauſe of ſome augmentation in the ſpecific weight of the atmoſpheric air produced by the combuſtion.

"Theſe arguments *à priori* are ſo ſtrongly corroborated by the fact, that no doubt can well be entertained concerning their validity. It appears, that the ſolid contents of the machine let off at Verſailles meaſured 37,500 cubic feet; that the weight of the common air that is diſplaced, was 3192 pounds; and as the gas of M. Montgolfier was thought to be about one half lighter than common air, it is there ſaid that this gas weighed only 1596 pounds. Weighed only!—But was it conſidered, that this gas muſt have been the produce of no more than 50 pounds of ſtraw and 5 pounds of wool? Is it likely that ſubſtances weighing in all 55 pounds, ſhould yield 1596 pounds of air? Is it not ſurpriſing that this philoſophical paradox ſhould have hitherto eſcaped unnoticed?

"But let us attend to a particular circumſtance mentioned in the account of the experiment, and we ſhall perhaps find the true cauſe of the aſcenſion of the machine. The manner in which this large bag was filled, is ſaid to have been by piling it upon a circular ſtage, and contracting it as much as poſſible, that very little common air might remain in it. Its orifice was ſpread over an aperture in the middle of the ſtage, and ſtraw was burnt under it. The effect of this operation is thus deſcribed: "As ſoon as the machine began to ſwell, a rapid current of air immediately took place, which coming from without, ruſhed into the machine with ſuch force, that before the neceſſary precautions could be taken, the cloth, which was ſpread upon the ſtage and round the fire, in the form of a cylindrical funnel, was agitated with great violence." This account itſelf clearly points out the cauſe that ſwelled and buoyed up the machine: it was filled with common air dilated by heat, in the ſame manner as if the current of air that paſſes up a chimney were collected in a large empty bag; which being let looſe, would certainly riſe and float in the air, until the warm air within, loſing its heat, be reduced to the temperature of the ſurrounding air.

"The ſanguine hopes that are entertained of the uſeful application of this diſcovery may be gathered from a table, in which the dimenſions a machine muſt have to enable it to raiſe a certain weight, are ſet forth upon elaborate calculations. Theſe calculations are founded on the principles, That the air produced by M. Montgolfier is one-half lighter than common atmoſpheric air, and that the weight of the bag is at the rate of two ounces for each ſquare foot. A formula is hence deduced, in which the proportion between the ſolid contents and the ſurface of the ſphere are the only elements.

"We muſt here obſerve, that if, as appears to us very probable, it be merely the heat that diminiſhes the weight of air in the experiment, the diminution of one-half ſeems to be greatly exaggerated. It follows from the obſervations made by M. de Luc on the dilatation of air by the heat of the atmoſphere, that if a certain quantity of air paſſes from the temperature of 32° of Fahrenheit to that of boiling water, that is, 212°, the original bulk of that quantity will be increaſed $\frac{186}{500}$ parts of the whole; this therefore is the effect of 180° of Fahrenheit. That a given quantity of air may become one-half lighter, its bulk muſt be doubled; whence we infer, that a maſs of air whoſe bulk is 500, in order to acquire a bulk of 1000, muſt increaſe in heat $\frac{180\times500}{186}=484°$. Now, it is by no means probable, that the air contained in the machine of M. Montgolfier had ever acquired ſo conſiderable a degree of heat. This eſtimate, therefore, of a ſpecific gravity, one-half leſs than that of the atmoſpheric air, manifeſtly requires to be farther inveſtigated.

"Some inductions on this head may be derived from the circumſtances of the experiment made at Verſailles. According to the computation of M. Faujas, the weight of the lower air diſplaced by the inflated machine was 3192 lb. According to the obſervation of M. Gentil, made at the Royal Obſervatory, the machine muſt have aſcended 240 toiſes. By an eſtimate, as nearly approaching to truth as poſſible (according to the rules of the meaſurement of heights by the barometer), of the denſity of the air at the elevation at which the globe ceaſed to aſcend, this denſity muſt have been $\frac{1}{18}$ leſs than that of the place whence it firſt roſe. Thus, at that elevation, the weight of the air diſplaced by the machine was only 3015 lb. The machine, together with the air contained in it, weighed therefore likewiſe 3015 lb. ſince it there ceaſed to riſe. But of this total weight 900 lb. was the weight of the bag and its appendages; there remains therefore 2115 lb. for the air. But the air diſplaced by the machine near the ground weighed 3192 lb. The denſity therefore of the air contained in the machine, was to that of the air near the ground nearly as 2 to 3, inſtead of the ſuppoſed proportion of 1 to 2. And the exceſs of its heat above that of the outward air, altho' conſiderable, is thus found to have been one-half leſs than that above ſtated, namely, $\frac{180 \times 250}{186} = 243^{\circ}$.

" This heat, it ſeems, may be much leſs ſtill, and yet carry the machine very high, if ſuch intrepid men as M. Pilatre de Rozier and the marquis d'Arlandes will aſcend with it, and keep up the fire at its aperture. For, in fact, as the machine riſes, it will undoubtedly, if the ſame degree of heat be conſtantly kept up in its cavity, continually emit part of the air it contains. Thus, as ſoon as the heat of the internal air ſhall be ſufficient to raiſe the machine from the ground, it muſt continue to riſe without any further increaſe of that heat, and conſequently without there being much more difference between the temperature of the interior and exterior airs, than what is neceſſary to compenſate for the weight of the bag and its appendages.

" But a ſecond conſideration, that appears to us materially to affect the table above-mentioned, (in which, on the ſuppoſition of a conſtant given ſpecific gravity, nothing is conſidered but the proportion between the ſolid contents of the bag and its weight), is, that it can only be applicable to a real gas, and by no means to an air dilated by heat. For the effects of fire of a given intenſity in heating its ſurrounding air, are in the inverſe ratio of the ſquares of the diſtances: whence it appears that the fire muſt be increaſed, not in the ſimple ratio of the ſolid contents, but in a much greater one; which it will be very difficult to determine, ſince there are many other conſiderations that are to be taken into the computations. Every machine, of whatever kind and of whatever dimenſions, may no doubt be inflated by conveying into its cavity the current of air produced by the flame; but this would only be a manner of inflating it ſimilar to that which would be produced by opening the bag to the wind. Now this current of air, thus directed by the flame, would preſerve but a ſmall degree of dilatation; and a machine of ſo immenſe a ſize as that for which a ſubſcription is ſaid to be now open at Paris, will probably raiſe but a ſmall weight, and certainly diſappoint the expectations of thoſe who have undertaken to conſtruct it.

" If a farther proof were required, that the balloons of Meſſrs Montgolfier riſe only by the rarefaction of the interior air, we ſhould find it in the account given of the deſcent of that which was launched at Verſailles. " Two game-keepers, who were at about ten yards diſtance from the place where it ſubſided, aſſures us," ſays M. Faujas, " that it came down remarkably ſlow, gradually contracting itſelf as it came nearer the ground." Had this balloon been filled with gas lighter than the atmoſpheric air, it would not have been thus contracted in its deſcent: nothing but a change of air could have weighed it down; and in a balloon open at the bottom, this change would have happened by the entrance of a heavier air, which would have driven the lighter air upwards, and forced it out through the rents in the bag, without ſuffering it to collapſe. But a maſs of air dilated by heat, contracts on cooling; and the bag, in that caſe, being compreſſed by the outward air, will naturally collapſe, or be contracted in its dimenſions."

In the Review for March 1784, we find the ſame kind of reaſoning continued with regard to the great balloon at Lyons. " Thus much (ſays the author of the paper) appears certain, that the ſucceſs was by no means adequate to the ſanguine hopes of the projectors; and indeed, if we recollect how rapidly the effect of fire decreaſes in proportion to the increaſe of the diſtances, and that, in this inſtance, aſſuming the effect of the fire at the diſtance of one foot to be as unit, it could at the top of the balloon, when diſtended, be no more than $\frac{1}{15876}$ of that unit, we ſhall not be ſurpriſed at the difficulties that occurred, nor at the ſudden deſcent after the globe had reached a cold and rarefied ſtratum of the atmoſphere (even though there had been no rent), in which the neceſſary dilatation of the internal air would have required a fire much more intenſe than would have been compatible with the ſafety of the apparatus."

On reading theſe obſervations it immediately occurs, that no fair argument can be drawn from the expanſibility of common air to that of air which had paſſed through fire. The latter contains a great deal of fixed and phlogiſticated air, along, no doubt, with ſome inflammable air which eſcapes during combuſtion; perhaps not without a mixture of ſome kinds of acid, as well as alkaline air, rendered incapable of union by their being ſo much enveloped with others. Beſides all theſe, there muſt undoubtedly be alſo a very great quantity of phlogiſtic and aqueous vapours, the preciſe ſpecific gravity of which is altogether unknown. We are not, however, to judge merely from the ſpecific gravities: the degree of expanſion to which each of theſe are ſubject by the ſame degree of heat muſt be taken into conſideration; and this makes the calculation *à priori* of the force by which any balloon will aſcend, very difficult, if not impoſſible. To underſtand this in ſome meaſure, however, let us compare the different powers of aſcenſion of one cubic foot of fixed air with a cubic foot of common air, when both are heated to the degree of 212 of Fahrenheit, or to the boiling-point of water. With regard to the common air, it has been determined, that by the heat of boiling-water it is expanded one-third of its bulk. A cubic foot of this element (ſuppoſing it 800 times lighter than water, and that a cubic foot of water weighs 1000 ounces or $62\frac{1}{2}$ pounds) will weigh an ounce and a quarter, or 600 grains. By the third part of this weight, therefore, or 200 grains, the cubic foot of rarefied air will riſe; and if we could form any veſſel to contain it which would weigh leſs than 200 grains, ſuch veſſel would ariſe along with it. The ſpecific gravity of fixed air is to that of atmoſpheric air, as 220 to 152, and muſt therefore weigh $868\frac{8}{19}$ grains. But the expanſibility of fixed air is to that of common air, as 220 to 132. By the heat of boiling-water, therefore, a cubic foot of fixed air muſt loſe 333 grains of its weight, which would reduce it to nearly 535 grains; and therefore a cubic foot even of this air, though ſo much heavier than common atmoſpheric air, would have a power of aſcenſion by means of the heat of boiling-water, almoſt equal to 65 grains.

Phlogiſticated air is to common air in ſpecific gravity, as 140 to 152; in expanſibility, as 165 to 132: a cubic foot of it, therefore, will weigh only 552$\frac{12}{19}$ grains. By a boiling heat it would loſe, according to the above-mentioned proportion, 250 grains. A cubic foot of phlogiſticated air, then, heated to the degree of boiling-water, would weigh only between 202 and 203 grains, and conſequently would have an aſcenſive power equivalent to 397 grains.

With regard to the other kinds of air which are lighter than phlogiſticated air, the caſe is ſtill more evident. However, ſuppoſing even the balloon to be filled by means of the fuel with equal quantities of fixed and phlogiſticated air, it is plain that this mixture, when expoſed to the heat of boiling-water, muſt have a conſiderably greater power of aſcenſion than common atmoſpherical air; for the cubic foot of fixed air would have an aſcenſive power of 65, and the phlogiſticated air of 397, which added together make 462; while two cubic feet of common air, heated to the ſame degree, would have only an aſcenſive power of 400.—It is impoſſible to aſcertain the proportions of the different kinds of air which compoſe the elaſtic fluid iſſuing from burning fuel, but it is eaſy to ſee that they cannot be in the proportions aſſumed above; for the phlogiſticated air is certainly in the greateſt quantity; and hence our author's calculations muſt be vaſtly erroneous. The error, however, does not lie altogether here, but likewiſe in ſuppoſing heat to decreaſe when confined in a cloſe place in the ſame proportion as in the open air. Without entering into any inveſtigation of the cauſes, it is a well-known fact that heat *aſcends* and *accumulates* in the upper part of any cloſe place, as evidently as water *deſcends* and *is accumulated* in the lower part of any veſſel into which it is poured. In any balloon, therefore, which is raiſed and kept up by fire, the upper part will conſtantly be hotter than the lower; excepting, indeed, thoſe places which are immediately adjoining to the fire. The fire, therefore, is by no means to be increaſed in proportion to the cubical contents of the balloons, otherwiſe it would be impoſſible to preſerve them from deſtruction. The following experiments were made with a view to determine theſe matters, as far as they can well be determined in miniature.

Three different parallelopipeds were prepared, by paſting writing paper over ſlight wooden frames. Externally the ſmalleſt meaſured 6 inches ſquare, and 12 inches in height; the under-part being left quite open. Its cubical contents thus were 432 inches, or the fourth-part of a cubic foot; but by reaſon of the ſpace occupied by the wood-work, it could not be eſtimated at more than 417 inches. The ſecond meaſured exactly a cubic foot; and, deducting for the ſpace occupied by the wood, meaſured 1710 inches. The third was one foot ſquare, and two feet in height, and contained two cubical feet; and, deducting the wood as before, meaſured 3430 inches. The weight of air, therefore, contained in the leaſt, was nearly 144$\frac{3}{4}$ grains; in the ſecond, 593$\frac{1}{10}$; and in the third, 1186$\frac{2}{10}$. The firſt being ſuſpended in a balance and exactly counterpoiſed, a lighted candle was held under the open part at bottom. The machine inſtantly roſe, and required 30 grains to bring it again into balance. A thermometer held within the cavity with the bulb upwards, ſtood, when taken out, at 118°. The ſecond being now ſuſpended in like manner, and exactly counterpoiſed, required 75 grains to bring it into balance; the thermometer ſtanding at 106 within its cavity. The third, with the ſame candle, and treated in every reſpect in a ſimilar manner, required 90 grains to bring it back to an equilibrium; the thermometer ſtanding at 88.—On uſing a ſtronger heat, the firſt required 75, the ſecond 255, and the third 405 grains to reſtore the equilibrium; the thermometer ſtanding in the two firſt at 170, and in the laſt at 135.

From theſe experiments, it is evident, that the rarefaction of air which paſſes through fire, cannot in any manner of way be calculated from the rarefaction of common air by heat alone. In the firſt ſet of experiments, 417 cubic inches of air were rarefied one-fifth by the flame of a ſmall candle; 1710 inches, by the ſame rule, were rarefied about an eighth; and 3430 inches were rarefied one-thirteenth. But in the common mode of computation, if the flame of the candle had rarefied the firſt quantity of air one-fifth, it ought to have rarefied the ſecond, which was four times greater, only one-twentieth, and the third only one-fortieth part. Nay, according to the aſſertion above-quoted, that "the fire muſt be increaſed, not only in proportion to the cubical contents, but in a much greater proportion," the effects of the candle ought to have been ſtill much leſs than we have calculated them. But this is not all. The room in which theſe experiments were made was warm, and the thermometer ſtood at 70°. By an expanſion of 48° only, one-fifth part was rarefied; but if 180° of Fahrenheit give very little more than one-third of rarefaction, 48 degrees ought to have given ſcarce a fourth-part of that third, or a twelfth part inſtead of a third. In like manner, when the ſtrong heat was uſed, the weight raiſed by its means indicated a rarefaction of more than one-half, though by the thermometer it ought not to have been one-third.

It now remains only to give ſome inſtructions for making balloons. 1. For thoſe who intend only to conſtruct a ſmall balloon merely to enjoy the ſight of its aſcent in the air, inflammable gas will be found moſt eligible. Indeed it is almoſt the only kind that can be uſed; for the other kinds are ſo little inferior in ſpecific gravity to the common atmoſphere, that it will require a very capacious bag to riſe when filled with them. The lighteſt materials are to be procured; and it is a matter of no ſmall difficulty to determine what theſe materials are. Thin ſilk covered with elaſtic gum diſſolved in æther has been found to anſwer the purpoſe of confining inflammable air more perfectly than any other thing; but as this material is exceſſively dear, a varniſh made of linſeed oil has been tried, and found to anſwer tolerably well. Indeed, inſtead of ſilk, thin paper varniſhed may be uſed: for as neither ſilk nor paper will contain inflammable air by themſelves, it is plain, that the only uſe of theſe materials is to ſupport the varniſh; and while this can be done, it is no matter by what means. In fact, the wideſt gauze may be covered with iſinglaſs or gums properly diſſolved, in ſuch a manner as to be capable of containing inflammable air; and the thinner and lighter the materials are, the leſs may be the diameter of the intended balloon.

With regard to the form, that of a ſphere is moſt proper, as a body of this kind meets with leſs reſiſtance in paſſing through the air than any other. A ſmall aperture is always to be left, for the purpoſe of admitting the inflammable air with which the balloon is to be filled. From this aperture a gut or pipe ought to proceed, of ſuch a length as to admit of being eaſily and cloſely tied when the veſſel in which the inflammable air was produced ſhall be removed.

The balloon being fully prepared, its ſides are to be ſqueezed together as completely as poſſible; but at the ſame time very gently, leſt the varniſh ſhould be cracked. This is done to get out of it all the common air which it originally contained; for the leſs of this that remains in it, the more eaſily will the balloon aſcend, and the greater weight it will be able to carry up. To fill it with inflammable air, a ſufficient quantity of vitriolic acid and filings of iron or zinc muſt be procured. For a globe of three feet diameter the following proportions have been recommended; 40 ounces of vitriolic acid, 90 of iron-filings, and 450 of water. The moſt proper veſſel for mixing theſe ingredients is a copper-ſtill, perforated at top for the conveniency of pouring in more acid or water as ſhall be neceſſary. This metal is to be choſen in preference to any other, on account of its not being eaſily affected by fire, and being likewiſe inſoluble in diluted vitriolic acid. The ſtill is to be fitted with a refrigeratory and worm, in order to condenſe any aqueous vapour that may ariſe along with the air. This condenſed vapour muſt be received into a ſmall veſſel exactly fitted to the worm; and into the upper part of which muſt be cloſely inſerted a tube of tin or ſome other ſolid material capable of conducting the air, without loſing it, into the balloon. The acid diluted with the water is firſt to be put into the ſtill, and the iron gradually added through the hole in the top. An efferveſcence will immediately enſue, and the balloon will ſwell conſiderably; but as the dilatation advances, the reſiſtance of the external air rather increaſes at the ſame time that the propelling force of the inflammable air is leſſened. Fire muſt therefore be applied to the ſtill; which will ſoon expel all the inflammable air, and would even burſt the balloon if long continued. Unleſs a valve is applied to let out part of the inflammable air when it aſcends into the higher regions, it will be improper to fill the balloon very full; becauſe of the danger of burſting in a more rarefied air. A method of making balloons aſcend to a prodigious height, would be to have a valve opening outwards, and confined by a ſpring, the elaſticity of which could be overcome by the expanſion of the air, without burſting the globe. This valve ought to open into another flaccid balloon, by which means the air that eſcaped from the former would not be loſt, but dilate the ſecond; ſo that both would have the ſame propenſity to aſcend that the ſingle one had. On their entrance into a region where the air was ſtill more rare, both would be diſtended; and thus by connecting three, four, or more bags with one another, it ſeems practicable in theory to raiſe them to any height whatever.

2. The other kind of balloons, which are raiſed by means of air paſſing through fire, ſeem ſcarcely proper for experiments except of the higher kind, where ſome perſon aſcends with them, and regulates their motion by increaſing or diminiſhing the fire by which they are ſupported. With regard to the conſtruction of theſe, little can as yet be ſaid, excepting what may be inferred from the experiments of M. Montgolfier and Roſier. The deſcriptions of theſe already given ſufficiently ſhow the method of conſtructing *fire balloons*, as they are called. The only remark that can well be made on them at preſent is, that in theſe, as well as the others, the whole power of aſcenſion lies on the top; becauſe there the preſſure of the atmoſphere is conſiderably leſs than at bottom; whereas the expanſive power of the air within continues the ſame over the whole. In the great balloon conſtructed at Lyons, which was 126 feet in height, the difference between the external and internal preſſure muſt have been very great. Every cubic foot of air weighs about an ounce and a quarter. Of conſequence, upon every cube of one foot, the air preſſes with one ounce and a quarter leſs weight on the upper than on the under part. Nevertheleſs, if we ſuppoſe the cube hollow, and filled with air, the internal air will preſs upon that which lies below it with a force equal to one ounce and a quarter; of conſequence, the cube will neither have any inclination to aſcend or deſcend; but if we lighten the internal air by any given quantity, ſuppoſe half an ounce, while we preſerve the ſame elaſticity with the external air, it is plain, that the upper and internal part of the cube will be preſſed upwards by half an ounce more than it is preſſed downward by the external air. Hence it is evident, that the upper part of theſe machines, inſtead of being weaker, ought to be ſtronger than the under parts. This is evident from what happened to the balloon at Lyons. At the height of 126 feet, there muſt have been a difference of no leſs than 9 pounds 13 ounces upon every ſquare foot, between the internal and external preſſure. From this indeed the weight of the internal column muſt be deducted; but ſuppoſing the air to have been but very little rarefied, the difference muſt have been immenſe. In fact, this difference is the very power of aſcenſion itſelf; and we ſee that this was ſufficient to overcome 8000 pounds weight, for the machine itſelf, beſides that of ſeven people, whom we cannot well ſuppoſe to have weighed leſs than 1000 pounds. Now, as the diameter of the balloon was 100 feet, we ſee that the whole preſſure reſted upon a circle of cotton cloth, whoſe diameter was 100 feet, and area 7850. The preſſure therefore was more than a pound upon every ſquare foot, and how much more we do not know, unleſs the machine had been perfectly *in æquilibrio* with the atmoſphere. But this it was not: for it aſcended with great velocity; and the power by which this velocity was occaſioned, exerted itſelf upon the upper parts. The conſequence was, that the cloth was torn; having been imprudently changed by M. Roſier from double canvas to ſingle cotton.

ALBINUS (Bernhard Siegfred), a celebrated phyſician and anatomiſt, was born, of an illuſtrious family, at Francfort on the Oder in 1697. His father was then profeſſor of the practice of medicine in the univerſity of Francfort; but in the year 1702 he repaired to Leyden,

den, being nominated profeſſor of anatomy and ſurgery in that univerſity. Here his ſon had an opportunity of ſtudying under the moſt eminent maſters in Europe, who, from the ſingular abilities which he then diſplayed, had no difficulty in prognoſticating his future eminence. But while he was diſtinguiſhed in every branch of literature, his attention was particularly turned to anatomy and ſurgery. His peculiar attachment to theſe branches of knowledge gained him the intimate friendſhip of Ruyſch and Rau, who at that time flouriſhed in Leyden; and the latter, ſo juſtly celebrated as a lithotomiſt, is ſaid to have ſeldom performed a capital operation without inviting him to be preſent. Having finiſhed his ſtudies at Leyden, he went to Paris, where he attended the lectures of Du Verney, Vaillant, and other celebrated profeſſors. But he had ſcarce ſpent a year there, when he was invited by the curators of the univerſity of Leyden, to be a lecturer in anatomy and ſurgery at that place. Though contrary to his own inclination, he complied with their requeſt, and upon that occaſion was created Dr of phyſic without any examination. Soon after, upon the death of his father, he was appointed to ſucceed him as profeſſor of anatomy; and upon being admitted into that office on the 9th of November 1721, he delivered an oration, *De vera via ad fabricæ humani corporis cognitionem ducente;* which was heard with univerſal approbation. In the capacity of a profeſſor, he not only beſtowed the greateſt attention upon the inſtruction of the youth entruſted to his care, but in the improvement of the medical art. With this view, he publiſhed many important diſcoveries of his own; and by elegant editions, turned the attention of phyſicians to works of merit, which might otherwiſe have been neglected. By theſe means his fame was ſoon extended over Europe; and the ſocieties of London, Peterſburgh, and Harlem, cheerfully received him as an aſſociate. In 1745, he was appointed profeſſor of the practice of medicine at Leyden, and was ſucceeded in the anatomical chair by his brother Frid. Bern. Albinus. He was twice rector of the univerſity, and as often he refuſed that high honour when it was voluntarily offered him. At length, worn out by long ſervice and intenſe ſtudy, he died on the 9th of September 1770, in the 74th year of his age.

ALBUGO. *Dele* the marginal note.

Some diſtinguiſh this diſorder by *nubeculæ*, when its ſeat is ſuperficial; and *albugo*, when it is deep. Others make the following diſtinctions, viz. when the ſpeck appears of a ſhining white, and without pain, it is called a *cicatrice;* when of an opaque whiteneſs, an *albugo*. Seated ſuperficially, it hath been termed a *ſpeck;* and more deeply, a *dragon*. If an abſceſs was the cauſe, its contents hardening between the laminæ of the cornea, cauſes it to project a little; and then it is called a *pearl*.

The cauſes are various; as inflammation in the eye, abſceſs in the cornea, eroſion, meaſles, ſmall-pox, wounds, burns, &c.

When deep, the cure is difficult; when the conſequence of a wound or ulcer, they are rarely cured; when cauſed by an imprudent uſe of vitriolic collyriums, and when they alter the natural ſhape of the eye, the prognoſtic is as unfavourable. Thoſe which follow an inflammation, generally diſappear ſpontaneouſly. Happening after the ſmall-pox, meaſles, or other inflammatory cauſes, the utmoſt haſte ſhould be made to relieve, by bleeding, purging, bliſtering, diuretics, and an abſtemious diet. Avoid cold and aſtringent collyriums; but the fumes of coffee, or of the decoction of the woods, may be uſeful. When theſe ſpecks are very ſmall, they often ulcerate; but theſe ulcerations are ſoon healed by the application of the *pulv. rad. irid. paucul. ſac. chryſtal.* or, as is juſtly preferred by many, the *aqq. ſapph.* If the diſorder hath been of long ſtanding, the cure is very difficult; however, the following methods may be attempted: expoſe the diſeaſed part of the eye to the fumes of camphorated ſpirit of wine directed through a quill: this, by a continued uſe, may abrade the ſpeck. This method ſeldom fails to excite ſome degree of inflammation, by which the cure is effected; though when the inflammation is thus produced, it muſt be removed by the common methods with all poſſible ſpeed. To this end, the following have been alſo applied with ſome degree of ſucceſs, *viz.* the juice of celandine, the gall of eels, or of the pike, or of a partridge, and the oil of box: if theſe prove too ſharp, let them be diluted with water, or with a thin ſolution of gum dragon: apply any of theſe once in 24 hours; and half an hour after the application, waſh it off with a little brandy and water. The *aq. ſapph.* alone ſometimes ſucceeds. When the film is very tough, and the eye not inflamed, common glaſs finely levigated may be blown upon it through a quill, and repeated once in a day or two.

Motherby, Med. Dict.

ALBURNUM, the ſoft white ſubſtance which in trees is found between the liber or inner bark and the wood, and in progreſs of time acquiring ſolidity, becomes itſelf the wood. From its colour and comparative ſoftneſs, it has been ſtyled by ſome writers the fat of trees, *adeps arborum*.

The alburnum is found in largeſt quantities in trees that are vigorous; though in ſuch as languiſh, or are ſickly, there is a greater number of beds. In an oak ſix inches in diameter, this ſubſtance is nearly equal in bulk to the wood. In a trunk of one foot diameter, it is as one to three and a half; of two and a half feet diameter, as one to four and a half, &c. but theſe proportions vary according to the health and conſtitution of the trees.—The alburnum is frequently gnawed in pieces by inſects which lodge in the ſubſtance, and are nouriſhed from it.

ALDER, (*Encycl.*) The bark of the black berry-bearing alder is ſaid to be the moſt certain purge for the horned cattle in obſtinate conſtipations of the bowels. Gunner ſays, that horſes do not eat the leaves, but that cows ſometimes will, and that it greatly increaſes the quantity of the milk.

ALGÆ, FLAGS; one of the ſeven families or natural tribes into which the whole vegetable kingdom is divided by Linnæus, in his *Philoſophia Botanica*. They are defined to be plants, whoſe root, leaf, and ſtem are all one. Under this deſcription are comprehended all the ſea-weeds, and ſome other aquatic plants. In the ſexual ſyſtem, they conſtitute the third order of the 24th claſs *cryptogamia;* in Tournefort, the ſecond genus of the ſecond ſection, *marinæ, aut fluviatiles*, of the 17th claſs, *aſpermæ vulgo habitæ;* and the 57th order in Linnæus's Fragments of a Natural Method. The diſcoveries made in this part of the vegetable kingdom are uncertain, and imperfect; and the attempts, in particular, to arrange flags by the parts of the fructification, have not been attended with great ſucceſs. Dillenius has arranged this order of plants from their general habit and ſtructure; Michelius from the parts of fructification.—Each has conſiderable merit.

ALIMENT. Marginal note, for n° 438, &c. read 440—442.

A conſiderable change has now taken place in the vegetables made uſe of as food by the ancients, by ſubſtituting, inſtead of what were then uſed, a number of more bland, agreeable, and nutritive juices. The acorns and nuts of the primitive times have given way to a variety of ſweeter farinaceous ſeeds and roots. To the malvaceous tribe of plants ſo much uſed by the Greeks and Romans, hath ſucceeded the more grateful ſpinach; and to the blite, the garden orach. The rough borage is ſupplanted by the aceſcent ſorrel; and aſparagus has baniſhed a number of roots recorded by the Roman writers under the name of *bulbs;* but Linnæus is of opinion, that the parſnip has undeſervedly uſurped the place of the ſkirret. The bean of the ancients, improperly ſo called, being the roots, as well as other parts of the *nymphæa nelumbo,* or Indian water-lily, is ſuperſeded by the kidney-bean. The garden rocket, eaten with, and as an antidote againſt the chilling qualities of the lettuce, is baniſhed by the more agreeable creſs and tarragon; the apium by the meliorated celery; the pompion, and others of the cucurbitaceous tribe, by the melon; and the ſumach berries, by the fragrant nutmeg. The ſilphium, or ſuccus Cyrenaicus, which the Romans purchaſed from Perſia and India at a great price, and is thought by ſome to have been the aſafetida of the preſent time, is no longer uſed in preference to the alliaceous tribe.

To turn from the vegetable to ſome of the animal ſubſtitutes, we may mention the carp among fiſhes, as having excluded a great number held in high eſtimation among the Romans. The change of oil for butter; of honey for ſugar; of mulſa, or liquors made of wine, water, and honey, for the wines of modern times; and that of the ancient zythus for the preſent improved malt liquors; not to mention alſo the *calida* of the Roman taverns, analogous to our tea and coffee.

ALKADARII, a ſect among the Mahometans, who deny any eternal, fixed, divine decrees, and are aſſerters of free will. The word is formed from the Arabic *alkadar,* which ſignifies "decree." The Alkadarii are a branch of Motazalites, and ſtand oppoſed to the Algiabarii. See ALGIABARII, (*Encycl.*)

ALKALI, (*Encycl.*) Alkalis comprehend one claſs of the chemical elements, or component parts or neutral ſalts, as acids do another. Concerning the origin of alkalis there have been a great number of various conjectures, as well as concerning that of acids; but nothing certain has been, or in all probability will be, diſcovered. They are diſtinguiſhed from other bodies of the ſaline kind by the following properties. 1. They combine with acids more readily than any other known ſubſtance, excepting the pure ponderous earth, occaſioning an efferveſcence and heat. 2. When they are in a concrete form, into which they may be eaſily reduced by evaporation; if expoſed to the open air, they attract the moiſture from it, though not ſo ſtrongly as concentrated acids; and generally deliquate, that is, become a fluid. But if they are mixed with water all at once, a conſiderable degree of heat is produced. 3. They generally change the blue and red colour of vegetables to a green; whereas the acids change it to red, or to a ſtronger red. 4. They have an acrid burning taſte, which has ſomething of urinous. 5. They partly exhale with water, eſpecially when boiled in open veſſels. 6. They may be fuſed by a moderate heat; and in that ſtate they diſſolve all ſorts of earths, eſpecially thoſe called *vitrifiable;* and if the heat is ſufficient, they and the earth form a brittle ſubſtance called *glaſs;* and upon this principle common glaſs is made.

Alkalis are principally diſtinguiſhed into *fixed* and *volatile;* the former being not ſo eaſily diſſipated even by a ſtrong fire; for which reaſon they are commonly employed in making glaſs, and other compoſitions. But the volatile alkalis are ſo eaſily diſſipated, that they may be almoſt entirely evaporated by a much leſs degree of heat than that of boiling water. Notwithſtanding that various ſorts of alkali are enumerated, it is ſuppoſed that there is but one alkaline principle in nature, which, by being variouſly combined with ſundry ſubſtances, aſſumes various particular properties. However, an alkali is never found pure in nature, but it is always combined with other ſubſtances, from which it muſt be ſeparated by art, in order to obtain it ſufficiently pure. The fixed alkali is obtained either from ſea-ſalt, or from vegetables; hence it is called *fixed mineral alkali* in the firſt caſe, and *fixed vegetable alkali* in the ſecond. The volatile alkali is obtained, by means of decompoſition and putrefaction, from all animal ſubſtances, and may be alſo obtained by decompoſition and other means from ſome vegetable and a few other matters. Fixed alkali, whether vegetable or mineral, has always the ſame principal properties; yet they differ from one another in degree, viz. the mineral alkali poſſeſſes the alkaline properties in a leſs degree than the vegetable alkali; for when it is expoſed to the open air, it will not attract the moiſture from it in ſuch a quantity as to deliquate; when mixed with water, it will not occaſion ſo much heat as the fixed vegetable alkali, &c.—Its affinity with other ſubſtances is exhibited below:

1. Vitriolic acid,
2. Nitrous acid,
3. Marine acid,
4. Phoſphoric acid,
5. Acid of ſugar,
6. Other vegetable acids,
7. Sulphur,
8. Oils,
9. Tin,
10. Lead,
11. Copper,
12. Gold, and
13. Water.

The fixed vegetable alkali has an affinity with the following ſubſtances:

1. Vitriolic acid,
2. Nitrous acid,
3. Marine acid,
4. Phoſphoric acid,
5. Acid of ſugar,
6. Other vegetable acids,
7. Sulphur,
8. Oils,
9. Tin,
10. Lead,
11. Copper,
12. Gold, and
13. Water.

Alkaline ſalts are of great uſe in chemiſtry, not only becauſe they counteract the action of acids, but alſo becauſe they are powerful ſolvents; and, when combined with other ſubſtances, communicate to them part of their ſaline properties. Thus, when they are combined with ſulphur, they make a compound called *hepar ſulphuris*, or liver of ſulphur, which is diſſoluble in water, whereas ſulphur by itſelf is not; and when they are combined with oils, form compounds called *ſoaps*, which are diſſolvable in water, whereas oil by itſelf is not. The fixed alkali, more commonly uſed, by reaſon of its greateſt purity, is that extracted from tartar, which is a ſubſtance found adhering to the ſides of caſks that have contained wine, and is conſidered as the eſſential ſalt of that liquor. This alkali, when it is in a liquid form by its combination with a ſufficient quantity of water, is commonly, but improperly, called *oil of tartar*.

Volatile alkali, when firſt extracted from animal or vegetable ſubſtances, is very impure; but by proper methods it may be purified to a great degree; and in that purified ſtate it differs from fixed alkali, principally becauſe it is very volatile: it has a ſtrong penetrating ſmell, which occaſions coughs, ſuffocation, &c. —The hart's-horn drops commonly uſed, the ſmell of which almoſt every body knows, are a volatile alkali.

ALKENNA, in botany. See LAWSONIA, (*Encycl.*)

ALLODIUM, (*Encycl.*) See alſo FEE and FEODAL *Syſtem*, (*Encycl.*)

ALL-SPICE, PIMENTO, or *Jamaica Pepper*. See PIMENTO, (*Encycl.*)

ALOE, (*Encycl.*) The *mitre-ſhaped aloe*, ſo termed from the figure of its leaves, is a kind of ſymbolic plant to the Mahometans, eſpecially in Egypt, and in ſome meaſure dedicated to the offices of religion; for whoever returns from a pilgrimage to Mecca, hangs it over his ſtreet-door, as a token of his having performed that holy journey. The ſuperſtitious Egyptians believe, that this plant hinders evil ſpirits and apparitions from entering the houſe; and on this account, whoever walks the ſtreets in Cairo, will find it over the doors both of Chriſtians and Jews. From the ſame plant the Egyptians diſtil a water, which is ſold in the apothecaries ſhops at Cairo, and recommended in coughs, hyſterics, and aſthmas. An unexperienced French ſurgeon, ſays Haſſelquiſt, gave a Coptite, 40 years old, afflicted with the jaundice, four tea-cups full of the diſtilled water of this ſpecies of aloe, and cured him in four days. This remedy, unknown to our apothecaries, is not difficult to be obtained, as the plant might eaſily be raiſed in the warm ſouthern parts of Europe. The Arabians call it *ſabbara*.

The under leaves of a ſpecies of aloe, termed by Linnæus *aloe diſticha*, are of a dark-green colour, ſpotted with white, ſomewhat reſembling the colour of ſoft ſoap; whence it is ſometimes diſtinguiſhed by the name of *ſoap-aloe*.

The name of *pearl aloe* is given to a certain ſpecies, the leaves of which are cloſely ſtudded with white beautiful protuberances.

Of the leaves of the Guinea aloe, mentioned by Mr Adanſon in his voyage to Senegal, the negroes make very good ropes, not apt to rot in the water.

Dr Sloane mentions two ſorts of aloes; one of which is uſed for fiſhing-lines, bow-ſtrings, ſtockings, and hammocks; the other has leaves which, like thoſe of the wild-pine and banana, hold rain-water, and thereby afford a very neceſſary refreſhment to travellers in hot countries, where there is generally a ſcarcity of wells and water.

The ſubſtance known among druggiſts and apothecaries by the name of *aloes*, is a thick, or inſpiſſated juice, drawn from the plants by expreſſion or inciſion. Of this ſubſtance there are three ſorts, which differ in purity, and, according to moſt authors, are the produce of the ſame plant.

The manner of collecting and preparing the juice, is thus explained by J. Bauhin: having cut the herb in pieces, they bruiſe it, and ſqueeze out the juice, which they put up into a veſſel of a long and round ſhape, ſuffering it to ſtand for the ſpace of 25 days; in the meanwhile they take care to clear off the uſeleſs ſcum, and throw it away, as alſo the upper part of the juice, until ſuch time as ſome difference appears in its colour and conſiſtence. The purer part of this juice being concreted, or hardened, is called *ſuccotrine aloes;* the remaining part, being of a dark liver-colour, is called *hepatic aloes;* and from the dregs or ſettlings, is made that ſort called *caballine* or *horſe-aloes*.

Notwithſtanding the contrary opinion of Columna, Bauhin, Ray, and other naturaliſts, we are now ſufficiently certain, that the three kinds of aloes juſt mentioned, are the juices of three different plants: the ſuccotrine, of the *aloe vera* of Miller; the hepatic, of the *aloe vulgaris* of Bauhin, *aloe Dioſcoridis et aliorum* of Sloane, and *aloe barbadenſis* of Miller; the caballine, of the *aloe Guineenſis caballina, vulgari ſimilis, ſed tota maculata*, of Commelin.

The fineſt or pureſt is the ſuccotrine aloes; ſo called, ſays Pomet, either becauſe the ſubſtance itſelf is a concreted juice, or, which is moſt probable, becauſe the beſt comes from Socotora, or Zocotra, an iſland in the ſtreights of Babelmandel. Succotrine aloes, when broken, is tranſparent; and when powdered, of a fine yellow golden colour, with a bitter taſte, and a ſmell like that of myrrh. From the root and leaves of the Weſt-India, or Barbadoes aloes, is prepared the ſecond ſort, called from its colour, which is a dark-red like that of a liver, *hepatic aloes*. This ſort, which is coarſer than the former, and ſeldom uſed in medicine except for horſes, is brought us in gourds or calabaſhes of different ſizes and weight. It is of a liver colour, clear, and not very fetid in ſmell.

The third ſort, by much the coarſeſt, black, hard to break, and frequently adulterated, is called *caballine aloes;* becauſe, like the ſecond ſort, it is ſolely appropriated to the uſe of horſes. This ſort is generally ſold in the ſhops for the true hepatic aloes.

The month of March, ſays Mr Hughes in his Natural Hiſtory of Barbadoes, is the propereſt ſeaſon to make the aloes; which is done in the following manner: Each negro has by him three or four portable tubs, into which the leaves are thrown with their broken ends downwards. Theſe being full of large longitudinal veins, or veſſels, yield an eaſy paſſage to the juice, which is of a greeniſh yellow colour, to drip out. The juice being boiled for about five hours in a copper or kettle, the watery particles evaporate, and the remainder comes to a conſiſtency, and thickens as ſugar doth when ſufficiently boiled. The way to know when it is enough boiled, is to dip a ſtick in the liquor, and obſerve whether the aloes, ſticking to it when cold, breaks ſhort; if it does, then it is boiled to perfection, and fit to be poured into gourds, calabaſhes, or other veſſels for uſe.

Succotrine aloes, which is the only ſort now preſcribed in medicine, is ſeldom or never adminiſtered in potion, by reaſon of its extreme bitterneſs; but is often given in pills, being in fact the baſis of the greateſt part of the purgative pills now in uſe. The Francfort or angelic pill is entirely compoſed of it. In the city of Goa, as Garcias relates, aloes well bruiſed and mixed with milk, is preſcribed with ſucceſs, to ſuch as are afflicted with ulcers in the kidneys or bladder, and void purulent urine. The herbs which produce the three medicines juſt mentioned, are by no means to be confounded with the tree from which is procured the precious, valuable, and rare wood called *wood of aloes.*

ALOPECIA, (*Encycl.*) *Dele* the marginal note.

The term is uſed among phyſicians to denote a total falling off of the hair from certain parts, occaſioned either by the defect of nutritious juice, or by its vicious quality corroding the roots of it, and leaving the ſkin rough and colourleſs.

The word is formed from αλωπηξ, *vulpes*, "a fox;" whoſe urine, it is ſaid, will occaſion baldneſs; or becauſe it is a diſeaſe which is common to that creature.

The alopecia properly differs from *defluvium capillorum*; as in the former certain parts or patches are left entirely bald, whereas in the latter, the hair only grows immoderately thin. It alſo differs from the ophiaſis, as this latter creeps in ſpires about the head, like the windings of a ſerpent; whereas the former is not confined to any figure.

The remedies which remove the proximate cauſe of this malady, are called μετασυγκριτικα, *metaſyncritica.* Here, firſt, if any corrupt hairs ſtill remain, they are to be drawn out either with tweezers, or by dropaciſm; or the place muſt be ſhaved by a razor. Then the head is to be waſhed every night at going to bed with a ley, prepared by boiling the aſhes of vine branches in red wine. A powder made by reducing hermodactyls to fine flour, is alſo recommended for the ſame purpoſe.

In caſes where the baldneſs is total, a quantity of the fineſt burdock roots are to be bruiſed in a marble mortar, and then boiled in white wine until there remains only as much as will cover them. This liquor, carefully ſtrained off, is ſaid to cure baldneſs, by waſhing the head every night with ſome of it warm. A ley made by boiling aſhes of vine branches in common water, is alſo recommended with this intention. A freſh cut onion, rubbed on the part until it be red and itch, is likewiſe ſaid to cure baldneſs.

A multitude of ſuch remedies are every where to be found in the works of Valeſcus de Taranta, Rondeletius, Hollerius, Trincavellius, Celſus, Senertay, and other practical phyſicians. See Buxus, (*Encycl.*)

ALTERANTS. In the marginal note, for Medicine, &c. read Materia Medica, p. 4475. col. 1. par. 2.

ALTHÆA. Marginal note, for n° 90, read *The Table.*

ALUM. Marginal note, for n° 91, read *The Table.*

AMALGAMATION, (*Encycl.*) The proper method of making amalgams is, by firſt melting the metal with as little heat as poſſible, and then pouring the quickſilver into it. During this operation part of the metal undergoes a kind of calcination, whence the ſurface of ſome amalgams become black and duſty in a very ſhort time. This is effectually prevented by adding a ſmall quantity of tallow or hog's-lard to the mixture whilſt hot; which reſtores the phlogiſton loſt by the metal, and preſerves the mixture always of a metalline ſplendor. This is eſpecially neceſſary in making an amalgam with zinc, which is found to excite the electrical power of glaſs more than any other. It requires at leaſt four parts of zinc to one of mercury.

AMAUROSIS. Marginal note, for 790, read 455.

AMBERGRISE, (*Encycl.*) In the Philoſophical Tranſactions we meet with an account of the origin of ſubſtance, very different from the commonly received one of its being a natural bitumen. This account was communicated to the Society by Paul Dudley, Eſq; who had it from an American ſhipmaſter. It is in ſubſtance the ſame with the account given by Doctor Douglas in his Hiſtorical and Political Summary of the Engliſh Colonies, vol. i. p. 57. "Ambergriſe," ſays he, "is now fully diſcovered to be ſome production of the ſpermaceti whale; for ſome time it was imagined ſome peculiar concreted juice lodged in a peculiar cyſtis, in the ſame manner as is the caſtoreum of the beaver or fiber canadenſis, and the zibethum of the civet-cat or hyæna, in cyſtiſes on both ſides in the ani rima. Thus, not long ſince, ſome of our Nantucket whalers imagined, that in ſome (very few and rare) of theſe male or bull-whales, they had found the gland or cyſtis in the loins near the ſpermatic organs: late and more accurate obſervations ſeem to declare it to be ſome part of the ordure, dung, or alvine excrement of the whale. Squid fiſh, one of the Newfoundland baits for cod, are ſometimes in Newfoundland caſt aſhore in quantities; and as they corrupt and fry in the ſun, they become a jelly or ſubſtance of an ambergriſe ſmell; therefore, as ſquid bills are ſometimes found in the lumps of ambergriſe, it may be inferred, that ambergriſe is ſome of the excrement from ſquid food, with ſome ſingular circumſtances or diſpoſitions that procure this quality ſeldom concurring. Thus the Nantucket whalers, for ſome years laſt paſt, have found no ambergriſe in their whales."

In the ſixth volume of Goldſmith's Natural Hiſtory, we find an account ſomewhat different from the foregoing. He tells us, that it is found in the cachalot or ſpermaceti whale, in the place where the ſeminal veſſels are uſually ſituated in other animals. It is found in a bag of three or four feet long, in round lumps, from one to 20 pounds weight, floating in a fluid rather thinner than oil, and of a yellowiſh colour. There are never more ſeen than four at a time in one of theſe bags; and that which weighed 20 pounds, and which was the largeſt ever ſeen, was found ſingle. Theſe balls of ambergriſe are not found in all fiſhes of this kind, but chiefly in the oldeſt and ſtrongeſt. In the 73d volume of Philoſophical Tranſactions, Dr Schwediawer gives an account very ſimilar to the former one.

AMERICA. Marginal note, n° 11. for *cool*, read *moderate.*

AMNIOS, (*Encycl.*). See Generation, footnote (c), (*Encycl.*)

AMOMUM. At the end, for n° 97, read *The Catalogue of Simples.*

AMPUTATION. Marginal note, for n° 28, 29. read ſect. xviii. p. 8453.

AMSTERDAM island, (*Encycl.*) ſaid there, by miſtake, not to be taken notice of in our later diſcoveries. It was viſited by capt. Cook in his late voyages. Its greateſt extent from eaſt to weſt is about 21 miles, and from north to ſouth about 13. It is broad at the eaſt end, and runs taper towards the weſt, where it turns, and runs to a point due north. It is about ſix leagues to the weſt of Middleburgh. The ſhore is ſurrounded by a coral rock, and its moſt elevated parts are not above ſix or eight yards above the level of the ſea. S. Lat. 21. 11. W. Long. 175. It is wholly laid out in plantations, in which are cultivated ſome of the richeſt productions of nature.

Here are bread-fruit, cocoa-nut trees, plantains, bananas, ſhaddocks, yams, and ſome other roots; ſugar-canes, and a fruit like a nectarine, called by the natives *fighega*. There did not appear an inch of waſte ground: the roads occupied no more ſpace than was abſolutely neceſſary: the fences did not take up above four inches each; and even theſe were not wholly loſt, for in many grew ſome uſeful trees or plants: it was every where the ſame, change of place altered not the ſcene: nature, aſſiſted by a little art, nowhere appeared in more ſplendor than on this iſland. Water is not ſo plentiful here as at the Society-iſlands; but the chief pointed out a pool of freſh water unaſked, to ſupply the ſhips with that neceſſary article. Caſuarinas, pandangs, and wild ſago-palms, appear here with their various tints of green, and barringtoniæ as big as the loftieſt oaks. The bread-fruit does not, however, thrive here with the ſame luxuriance as at the Society-iſlands, the coral rock, which compoſes the baſis of this ſpot, being much more thinly covered with mould.

Both men and women are of the common ſize of Europeans, and their colour is that of a lightiſh copper; they are well-ſhaped, have regular features, are active, briſk, and lively. They have fine eyes, and in general good teeth, even to an advanced age. The women are the merrieſt creatures imaginable, and inceſſant talkers. In general, they appear to be modeſt; although there was no want of thoſe of a different ſtamp. Among the natives, who ſwam about the ſhip very vociferouſly, were a conſiderable number of women, who wantoned in the water like amphibious creatures, and were eaſily perſuaded to come on board perfectly naked; but none of them ventured to ſtay there after ſunſet, but returned to the ſhore to paſs the night, like the greater part of the inhabitants, under the ſhade of the wild wood which lined the coaſt. There they lighted great fires, and were heard converſing almoſt the whole night. The hair of both ſexes in general is black, but eſpecially that of the women; both ſexes wear it ſhort, except a ſingle lock on the top of the head, and a ſmall quantity on each ſide. The men cut or ſhave their beards quite cloſe, which operation they perform with two ſhells. The hair of many was obſerved to burnt at the ends, and ſtrewed with a white powder, which was found, on examining it, to be lime made of ſhell or coral, which had corroded or burnt the hair; ſome made uſe of a blue powder, and others, both men and women, of an orange-coloured powder made of turmeric.

The dreſs of both ſexes conſiſts of a piece of cloth or matting wrapped round the waiſt, and hanging down below the knees. From the waiſt upwards they are generally naked, and it ſeems to be a cuſtom to anoint theſe parts every morning. The practice of tattowing, or puncturing the ſkin, likewiſe prevails. The men are tattowed from the middle of the thigh to above the hips; the women have it only on their arms and fingers, and on thoſe parts but very ſlightly. Their ornaments are amulets, necklaces, and bracelets, the bone, ſhells, and beads of mother-of-pearl, tortoiſe-ſhell, &c. which are worn by men as well as women. The women alſo wear on their fingers neat rings made of tortoiſe-ſhell, and pieces in their ears about the ſize of a ſmall quill: but here ornaments are not commonly worn, though all have their ears pierced. They have alſo a curious apron, made of the out-ſide feathers of the cocoa-nut ſhell, and compoſed of a number of ſmall pieces ſewed together in ſuch a manner as to form ſtars, half-moons, little ſquares, &c.; it is ſtudded with beads and ſhells, and covered with red feathers, ſo as to have a pleaſing effect. They make the ſame kind of cloth, and of the ſame materials, as at O-Taheitee, though they have not ſuch a variety, nor do they make any ſo fine; but as they have a method of glazing it, it is more durable, and will reſiſt rain for ſome time, which the other cloth would not. Their colours are black, brown, yellow, purple, and red; all made from vegetables. They make various ſorts of matting, ſome of a very fine texture, which is generally uſed for cloathing; and the thick and ſtronger ſort ſerves to ſleep upon, and to make ſails for their canoes, &c. Among other uſeful utenſils, they have various ſorts of baſkets, ſome made of the ſame materials as their mats, and others of the twiſted fibres of cocoa-nuts. Theſe are not only durable, but beautiful, being generally compoſed of different colours, and ſtudded with beads made of ſhells or bones. They have many little nicknacks among them, which ſhow that they neither want taſte to deſign, nor ſkill to execute, whatever they take in hand. Their fiſhing implements are much the ſame as in other iſlands: here was purchaſed a fiſh-net made like our caſting-nets, knit of very firm though ſlender threads.

Notwithſtanding their very friendly diſpoſition, theſe people have very formidable weapons; ſome of their ſpears have many barbs, and muſt be very dangerous weapons when they take effect. A large flat ſhell or breaſtplate was purchaſed, made of a roundiſh bone, white and poliſhed like ivory, about 18 inches in diameter, which appeared to have belonged to an animal of the whale tribe.

AMYGDALUS. At the end of the article, for n° 99. read *The Catalogue of Simples*.

AMYLACEOUS, from *amylum*, "ſtarch;" a term applied to the fine flour of farinaceous ſeeds, in which conſiſts their nutritive part. See Bread, (*Encycl.*)

ANACARDIUM, (*Encycl.*). See alſo Cashew-nut, (*Encycl.*)

ANALYSIS, (*Encycl.*) Rhetorical analyſis, is that which examines the connections, tropes, figures, and the like, inquiring into the propoſition, diviſion, paſſions, arguments, and other apparatus of rhetoric.

Several authors, as Freigius and others, have given analyſes of Cicero's Orations, wherein they reduce them to their grammatical and logical principles; ſtrip them of all the ornaments and additions of rhetoric which otherwiſe diſguiſe their true form, and conceal the connection between one part and another. The deſign of theſe authors is to have thoſe admired harangues juſt ſuch as the judgment diſpoſed them, without the help of imagination; ſo that here we may coolly view the force of each proof, and admire the uſe Cicero made of rhetorical figures to conceal the weak part of a cauſe.

A collection has been made of the analyſes formed by the moſt celebrated authors of the 16th century, in 3 vols folio.

ANALYSIS is alſo uſed, in chemiſtry, for the decompounding of a mixed body, or the ſeparation of the principles and conſtituent parts of a compounded ſubſtance.

To analyze bodies, or reſolve them into their component parts, is indeed the chief object of the art of chemiſtry. Chemiſtry furniſhes ſeveral means for the decompoſition of bodies, which are all founded on the differences of the properties belonging to the different principles of which the body to be analyzed is compoſed. If, for example, a body be compoſed of ſeveral principles, ſome of which have a great, and others a moderate degree of volatility, and, laſtly, others are fixed, its moſt volatile parts may be firſt ſeparated by a gradual heat in diſtilling veſſels; and then the parts which are next in volatility will paſs over in diſtillation; and laſtly, thoſe parts which are fixed, and capable of reſiſting the action of fire, will remain at the bottom of the veſſel.

ANALYSIS is alſo uſed for a kind of ſyllabus, or table of the principal heads or articles of a continued diſcourſe, diſpoſed in their natural order and dependency. Analyſes are more ſcientifical than alphabetical indexes; but they are leſs uſed, as being more intricate.

ANALYSIS is likewiſe uſed for a brief, but methodical, illuſtration of the principles of a ſcience; in which ſenſe it is nearly ſynonimous with what we otherwiſe call a *ſynopſis*.

ANASARCA, (*Encycl.*) *Dele* the references.—— In this diſtemper the water is contained in the cellular membrane between the ſkin and fleſh. Its cure is the ſame with that of the aſcites. See MEDICINE, n° 441—444. and p. 4870. col. 2. (*Encycl.*)

ANEMONE, (*Encycl.*) Horned cattle, when removed from the higher grounds into woods and woody paſtures, frequently eat the wood-anemone; and, according to Linnæus and Gunner, many obſervations have proved that it cauſes the bloody flux among them.

Sea-ANEMONE. See ANIMAL-*Flower* and SEA-*Anemone*, (*Encycl.*)

ANETHUM. For n° 103. read *Catalogue of Simples*.

ANEURISM. For n° 38. read p. 8416.

ANGELICA. For n° 104. read *The Catalogue of Simples*.

ANGINA PECTORIS. See MEDICINE, n° 70, 480. (*Encycl.*)

ANTIMONIALS. For "*References at Materia* MEDICA, n° 110." read "*See* MATERIA *Medica, The Catalogue of Simples*."

ANTIMONY. For *References*, &c. read "*See* MATERIA MEDICA, *The Catalogue of Simples*."

ANTIQUITIES. Marginal note: For VII. read III.

ANVIL, (*Encycl.*) a ſmith's utenſil, ſerving to place their work on to be hammered or forged. The face or uppermoſt ſurface of the anvil muſt be very flat and ſmooth, without flaws; and ſo hard that a file will not touch it.—At one end is ſometimes a pike, bickern or beak-iron, for the rounding of hollow work. The whole is uſually mounted on a firm wooden block.

APHIS*, (*Encycl.*) Theſe inſects are found in great numbers on the ſtems, leaves, and even roots of many trees and plants. Thoſe trees that are moſt loaded with the inſects, ſuffer greatly from them. The plant-lice thruſt their ſharp-pointed roſtrum into the ſubſtance of the leaf to draw out their ſuſtenance, which warps the ſtems and leaves, and occaſions in the latter cavities underneath, and ſwellings above; nay, even in ſome, a kind of hollow gall filled with inſects, as is often ſeen on elm-leaves.

It appears aſtoniſhing, that the ſlight puncture of ſo ſmall an animal ſhould ſo greatly diſfigure a plant: but it muſt be remembered, that plant-lice always live in numerous aſſociations, which increaſe viſibly by the prodigious fruitfulneſs of thoſe inſects; ſo that altho' each puncture be ſlight, yet the number of them is ſo great, ſo reiterated, that it is no longer a wonder the leaves ſhould be diſfigured. And indeed lovers of gardening and plants ſeek to free and cleanſe their trees from this vermin; but their care often proves unavailing, the inſect is ſo fruitful that it ſoon produces a freſh colony. The beſt and ſureſt method of extirpating it, is to put on the trees infeſted with them ſome larvæ of the plant-louſe-lion, or aphidivorous flies †; for thoſe voracious larvæ deſtroy every day a great number of the inſects, and that with ſo much the more facility, as the latter remain quiet and motionleſs in the neighbourhood of theſe dangerous enemies, who range over heaps of plant-lice, which they gradually waſte and diminiſh.

APIS, (*Encycl.*) See alſo BEE.——P. 515. col. 1. par. 2. for n° 2. read n° 21. And p. 554. col. 1. line 31. for fig. 12. read fig. 17.

APPLE, (*Encycl.*) For *Malus* read *Pyrus*.

The beſt method of preſerving apples for winter uſe, is to let them hang upon the trees until there is danger of froſt, to gather them in dry weather, and then to lay them in large heaps to ſweat for a month or ſix weeks. They ought then to be carefully looked over, all which have the leaſt appearance of decay taken out, the ſound fruit wiped dry, and packed up in large oil jars, which have been thoroughly ſcalded and dry, and then ſtopped cloſe to exclude the air. If this plan is duly obſerved, the fruit will keep a long time ſound, and their fleſh remain plump; whereas, when expoſed to the air, their ſkins will ſhrivel, and their pulp ſoften.

Among the various kinds of apples, ſome are uſed for the deſſert, ſome for the kitchen, and ſome for cyder-making. Thoſe uſed for the deſſert are the following, placed as they ſucceſſively ripen after one another: The white juncating, the margaret apple, the ſummer pearmain, the ſummer queening, the embroidered apple, the golden rennet, the ſummer white calville, the ſummer red calville, the ſilver pippen, the aromatic

* See Plate CCCXIII.

† See *Coccinella*, *Ichneumon*, *Hemerobius*, &c. (APPENDIX.)

aromatic pippen, *la reinette griſe*, *la haute bonte*, the royal ruſſetting. Wheeler's ruſſet, Sharp's ruſſet, the ſpine apple, the golden pippen, the nonpareil, the *l'api* or *pomme d'api*.

Thoſe for the kitchen uſe, in the order of their ripening are theſe: The codling, the ſummer marygold, the ſummer red pearmain, the Holland pippen, the Kentiſh pippen, the courpendu, Loan's pearmain, the French rennet, the French pippen, the royal ruſſet, the monſtrous rennet, the winter pearmain, the *pome violette*, Spencer's pippen, the ſtone pippen, and the oaken pippen.

Thoſe moſt eſteemed for cyder are, the Devonſhire royal wilding, the redſtreak apple, the whitſour, the Herefordſhire under-leaf, and the John apple, or *deux annes*, everlaſting hanger, and gennet moyle.

The apple is compoſed of four diſtinct parts, viz. the pill, the parenchyma, the branchery, and the core. The pill or ſkin is only a dilatation of the outermoſt ſkin or rind of the bark of the branch on which it grew. The parenchyma or pulp, as tender and delicious as it is found, is only a dilatation, or, as Dr Grew calls it, *a ſwelth* or ſuperbience of the inner part of the bark of the branch. This appears not only from the viſible continuation of the bark from the one through the pedicle or ſtalk to the other, but alſo from the ſtructure common to both. The branchery or veſſels, are only ramifications of the woody part of the branch, ſent throughout all the parts of the parenchyma, the greater branches being made to communicate with each other by inoſculations of the leſs.

The apple core is originally from the pith of the branch; the ſap of which finding room enough in the parenchyma through which to diffuſe itſelf, quits the pith, which by this means hardens into core.

The juice of apples is a menſtruum for iron. A ſolution of iron in the juice of the apples called *golden rennets*, evaporated to a thick conſiſtence, proves an elegant chalybeate, which keeps well.

AQUA. For n° 501. read 541.

ARACHIS, (*Encycl.*) See alſo EARTH-*Nut*, (*Encycl.*)

ARBOR VITÆ. See THUYA, (*Encycl.*)

ARCHBISHOP, (*Encycl.*) Archbiſhops were not known in the eaſt till about the year 320; and though there were ſome ſoon after this who had the title, yet that was only a perſonal honour, by which the biſhops of conſiderable cities were diſtinguiſhed. It was not till of late that archbiſhops became metropolitans, and had ſuffragans under them. Athanaſius appears to be the firſt who uſed the title *archbiſhop*, which he gave occaſionally to his predeceſſor; Gregory Nazianzen, in like manner, gave it to Athanaſius; not that either of them were intitled to any juriſdiction, or even any precedence, in virtue of it. Among the Latins, Iſidore Hiſpalenſis is the firſt that ſpeaks of archbiſhops. He diſtinguiſhes four orders or degrees in the eccleſiaſtical hierarchy, viz. patriarchs, archbiſhops, metropolitans, and biſhops.

The archbiſhop, beſide the inſpection of the biſhops and inferior clergy in the province over which he preſides, exerciſes epiſcopal juriſdiction in his own dioceſe. He is guardian of the ſpiritualities of any vacant ſee in his province, as the king is of the temporalities; and exerciſes eccleſiaſtical juriſdiction in it. He is intitled to preſent by lapſe to all the eccleſiaſtical livings in the diſpoſal of his dioceſan biſhop, if not filled within ſix months. He has likewiſe a cuſtomary prerogative, upon conſecrating a biſhop, to name a clerk or chaplain to be provided for by ſuch biſhop; in lieu of which it is now uſual to accept an option. He is ſaid to be enthroned when veſted in the archbiſhopric; whereas biſhops are ſaid to be inſtalled.

The archbiſhop of Canterbury had anciently, viz. till the year 1152, juriſdiction over Ireland as well as England, and was ſtyled a *patriarch*, and ſometimes *alterius orbis papa*, and *orbis Britannici pontifex*. Matters were done and recorded in his name thus, *Anno pontificatus noſtri primo*, &c. The firſt archbiſhop of Canterbury was Auſtin, appointed by king Ethelbert, on his converſion to Chriſtianity, about the year 598. He was alſo *legatus natus*. He even enjoyed ſome ſpecial marks of royalty; as, to be patron of a biſhoprick, which he was of Rocheſter; and to make knights, coin moneys, &c. He is ſtill the firſt peer of England, and the next to the royal family; having precedence of all dukes and all great officers of the crown. It is his privilege, by cuſtom, to crown the kings and queens of this kingdom. He may retain and qualify eight chaplains; whereas a duke is by ſtatute allowed only ſix. He has, by common law, the power of probate of wills and teſtaments, and granting letters of adminiſtration. He has alſo a power to grant licences and diſpenſations in all caſes formerly ſued for in the court of Rome, and not repugnant to the law of God. He accordingly iſſues ſpecial licences to marry, to hold two livings, &c. and he exerciſes the right of conferring degrees. He alſo holds ſeveral courts of judicature; as, court of arches, court of audience, prerogative court, and court of peculiars.

The archbiſhop of York has the like rights in his province as the archbiſhop of Canterbury. He has precedence of all dukes not of the royal blood; and of all officers of ſtate, except the lord high chancellor. He has alſo the rights of a count palatine over Hexamſhire. The firſt archbiſhop of York was Paulinus, appointed by Pope Gregory about the year 622. He had formerly juriſdiction over all the biſhops of Scotland; but in the year 1470, pope Sextus IV. created the biſhop of St Andrew's archbiſhop and metropolitan of all Scotland.

ARCTIUM. For "*References at Materia Medica*," read "MATERIA MEDICA, *Catalogue of Simples*."

AREIA, (*Encycl.*) There is another ſpecies; the holeracea, which is the true cabbage palm.

ARGENTUM VIVUM. For *References at Materia Medica*, read "MATERIA MEDICA, *Catalogue of Simples*."

ARGONAUTIC EXPEDITION. See THESSALY, (*Encycl.*) This celebrated voyage, which is the firſt epoch in the Grecian hiſtory upon which any ſtreſs can be laid, was undertaken, according to Archbiſhop Uſher and the authors of the Univerſal Hiſtory, 1280 B. C. Dr Blair places it 1263; and Sir Iſaac Newton and Dr Prieſtley 936 years before the ſame period; but all chronologers agree in fixing this enterprize near a century before the Trojan war.

Dr Bryant rejects the hiſtory of the Argonautic expedition as a Grecian fable, founded indeed on a tradition

Arillus, Armſtrong.

dition derived from Egypt, and ultimately referring to Noah's preſervation, &c. in the ark.

ARILLUS, an improper term invented by Linnæus, and defined to be the proper exterior coat or covering of the ſeed, which falls off ſpontaneouſly.

All ſeeds are not furniſhed with an arillus; in many, a dry covering, or ſcarf-ſkin, ſupplies its place. In Jeſſamy; hound's tongue, *cynogloſſum;* cucumber; fraxinella, *dictamnus;* ſtaff-tree, *celaſtrus;* ſpindle-tree, *euonymus;* African ſpiræa, *dioſma;* and the coffee-tree, *coffea;* it is very conſpicuous.

In the genus hound's tongue, four of theſe arilli, or proper coats, each infolding a ſingle ſeed, are affixed to the ſtyle or pointal; and in this circumſtance, ſays Linnæus, does the eſſence of the genus conſiſt. In fraxinella, the arillus is common to two ſeeds. The ſtaff-tree has its ſeeds only half involved with this cover.

The arillus is either

Baccatus, ſucculent, and of the nature of a berry; as in the ſpindle tree, *euonymus.*

Cartilagineus, cartilaginous, or griſtly; as in the African ſpiræa, *dioſma.*

Coloratus, coloured; as in the ſtaff-tree.

Elaſticus, endued with elaſticity, for diſperſing the ſeeds; as is remarkable in the African ſpiræa, *dioſma*, and fraxinella.

Scaber, rough and knotty; as in hound's-tongue.

Although covered with an arillus, or other dry coat, ſeeds are ſaid to be naked (*ſemina nuda*), when they are not incloſed in any ſpecies of pericarpium or fruit-veſſel; as in the graſſes, and the *labiati* or lipped flowers of Tournefort, which correſpond to the *Didynamia Gymnoſpermia* of Linnæus.

Seeds are ſaid to be covered (*ſemina tecta*) when they are contained in a fruit-veſſel, whether capſule, pod, or pulpy pericarpium, of the apple, berry, or cherry kind. See SEMEN, (*Encycl.*)

This exterior coat of the ſeed is, by ſome former writers, ſtyled *Calyptra*. See CALYPTRA, (*Encycl.*)

The different ſkins or coverings of the ſeed, are adapted, ſay naturaliſts, for receiving the nutritive juices, and tranſmitting them within.

ARMSTRONG, (Dr John), an eminent phyſician, poet, and miſcellaneous writer, was born in Caſtleton pariſh, Roxburghſhire, where his father and brother were miniſters; completed his education in the univerſity of Edinburgh, where he took his degree in phyſic, Feb. 4. 1732, with much reputation; and publiſhed his theſis, as the forms of that univerſity require; the ſubject was *De tabe purulenta*. In 1735 he publiſhed a little humourous fugitive pamphlet in 8vo, entitled, *An Eſſay for abridging the Study of Phyſic; to which is added a Dialogue betwixt Hygeia, Mercury, and Pluto, relating to the Practice of Phyſic, as it is managed by a certain illuſtrious Society. As alſo an Epiſtle from Uſbek the Perſian to Joſhua Ward, Eſq.* This piece contains much fun and drollery; in the dialogue, he has caught the very ſpirit of Lucian. In 1737 he publiſhed A Synopſis of the Hiſtory and Cure of the Venereal Diſeaſes, 8vo. This was ſoon followed by the *Oeconomy of Love:* a poem which has much merit; but, it muſt be confeſſed, is too ſtrongly tinctured with the licentiouſneſs of Ovid. It is ſaid, however, that his maturer judgment expunged many of the luxuriances of youthful fancy, in an edition "reviſed and corrected by the author" in 1768. It appears by one of the caſes on literary property, that Mr Millar paid 50 guinea for the copy-right of this poem, which was intended as a burleſque on ſome dictatic writers. It has been obſerved of Dr Armſtrong, that his works have great inequalities, ſome of them being poſſeſſed of every requiſite to be ſought after in the moſt perfect compoſition, while others can hardly be conſidered as ſuperior to the productions of mediocrity. The *Art of preſerving Health*, his beſt performance, which was publiſhed in 1744, will tranſmit his name to poſterity as one of the firſt Engliſh writers, has been honoured with the following teſtimony of a reſpectable critic. On this work we ſhall alſo tranſcribe a beautiful elogium from an eminent phyſician *: "Of all the poetical performances on this ſubject that have come to my hands, Dr Armſtrong's Art of preſerving Health is by far the beſt. To quote every charming deſcription and beautiful paſſage of this poem, one muſt tranſcribe the whole. We cannot, however, expect new rules, where the principal deſign was to raiſe and warm the heart into a compliance with the ſolid precepts of the ancients, which he has enforced with great ſtrength and elegance. And, upon the whole, he has convinced us, by his own example, that we ought not to blame antiquity for acknowledging

> One power of phyſic, melody, and ſong."

Armſtrong.

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ARILLUS, an improper term invented by Linnæus, and defined to be the proper exterior coat or covering of the ſeed, which falls off ſpontaneouſly.

All ſeeds are not furniſhed with an arillus; in many, a dry covering, or ſcarf-ſkin, ſupplies its place. In Jeſſamy; hound's tongue, *cynogloſſum;* cucumber; fraxinella, *dictamnus;* ſtaff-tree, *celaſtrus;* ſpindle-tree, *euonymus;* African ſpiræa, *dioſma;* and the coffee-tree, *coffea;* it is very conſpicuous.

In the genus hound's tongue, four of theſe arilli, or proper coats, each infolding a ſingle ſeed, are affixed to the ſtyle or pointal; and in this circumſtance, ſays Linnæus, does the eſſence of the genus conſiſt. In fraxinella, the arillus is common to two ſeeds. The ſtaff-tree has its ſeeds only half involved with this cover.

The arillus is either

Baccatus, ſucculent, and of the nature of a berry; as in the ſpindle tree, *euonymus.*

Cartilagineus, cartilaginous, or griſtly; as in the African ſpiræa, *dioſma.*

Coloratus, coloured; as in the ſtaff-tree.

Elaſticus, endued with elaſticity, for diſperſing the ſeeds; as is remarkable in the African ſpiræa, *dioſma,* and fraxinella.

Scaber, rough and knotty; as in hound's-tongue.

Although covered with an arillus, or other dry coat, ſeeds are ſaid to be naked (*ſemina nuda*), when they are not incloſed in any ſpecies of pericarpium or fruit-veſſel; as in the graſſes, and the *labiati* or lipped flowers of Tournefort, which correſpond to the *Didynamia Gymnoſpermia* of Linnæus.

Seeds are ſaid to be covered (*ſemina tecta*) when they are contained in a fruit-veſſel, whether capſule, pod, or pulpy pericarpium, of the apple, berry, or cherry kind. See SEMEN, (*Encycl.*)

This exterior coat of the ſeed is, by ſome former writers, ſtyled *Calyptra.* See CALYPTRA, (*Encycl.*)

The different ſkins or coverings of the ſeed, are adapted, ſay naturaliſts, for receiving the nutritive juices, and tranſmitting them within.

ARMSTRONG, (Dr John), an eminent phyſician, poet, and miſcellaneous writer, was born in Caſtleton pariſh, Roxburghſhire, where his father and brother were miniſters; completed his education in the univerſity of Edinburgh, where he took his degree in phyſic, Feb. 4. 1732, with much reputation; and publiſhed his theſis, as the forms of that univerſity require; the ſubject was *De tabe purulenta.* In 1735 he publiſhed a little humourous fugitive pamphlet in 8vo, entitled, *An Eſſay for abridging the Study of Phyſic; to which is added a Dialogue betwixt Hygeia, Mercury, and Pluto, relating to the Practice of Phyſic, as it is managed by a certain illuſtrious Society. As alſo an Epiſtle from Uſbek the Perſian to Joſhua Ward, Eſq.* This piece contains much fun and drollery; in the dialogue, he has caught the very ſpirit of Lucian. In 1737 he publiſhed A Synopſis of the Hiſtory and Cure of the Venereal Diſeaſes, 8vo. This was ſoon followed by the *Oeconomy of Love:* a poem which has much merit; but, it muſt be confeſſed, is too ſtrongly tinctured with the licentiouſneſs of Ovid. It is ſaid, however, that his maturer judgment expunged many of the luxuriances of youthful fancy, in an edition "reviſed and corrected by the author" in 1768. It appears by one of the caſes on literary property, that Mr Millar paid 50 guinea for the copy-right of this poem, which was intended as a burleſque on ſome didactic writers. It has been obſerved of Dr Armſtrong, that his works have great inequalities, ſome of them being poſſeſſed of every requiſite to be ſought after in the moſt perfect compoſition, while others can hardly be conſidered as ſuperior to the productions of mediocrity. The *Art of preſerving Health,* his beſt performance, which was publiſhed in 1744, will tranſmit his name to poſterity as one of the firſt Engliſh writers, has been honoured with the following teſtimony of a reſpectable critic. On this work we ſhall alſo tranſcribe a beautiful elogium from an eminent phyſician *: "Of all the poetical performances on this ſubject that have come to my hands, Dr Armſtrong's Art of preſerving Health is by far the beſt. To quote every charming deſcription and beautiful paſſage of this poem, one muſt tranſcribe the whole. We cannot, however, expect new rules, where the principal deſign was to raiſe and warm the heart into a compliance with the ſolid precepts of the ancients, which he has enforced with great ſtrength and elegance. And, upon the whole, he has convinced us, by his own example, that we ought not to blame antiquity for acknowledging

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The Doctor in the ſame paper tranſcribes a journal of experiments, ſhowing the degree of purity of the atmoſphere in various places, and under different circumſtances; which we ſhall inſert here in an abridged manner, thinking it of great uſe to other experimentators.

The method uſed in thoſe experiments, was to introduce one meaſure of common air into the eudiometer-tube, and then one meaſure of nitrous air. The moment that theſe two ſorts of elaſtic fluids came into contact, he agitated the tube in the water-trough, and then meaſured the diminution, expreſſing it by hundredth parts of a meaſure; thus, when he ſays that ſuch air was found to be 130, it ſignifies, that after mixing one meaſure of it with one of nitrous air, the whole mixed and diminiſhed quantity was 130 hundredths of a meaſure, viz. one meaſure and 30 hundredths of a meaſure more.

" The different degrees of ſalubrity of the atmoſphere, as I found it in general in my country-houſe at Southall Green, ten miles from London, from June to September, lay between 103 and 109.

" I was ſurpriſed, when upon my return to town to my former lodgings in Pall-Mall Court, I found the common air purer in general in October, than I uſed to find it in the middle of ſummer in the country; for on the 22d of October, at nine o'clock in the morning, the weather being fair and froſty, I found that one meaſure of common air, and one of nitrous air, occupied 100 ſubdiviſions in the glaſs tube, or exactly one meaſure. That very day, at two o'clock in the afternoon (it being then rainy weather), the air was ſomewhat altered for the worſe. It gave 102.

" October the 23d, it being rainy weather, the air gave 102.

" October the 24th, the weather being ſerene, the air at nine o'clock in the morning gave 100.

" October the 25th, the ſky being cloudy at 11 o'clock in the morning, the air gave 102. At 11 o'clock at night, from five different trials, it gave 105.

" October the 26th, the weather being very dark and rainy, the air gave 105, as before."

The air at Oſtend was found by the Doctor to be generally very good, giving between 94 and 98.

At Bruges, the air taken at ſeven o'clock at night gave 103.

November the 8th, the air at Ghent at three in the afternoon gave 103.

November the 12th, the air of Bruſſels at ſeven o'clock P. M. gave 105½.

The next day the air of the lower part of the ſame city gave 106; that of the higheſt appeared to be purer, as it gave 104; which agrees with the common popular obſervation. November the 14th, both the air of the higheſt and that of the loweſt part of the city appeared to be of the ſame goodneſs, giving 103. The weather was froſty.

November the 22d, the air of Antwerp in the evening gave 109½; the weather being rainy, damp, and cold.

November the 23d, the air of Breda gave 106. The next day about 11 o'clock the air gave 102; the weather being fair, cold, and inclining to froſt. At ſeven o'clock it gave 103. Next day, being the 25th, the air gave 104; the weather being cold and rainy. The 26th it gave 103; the weather being very rainy, cold, and ſtormy.

November the 27th, the air at the Moordyke cloſe to the water gave 101½, the weather being fair and cold, but not froſty. This ſpot is reckoned very healthy.

November the 28th, the air of Rotterdam gave 103; the weather being rainy and cold.

November the 29th, the air of Delpht gave 103; the weather being ſtormy and rainy.

November the 30th, the air of the Hague gave 104; the weather being cold, and the wind northerly. The firſt of December the weather underwent a ſudden change; the wind becoming ſoutherly and ſtormy, and the atmoſphere becoming very hot. The day after, Fahrenheit's thermometer ſtood at 54°; and the common air being repeatedly and accurately tried gave 116; and that preſerved in a glaſs phial from the preceding day gave 117; and that gathered cloſe to the ſea gave 115.

December the 4th, the air of Amſterdam gave 103; the weather being rainy, windy, and cold. The day after, the weather continuing nearly the ſame, the air gave 102.

December the 10th, the air of Rotterdam gave 101; the weather being rainy.

December the 12th, being in the middle of the water between Dort and the Moordyke, the air gave 109; the weather being remarkably dark, rainy, and windy.

December the 13th, the air of Breda in the morning gave 109; the weather continuing as the day before, And in the afternoon, the air gave 106½; the weather having cleared up.

December the 16th, the air of the lower part of the city of Antwerp gave 105; that of the higher part, 104; the weather being rainy and temperate.

December the 17th, the air of Antwerp gave 107; the weather continuing nearly as in the preceding day.

December the 19th, the air of Bruſſels gave 109; the weather being rainy, windy, and rather warm.

December the 21ſt, the air of Bruſſels gave 106; the weather being dry and cold. The next day the air and weather continued the ſame.

December the 23d, the air of Mons gave 104; the weather being rainy and cold.

December the 24th, the air near Bouchain gave 104½; the weather being cloudy and cold.

December the 25th, the air of Peronne gave 102½; the weather being froſty.

December the 26th, the air of Cuvilli gave 103; the weather froſty.

December the 27th, the air of Senlis gave 102½; the weather froſty.

December the 29th, the air of Paris gave 103; the weather froſty.

1780. January the 8th, the air of Paris gave 100; the weather froſty.

January the 13th, the air of Paris gave 98; hard froſt.

Thus far with Dr Ingenhouſz's obſervations. His apparatus was a very portable one, made by Mr Martin, which in reality is the eudiometer-tube and meaſure as uſed by Mr Fontana, before he made his laſt improvement. " The whole of this apparatus (ſays Dr Ingenhouſz) was packed up in a box about ten inches long, five broad, and three and a half high. The glaſs tube or great meaſure, which was 16 inches long, and divided in two ſeparate pieces, lay in a ſmall compaſs, and could be put together by braſs ſcrews, adapted to the divided extremities. Inſtead of a water-trough, ſuch as is uſed commonly, I made uſe of a ſmall round wooden tub, &c."

The abbe Fontana, who has made a great number of very accurate experiments upon this ſubject, gives his opinion in the following words. "I have not the leaſt heſitation in aſſerting, that the experiments made to aſcertain the ſalubrity of the atmoſpherical air in various places in different countries and ſituations, mentioned by ſeveral authors, are not to be depended upon; becauſe the method they uſed was far from being exact (A), the elements or ingredients for the experiment were unknown and uncertain, and the reſults very different from one another.

"When all the errors are corrected, it will be found that the difference between the air of one country and that of another, at different times, is much leſs than what is commonly believed; and that the great differences found by various obſervers are owing to the fallacious effects of uncertain methods. This I advance from experience; for I was in the ſame error. I found very great differences between the reſults of the experiments of this nature which ought to have been ſimilar; which diverſities I attributed to myſelf, rather than to the method I then uſed. At Paris I examined the air of different places at the ſame time, and eſpecially of thoſe ſituations where it was moſt probable to meet with infected air, becauſe thoſe places abounded with putrid ſubſtances and impure exhalations; but the differences I obſerved were very ſmall, and much leſs than what could have been ſuſpected, for they hardly arrived to one fiftieth of the air in the tube. Having taken the air of the hill called *Mount Valerian*, at the height of about 500 feet above the level of Paris, and compared it with the air of Paris taken at the ſame time, and treated alike, I found the former to be hardly one thirtieth better than the latter.

"In London I have obſerved almoſt the ſame. The air of Iſlington and that of London ſuffered an equal diminution by the mixture of nitrous air; yet the air of Iſlington is eſteemed to be much better. I have examined the air of London taken at different heights, (for inſtance, in the ſtreet, at the ſecond floor, and at the top of the adjoining houſes), and have found it to be of the ſame quality. Having taken the air at the iron gallery of St Paul's cupola, at the height of 313 feet above the ground, and likewiſe the air of the ſtone gallery, which is 202 feet below the other; and having compared theſe two quantities of air with that of the ſtreet adjoining, I found that there was ſcarce any ſenſible difference between them, although taken at ſuch different heights.

"In this experiment a circumſtance is to be conſidered, which muſt have contributed to render the abovementioned differences more ſenſible: this is, the agitation of the air of the cupola; for there was felt a pretty briſk wind upon it, which I obſerved to be ſtronger and ſtronger the higher I aſcended; whereas in the ſtreet, and indeed in all the ſtreets I paſſed through, there was no ſenſible wind to be felt. This experiment was made at four in the afternoon, the weather being clear. The quickſilver in the barometer at that time was 28,6 inches high, and Fahrenheit's thermometer ſtood at 54°."

A few lines after, Mr Fontana proceeds thus:— "From this we clearly ſee, how little the experiments hitherto publiſhed about the differences of common air are to be depended upon. In general, I find that the air changes from one time to another; ſo that the differences between them are far greater than thoſe of the airs of different countries, or different heights; for inſtance, I have found that the air of London in the months of September, October, and November, 1778, when treated with the nitrous air, gave II,I, 1,90, and II,II, 2,25, which is a mean reſult of many experiments, which differed very little from each other. The 26th day of November laſt, I found the air for the firſt time much better, for it gave II,I, 1,80, and II,II, 2,20; but the 14th of February, 1779, the air gave II,I, 1,69, and II,II, 2,21; from whence it appears, that the air of this 14th of February was better than it had been for ſix months before.

"There can be no doubt of the accuracy of the experiments, becauſe I compared the air taken at different times with that which I had firſt uſed in the month of September, and which I had preſerved in dry glaſs-bottles accurately ſtopped."

This difference in the purity of the air at different times, Mr Fontana farther remarks, is much greater than the difference between the air of the different places obſerved by him; notwithſtanding this great change, as he obſerved, and as he was informed by various perſons, no particular change of health in the generality of people, or facility of breathing, was perceived.

Mr Fontana laſtly concludes with obſerving, that "Nature is not ſo partial as we commonly believe. She has not only given us an air almoſt equally good every where, at every time, but has allowed us a certain latitude, or a power of living and being in health in qualities of air which differ to a certain degree. By this I do not mean to deny the exiſtence of certain kinds of noxious air in ſome particular places; but only ſay, that, in general, the air is good every where, and that the ſmall differences are not to be feared ſo much as ſome people would make us believe. Nor do I mean to ſpeak here of thoſe vapours and other bodies which are accidentally joined to the common air in particular places, but do not change its nature and intrinſical property. This ſtate of the air cannot be known by the teſt of nitrous air; and thoſe vapours are to be conſidered in the ſame manner as we ſhould conſider ſo many particles of arſenic ſwimming in the atmoſphere. In this caſe it is the arſenic, and not the degenerated air, that would kill the animals who ventured to breathe it."

ATTACHMENTS, Court *of*. See Forest *Courts*, (*Encycl.*)

ATROPA, (*Encycl.*) For a remedy againſt the poiſon, ſee the article Nightshade, (*Encycl.*)

AVIGATO, or Avocado *Pear*. See the next article.

(A) It is plain that Dr Ingenhouſz's method is not implied in this remark; ſince the Doctor's experiments were made long after, and the method uſed by him was properly that of Mr Fontana.

Avocato.

AVOCATO-PEAR *Tree*, or *Laurus Perſea*; a ſpecies omitted to be deſcribed under the article LAURUS, (*Encycl.*)

It is a native of the Weſt Indies. In form and thickneſs the fruit reſembles a pear. The pulpy and fleſhy part is of a pale green, with little or no conſiſtence when ripe, and melts in the mouth like marrow, which it greatly reſembles in taſte. The ſkin is ſmooth and thin, but of a ſtrong tough ſubſtance, and of a beautiful green colour, which does not become yellow till the fruit is perfectly ripe. The fruit, by reaſon of its ſoftneſs, may be eaten out of the ſurrounding ſkin with a tea-ſpoon, like jelly and marmalade. It is frequently ſerved up in the Weſt Indies on a plate, with ſugar, roſe-water, and orange-flowers; moſt commonly, however, it is mixed with ſugar and the juice of limes, which render it extremely palatable.

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In the middle of the pulpy part of the fruit lies the nut or ſeed, which is very large, almoſt round, of a pale ruſſet colour, a little wrinkled, contains no kernel within it, and whoſe degree of hardneſs does not exceed that of a cheſnut diveſted of its ſkin. This nut, about an hour after it is ſeparated from the fruit, ſplits of itſelf into two or three pieces. If committed to the ground in this ſtate, no vegetation enſues, becauſe the embryo of the ſeed is broken; ſo that ſuch as would propagate theſe plants from ſeed muſt ſow the nuts the moment they are taken out of the pulp, in which caſe they will begin to germinate in eight or ten days after.

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AURORA, one of the New Hebrides iſlands in the South Sea, in which Mr Foſter ſuppoſes the *Peak d'Etoile* mentioned by Mr Bougainville to be ſituated. The iſland is inhabited; but none of its inhabitants came off to viſit captain Cook. The country is woody, and the vegetation ſeemed to be exceſſively luxuriant. It is about 12 leagues long, but not above five miles broad in any part; lying nearly north and ſouth. The middle lies in S. Lat. 15. 6. E. Long. 168. 24.

AURUM FULMINANS, (*Encycl.*) See *Fulminating* GOLD.—It has been thought that this ſubſtance, which explodes with an aſtoniſhing violence, and makes a very ſharp report, would produce a far greater effect than gun-powder, if it were cheap enough to be uſed as a ſubſtitute for fire-arms. But repeated experiments have ſhown, that when fulminating gold is confined in the barrel of a piſtol, in a hollow iron ball, or the like, its effects are much inferior to thoſe of gun-powder; and the reaſon is, becauſe fulminating gold produces an incomparably leſs quantity of elaſtic fluid than gun-powder does. The ſurpriſing effects produced by it when fulminating in the open air, according to Mr Cavallo, muſt be owing to the ſudden generation of the elaſtic fluid, and not to the quantity of it produced. Bergman ſays, that the elaſtic fluid generated by fulminating gold is ſcarcely equal to four times the bulk of the fulminating gold. He alſo ſays, that half a drachm of fulminating gold, fired in a cloſe veſſel, makes a report hardly audible; and that the elaſtic fluid it generates, extinguiſhes flame, is noxious to animals, is not abſorbed by water, nor renders lime-water turbid.—Theſe are the characteriſtic properties of phlogiſticated air.

B.

BACHELOR, (*Encycl.*) See alſo BATCHELOR, (*Encycl.*)

Knights BACHELOR. See *Knights* BATCHELOR, (*Encycl.*)

BACTRIA. Marginal note, for *Khoraſan* read *Choraſan.*

BALDNESS, (*Encycl.*) See alſo ALOPECIA (*Appendix*).

BALSAM-APPLE, See MOMORDICA, (*Encycl.*)

BAMBOO. See ARUNDO and BAMBOO, (*Encycl.*) This tree, the ily or ilii of the Hortus Malabaricus, grows naturally in ſandy places, and on the banks of rivers in both Indies; where it frequently attains a height exceeding even that of the cocoa-tree. The root is not very different from the ſtem, unleſs that it is of a whitiſh colour, and conſiſts of ſeveral radicles or fibres. From the joints of the main root are emitted ſmall jointed ſtalks, which again emit others from their joints; and from theſe, as from ſo many new roots, ariſe ſeveral ſtalks joined together; which being planted with their radicles or ſtring-roots, ſerve to perpetuate the ſpecies. Theſe ſtalks are round, have a green bark; are hard, emit from the joints new branches and twigs, and are armed in the joints themſelves with one, two, or more, rigid and acute thorns of an oblong figure. It is to be obſerved, however, that the ſtalks in queſtion, ariſing, as we have ſaid, immediately from the root, have attained in their native ſoil the height of two or three men, and the thickneſs of almoſt a ſpan, before they ſend forth any lateral branches. Theſe, when young and tender, are nearly ſolid, pervious only in the middle by a ſmall tube

Bamboo.

tube. The older ſtalks and branches are hollow within, being ſhut, however, at the joints with a woody partition, and covered internally with a ſlender whitiſh membrane that is compoſed of hard white woody filaments. The colour of the ſtalks, when young, is a browniſh green; when older, a ſhining yellow, with a ſhade of white. The leaves are long, narrow, ſeated on ſhort footſtalks, ſtreaked with longitudinal veins, and rough on the edges if rubbed downwards. The flowers grow in long ſcaly ſpikes, which proceed in great numbers from the joints of the ſtalks. Rheede mentions a tradition prevailing on the coaſt of Malabar, that the bamboo vegetates till its 60th year; at which period of its growth, and nearly a month before the flowers emerge from their ſcaly covers, the tree is diveſted of all its leaves; and after it has ceaſed to flower, immediately dies. This tree or reed is termed by the inhabitants of Ceylon, *unaghas*, that is, "fever-tree," from an opinion generally entertained in that iſland, that a fever is the certain conſequence of bathing in any river into which the flowers or leaves of the bamboo have fallen. By the Arabians it is named *tabaxir;* as is likewiſe a milky humour or ſugar produced in it. The Indians call it *mambu;* whence vulgarly, and by corruption, its European name of *bambu* or *bamboo*. In the iſland of Madagaſcar, and particularly in the province of Galemboulou, by the teſtimony of Flacourt, it is produced in ſuch abundance as to give name to the province, for in thoſe parts it is termed *voulu*. The ſize of this tree in India is generally ſo great, that houſes are built of it. In the porch of the academical garden at Leyden are ſuſpended ſome fragments, a preſent of the celebrated Piſo, the largeſt of which exceeds 28, the leaſt 26, feet in length. That they muſt, however, have been double that ſize before they were broken off, appears probable from this circumſtance, that the thickneſs of one extremity ſcarce differs from that of the other. It is likewiſe wonderful that ſo immenſe a reed ſhould be clothed with ſo very ſmall leaves; the largeſt of the dried ones in the collection of Profeſſor Syens at Leyden, mentioned by Rheede in his Hortus Malabaricus, ſcarcely exceeding a ſpan in length, or the breadth of a finger in width. The ſtalks, when old, are entirely covered in the cavity with a ſort of calx, which is eſteemed uſeful in the ſtrangury, and to ſuch as are troubled with purulent urine. Bamboo being burnt, affords very fertile aſhes, in which plants of all kinds thrive remarkably. Whilſt burning, the ſtalks emit a very loud exploſion; the air contained in their cavity being rarefied by the heat, and deſiring a larger ſpace, breaks thro' the partitions at the joints, and violently ſeeks a paſſage whereby to eſcape. Kempfer relates, in the Amœnitates Exoticæ, that in a province of Japan called *Oomi*, which has a ſlimy bottom, the roots of bamboo luxuriate with ſuch wonderful beauty, that, being dug out of the ground and diſentangled from the ſtrings which encompaſs them, they ſerve, as the ſtalks with us, for walking-ſticks, commonly called *rotang*. From this curious reed ſeveral conveniences are obtained beſides thoſe which have been mentioned. The reader is referred for a more minute detail, to the Mantiſſa Aromatica of Piſo; where, beſides a very accurate deſcription of the tabaxir or ſugar mentioned above, he will alſo learn, that the tender branches or twigs, particularly thoſe near the root, being macerated in ſalt and vinegar, afford, with the addition of garlic and the pods of capſicum, a ſort of pickle, which is eſteemed excellent, and conſtitutes not the leaſt valuable part of thoſe famous condita commonly termed *achar* and *atsjaar*, and well known in Europe for exciting the appetite and promoting digeſtion.

Bamff, Banditti.

BAMFF, (*Encycl.*) By miſtake, this place was ſaid to have no harbour. The following account is given by Mr Pennant: "It is pleaſantly ſituated on the ſide of a hill; has ſeveral ſtreets; and that with the town-houſe in it, adorned with a new ſpire, is very handſome. This place was erected into a borough by virtue of a charter from Robert II. dated October 7. 1372, endowing it with the ſame privileges, and putting it on the ſame footing with the burgh of Aberdeen; but tradition ſays it was founded in the reign of Malcolm Canmore. The harbour is very bad, as the entrance at the mouth of the Devron is very uncertain, being often ſtopped by the ſhifting of the ſands, which are continually changing in great ſtorms; the pier is therefore placed on the outſide. Much ſalmon is exported from hence. About Troophead ſome kelp is made; and the adventurers pay the lord of the manor 50 l. *per annum* for the liberty of collecting the materials."

BANDITTI, (*Encycl.*) from the Italian *bandito;* perſons proſcribed, or, as we call it, outlawed: ſometimes denominated *banniti* or *foris-banniti*. It is alſo a denomination given to highwaymen or robbers who infeſt the roads in troops, eſpecially in Italy, France, and Sicily. Mr Brydone, in his Tour through Sicily, informs us, that in the eaſtern part, called *Val Demoni*, from the devils that are ſuppoſed to inhabit Mount Ætna, it has ever been found altogether impracticable to extirpate the banditti; there being numberleſs caverns and ſubterraneous paſſages round that mountain, where no troops could poſſibly purſue them: beſides, they are known to be perfectly determined and reſolute, never failing to take a dreadful revenge on all who have offended them. Hence the prince of Villa Franca has embraced it, not only as the ſafeſt, but likewiſe as the wiſeſt and moſt political ſcheme, to become their declared patron and protector: and ſuch of them as think proper to leave their mountains and foreſts, though perhaps only for a time, are ſure to meet with good encouragement and a certain protection in his ſervice, where they enjoy the moſt unbounded confidence, which, in no inſtance, they have ever yet been found to make an improper or a diſhoneſt uſe of. They are clothed in the prince's livery, yellow and green, with ſilver lace; and wear likewiſe a badge of their honourable order, which entitles them to univerſal fear and reſpect from the people.

In ſome circumſtances, theſe banditti are the moſt reſpectable people of the iſland, and have by much the higheſt and moſt romantic notions of what they call their point of honour. However criminal they may be with regard to ſociety in general; yet, with reſpect to one another, and to every perſon to whom they have once profeſſed it, they have ever maintained the moſt unſhaken fidelity. The magiſtrates have often been obliged to protect them, and pay them in court, as they are known to be perfectly determined and deſperate, and ſo extremely vindictive, that they

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Aurora, Aurum.

AURORA, one of the New Hebrides iſlands in the South Sea, in which Mr Foſter ſuppoſes the *Peak d'Etoile* mentioned by Mr Bougainville to be ſituated. The iſland is inhabited; but none of its inhabitants came off to viſit captain Cook. The country is woody, and the vegetation ſeemed to be exceſſively luxuriant. It is about 12 leagues long, but not above five miles broad in any part; lying nearly north and ſouth. The middle lies in S. Lat. 15. 6. E. Long. 168. 24.

AURUM fulminans, (*Encycl.*) See *Fulminating* Gold.—It has been thought that this ſubſtance, which explodes with an aſtoniſhing violence, and makes a very ſharp report, would produce a far greater effect than gun-powder, if it were cheap enough to be uſed as a ſubſtitute for fire-arms. But repeated experiments have ſhown, that when fulminating gold is confined in the barrel of a piſtol, in a hollow iron ball, or the like, its effects are much inferior to thoſe of gun-powder; and the reaſon is, becauſe fulminating gold produces an incomparably leſs quantity of elaſtic fluid than gun-powder does. The ſurpriſing effects produced by it when fulminating in the open air, according to Mr Cavallo, muſt be owing to the ſudden generation of the elaſtic fluid, and not to the quantity of it produced. Bergman ſays, that the elaſtic fluid generated by fulminating gold is ſcarcely equal to four times the bulk of the fulminating gold. He alſo ſays, that half a drachm of fulminating gold, fired in a cloſe veſſel, makes a report hardly audible; and that the elaſtic fluid it generates, extinguiſhes flame, is noxious to animals, is not abſorbed by water, nor renders lime-water turbid.—Theſe are the characteriſtic properties of phlogiſticated air.

B.

BACHELOR, (*Encycl.*) See alſo Batchelor, (*Encycl.*)

Knights Bachelor. See *Knights* Batchelor, (*Encycl.*)

BACTRIA. Marginal note, for *Khoraſan* read *Choraſan.*

BALDNESS, (*Encycl.*) See alſo Alopecia (*Appendix*).

BALSAM-apple, See Momordica, (*Encycl.*)

BAMBOO. See Arundo and Bamboo, (*Encycl.*) This tree, the ily or ilii of the Hortus Malabaricus, grows naturally in ſandy places, and on the banks of rivers in both Indies; where it frequently attains a height exceeding even that of the cocoa-tree. The root is not very different from the ſtem, unleſs that it is of a whitiſh colour, and conſiſts of ſeveral radicles or fibres. From the joints of the main root are emitted ſmall jointed ſtalks, which again emit others from their joints; and from theſe, as from ſo many new roots, ariſe ſeveral ſtalks joined together; which being planted with their radicles or ſtring-roots, ſerve to perpetuate the ſpecies. Theſe ſtalks are round, have a green bark; are hard, emit from the joints new branches and twigs, and are armed in the joints themſelves with one, two, or more, rigid and acute thorns of an oblong figure. It is to be obſerved, however, that the ſtalks in queſtion, ariſing, as we have ſaid, immediately from the root, have attained in their native ſoil the height of two or three men, and the thickneſs of almoſt a ſpan, before they ſend forth any lateral branches. Theſe, when young and tender, are nearly ſolid, pervious only in the middle by a ſmall tube. The older ſtalks and branches are hollow within, being ſhut, however, at the joints with a woody partition, and covered internally with a ſlender whitiſh membrane that is compoſed of hard white woody filaments. The colour of the ſtalks, when young, is a browniſh green; when older, a ſhining yellow, with a ſhade of white. The leaves are long, narrow, ſeated on ſhort footſtalks, ſtreaked with longitudinal veins, and rough on the edges if rubbed downwards. The flowers grow in long ſcaly ſpikes, which proceed in great numbers from the joints of the ſtalks. Rheede mentions a tradition prevailing on the coaſt of Malabar, that the bamboo vegetates till its 60th year; at which period of its growth, and nearly a month before the flowers emerge from their ſcaly covers, the tree is diveſted of all its leaves; and after it has ceaſed to flower, immediately dies. This tree or reed is termed by the inhabitants of Ceylon, *unaghas*, that is, "fever-tree," from an opinion generally entertained in that iſland, that a fever is the certain conſequence of bathing in any river into which the flowers or leaves of the bamboo have fallen. By the Arabians it is named *tabaxir;* as is likewiſe a milky humour or ſugar produced in it. The Indians call it *mambu;* whence vulgarly, and by corruption, its European name of *bambu* or *bamboo*. In the iſland of Madagaſcar, and particularly in the province of Galemboulou, by the teſtimony of Flacourt, it is produced in ſuch abundance as to give name to the province, for in thoſe parts it is termed *voulu*. The ſize of this tree in India is generally ſo great, that houſes are built of it. In the porch of the academical garden at Leyden are ſuſpended ſome fragments, a preſent of the celebrated Piſo, the largeſt of which exceeds 28, the leaſt 26, feet in length. That they muſt, however, have been double that ſize before they were broken off, appears probable from this circumſtance, that the thickneſs of one extremity ſcarce differs from that of the other. It is likewiſe wonderful that ſo immenſe a reed ſhould be clothed with ſo very ſmall leaves; the largeſt of the dried ones in the collection of Profeſſor Syens at Leyden, mentioned by Rheede in his Hortus Malabaricus, ſcarcely exceeding a ſpan in length, or the breadth of a finger in width. The ſtalks, when old, are entirely covered in the cavity with a ſort of calx, which is eſteemed uſeful in the ſtrangury, and to ſuch as are troubled with purulent urine. Bamboo being burnt, affords very fertile aſhes, in which plants of all kinds thrive remarkably. Whilſt burning, the ſtalks emit a very loud exploſion; the air contained in their cavity being rarefied by the heat, and deſiring a larger ſpace, breaks thro' the partitions at the joints, and violently ſeeks a paſſage whereby to eſcape. Kempfer relates, in the Amœnitates Exoticæ, that in a province of Japan called *Oomi*, which has a ſlimy bottom, the roots of bamboo luxuriate with ſuch wonderful beauty, that, being dug out of the ground and diſentangled from the ſtrings which encompaſs them, they ſerve, as the ſtalks with us, for walking-ſticks, commonly called *rotang*. From this curious reed ſeveral conveniences are obtained beſides thoſe which have been mentioned. The reader is referred for a more minute detail, to the Mantiſſa Aromatica of Piſo; where, beſides a very accurate deſcription of the tabaxir or ſugar mentioned above, he will alſo learn, that the tender branches or twigs, particularly thoſe near the root, being macerated in ſalt and vinegar, afford, with the addition of garlic and the pods of capſicum, a ſort of pickle, which is eſteemed excellent, and conſtitutes not the leaſt valuable part of thoſe famous condita commonly termed *achar* and *atsjaar*, and well known in Europe for exciting the appetite and promoting digeſtion.

BAMFF, (*Encycl.*) By miſtake, this place was ſaid to have no harbour. The following account is given by Mr Pennant: "It is pleaſantly ſituated on the ſide of a hill; has ſeveral ſtreets; and that with the town-houſe in it, adorned with a new ſpire, is very handſome. This place was erected into a borough by virtue of a charter from Robert II. dated October 7. 1372, endowing it with the ſame privileges, and putting it on the ſame footing with the burgh of Aberdeen; but tradition ſays it was founded in the reign of Malcolm Canmore. The harbour is very bad, as the entrance at the mouth of the Devron is very uncertain, being often ſtopped by the ſhifting of the ſands, which are continually changing in great ſtorms; the pier is therefore placed on the outſide. Much ſalmon is exported from hence. About Troophead ſome kelp is made; and the adventurers pay the lord of the manor 50 l. *per annum* for the liberty of collecting the materials."

BANDITTI, (*Encycl.*) from the Italian *bandito;* perſons proſcribed, or, as we call it, outlawed: ſometimes denominated *banniti* or *foris-banniti*. It is alſo a denomination given to highwaymen or robbers who infeſt the roads in troops, eſpecially in Italy, France, and Sicily. Mr Brydone, in his Tour through Sicily, informs us, that in the eaſtern part, called *Val Demoni*, from the devils that are ſuppoſed to inhabit Mount Ætna, it has ever been found altogether impracticable to extirpate the banditti; there being numberleſs caverns and ſubterraneous paſſages round that mountain, where no troops could poſſibly purſue them: beſides, they are known to be perfectly determined and reſolute, never failing to take a dreadful revenge on all who have offended them. Hence the prince of Villa Franca has embraced it, not only as the ſafeſt, but likewiſe as the wiſeſt and moſt political ſcheme, to become their declared patron and protector: and ſuch of them as think proper to leave their mountains and foreſts, though perhaps only for a time, are ſure to meet with good encouragement and a certain protection in his ſervice, where they enjoy the moſt unbounded confidence, which, in no inſtance, they have ever yet been found to make an improper or a diſhoneſt uſe of. They are clothed in the prince's livery, yellow and green, with ſilver lace; and wear likewiſe a badge of their honourable order, which entitles them to univerſal fear and reſpect from the people.

In ſome circumſtances, theſe banditti are the moſt reſpectable people of the iſland, and have by much the higheſt and moſt romantic notions of what they call their point of honour. However criminal they may be with regard to ſociety in general; yet, with reſpect to one another, and to every perſon to whom they have once profeſſed it, they have ever maintained the moſt unſhaken fidelity. The magiſtrates have often been obliged to protect them, and pay them in court, as they are known to be perfectly determined and deſperate, and ſo extremely vindictive, that they will certainly put any perſon to death that has ever given them juſt cauſe of provocation. On the other hand, it never was known that any perſon who had put himſelf under their protection, and ſhowed that he had confidence in them, had cauſe to repent of it, or was injured by any of them in the moſt minute trifle; but, on the contrary, they will protect him from impoſitions of every kind, and ſcorn to go halves with the landlord, like moſt other conductors and travelling ſervants, and will defend him with their lives if there is occaſion. Thoſe of their number who have thus enliſted themſelves in the ſervice of ſociety, are known and reſpected by the other banditti all over the iſland; and the perſons of thoſe they accompany are ever held ſacred. For theſe reaſons, moſt travellers chooſe to hire a couple of them from town to town; and may thus travel over the whole iſland in ſafety.

BANDY-LEGGED. See VALGUS, (*Encycl.*)

BARILLA, or BARILHA, the name of a plant cultivated in Spain for its aſhes, from which the pureſt kinds of mineral alkali are obtained.

There are four plants, which, in the early part of their growth, bear ſo ſtrong a reſemblance to each other as would deceive any but the farmers and nice obſervers. Theſe four are, *barilla*, *gazul*, (or, as ſome call it, *algazul*,) *ſoza*, and *ſalicornia* or *ſalicor*. They are all burnt to aſhes; but applied to different uſes, as being poſſeſſed of different qualities. Some of the roguiſh farmers mix more or leſs of the three laſt with the firſt; and it requires a complete knowledge of the colour, taſte, and ſmell of the aſhes to be able to detect their knavery.

Barilla is ſown afreſh every year. Its greateſt height above ground is four inches: each root puſhes out a vaſt number of little ſtalks, which again are ſubdivided into ſmaller ſprigs reſembling ſamphire; and all together form a large ſpreading tufted buſh. The colour is bright green; as the plant advances towards maturity, this colour vaniſhes away till it comes at laſt to be a dull green tinged with brown.

Gazul bears the greateſt affinity to barilla, both in quality and appearance: the principal difference conſiſts in its growing on a ſtill drier ſalter earth, conſequently it is impregnated with a ſtronger ſalt. It does not riſe above two inches out of the ground, ſpreading out into little tufts. Its ſprigs are much flatter and more pulpy than thoſe of barilla, and are ſtill more like ſamphire. It is ſown but once in three, four, or five years, according to the nature of the ſoil.

Soza, when of the ſame ſize, has the ſame appearance as gazul; but in time grows much larger, as its natural ſoil is a ſtrong ſalt marſh, where it is to be found in large tufts of ſprigs, treble the ſize of barilla, and of a bright green colour, which it retains to the laſt.

Salicor has a ſtalk of a deep green colour inclining to red, which laſt becomes by degrees the colour of the whole plant. From the beginning it grows upright, and much reſembles a buſh of young roſemary. Its natural ſoil is on the declivities of hills near the ſalt marſhes, or on the edges of the ſmall drains or channels cut by the huſbandmen for the purpoſe of watering the fields: before it has acquired its full growth, it is very like the barilla of thoſe ſeaſons in which the ground has been dunged before ſowing. In thoſe years of manuring, barilla, contrary to its uſual nature, comes up with a tinge of red; and when burnt falls far ſhort of its wonted goodneſs, being bitter, more impregnated with ſalts than it ſhould be, and raiſing a bliſter if applied for a few minutes to the tongue. Barilla contains leſs ſalt than the others; when burnt, it runs into a maſs reſembling a ſpongy ſtone, with a faint caſt of blue.

Gazul, after burning, comes as near barilla in its outward appearance as it does while growing in its vegetable form; but, if broken, the inſide is of a deeper and more gloſſy blue. Soza and ſalicor are darker, and almoſt black within, of a heavier conſiſtence, with very little or no ſign of ſpongineſs.

All theſe aſhes contain a ſtrong alkali; but barilla the beſt and pureſt, though not in the greateſt quantity. Upon this principle, it is fitteſt for making glaſs and bleaching linen; the others are uſed in making ſoap. Each of them would whiten linen; but all, except barilla, would burn it. A good crop of barilla impoveriſhes the land to ſuch a degree, that it cannot bear good barilla a ſecond time, being quite exhauſted. For this reaſon the richer farmers lay manure upon the ground, and let it lie fallow for a ſeaſon; at the end of which it is ſown afreſh without any danger, as the weeds that have ſprung up in the year of reſt have carried off all the pernicious effects of the dung. A proper ſucceſſion of crops is thus ſecured by manuring and fallowing the different parts of the farm, each in their turn. The poorer tribe of cultivators cannot purſue the ſame method for want of capital; and are therefore under the neceſſity of ſowing their lands immediately after manuring, which yields them a profit juſt ſufficient to afford a preſent ſcanty ſubſiſtence, though the quality and price of their barilla be but trifling.

The method uſed in making barilla is the ſame as that followed in Britain in burning kelp. The plant as ſoon as ripe is plucked up and laid in heaps, then ſet on fire. The ſalt juices run out below into an hole made in the ground, where they run into a vitrified lump, which is left about a fortnight to cool. An acre may give about a tun.

BAROMETER, (*Encycl.*) A conſiderable improvement on the wheel-barometer † is that of Mr Fitzgerald, F.R.S. It is furniſhed with two pulleys that move on friction-wheels; each of which turns an index on the centre of a graduated circle. The ſmaller circle is four inches in diameter, and divided into three equal parts, each of which is again ſubdivided decimally; and the changes correſponding to the riſe or fall of the mercury from 28 to 31 inches, are marked on the margin of it, as they are on the ſcales of common barometers. The larger circle is divided into 300 equal parts; and being about 30 inches in circumference, the index belonging to it will mark diſtinctly the 600th part of an inch in the riſe or fall of the mercury. On the centre of this circle two regiſters are fixed, which are placed along the index when the inſtrument is adjuſted; one of them is carried round with the index, and left behind on its return; ſo that their diſtance will determine the limits of the variation from one obſervation to another.

Mr Paſſemont, an ingenious artiſt at Paris, has invented a *marine barometer*, by twiſting the middle part of the common one into a ſpiral conſiſting of two revoluvolutions. Thus the impulſes which the mercury receives from the motions of the ſhip are deſtroyed, by being tranſmitted in contrary directions.

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† See *Barometer*, n°24.

Notwithſtanding the amazing pains which Mr de Luc has taken to remove every inaccuracy in the barometer, it is not yet entirely free from error; nor do the obſervations made by different perſons altogether correſpond. Conſiderable improvements have been made by Col. Roy and Sir George Shuckburgh, of which an account is given in the 67th and 68th vols of the Philoſophical Tranſactions.

FIRE-BARRELS. See FIRE-*Ship*, note B, (*Encycl.*)

BASKERVILLE (John), an eminent artiſt, eſpecially in letter-founding and printing, of the preſent century. He was born in 1706 at Woverley in Worceſterſhire, and was heir to an eſtate of about 60 l. a-year; the whole of which income he allowed to his parents till their deaths. In his early years he conceived a love for fine writing, and cutting in ſtone; and being brought up to no particular profeſſion, he commenced writing-maſter in Birmingham when about 20 years of age. The improvements in different manufactures there ſoon drew his attention, and he applied to the Japan buſineſs, which he carried on for a long time with diſtinguiſhed excellence and ſucceſs. In 1750 he applied himſelf to letter-founding, the bringing of which to perfection coſt him much labour and expence. In a few years he proceeded to printing; and his firſt work was an edition of Virgil on royal quarto, which now ſells for three guineas. In a ſhort time he obtained leave from the univerſity of Cambridge to print a Bible in royal folio, and editions of the Common Prayer in three ſizes; for which he paid a large ſum to the univerſity. He afterwards printed Horace, Terence, Catullus, Lucretius, Juvenal, Salluſt, and Florus, in royal quarto; Virgil in octavo; and ſeveral books in duodecimo. He publiſhed likewiſe ſome of the Engliſh claſſics. The beſt teſtimonies of the merit of theſe performances are themſelves; and Mr Baſkerville's name is deſervedly ranked among thoſe who, in modern times, have brought the art of printing to its greateſt perfection. Not meeting, however, with that encouragement from the bookſellers which he expected, he ſet up a letter-foundery for ſale a little before his death; which buſineſs is now carried on by his widow. He died without iſſue in July 1775.

BASTARD, (*Encycl.*) This article contains the ſtate of the matter according to the law of England. How it ſtands in the law of Scotland, ſee LAW, Part III. N° clxxxii. 3. 4. and clxi. 33.

KNIGHTS *of the* BATH, a military order in England, ſuppoſed to have been inſtituted by Richard II. who limited their number to four; however, his ſucceſſor Henry IV. increaſed them to 46. Their motto was *Tres in uno*, ſignifying the three theological virtues.

This order received its denomination from a cuſtom of bathing before they received the golden ſpur. It is ſeldom conferred but at the coronation of kings, or the inauguration of a prince of Wales, or duke of York. They wear a red ribband beltwiſe.—The order of the Bath, after remaining many years extinct, was revived under George I. by a ſolemn creation of a great number of knights.

BAVINS. See FIRE-*Ship*, note D, (*Encycl.*)

BENARES. See OBSERVATORY, (*Encycl.*)

King's-BENCH, (*Encycl.*) See alſo KING's-*Bench*, (*Encycl.*)

BERWICK, (*Encycl.*) The town of Berwick upon Tweed was originally part of the kingdom of Scotland; and, as ſuch, was for a time reduced by king Edward I. into the poſſeſſion of the crown of England: and, during ſuch its ſubjection, it received from that prince a charter, which (after its ſubſequent ceſſion by Edward Baliol, to be for ever united to the crown and realm of England) was confirmed by king Edward III. with ſome additions; particularly, that it ſhould be governed by the laws and uſages which it enjoyed during the time of king Alexander, that is, before its reduction by Edward I. Its conſtitution was new-modelled, and put upon an Engliſh footing by a charter of king James I. and all its liberties, franchiſes, and cuſtoms, were confirmed in parliament by the ſtatutes 22 Edw. IV. c. 8. and 2 Jac. I. c. 28. Though, therefore, it hath ſome local peculiarities, derived from the ancient laws of Scotland; yet it is clearly part of the realm of England, being repreſented by burgeſſes in the houſe of commons, and bound by all acts of the Britiſh parliament, whether ſpecially named or otherwiſe. And therefore it was (perhaps ſuperfluouſly) declared by ſtat. 20 Geo. II. c. 42. that where England only is mentioned in any act of parliament, the ſame notwithſtanding hath and ſhall be deemed to comprehend the dominion of Wales and town of Berwick upon Tweed. And though certain of the king's writs or proceſſes of the courts of Weſtminſter do not uſually run into Berwick, any more than the principality of Wales; yet it hath been ſolemnly adjudged, that all prerogative writs (as thoſe of *mandamus*, prohibition, *habeas corpus*, *certiorari*, &c.) may iſſue to Berwick as well as to every other of the dominions of the crown of England, and that indictments and other local matters ariſing in the town of Berwick may be tried by a jury of the county of Northumberland.

BEZOAR MINERAL. Line 2d from the end, for *tin, &c. in diſrepute*, read *tin, &c. all now in diſrepute.*

BILE, (*Encycl.*) See alſo GALL, (*Encycl.*)

BISHOP, (*Encycl.*) See alſo EPISCOPACY, (*Encycl.*)

BIOGRAPHY, (*Encycl.*) See further the article HISTORY, n° 85, (*Encycl.*)

BLACKSTONE (Sir William), an eminent Engliſh lawyer, was born at London in July 1723. His father, Mr Charles Blackſtone, a ſilk-man, citizen, and bowyer of London, died ſome months before the birth of our author, who was the youngeſt of four children; and their mother died before he was 12 years old.

Even from his birth, the care both of his education and fortune was kindly undertaken by his maternal uncle Mr Thomas Bigg, an eminent ſurgeon in London, and afterwards, on the death of his elder brothers, owner of the Chilton eſtate, which is ſtill enjoyed by that family. In 1730, being about ſeven years old, he was put to ſchool at the Charter-houſe; and in 1735 was, by the nomination of Sir Robert Walpole, on the recommendation of Charles Wither of Hall in Hampſhire, Eſq; his couſin by the mother's ſide, admitted upon the foundation there. In this excellent ſeminary he applied himſelf to every branch of youthful education, with the ſame aſſiduity which accompanied his ſtudies through life. His talents and induſtry rendered him the favourite of his maſters, who encouraged and aſſiſted him with the utmoſt attention: ſo that at the age of 15 he was at the head of the ſchool, and although ſo young, was thought well qualified to be removed to the univerſity. He was accordingly entered a commoner at Pembroke college in Oxford, on the 30th of November 1738, and was the next day matriculated. At this time he was elected to one of the Charter-houſe exhibitions by the governors of that foundation, to commence from the Michaelmas preceding; but was permitted to continue a ſcholar there till after the 12th of December, being the anniverſary commemoration of the founder, to give him an opportunity of ſpeaking the cuſtomary oration which he had prepared, and which did him much credit. About this time alſo he obtained Mr Benſon's gold prize-medal of Milton, for verſes on that poet. In the February following, the ſociety of Pembroke college unanimouſly elected him to one of Lady Holford's exhibitions for Charter-houſe ſcholars in that houſe. Here he proſecuted his ſtudies with unremitting ardour; and although the claſſics, and particularly the Greek and Roman poets, were his favourites, they did not entirely engroſs his attention: logic, mathematics, and the other ſciences, were not neglected. At the early age of 20, he compiled a treatiſe entitled *Elements of Architecture*, intended for his own uſe only, and not for publication; but eſteemed by thoſe judges who have peruſed it, in no reſpect unworthy his maturer judgment and more exerciſed pen.

Having determined on his future plan of life, and made choice of the law for his profeſſion, he was entered in the Middle Temple on the 20th of November 1741. He now found it neceſſary to quit the more amuſing purſuits of his youth, for the ſeverer ſtudies to which he had dedicated himſelf; and betook himſelf ſeriouſly to reading law. He expreſſed his diſagreeable ſenſations on this occaſion in a copy of verſes, ſince publiſhed by Dodſley in vol. 4th of his miſcellanies, intitled *The Lawyer's Farewell to his Muſe;* in which the ſtruggle of his mind is expreſſed ſo ſtrongly, ſo naturally, with ſuch elegance of ſenſe and language, and harmony of verſification, as muſt convince every reader that his paſſion for the muſes was too deeply rooted to be laid aſide without much reluctance; and that, if he had purſued that flowery path, he would perhaps have proved inferior to few of our Engliſh poets.

Several little fugitive pieces beſides this, have at times been communicated by him to his friends; and he left (but not with a view of publication) a ſmall collection of juvenile pieces, both originals and tranſlations, inſcribed with this line from Horace,

Nec luſiſſe pudet, ſed non incidere ludum.

Some notes on Shakeſpeare, which juſt before his death he communicated to Mr Steevens, and which were inſerted by him in his laſt edition of that author, ſhow how well he underſtood the meaning, as well as the beauties, of that his favourite among the Engliſh poets.

In November 1743, he was elected into the ſociety of All-Souls college; and in the November following, he ſpoke the anniverſary ſpeech in commemoration of archbiſhop Chicheley the founder, and the other benefactors to that houſe of learning, and was admitted actual fellow.

From this period he divided his time between the univerſity and the Temple, where he took chambers in order to attend the courts: in the former he purſued his academical ſtudies, and on the 12th of June 1745 commenced bachelor of civil law; in the latter he applied himſelf cloſely to his profeſſion, both in the hall and in his private ſtudies, and on the 28th of November 1746 was called to the bar. Though he was little known or diſtinguiſhed in Weſtminſter-hall, he was actively employed, during his occaſional reſidence at the univerſity, in attending to its intereſts, and mingling with and improving its interior concerns.

In May 1749, as a ſmall reward for his ſervices, and to give him further opportunities of advancing the intereſts of the college, Mr Blackſtone was appointed ſteward of their manors. And in the ſame year, on the reſignation of his uncle Seymour Richmond, Eſq; he was elected recorder of the borough of Wallingford in Berkſhire, and received the king's approbation on the 30th of May.

The 26th of April 1750, he commenced doctor of civil law, and thereby became a member of the convocation, which enabled him to extend his views beyond the narrow circle of his own ſociety, to the general benefit of the univerſity at large.

In the ſummer 1753, he took the reſolution of wholly retiring to his fellowſhip and an academical life, ſtill continuing the practice of his profeſſion as a provincial counſel.

His Lectures on the Laws of England appears to have been an early and favourite idea; for in the Michaelmas term, immediately after he quitted Weſtminſter-hall, he entered on theprovince of reading them at Oxford; and we are told by the author of his life, that even at their commencement, ſuch were the expectations formed from the acknowledged abilities of the lecturer, they were attended by a very crowded claſs of young men of the firſt families, characters, and hopes; but it was not till the year 1758, that the lectures in the form they now bear were read at the univerſity.

Mr Viner having by his will left not only the copyright of his abridgment, but other property to a conſiderable amount, to the univerſity of Oxford, to found a profeſſorſhip, fellowſhips, and ſcolarſhips of common law, he was on the 20th of October 1758 unanimouſly elected Vinerian profeſſor; and on the 25th of the ſame month read his firſt introductory lecture, which he publiſhed at the requeſt of the vice-chancellor and heads of houſes, and afterwards prefixed to the firſt volume of his Commentaries.

His lectures had now gained ſuch univerſal applauſe, that he was requeſted by a noble perſonage who ſuperintended the education of our preſent ſovereign, then prince of Wales, to read them to his Royal Highneſs; but as he was at that time engaged to a numerous claſs of pupils in the univerſity, he thought he could not, conſiſtently with that engagement, comply with this requeſt, and therefore declined it. But he tranſmitted copies of many of them for the peruſal of his royal highneſs; who, far from being offended at an excuſe grounded on ſo honourable a motive, was pleaſed to order a handſome gratuity to be preſented to him.

It is doubtful whether the Commentaries were originally intended for the preſs; but many imperfect and incorrect copies having got abroad, and a pirated edition

Blackſtone, Birch.

edition of them being either publiſhed, or preparing for publication in Ireland, the learned lecturer thought proper to print a correct edition himſelf; and in November 1765 publiſhed the firſt volume, under the title of *Commentaries on the Laws of England;* and in the courſe of the four ſucceeding years, the remaining parts of this admirable work.

It ought to be remarked, that before this period the reputation his lectures deſervedly acquired him had induced him to reſume his practice in Weſtminſter-hall; and in a courſe ſomewhat inverted from the general progreſs of his profeſſion, he who had quitted the bar for an academic life, was ſent back from the college to the bar, with a conſiderable increaſe of buſineſs. He was likewiſe elected into parliament, firſt for Hindon, and afterwards for Weſtbury in Wilts; but in neither of theſe departments did he equal the expectations his writings had raiſed.

The part he took in the Middleſex election drew upon him the attack of ſome perſons of ability in the ſenate, and likewiſe a ſevere animadverſion of one of the keeneſt polemical writers * in the paper-war of that day. This circumſtance probably ſtrengthened the averſion he profeſſed to parliamentary attendance; "where, (he ſaid) amidſt the rage of contending parties, a man of moderation muſt expect to meet with no quarter from any ſide:" and when, on the reſignation of Mr Dunning in 1770, he was offered the place of ſolicitor-general, he refuſed that office; but ſhortly afterwards, on the promotion of Sir Joſeph Yates to a ſeat in the court of common-pleas, accepted a ſeat on the bench, and by the death of Sir Joſeph ſucceeded him there alſo.

As a judge, he was not inactive; but, when not occupied in the duties of his ſtation, was generally engaged in ſome ſcheme of public utility. The act for detached houſes for hard labour for convicts, as a ſubſtitute for tranſportation, owed its origin in a great meaſure to him.

It ought not to be omitted, that the laſt augmentation of the judges ſalaries, calculated to make up the deficiencies occaſioned by the heavy taxes they are ſubject to, and thereby render them more independent, was obtained in a great meaſure by his induſtry and attention. This reſpectable and valuable man died on the 14th of February 1780, in the 50th year of his age.

Birch.

BIRCH, (Dr Thomas), an eminent hiſtorical and biographical writer, was born in London in 1705. His parents were both of them Quakers; and his father, Joſeph Birch, was a coffee-mill-maker by trade. Thomas being put to ſchool, was indefatigable in his application, and ſtole many hours from ſleep to increaſe his ſtock of knowledge. By this unremitting diligence, though he had not the happineſs of an univerſity education, he ſoon became qualified to take holy orders in the church of England, to the ſurpriſe of his acquaintance. In 1728 he married the daughter of the Rev. Mr Cox, to whom he was curate: but his felicity was of ſhort duration, Mrs Birch dying of a puerperal fever in leſs than 12 months after their marriage; an event which he deplores in a very elegant and pathetic poem, preſerved in Nichols's Collection. In 1732 he was recommended to the friendſhip and favour of the late lord high chancellor Hardwicke, then attorney-general; to which noble peer, and to the preſent Earl of Hardwicke, he was indebted for all his preferments. The firſt proof he experienced of his patron's regard, was the living of Ulting in the county of Eſſex, in the gift of the crown, to which he was preſented 1732. In 1734 he was appointed one of the domeſtic chaplains to the unfortunate Earl of Kilmarnock, who was beheaded 1746. Mr Birch was choſen a member of the Royal Society, Feb. 20. 1734-5; and of the Society of Antiquaries, Dec. 11. 1735, of which he afterwards became director till his death. Before this, the Mariſchal college of Aberdeen had conferred on him, by diploma, the degree of Maſter of Arts. In 1743, by the intereſt of Lord Hardwicke, he was preſented by the crown to the ſinecure rectory of Landewy Welfrey in the county of Pembroke; and in 1743-4 was preferred, in the ſame manner, to the rectory of Sidington St Peter's, in the county and dioceſe of Glouceſter. We find no traces of his having taken poſſeſſion of this living; and indeed it is probable that he quitted it immediately for one more ſuitable to his inclinations and to his literary engagements, which required his almoſt conſtant reſidence in town; for on the 24th of February 1743-4, he was inſtituted to the united rectories of St Michael Woodſtreet and St Mary Staining; and in 1745-6 to the united rectories of St Margaret Pattens and St Gabriel, Fenchurch-ſtreet, (by lord chancellor Hardwicke, in whoſe turn the preſentation then was). In January 1752, he was elected one of the ſecretaries of the Royal Society, in the room of Dr Cromwell Mortimer, deceaſed. In January 1753 the Mariſchal College of Aberdeen created him doctor of divinity; and in that year the ſame degree was conferred on him by archbiſhop Herring. He was one of the truſtees of the Britiſh Muſæum; for which honour he was probably indebted to the preſent Earl of Hardwicke, as he was for his laſt preferment, the rectory of Depden in Eſſex, to which he was inducted Feb. 26. 1761. In the latter part of his life he was chaplain to the princeſs Amelia. In 1765 he reſigned his office of ſecretary to the Royal Society, and was ſucceeded by Dr Morton. His health declining about this time, he was ordered to ride for the recovery of it; but being a bad horſeman, and going out Jan. 9. 1766, he was unfortunately thrown from his horſe, on the road betwixt London and Hampſtead, and died on the ſpot, in the 61ſt year of his age, to the great regret of the Doctor's numerous literary friends; and was buried in St Margaret Pattens. Dr Birch had in his lifetime been very generous to his relations; and none that were nearly allied to him being living at his deceaſe, he bequeathed his library of books and manuſcripts, with his picture painted in 1735, and all his other pictures and prints not otherwiſe diſpoſed of by his will, to the Britiſh Muſæum. He likewiſe left the remainder of his fortune, which amounted to not much more than 500l. to be laid out in government-ſecurities, for the purpoſe of applying the intereſt to increaſe the ſtipend of the three aſſiſtant librarians: thus manifeſting at his death, as he hath done during his whole life, his reſpect for literature, and his deſire to promote uſeful knowledge. To the Royal Society he bequeathed his picture painted by Wills in 1737, being the original of the mezzotinto print done by Fauber in 1741. His principal publications were, 1. "The General Dictionary,

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* Junius.

Birch, Black.

Black, Blackwall.

tionary, Hiſtorical and Critical ;" including a new tranſlation of Mr Bayle, and interſperſed with ſeveral thouſand new lives. Dr Birch's aſſociates in this undertaking were, the Rev. John Peter Bernard, Mr John Lockman, and Mr George Sale. The whole deſign was completed in 10 volumes folio. 2. Dr Cudworth's "Intellectual Syſtem" (improved from the Latin edition of Moſheim), his diſcourſe on the true notion of the Lord's Supper, and two ſermons, with an account of his life and writings, 2 vols 4to, 1743. 3. "The life of the Hon. Robert Boyle, 1744;" prefixed to an edition of that excellent philoſopher's works, reviſed by Dr Birch. 4. "The lives of Illuſtrious Perſons of Great Britain," annexed to the engravings of Houbraken and Vertue, 1747—1752. 5. "An Inquiry into the Share which King Charles I. had in the tranſactions of the Earl of Glamorgan, 1747," 8vo. 6. An edition of "Spenſer's Fairy Queen, 1751," 3 vols, 4to, with prints from deſigns by Kent. 7. "The Miſcellaneous Works of Sir Walter Raleigh ;" to which was prefixed the Life of that great, unfortunate, and injured man, 1751, 2 vols 8vo. 8. "The Theological, Moral, Dramatic, and Poetical Works of Mrs Catherine Cockburn ; with an Account of the Life of that very ingenious Lady, 1751," 2 vols 8vo. 9. "The Life of the Moſt Reverend Dr John Tillotſon, Lord Archbiſhop of Canterbury. Compiled chiefly from his original Papers and Letters, 1752" 8vo. 10. "Milton's Proſe Works, 1753," 2 vols 4to. with a new Life of that great Poet and Writer. 11. "Memoirs of the Reign of Queen Elizabeth, from the year 1581 till her death. In which the ſecret intrigues of her court, and the conduct of her favourite Robert Earl of Eſſex, both at home and abroad, are particularly illuſtrated. From the original papers of his intimate friend Anthony Bacon, Eſq; and other manuſcripts never before publiſhed, 1754," 2 vols 4to. 12. "The Hiſtory of the Royal Society of London for improving natural knowledge, from its firſt riſe. In which the moſt conſiderable of thoſe papers, communicated to the Society, which have hitherto not been publiſhed, are inſerted in their proper order, as a ſupplement to the Philoſophical Tranſactions, 1756 and 1757. 4 vols 4to." 13. "The Life of Henry Prince of Wales, eldeſt Son of King James I. Compiled chiefly from his own papers and other manuſcripts, never before publiſhed. 1760." 8vo. His numerous communications to the Royal Society may be ſeen in the Philoſophical Tranſactions; and his poetical talents are evident from the verſes already referred to.

BLACK-CAP, in ornithology, a ſpecies of MOTACILLA, under which article it was omitted to be deſcribed. It is a ſmall bird, ſcarce weighing half an ounce. The crown of the head in the male is black : the hind part of the neck a light aſh-colour : the back and coverts of the wings are of a greyiſh green : the quill-feathers and tail duſky, edged with dull green : the breaſt and upper part of the belly are of a pale aſh-colour : the vent feathers whitiſh : the legs of a lead colour. The female is diſtinguiſhed from the male by the ſpot on the head, which in that is of a dull ruſt-colour. The black-cap is a bird of paſſage, leaving us before winter. It ſings very finely ; and on that account is called in Norfolk the *mock-nightingale*. It has uſually a full, ſweet, deep, loud wild pipe ; yet the ſtrain is of ſhort continuance, and his motions are deſultory : but when that bird ſits calmly, and in earneſt engages in ſong, he pours forth very ſweet but inward melody ; and expreſſes great variety of ſweet and gentle modulations, ſuperior perhaps to thoſe of any of our warblers, the nightingale excepted.

The black-cap frequents orchards and gardens. Mr Pennant diſcovered the neſt of this bird in a ſpruce fir, about two feet from the ground ; the outſide was compoſed of the dried ſtalks of the gooſe graſs; with a little wool and green moſs round the verge ; the inſide was lined with the fibres of roots, thinly covered with black horſe hair. There were five eggs of a pale reddiſh brown, mottled with a deeper colour, and ſprinkled with a few dark ſpots.

BLACK-JACK, a kind of mineral found in the Derbyſhire mines. It was ſome time ago employed in Wales for mending the roads ; but is now found to anſwer the purpoſe of calamine for making braſs.—Monſ. Van Swab, in 1738, was the firſt perſon who diſtilled zinc from Black-jack ; and it is ſaid that ſome Engliſh manufacturers purchaſed the ſecret from him when he was in England ; though they might poſſibly have taken the hint from a work which he erected for the purpoſe above mentioned.

BLACKWALL, (Anthony, A. M.), a learned author, after completing his academical education at Emanuel college, Cambridge, was appointed head maſter of the free ſchool at Derby, and lecturer of Allhallows there, where he firſt diſtinguiſhed himſelf in the literary world by an edition of Theognis, printed at London in 1706, and was afterwards head maſter of the free ſchool at Market-Boſworth in Leiceſterſhire. The Grammar whereby he initiated the youth under his care into Latin, was of his own compoſing, and ſo happily fitted for the purpoſe, that he was prevailed on to make it public, though his modeſty would not permit him to fix his name to it, becauſe he would not be thought to preſcribe to other inſtructors of youth. It is intitled, "A New Latin Grammar; being a ſhort, clear, and eaſy Introduction of young Scholars to the Knowledge of the Latin Tongue ; containing an exact Account of the two firſt Parts of Grammar." In his "Introduction to the Claſſics," firſt publiſhed in 1718, 12mo, he diſplayed the beauties of thoſe admirable writers of antiquity, to the underſtanding and imitation even of common capacities; and that in ſo conciſe and clear a manner, as ſeemed peculiar to himſelf. But his greateſt and moſt celebrated work was, "The Sacred Claſſics defended and illuſtrated ; or, An Eſſay humbly offered towards preſerving the Purity, Propriety, and True Eloquence of the Writers of the New Teſtament," in 2 vols. Mr Blackwall had the felicity to bring up many excellent ſcholars in his ſeminaries at Derby and Boſworth ; among others, the celebrated Richard Dawes, author of the *Miſcellanea Critica*. A gentleman who had been his ſcholar, being patron of the church of Clapham in Surrey, preſented him to that living as a mark of his gratitude and eſteem. This happening late in life, and Blackwall having occaſion to wait upon the biſhop of the dioceſe, he was ſomewhat pertly queſtioned by a young chaplain as to the extent of his learning. "Boy, (replied the indignant veteran), I have forgot more than ever you knew !"

knew!" He died at Market-Boſworth, April 8. 1730.

BLAKE, p. 1173. l. 3. for *his* read *their*.

BLEEDING. For chap. i. read n° 356. *et ſeq.*

BLOOD, laſt line of n° 27. for *brimſtone* read *limeſtone*.

Mr Brown has made a number of experiments on ſolutions of the different metals precipitated by alkalis impregnated with the phlogiſton of blood, as in the making of Pruſſian blue. This lixivium being poured into a ſolution of ſilver in aquafortis, produces a coagulum of a pure fleſh-colour. The like lixivium made with fleſh inſtead of blood, produces, in this caſe, a white coagulum; and ſimple oil of tartar being uſed in the ſame experiment, by way of compariſon with theſe lixivia, afforded a much whiter ſediment. Spirit of ſalt being added ſeverally to all the three mixtures, the bloom of the fleſh-colour was taken off in the firſt; but it ſuffered no other change. In the ſecond, the coagulum was tinged a little blue; and in the third, the whiteneſs was evidently improved. The bluiſh tinge in the ſecond caſe is not wholly to be attributed to the fleſh; but perhaps might be owing to an alloy of copper in the ſilver, from which it is ſeldom entirely freed.

The ſame liquors were made uſe of to form a precipitate from corroſive ſublimate of mercury diſſolved in water: the conſequence of which was, that the lixivium with the blood produced a pure yellow; that with fleſh, an orange colour; and the ſimple oil of tartar, a dingy red. The addition of ſpirit of ſalt afterwards to theſe made ſome very odd alterations; for the firſt changed its yellow into an orange colour, and the ſecond its orange colour to a blue, while the third became without any colour. The blue colour in the lixivium with the fleſh, when mixed with this ſolution, may be accounted for from the vitriol in this preparation; but it is not ſo eaſy to ſay, why the ſame vitriol ſhould not have produced alſo a blue in a lixivium with blood.

Copper, when diſſolved in aquafortis, makes the water of a green colour; and on pouring to this the two lixivia of blood and of fleſh, the coagula are much alike; that is, they are white, tinged with green; but on adding ſpirit of ſalt to them, they become of a colour not unlike that of copper before the ſolution. Oil of tartar gives a pale green ſolution; and the ſpirit of ſalt clears up the liquor, and reſtores it to its former colour.

Biſmuth diſſolved in aquafortis, and mixed with a lixivium of blood, produces a milky coagulum, which, after a ſhort time ſtanding, with the addition of ſome ſpirit of ſalt, becomes of a pale blue. The lixivia of fleſh, and of crude ſalt of tartar, produced both white coagula, which the ſpirit of ſalt made no alteration in. From theſe experiments it appears, that not any of theſe metallic bodies would produce a fine blue colour with the lixivium of the blood; but a ſolution of iron anſwers all the experiments that are made with the ſolution of vitriol, and produces as fine a blue colour as that made in the common way.

BLUE-JOHN, among miners, a kind of mineral which has lately been fabricated into vaſes and other ornamental figures. It is of the ſame quality with the cubical ſpar, with reſpect to its fuſibility in the fire. It loſes its colour, and becomes white in a moderate heat: the weight of a cubic foot of the blueſt kind is 3180 ounces, and that of the leaſt blue is 3140 ounces. This ſubſtance began firſt to be applied to uſe about 18 years ago at one of the oldeſt mines in Derbyſhire, called *Odin* mine, probably from its being dedicated to Odin the great god of the northern nations, at the foot of a high mountain called *Mam-Tor* in Caſtleton. Here the greateſt quantities are ſtill found; the largeſt pieces are ſold for 9 l. a ton, the middle-ſized for 6 l. and the leaſt for 50 s.

BLUSHING, a ſuffuſion or redneſs of the cheeks, excited by a ſenſe of ſhame, on account of conſciouſneſs of ſome failing or imperfection.

Bluſhing is ſuppoſed to be produced from a kind of conſent or ſympathy between ſeveral parts of the body, occaſioned by the ſame nerve being extended to them all. Thus the fifth pair of nerves being branched from the brain to the eye, ear, muſcles of the lips, cheeks, palate, tongue, and noſe; a thing ſeen or heard that is ſhameful affects the cheeks with bluſhes, driving the blood into the minute veſſels thereof; at the ſame time that it affects the eye and ear. For the ſame reaſon it is, as Mr Derham obſerves, that a ſavoury thing ſeen or ſmelt affects the glands and parts of the mouth: if a thing heard be pleaſing, it affects the muſcles of the face with laughter; if melancholy, it exerts itſelf on the glands of the eyes, and occaſions weeping, &c. And to the ſame cauſe Dr Willis aſcribes the pleaſure of kiſſing.

BOILING FOUNTAIN. See ICELAND, and Plate CLVII.

BONITO, in ornithology. See SCOMBER, (*Encycl.*)

BOLETUS, (*Encycl.*) Horned cattle are fond of the brown boletus, and eat it greedily; but it is believed that it vitiates the milk, and leſſens the quantity of it.

BONES, (*Encycl.*) From a diſcovery made by Mr Scheele, of a method of producing the phoſphoric acid in large quantity from bones, it has been aſſerted, that this acid is naturally contained in the bones, united with a calcareous earth. From many experiments, however, it appears that no acid is naturally contained in calcined bones; nor can the acid of phoſphorus be extracted from them but by means of the vitriolic acid: whence it ſeems probable, that the phoſphoric acid in this caſe is produced by the combination of a certain quantity of earth with the vitriolic acid.——With regard to the earth of bones itſelf, it appears to be very different from the calcareous kind: it is much more ſoluble in the vitriolic acid, and may be precipitated from that or any other by means of the cauſtic volatile alkali, which cannot be done with the calcareous earth.

BOTANICAL TABLE, (*Encycl.*) In this table it was omitted to mark with their proper numbers, as propoſed, the genera included in the 58 Orders belonging to Linnæus's Fragments of a Natural Method of Claſſification. In the following recapitulation of thoſe genera, that omiſſion is ſupplied; the figures added to each genus denoting the natural order to which it belongs: and theſe numbers or figures may be marked with the pen at the correſponding genera in the Table itſelf.

Abrus 32
Acalypha 38
Acanthus 40
Acer 23
Achras 43
Achyranthes 54

Botany.

Acnida 53
Aconitum 26
Acorus 2
Acroſtichum 55
Actæa 26
Adanſonia 37
Adelia 38
Adenanthera 33
Adianthum 55
Adonis 26
Adoxa 13
Ægilops 4
Ægopodium 45
Æſculus 23
Æſchynomene 32
Æthuſa 28
Agaricus 58
Agave 10
Agrimonia 35
Agroſtemma 22
Agroſtis 4
Aira 4
Ajuga 42
Aizoon 13
Albuca 10
Alcæa 37
Alchemilla 35
Aldrovanda 14
Aletris 10
Aliſma 5
Allium 9
Aloe 10
Alopecurus 4
Alpinia 8
Alſine 22
Alſtromœria 11
Althæa 37
Alyſſum 39
Amaranthus 54
Amaryllis 9
Ambroſynia 2
Amethyſtea 42
Ammania 17
Ammi 45
Amomum 8
Amorpha 32
Amygdalus 36
Anabaſis 12
Anacardium 12
Anagallis 20
Anagyris 32
Anaſtatica 39
Anchuſa 41
Andrachne 38
Andromeda 18
Andropogon 4
Androſace 21
Anemone 26
Anethum 45
Angelica 45
Anguria 34
Annona 51
Anthericum 10
Antholyza 6
Anthoſpermum 47

Anthoxanthum 4
Anthyllis 32
Aphanes 35
Aphyllanthes 5
Apium 45
Apluda 4
Apocynum 30
Aquilegia 26
Arabis 39
Arachis 32
Aralia 46
Arbutus 18
Arctopus 45
Areca 1
Arenaria 22
Arethuſa 7
Aretia 21
Argemone 27
Ariſtida 4
Ariſtolochia 11
Artedia 45
Arum 2
Arundo 4
Aſarum 11
Aſclepias 30
Aſcyrum 20
Aſpalathus 32
Aſparagus 11
Aſperugo 41
Aſperula 47
Aſphodelus 10
Aſplenium 55
Aſtragalus 32
Aſtrantia 45
Athamanta 45
Atragene 26
Atraphaxis 12
Atriplex 12
Atropa 28
Avena 4
Averrhoa 14
Avicennia 40
Axyris 12
Ayenia 37
Azalea 18
Ballota 42
Baniſteria 23
Barleria 40
Bartſia 40
Baſella 12
Bauhinia 33
Begonia 12
Beſleria 40
Beta 12
Betonica 42
Bignonia 40
Biſcutella 39
Biſerrula 32
Bixa 37
Blæria 18
Blechnum 55
Blitum 12
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Trientalis	20
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Triglochin	5
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Triticum	4
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Tulipa	10
Turnera	37
Turritis	39
Typha	3
Vaccinium	18
Valantia	47
Valliſneria	1
Vandellia	40
Varronia	41
Velezia	22
Vella	39
Veratrum	10
Verbaſcum	28
Verbena	40
Veronica	40
Viburnum	43
Vicia	32
Vinca	30
Viola	29
Vitex	40
Vitis	46
Ulex	32
Ulmus	53
Volkameria	40
Uniola	4
Urena	37
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BOTTS, (*Encycl.*) See alſo OESTRUS, (*Encycl.* and *Appendix.*)

BOW-LEGGED. See VALGUS, (*Encycl.*)

BOWYER (William), the moſt learned printer of his age, was born at White Fryars in London, Dec. 17. 1699. His father, whoſe name alſo was William, had been eminent in the ſame profeſſion; and his maternal grandfather (Icabod Dawks) was employed in printing the celebrated Polyglott bible of biſhop Walton. At a proper age, he was placed for grammatical education under the care of Mr Ambroſe Bonwicke, a nonjuring clergyman of known piety and learning, who then lived at Headly, near Leatherhead in Surry. Here Mr Bowyer made great advances in literature, and a firm attachment commenced betwixt him and his maſter. On the 30th of January 1713, the whole property of the elder Mr Bowyer was deſtroyed by fire; on which occaſion Mr Bonwicke generouſly undertook the education of his pupil for one year. In 1716, young Mr Bowyer was admitted a ſizar at St John's college, Cambridge, where Dr Robert Jenkin was at that time maſter. He continued at the college of Cambridge under the tuition of the reverend Dr John Newcome till June 1722, during which period he probably took his degree of Bachelor of Arts; and it appears that he was deſirous of obtaining a fellowſhip, though it is not certain that he ever ſtood a candidate for that honour. Soon after this he had an opportunity of repaying the kindneſs which Mr Bonwicke had ſhown him, by officiating ſome time after his death in the capacity of a ſchoolmaſter for the benefit of his family.

Mr Bowyer now entered into the printing-buſineſs along with his father. One of the firſt books which received the benefit of his correction was the complete edition of Selden in three volumes folio by Dr David Wilkins. This edition was begun in 1722, and finiſhed in 1726; and Mr Bowyer's great attention to it appeared in his drawing up an epitome of Selden *de Synedriis*, as he read the proof-ſheets. In 1727, he drew up an excellent ſketch of William Baxter's Gloſſary of the Roman Antiquities. This was called "A view of a book intitled *Reliquiæ Baxterianæ*. In a letter to a friend." A ſingle ſheet 8vo. By this firſt public proof of Mr Bowyer's abilities, Dr Wotton and Mr Clarke were highly pleaſed; but as it was never publiſhed, and very few copies printed, it is very ſeldom found with the gloſſary.

In 1727 Mr Bowyer loſt his mother; on which occaſion he received a letter of conſolation from Mr Chiſhull the learned editor of the *Antiquitates Aſiaticæ*. In October 1728 he married Miſs Ann Prudom, his mother's niece, a very accompliſhed lady, by whom he he had two ſons, William and Thomas; the former of whom died an infant, and the latter ſurvived his father. In 1729 Mr Bowyer publiſhed a curious treatiſe, intitled, "A Pattern for young Students in the

Univerſity; ſet forth in the Life of Ambroſe Bonwicke, ſome time ſcholar of St John's College, Cambridge:" but though this treatiſe was generally aſcribed to Mr Bowyer, it was in reality the production of Mr Ambroſe Bonwicke the elder. About this time it appears, that Mr Bowyer had written a pamphlet againſt the Separatiſts, though neither the title nor the occaſion of it are now remembered. The ſame year, through the friendſhip of the Right Hon. Arther Onſlow, he was appointed printer of the Votes of the Houſe of Commons; which office he held, under three ſucceſſive ſpeakers, for near 50 years.

In 1731 Mr Bowyer publiſhed, and, it is believed, *tranſlated*, Voltaire's Life of Charles XII. This year alſo his wife died; on which occaſion his friends Mr Clarke and Mr Chiſhul wrote him very affectionate and Chriſtian letters. He remained a widower till 1747, when he married a very benevolent and worthy woman, Mrs Elizabeth Bill, by whom he had no children. In 1733 he publiſhed a piece in two ſheets 4to, intitled, "The Beau and the Academic;" being a tranſlation from a Latin poem recited that year at the Sheldonian theatre; and in 1736 he was admitted into the Society of Antiquarians, where he became an active and uſeful member.

In 1737 Mr Bowyer loſt his father; and on this occaſion Mr Clarke again addreſſed to him a letter of conſolation. In 1742 our author publiſhed a tranſlation of Trapp's Latin Lectures on Poetry, in which he was aſſiſted by Mr Clarke, though the latter had a contemptible opinion of the performance.

In 1749, Mr Bowyer, along with Dr Burton, was virulently attacked by Dr King in a piece intitled *Elogium famæ inſerviens Jacci Etonenſis ſive Gigantis*: or, "The praiſes of Jack Eaton, commonly called *Jack the Giant*."—This abuſe was probably occaſioned by Mr Bowyer's having hinted in converſation ſome doubts concerning the Doctor's ſkill in Latin. Our author drew up ſome ſtrictures in his own defence, which he intended to inſert at the concluſion of a preface to Monteſquieu's Reflections; but by Dr Clarke's advice they were omitted. In 1750, a prefatory critical diſſertation and ſome notes were annexed by our author to Kuſter's Treatiſe *De uſu verborum mediorum*; a new edition of which, with farther improvements, appeared in 1773. He wrote likewiſe about the ſame time a Latin preface to Leedes's *Veteres poetæ citati*, &c.—Being ſoon after employed to print an edition of Col. Bladen's tranſlation of Cæſar's Commentaries, that work received conſiderable improvements from Mr Bowyer's hands, with the addition of ſuch notes in it as are ſigned TYPOGR. In the ſubſequent editions of this work, though printed by another perſon during our author's lifetime, the ſame ſignature, though contrary to decorum, and even to juſtice, was ſtill retained. In 1751, he wrote a long preface to Monteſquieu's "Reflexions on the riſe and fall of the Roman Empire;" tranſlated the dialogue between Sylla and Socrates; made ſeveral corrections to the work from the Baron's "Spirit of Laws;" and improved it with his own notes. A new edition, with many new notes, was printed in 1759. In 1751 he alſo publiſhed the firſt tranſlation that ever was made of Rouſſeau's paradoxical oration, which gained the prize at the academy of Dijon in 1750; and which firſt announced that ſingular genius to the attention and admiration of Europe. On the publication of the third edition of Lord Orrery's "Remarks on the Life and Writings of Dr Swift," in 1752, Mr Bowyer wrote and printed, but never publiſhed, "Two Letters from Dr Bentley in the Shades below, to Lord Orrery in a Land of thick darkneſs." The notes ſigned B, in the ninth quarto volume of Swift's works, are extracted from theſe Letters. In 1753, he endeavoured to allay the ferment occaſioned by the Jew bill; with which view he publiſhed, in quarto, "Remarks on the ſpeech made in common-council, on the bill for permitting perſons profeſſing the Jewiſh religion to be naturalized, ſo far as prophecies are ſuppoſed to be affected by it.' This little tract was written with ſpirit, and well received by thoſe who were ſuperior to narrow prejudices. Its deſign was to ſhow, that whatever political reaſons might be alleged againſt the bill, Chriſtianity was in no danger of being prejudiced by the intended protection promiſed to the Jews. The ſame year ſome of Mr Bowyer's notes were annexed to Biſhop Clayton's tranſlation of "A Journal from Grand Cairo to Mount Sinai and back again."—In 1754, Mr Bowyer, with a view of leſſening his fatigue, entered into partnerſhip with a relation; but ſome diſagreement ariſing, the connection was diſſolved in three years. On the death of Mr Richardſon in 1761, Mr Bowyer ſucceeded him as printer to the Royal Society, through the favour of the late Earl of Macclesfield; and, under the friendſhip of five ſucceſſive preſidents, enjoyed that office till his death.

In 1763, Mr Bowyer publiſhed an excellent edition of the Greek Teſtament, in two vols 12mo. It appeared under the following title: *Novum Teſtamentum Græcum; ad fidem Græcorum ſolùm Codicum MSS. nunc primum impreſſum, adſtipulante Joanne Jacobo Wetſtenio, juxta Sectiones Jo. Alberti Bengelii diviſum*; et nova *interpretatione ſæpius illuſtratum. Acceſſêre in altero volumine, Emendationes conjecturales virorum doctorum undecunque collectæ*. This ſold with great rapidity: the Conjectural Emendations were well received by the learned, and are thought to be a valuable work. The preſident and fellows of Havard college in Cambridge expreſſed their approbation of this edition in very high terms. In a letter to Mr Bowyer, written in the year 1767, "This work, (ſay they), though ſmall in bulk, we eſteem as a rich treaſure of ſacred learning, and of more value than many large volumes of the commentators." A ſecond edition of the Conjectures on the New Teſtament, with very conſiderable enlargements, was ſeparately publiſhed, in one vol. 8vo, in 1772. Biſhop Warburton having cenſured a paſſage in the former edition, Mr Bowyer ſent him a copy of this book, with a conciliatory letter. Dr Warburton's Divine Legation had received very conſiderable advantage from Mr Bowyer's corrections; and this even in an edition which was neceſſarily given to another preſs. In 1761 he was employed to print his Lordſhip's Doctrine of Grace. A ſecond edition being ſoon wanted, and Mr Bowyer not having been intruſted with the care of it, he prepared a ſeries of letters to the biſhop in his own defence; of which, together with a few he had formerly received from that great writer, he afterwards printed *twelve copies*, of which *ten* have ſince been deſtroyed. However, there is the beſt authority for aſſerting, that notwithſtanding any little altercations which happened, Dr Warburton always retained a ſincere regard for our author.

In 1765, at the requeſt of Thomas Hollis, Eſq; Mr Bowyer wrote a ſhort Latin preface to Dr Wallis's *Grammatica Linguæ Anglicanæ*. He wrote alſo a larger Engliſh preface for the ſame work, which, however, ſtill remains unprinted. In 1766 he entered into partnerſhip with Mr Nichols, who had been trained by him to the profeſſion, and had for ſeveral years aſſiſted him in the management of his buſineſs. The ſame year, Mr Bowyer wrote an excellent Latin preface to *Joannis Harduini, Jeſuitæ, ad Cenſuram Scriptorum veterum Prolegomena. Juxta Autographum.* In 1767 he was appointed to print the Journals of the Houſe of Lords and the Rolls of Parliament. This year he printed Mr Clarke's excellent and learned work on "The Connection of the Roman, Saxon, and Engliſh Coins;" and wrote ſome notes upon it, which are interſperſed throughout the volume with thoſe of the author. Part of the Diſſertation on the Roman ſeſterce was likewiſe Mr Bowyer's production; and the index, which is an uncommonly good one, was drawn up by him entirely.

In January 1771 Mr Bowyer loſt his ſecond wife, and again received a letter of conſolation from his old friend Mr Clarke, who had ſent him one almoſt forty years before on a ſimilar occaſion. In the Philoſophical Tranſactions for this year was printed a very ingenious "Inquiry into the Value of the ancient Greek and Roman Money," by the late Matthew Raper, Eſq. But his opinions not coinciding with thoſe of Mr Bowyer, he printed a ſmall pamphlet, intitled, "Remarks, occaſioned by a late Diſſertation on the Greek and Roman money."

In 1773 three little tracts were publiſhed by him, under the title of "Select Diſcourſes. 1. Of the correſpondence of the Hebrew months with the Julian, from the Latin of Profeſſor Michaelis. 2. Of the Sabbatical years, from the ſame. 3. Of the years of jubilee, from an anonymous writer in Maſſon's Hiſtoire Critique de la Republique des Lettres." In 1774 he corrected a new edition of Schrevelius's Greek Lexicon; to which he has added a number of words, diſtinguiſhed by an aſteriſk, which he himſelf had collected in the courſe of his ſtudies. Conſiderable additions, ſtill in manuſcript, were made by him to the lexicons of Hederic and Buxtorf, the Latin ones of Faber and Littleton, and the Engliſh Dictionary of Bailey; and he left behind him many other proofs of his critical ſkill in the learned languages. In 1774 was publiſhed, "The Origin of Printing, in two Eſſays. 1. The ſubſtance of Dr Middleton's Diſſertation on the Origin of Printing in England. 2. Mr Meerman's Account of the Invention of the Art at Haerlem, and its progreſs to Mentz, with occaſional Remarks, and and an Appendix." The original idea of this valuable tract, was Mr Bowyer's, but it was completed by Mr Nichols.

Although our author, during the laſt ten years of his life had been afflicted with the palſy and ſtone, he not only preſerved a remarkable cheerfulneſs of temper, but was enabled to ſupport the labour of almoſt inceſſant reading; and he regularly corrected the learned works, eſpecially the Greek books, which came from his preſs. This he continued to do till within a few weeks of his death, which happened in November 1777, when he had nearly completed his 78th year.

For more than half a century Mr Bowyer was unrivalled as a learned printer; and many of the moſt maſterly productions of this kingdom have come from his preſs. To his literary and profeſſional abilities he added an excellent moral character; and he was particularly diſtinguiſhed by his inflexible probity, and an uncommon alacrity in relieving the neceſſitous.

BRAMINS, (*Encycl.*) See alſo Observatory, (*Encycl.*)

To **BREAM**, to burn off the filth, ſuch as graſs, ooze, ſhells, or ſea-weed, from a ſhip's bottom, that has gathered to it in a voyage, or by lying long in a harbour. This operation is performed by holding kindled furze, faggots, or ſuch materials, to the bottom, ſo that the flame incorporating with the pitch, ſulphur, &c. that had formerly covered it, immediately looſens and throws off whatever filth may have adhered to the planks. After this, the bottom is covered anew with a compoſition of ſulphur, tallow, &c. which not only makes it ſmooth and ſlippery, ſo as to divide the fluid more readily, but alſo poiſons and deſtroys thoſe worms which eat through the planks in the courſe of a voyage. Breaming may be performed either when the ſhip lies aground after the tide has ebbed from her, or by docking, or by careening.

BRITAIN, (*Encycl.*) N° 454, for *Antigallican privateer*, read *the Active and Favourite king's ſhips.*

BROWN (Dr John), a clergyman of the church of England, and an ingenious writer, was born at Rothbury in Northumberland in November 1715. His father John Brown, was a native of Scotland, of the Browns of Colſtown near Haddington; and at the time of his ſon's birth was curate to Dr Thomlinſon rector of Rothbury. He was afterwards collated to the vicarage of Wigton in Cumberland; to which place he carried his ſon, who received the firſt part of his education there. Thence he was removed, in 1732, to the univerſity of Cambridge, and entered of St John's college, under the tuition of Dr Tunſtall. After taking the degree of bachelor of arts with great reputation (being amongſt the liſt of wranglers, and his name at the head of the liſt) he returned to Wigton, and received both deacon's and prieſt's orders from Sir George Fleming biſhop of Carliſle. Here he was appointed by the dean and chapter a minor canon and lecturer of the cathedral church. For ſome years he lived here in obſcurity; and nothing farther is known concerning him, than that in 1739 he went to Cambridge to take his degree of maſter of arts. In 1745 he diſtinguiſhed himſelf as a volunteer in the king's ſervice, and behaved with great intrepidity at the ſiege of Carliſle. After the defeat of the rebels, when ſeveral of them were tried at the aſſizes held at Carliſle in the ſummer of 1746, he preached at the cathedral church of that city two excellent diſcourſes, on the mutual connection between religious truth and civil freedom; and between ſuperſtition, tyranny, irreligion, and licentiouſneſs.

Mr Brown's attachment to the royal cauſe and to the Whig party procured him the friendſhip of Dr Oſbaldeſton, who was the only perſon that continued to be his friend through life, the peculiarities of Mr Brown's temper, or ſome other cauſe, having produced quarrels with every one elſe. When Dr Oſbaldeſton was advanced to the ſee of Carliſle, he appointed Mr Brown to be one of his chaplains.

It was probably in the early part of his life, and during his reſidence at Carliſle, that Mr Brown wrote his poem intitled *Honour*, inſcribed to the Lord Viſcount Lonſdale. Our author's next poetical production was his *Eſſay on Satire*; and which was of conſiderable advantage to him both in point of fame and fortune. It was addreſſed to Dr Warburton; to whom it was ſo acceptable, that he took Mr Brown into his friendſhip, and introduced him to Ralph Allen, Eſq; of Prior Park, near Bath, who behaved to him with great generoſity, and at whoſe houſe he reſided for ſome time.

In 1751 Mr Brown publiſhed his "Eſſays on the Characteriſtics of Lord Shafteſbury, &c." dedicated to Ralph Allen, Eſq. This was received with a high degree of applauſe, though ſeveral perſons attempted to anſwer it. In 1754, our author was promoted by the earl of Hardwicke to the living of Great Horkeſley in Eſſex.

In 1755, our author took the degree of Doctor of Divinity at Cambridge. This year he publiſhed his tragedy of Barbaroſſa; which, under the management of Mr Garrick, was acted with conſiderable applauſe; but when it came to be publiſhed, it was expoſed to a variety of ſtrictures and cenſures. This tragedy introduced our author to the acquaintance of that eminent actor; by whoſe favour he had a ſecond tragedy, named *Athelſtan*, repreſented at Drury-Lane play-houſe. This was alſo well received by the public; but did not become ſo popular as Barbaroſſa, nor did it preſerve ſo long the poſſeſſion of the ſtage.

In 1757 appeared his famous "Eſtimate of the manners and Principles of the Times." The reception which this work met with from the public was very flattering to his vanity; no fewer than ſeven editions of it having been printed in little more than a year. The chief deſign of this performance was to ſhow, that a vain, luxurious, and ſelfiſh effeminacy in the higher ranks of life marked the character of the age; and to point out the effects and ſources of this effeminacy. Several antagoniſts appeared, ſome of whom were neither deſtitute of learning nor ingenuity; though Mr Brown himſelf aſſerted that Dr Wallace, a clergyman of Edinburgh, was the only candid and decent adverſary that appeared againſt him. The teſtimony given by M. de Voltaire to the effect which the Eſtimate had on the conduct of the nation, is very honourable to Dr Brown. "When Marſhal Richlieu, in 1756, (ſays that celebrated writer) laid ſiege to Port Mahon, the capital of Minorca, the Britiſh ſent out admiral Byng with a ſtrong naval force, to drive the French fleet off the iſland, and raiſe the ſiege. At this time there appeared a book, entitled *An Eſtimate of the Manners of the Times*; of which there was no leſs than five editions printed off in London in the ſpace of three months. In this treatiſe the author proves that the Engliſh nation was entirely degenerated;—that it was near its ruin;—that its inhabitants were no longer ſo robuſt and hardy as in former times;—and that its ſoldiers had loſt their courage. —This work rouſed the ſenſibility of the Engliſh nation, and produced the following conſequences. They attacked, almoſt at one and the ſame time, all the ſea-coaſts of France, and her poſſeſſions in Aſia, Africa, and America." In 1758, our author publiſhed the ſecond volume of his Eſtimate of the Manners and Principles of the Times; containing additional remarks on the ruling manners and principles, and on the public effects of thoſe manners and principles. The deſign of this volume was, to retract ſuch miſtakes as he thought he had committed; to prove ſuch points as were affirmed and not proved; to illuſtrate thoſe particulars which were hinted, but not explained; to reply to ſuch capital objections as had been made to his general ſyſtem by preceding writers on the ſame ſubject; and to diſplay the conſequences which might be fairly deduced from his principles, and through a deſigned brevity were omitted in the firſt volume. But it unfortunately happened that the Doctor's ſelf-opinion, which gave ſo much offence in his firſt volume, broke out in the ſecond with ſtill greater violence. The conſequence of this was, that he expoſed himſelf to general cenſure and diſlike; and the prejudices againſt him occaſioned the real excellencies of the work to be very much overlooked. The periodical critics, whom he had gone needleſsly out of his way to abuſe, treated him with uncommon ſeverity; and ſuch a multitude of antagoniſts roſe againſt him, ſo many objections were urged upon him, by friends as well as enemies, that he ſeems to have been deeply impreſſed, and to have retired for a while into the country. From the country it was that he wrote, in a ſeries of letters to a noble friend, "An Explanatory Defence of the Eſtimate of the Manners and Principles of the Times; being an Appendix to that Work, occaſioned by the Clamours lately raiſed againſt it among certain Ranks of Men."

But while Dr Brown thus diſtinguiſhed himſelf as a political writer, he was advanced to no higher dignity in the church; nay, on ſome diſguſt, it is ſuppoſed, he reſigned his living in Eſſex; however, in recompence, Dr Oſbaldeſton procured him the rectory of St Nicholas in Newcaſtle on Tyne. He would probably have received further favours from this prelate, had not the latter died ſoon after his promotion to the ſee of London.

In 1760 our author publiſhed an Additional Dialogue of the Dead, between Pericles and Ariſtides; being a ſequel to a dialogue of Lord Lyttelton's between Pericles and Coſmo. One deſign of this additional dialogue was to vindicate the meaſures of Mr Pitt, againſt whoſe adminiſtration Lord Lyttelton had been ſuppoſed to have thrown out ſome hints. Our author's next publication, in 1663, was "The cure of Saul," a ſacred ode; which was followed in the ſame year by "A Diſſertation on the Riſe, Union, and Power, the Progreſſions, Separations, and Corruptions of Poetry and Muſic." This is one of the moſt pleaſing of Dr Brown's performances, and abounds with a variety of critical diſcuſſions. A number of ſtrictures on this piece were publiſhed; and the Doctor defended himſelf in a treatiſe intitled *Remarks on ſome Obſervations on Dr Brown's Diſſertations on Poetry and Muſic*. In 1764 our author publiſhed, in octavo, "The Hiſtory of the Riſe and Progreſs of Poetry through its ſeveral Species;" which is no more than the ſubſtance given in the diſſertation abovementioned. The ſame year Dr Brown publiſhed a volume of ſermons, dedicated to his patron Dr Oſbaldeſton biſhop of London; but moſt, if not all of theſe, had been ſeparately publiſhed, excepting the firſt three, which were on the ſubject of education. In the beginning of the year 1765, the Doctor again returned to politics, and publiſhed "Thoughts on Civil Liberty, Licentiouſneſs, and Faction." At the concluſion of this work the author preſcribed a code of education, upon which Dr Prieſtley made remarks at the end of his "Eſſay on the Courſe of a Liberal Education for civil and active Life." The ſame year he publiſhed a ſermon "On the Female Character and Education," preached on the 16th of May, 1765, before the guardians of the aſylum for deſerted female orphans. His laſt publication was, in 1766, "A Letter to the Rev. Dr Lowth, occaſioned by his late Letter to the Right Reverend Author of the Divine Legation of Moſes." This was occaſioned by Dr Lowth's having *clearly*, though *indirectly*, pointed at Dr Brown as one of the extravagant adulators and defenders of biſhop Warburton. Beſides theſe works, Dr Brown publiſhed a poem on Liberty, and two or three anonymous pamphlets. At the end of ſeveral of his later writings, he advertiſed his deſign of publiſhing "Chriſtian Principles of Legiſlation," but was prevented from executing it by his death; though the work appears to have been completed.

We come now to the concluding events of our author's life; concerning which the following is the moſt authentic intelligence that can be procured. Whilſt Dr Dumareſq reſided in Ruſſia in the year 1765, to which he had been invited the preceding year to give his advice and aſſiſtance for the eſtabliſhment and regulation of ſeveral ſchools which her Imperial majeſty intended to erect, he received a letter from a lady of diſtinguiſhed character in England, recommending to him Dr Brown as a proper correſpondent on this occaſion. Dr Dumareſq then wrote a letter to Dr Brown, telling him the occaſion of his application, and the difficulties that occurred. He had imagined that nothing more would be wanted of him than what concerned claſſical learning, and a general foundation for the ſciences; as that had been the common introduction to every kind of uſeful knowledge in the weſtern parts of Europe. But on his arrival he found that a much more extenſive ſcheme was required; and ſuch as extended not only to learning properly ſo called, but alſo to matters military and naval, civil and commercial. But having ſtated his difficulties in executing this plan to Dr Brown, the latter propoſed a ſcheme ſtill more extenſive; and which was no leſs than a general plan of civilization throughout the whole Ruſſian empire. In this plan, however, though it ſhowed very enlarged ideas and great ſtrength of mind, there were ſeveral defects which rendered it, as Dr Brown himſelf was afterwards convinced, impracticable. He had laid greater ſtreſs upon the ſupport, energy, and efficacy of abſolute power in princes when exerted in a good cauſe, than experience would warrant; and he was ready to imagine that the bulk of the Ruſſian nation, juſt emerging out of barbariſm, was like a *tabula raſa*, upon which any characters might be written. At laſt the Doctor's letter was laid before the empreſs, who was ſo pleaſed with it that ſhe immediately invited him to Ruſſia. He accepted the invitation, and procured his Majeſty's leave to go: 1000 l. were ordered for his expence, and he actually received 200 l. But when he was on the point of ſetting out, an attack of the gout and rheumatiſm, to which he had been all his lifetime ſubject, ſo impaired his health, that his friends diſſuaded, and at laſt ſucceeded in preventing him from going. The money was returned, excepting 97 l. 6 s. which had been expended in neceſſaries for the intended journey. But though he thus declined the journey, a long letter which he afterwards wrote to the empreſs, and which does honour to his abilities, ſhows that he had not abandoned his intention of being ſerviceable. The affair, however, taken in all its circumſtances, did no doubt greatly agitate his mind; and his being obliged at length to give up the journey, muſt have been no ſmall diſappointment to a man of his ſanguine expectations. This diſappointment concurring with the general ſtate of his health, and perhaps the recollection of ſome other failures that had happened, was followed by a dejection of ſpirits; in conſequence of which he put an end to his life on the 23d of September 1766, in the 51ſt year of his age. On the morning of that day his ſervant came into his bed-chamber, and aſked him what ſort of a night he had had? to which he replied, "A pretty good one." The ſervant having quitted the bedſide for a few minutes, heard a noiſe in the Doctor's throat, which he imagined to be owing to ſome obſtruction occaſioned by phlegm. Going to aſſiſt his maſter, he found him ſpeechleſs, and bleeding profuſely, having cut the jugular vein with a razor; and this he had done ſo effectually, that death ſpeedily enſued. Such was the unhappy end of this ingenious writer; but the manner of it, when ſome previous circumſtances of his life are underſtood, will caſt no ſtain on his character. He had a tendency to inſanity in his conſtitution; and from his early life, had been ſubject at times to ſome diſorder in his brain, at leaſt to melancholy in its exceſs. Mrs Gilpin of Carliſle, ſoon after Dr Brown's deceaſe, wrote in the following terms in a letter to a friend. "His diſtemper was a frenzy, to which he had by fits been long ſubject; to my own knowledge, above 30 years. Had it not been for Mr Fariſh frequently, and once for myſelf, the ſame event would have happened to him long ago. It was no premeditated purpoſe in him; for he abhorred the thought of ſelf-murder; and in bitterneſs of ſoul expreſſed his fears to me, that one time or another ſome ready miſchief might preſent itſelf to him, at a time when he was wholly deprived of his reaſon."

BRUCHUS, (*Encycl.*) See Plate CCCXIII.

BUBONOCELE. For n° 13. read p. 8388, 8422.

BUG, (*Encycl.*) Early in the ſpring, even in February, the larva of theſe creatures begins to burſt from the egg; and it is at this ſeaſon that attention is ſo very requiſite. The bed ought to be ſtripped of all its furniture; which ſhould be waſhed, and even boiled, if linen; if ſtuff, it ſhould be hot-preſſed. The bedſtead ſhould be taken to pieces, duſted, and waſhed with ſpirit of wine in the joints; for in thoſe parts the females lay their eggs. This done, the joints, crevices, cavities, &c. ſhould be well filled with the beſt ſoft ſoap mixed with verdigriſe and Scots ſnuff. On this ſubſtance the larva, if any eſcape the cleanſing, or any, which is common in old houſes, creep into the bedſtead, will feed at firſt, and of courſe be deſtroyed: this laſt will effect the purpoſe in houſes where theſe vermin are not ſo numerous, by repeating the operation every three months.—Profeſſor Kalm † mentions, that from repeated trials, he has been convinced that ſulphur, if it be properly employed, entirely deſtroys bugs and their eggs in beds or walls, though they were ten times more numerous than the ants on an ant-hill. His tranſlator, Dr Forſter, adds, that a ſtill more effectual remedy is, to waſh all the infected furniture with a ſolution of arſenic. See further the article CIMICIFUGA, below.

BURSERA, in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants. There is but one ſpecies, the gummifera, or gum-elimy. This is a large tree. The leaves are pennate, the middle rib five or ſix inches long, with the pinnæ ſet oppoſite to one another on footſtalks half an inch long. The bloſſoms are ſucceeded by purple-coloured berries bigger than large peas, hanging in cluſters on a ſtalk of about five inches long, to which each berry is joined by a footſtalk of half an inch long. The ſeed is hard, white, and of a triangular figure, incloſed within a thin capſule, which divides in three parts, and diſcharges the ſeed. This tree produces a large quantity of gum, of a brown colour, and of the conſiſtence of turpentine. It is eſteemed a good vulnerary, and is much uſed for horſes. Moſt of the Bahama iſlands abound with theſe trees.

BUTTERWORT, (*Encycl.*) Wherever this plant, called alſo *Yorkſhire ſanicle*, is found, it is a certain indication of a boggy ſoil. It has long had the reputation of being noxious to ſheep. The country people believe that it gives them the rot whenever they eat it, which they will not do but from great neceſſity. Hence this plant has been called the *white rot*.

C.

CABBAGE BARK-TREE. See GEOFFRÆA, below.

CABINDA, the chief port of the kingdom of Angoy in Loango in Africa. It is ſituated at the mouth of a river of the ſame name about five leagues north of Cape Palmerino, on the north ſide of the mouth of the river Zaire. The bay is very commodious for trade, wooding, and watering.

CACHEXY. For *Index ſubjoined to Medicine*, read, p. 4810.

CACTUS. For CERES, read CEREUS.

CÆSARIAN OPERATION. For chap. vi. read chap. xv.

CALAMUS, in botany, a genus of the monogynia order, belonging to the hexandria claſs of plants. There is but one ſpecies, the rotang, or true Indian cane. The ſtem is without branches, has a crown at top, and is every where beſet with ſtraight ſpines. This is the true Indian cane, which is not viſible on the outſide; but the bark being taken off diſcovers the ſmooth ſtick, which has no marks of ſpine on the bark, and is exactly like thoſe which the Dutch ſell to us; keeping this matter very ſecret, leſt travellers going by ſhould take as many canes out of the woods as they pleaſe. Sumatra is ſaid to be the place where moſt of theſe ſticks grow. Such are to be choſen as are of a proper growth between two joints, ſuitable to the faſhionable length of canes as they are then worn: but ſuch are ſcarce.

CALASH. For n° 76. read n° 73.

CALCAREOUS EARTH, (*Encycl.*) Though this kind of earth cannot be vitrefied by itſelf in the heat of our common furnaces, it is remarkable, that by mixing it with argillaceous earth, which is as unvitrefiable as itſelf, both will melt together into glaſs. To illuſtrate this, Dr Watſon relates the following experiment. "Mix well together equal weights of powdered chalk or other calcareous body, and powdered pipe-clay; put the mixture into a crucible. Any where towards the middle of the crucible put two ſolid pieces; one of pure chalk, the other of pure clay, ſo that they may not be contiguous to each other, but be every where ſeverally ſurrounded with the mixture of chalk and clay. Then by expoſing the whole to a ſtrong degree of heat for a ſufficient length of time, it will be found that the mixture has been converted into glaſs; and upon breaking the vitrefied maſs, we ſhall diſcover the two ſolid pieces of chalk and clay unvitrefied and unaltered in their figure, tho' every where ſurrounded with glaſs.

It is remarkable, that ſome kinds of calcareous earth, after being deprived of all their fixed air by calcination, will regain, upon being expoſed to the atmoſphere, the very ſame quantity that they loſt, while others will not. Dr Watſon informs us, that having calcined into lime 204 grains of dove marble, the lime weighed whilſt hot 116 grains. This was done on the 6th of March; and on the 5th of November following it weighed $203\frac{1}{2}$ grains. As it had been frequently weighed during that interval, it is very probable that the half grain had been loſt by repeating this operation. A ſecond experiment turned out, as accurately as could be expected, the ſame. Some dry chalk, weighing 120 grains, was reduced by calcination to 68. This quantity of lime increaſed only to 104 grains; ſo that 16 parts in 120, or between one ſeventh and one eighth of its weight, were never regained. The Doctor gives a reaſon for this defect of increaſe in the following manner. "The chalk or clunch (ſays he) of this country, is not a pure calcareous earth, but contains a portion of ſand: and hence, when a definite weight of this chalk-lime is expoſed to the air, it cannot acquire as much increaſe of weight as the ſame quantity of purer lime would do; for the ſand which is mixed with the lime is of a very different nature from it, and does not attract any thing from the air." It is difficult, however, on this ſuppoſition, to ſee why the ſand ſhould loſe any thing by calcination; for as it can regain no air, ſo it can loſe none in the fire. The following is a table of the weight regained by lime made from different materials, according to Dr Watſon's experiments. He obſerves, however, that there is great reaſon to believe, that the quantity of matter which the ſame ſort of lime can attract from the air, depends very much on the degree of heat with which the lime has been burned. There is a certain definite degree of heat requiſite to make the lime attract the greateſt poſſible quantity from the air. When the heat is not ſufficient to convert the whole of the ſubſtance into lime, then that part which is not converted into lime will not contribute any thing to the increaſe of the lime when expoſed to the air, inaſmuch as it poſſeſſes no quality of attracting any thing from the air. Our author obſerves alſo, that the ſame effect takes place when the heat has been more than ſufficient to convert the whole of the ſubſtance into lime; for then a partial vitrification takes place. The following ſubſtances were changed into lime by being expoſed to a very fierce fire for 24 hours. The experiment was made in November 1779; and in three months they had all acquired the greateſt increaſe of weight. The firſt column of the table expreſſes the increaſe of weight which a ton of the ſame ſubſtances gained; and the ſecond expreſſes that which they would have gained, had they been expoſed to the fire only for four hours.

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† *Travels in America.*

	C.	*q.*	*lb.*	*C.*	*q.*	*lb.*
Sunna marble,	8	1	15	15	0	12
Rhomboidal ſpar,	8	1	5	14	0	16
Statuary marble,	8	0	0	14	2	0
Chalk,	7	1	13	10	2	9
Clithero limeſtone,	6	2	9	12	1	15
Cryſtallized ſpar,	6	0	0	13	1	25

CALCINATION, (*Encycl.*) In confirmation of the opinion that the increaſe of weight in metallic calces is owing to the adheſion of elaſtic fluids, it may be obſerved, that various metallic calces are in great meaſure ſoluble in water; which ſhows that they have ſomething of a ſaline nature. Perhaps the elaſtic, or that matter, whatever it is, which generates the elaſtic fluids obtained from theſe calces, renders them ſo.

CALX ANTIMONII, is the earthy part of the regulus of antimony when deprived of its phlogiſton. See PHARMACY, n° 791. By the mere action of fire, however, the whole of its phlogiſton cannot be diſſipated; though it may be done by the addition of nitre, and the calx become perfectly white; but in this caſe it cannot be melted into glaſs, except in the focus of a burning mirror. The calx of antimony, perfectly deprived of its phlogiſton, has been uſed in medicine chiefly under the name of *diaphoretic antimony*; but little regard is now paid to it.

CAMPHORA. In marginal note, for n° 198. read *The Table.*

CAMPVEER. See VEER, (*Encycl.*)

Lighting a CANDLE *by a ſmall ſpark of electricity.* This method, which is an invention of Dr Ingenhouſz, is recorded in the Phil. Tranſ. vol. 68. It is done by a ſmall vial, having eight or ten inches of metallic coating, or even leſs, charged with electricity, which may be done at any time of the night by a perſon who has an electric machine in his room. "When I have occaſion to light a candle," ſays he, "I charge a ſmall-coated phial, whoſe knob is bent outwards, ſo as to hang a little over the body of the phial; then I wrap ſome looſe cotton over the extremity of a long braſs pin or a wire, ſo as to ſtick moderately faſt to its ſubſtance. I next roll this extremity of the pin wrapped up with cotton in ſome fine powder of reſin, (which I always keep in readineſs upon the table for this purpoſe, either in a wide-mouthed phial or in a looſe paper); this being done, I apply the extremity of the pin or wire to the external coating of the charged phial, and bring, as quickly as poſſible, the other extremity wrapped round with cotton to the knob: the powder of reſin takes fire, and communicates its flame to the cotton, and both together burn long enough to light a candle. As I do not want more than half a minute to light my candle in this way, I find it a readier method than kindling it by flint and ſteel, or calling a ſervant.

"I have found, that powder of white or yellow reſin lights eaſier than that of brown.

"The *farina lycopodii* may be uſed for the ſame purpoſe: but it is not ſo good as the powder of reſin, becauſe it does not take fire quite ſo readily, requiring a ſtronger ſpark not to miſs; beſides, it is ſoon burnt away.

"By dipping the cotton in oil of turpentine, the ſame effect may be as readily obtained, if you take a jar ſomewhat greater in ſize. This oil will inflame ſo much the readier if you ſtrew a few fine particles of braſs upon it. The pin duſt is the beſt for this purpoſe; but as this oil is ſcattered about by the exploſion, and when kindled fills the room with much more ſmoke than the powder of reſin, I prefer the laſt."

CANDLE-*Bombs*, a name given to ſmall glaſs bubbles, having a neck about an inch long, with a very ſlender bore, by means of which a ſmall quantity of water is introduced into them, and the orifice afterwards cloſed up. This ſtalk being put through the wick of a burning candle, the vicinity of the flame ſoon rarifies the water into ſteam, by the elaſticity of which the glaſs is broken with a loud crack.

CANELLA ALBA, (*Encycl.*) Marginal note, for n° 201, read *Catalogue of Simples*, (*Encycl.*) See alſo WINTERANIA in this *Appendix.*

CANNEL COAL, a ſpecies of coal remarkable for being eaſily kindled, and burning with a bright flame. It receives its name from *canwyll*, which in the old Britiſh language ſignifies "a candle;" the want of which is ſupplied by the bright flame of this coal. See COAL, (*Encycl.*)

CANTHARIS, (*Encycl.*) The cantharis noctiluca, which is frequently found in paſtures and under juniper trees, ſhines by night. In Italy and North America a ſpecies of winged cantharides remain all night on the ſhrubs and branches of trees, emitting light; but on the approach of any enemy inſtantly fly off, and the whole tree ſeems on fire. This wonderful light, which has no connection either with the culinary or electric fire, is placed in the ſegments of the abdomen of the inſect while it remains alive.

CAOUTCHOUC, (*Encycl.*) A method of diſſolving this elaſtic gum without ether is as follows: Take one pound of the ſpirit of turpentine, and a pound of the gum cut into very ſmall pieces; pour the turpentine into a long-necked matraſs, which muſt be placed in a ſand-bath; throw in the gum, not all at once, but by little and little according as it is perceived to diſſolve. When it is entirely diſſolved, pour into the matraſs a pint of nut or linſeed oil, or oil of poppies, rendered deſiccative in the uſual manner with litharge. Then let the whole boil for a quarter of an hour, and the preparation is finiſhed.—This would make an excellent varniſh for Air-balloons, were it not ſo expenſive on account of the price of the gum.

CARDAMOM. For n° 210, 211. read *The Catalogue of Simples.*

CAREENING. For plate LXXXIV. read plate LXXXIII.

CARICA, (*Encycl.*) See alſo PAPAW, (*Encycl.*)

CARIES. For *Index ſubjoined to Medicine*, read *Surgery*, n° 393.

CARNATION, or the naked parts of painting, (*Encycl.*) See alſo MINIATURE-*Painting*, (*Encycl.*)

CARRONADE, a ſhort kind of ordnance lately invented, capable of carrying a large ball, and uſeful in cloſe engagements at ſea. It takes its name from Carron, the place where it was invented. See GUNNERY, n° 45. (*Encycl.*)

CARUS. For *the Index ſubjoined to Medicine*, read MEDICINE, n° 372—374.

CARYOPHYLLUS. For n° 49. read *Catalogue of Simples.*

CASK, in heraldry. For n° 45. read p. 3607.

CASSIA. For n° 223. read *Catalogue of Simples.*

CASTOREUM. For n° 224. read *Catalogue of Simples.*

CAT. For fig. 4. read fig. 9.

CATECHU, (*Encycl.*) See alſo ARECA, (*Encycl.*)

CATHARTICS. For n° 54. &c. read p. 4476.

CATOCHE. For *Index ſubjoined to Medicine*, read *Medicine*, n° 387.

CAUSTICITY, (*Encycl.*) Par. 2d, line 10. after *inflammable matter*, add *and all their fixed air.*

CEMENT, (*Encycl.*) See alſo STUCCO, (*Encycl.*)

CENTRONIA, in natural hiſtory, a name by which the echini marini have been lately diſtinguiſhed. Dr Hill makes them a diſtinct claſs of animals living under the defence of ſhelly coverings formed of one piece, and furniſhed with a vaſt number of ſpines moveable at the creature's pleaſure.

CERATE. For the references at the end, read *Pharmacy*, n° 1019—1021.

CERUSSE OF ANTIMONY, the ſame with CALX *of Antimony.*

CHAIN-WALES, (*Encycl.*) See Plate LXXXII. fig. 13.

CHANCE. For *Sortes*, read *Sortilege.*

CHANCELLOR's COURT, in the univerſities of Oxford and Cambridge. See UNIVERSITY *Courts* (*Encycl.*)

CHAPEAU. For n° 27. read p. 3607.

CHARLOCKS, (*Encycl.*) Theſe are the peſts of our corn-fields, and are ſaid to give a moſt unwholeſome quality to bread when the ſeeds abound in grain.

CHARTA MAGNA. For LAW, n° 31. read MAGNA *Charta.*

CHAVARIA, in ornithology. See the article PARRA in this *Appendix*,

CHEMISTRY. N° 101. par ult. for "See ESSAYING, GLASS, and SMELTING," read "See FURNACE and GLASS."

CHESELDEN, (William), an eminent anatomiſt and ſurgeon, was born at Burrow on the Hill, in the county of Leiceſter, deſcended from an ancient family in the county of Rutland, whoſe arms and pedigree are in Wright's "Hiſtory of Rutland." He received the rudiments of his profeſſional ſkill at Leiceſter; and married Deborah Knight, a citizen's daughter, by whom he had one daughter, Williamina Deborah. In 1713 he publiſhed his Anatomy of the Human Body, 1 vol. 8vo; and in 1723, A Treatiſe on the high Operation for the Stone. He was one of the earlieſt of his profeſſion who contributed by his writings to raiſe it to its preſent eminence. The following verſes were addreſſed to him in 1733, "on his many dextrous and ſucceſsful operations:"

Oh wondrous Artiſt! (ſurely given,
By the peculiar grace of Heaven,
As a new Saviour to mankind,
The lame to cure, relieve the blind,
And, by the ever happy knife,
To eaſe, and lengthen human life!
How doſt thou grace that noble art,
Which owes to you its nobleſt part!
How well deſerve the general praiſe
Your univerſal fame does raiſe!
How juſt your merit, for the place
Conferr'd on you by royal grace!
Well might the care alone be thine,
To tend on gracious Caroline,
Since all allow your ſkill divine.
No more let France her artiſts boaſt,
To you but ſmatterers at moſt.
Their Charité, or Hotel Dieu,
Ne'er ſaw ſuch cures as done by you;
Aware of this, with utmoſt ſpeed,
Their New ACADEMY decreed
You all their honours, and, to grace
Their liſt, therein give you a place:
From ſuch a member they receive
A greater honour than they give.
Long may you live, and bleſs the land
With your unerring ſkill and hand.
May this ne'er fail, that never warp;
And may they both deſcend to Sharp!

M. Rev Appen. vol. 62. p. 522.

In the beginning of 1736, he was thus honourably mentioned by Mr Pope: "As ſoon as I had ſent my laſt letter, I received a moſt kind one from you, expreſſing great pain for my late illneſs at Mr Cheſelden's. I conclude you was eaſed of that friendly apprehenſion in a few days after you had diſpatched yours, for mine muſt have reached you then. I wondered a little at your quære, who Cheſelden was. It ſhews that the trueſt merit does not travel ſo far any way as on the wings of poetry: he is the moſt noted and moſt deſerving man in the whole profeſſion of chirurgery; and has ſaved the lives of thouſands by his manner of cutting for the ſtone." He appears to have been on terms of the moſt intimate friendſhip with Mr Pope, who, frequently, in his Letters to Mr Richardſon, talks of dining with Mr Cheſelden, who then lived in or near Queen Square. In February 1737, Mr Cheſelden was appointed ſurgeon to Chelſea Hoſpital. As a governor of the Foundling Hoſpital, he ſent a benefaction of 50l. to that charity, May 7. 1751. incloſed in a paper with the following lines:

'Tis what the happy to the unhappy owe;
For what man gives, the gods by him beſtow. POPE.

He died at Bath, April 11. 1752, of a diſorder ariſing from drinking ale after eating hot buns. Finding himſelf uneaſy, he ſent for a phyſician, who adviſed vomiting immediately; and if the advice had been taken, it was thought his life might have been ſaved. By his direction, he was buried at Chelſea.

CHEVERON. For n° 23, 24. read p. 3592.

CHINA, (*Encycl.*) The immenſe population of China, recorded under that article, n° 55. falls very far ſhort of that recorded by ſome late authors. In the Memoirs of the Hiſtory, &c. of the Chineſe by the miſſionaries at Pekin, publiſhed at Paris in 1780, we find a controverſy on this ſubject between M. Pau and the ex-jeſuit M. Amiott. The former had publiſhed a book, intitled "Philoſophical Inquiries concerning the Egyptians and Chineſe," in which he rates the population of China much below 82 millions. Amiott is ſo far from being of this opinion, that he eſtimates their number at 200 millions. To confirm this eſtimate, he produces a liſt made in 1743, of all that paid taxes in the reſpective provinces, that is, of all the heads of families; and, on ſumming up their numbers, he finds 28,516,428 families; in which enumeration, ſays he, women, children, and domeſtics, are not reckoned. The Chineſe reckon, at an average, ſix to a family; M. Amiott reduces this computation to five, and on this ſuppoſition makes the inhabitants of China amount to 142,582,400 ſouls. But in this number the Miſſionary comprehends neither the grand mandarins, the inferior ones, nor the literati, nor the military, which amount, according to his calculations, to upwards of ſeven millions; which added to the enumeration abovementioned, make 149,663,000 ſouls. Fifty millions are nevertheleſs ſtill wanting to make up the 200 millions at which our Miſſionary eſtimates the inhabitants of China. Theſe he finds in the inhabitants of Pekin, which he reckons at two millions, the Mantcheou Tartars, who live among the Chineſe, the tradeſmen, the perſons employed in the ſilk manufactures, and the populace of the cities, which are not regiſtered. But the computations of M. Amiott are liable to great difficulties, and are certainly arbitrary and uncertain in ſeveral reſpects. He comprehends in his enumeration diſtricts and provinces that belong to Tartary, and not to China; and he calculates often from regiſters of the ſame diſtricts, that are diſcordant and contradictory. When it is conſidered, that the enumerations of the inhabitants of China have been different under different dynaſties, as all the emperors did not poſſeſs the ſame extent of territory,—that the wars with the Tartars often obliging the Chineſe to withdraw in great numbers towards the ſouth, rendered certain provinces more populous at one period than they were at another,—that the numbers of the poor, the ſtraggling labourers, and of thoſe that ply on the rivers, cannot be eaſily computed,—and that many of the regiſters are evidently arbitrary; we find ourſelves diſpoſed to ſuſpend our determination of the controverſy between M. Amiott and M. Pau relative to the object now under conſideration. If population had gone on increaſing in China, from the third century before the Chriſtian æra (which was the period of their riſing power), the Chineſe might have ſent into Tartary numerous colonies, which would have peopled that country and civilized its inhabitants. But this has not been the caſe; and notwithſtanding all the pompous relations of the Miſſionaries, it is certain, that a bad adminiſtration,—the extortions and oppreſſive conduct of civil and military officers,—the revolutions occaſioned by the eſtabliſhment of different dynaſties,—famine,—epidemics,—inundations,—wars,—maſſacres—and the fall of great miniſters, involving their friends and families in ruin, keep population within certain bounds, and hinder it from riſing to a pitch that would produce new and fatal revolutions.

M. Rev. Appen. to vol. 61. p. 522.

CHITAU. For *Lignum-aloes*, read *Xylo-aloes*.

CHIVALRY, (*Encyl.*) See alſo KNIGHT, (*Encycl.*)

CHOCOLATE, (*Encycl.*) This, according to Linnæus, is more ſalutary than either tea or coffee. There are three methods of preparing it, as practiſed by the Indians, the Spaniards, and others. The Indians, to one pound of the roaſted nuts put half a pound of ſugar diſſolved in roſe-water, and half a pound of flour of maize or Indian corn. The Spaniards, to ſix pounds of the nut add three and an half of ſugar, ſeven pods of vanillas, one pound and an half of Indian corn, half a pound of cinnamon, ſix cloves; one drachm of capſicum, and whatſoever is thought requiſite of the roucou nut to improve the colour, together with ambergriſe or muſk to give an agreeable ſcent. In the other and more common way, to ſeventeen pounds of nuts are added ten pounds of ſugar, twenty-eight pods of vanillas, one drachm of ambergriſe, and ſix ounces of cinnamon.

CICINDELA, (*Encycl.*) See alſo GLOW-*Worm*, (*Encycl.*)

CIMICIFUGA, in botany, a genus of the polyandria order, belonging to the dioecia claſs of plants. Meſſerſchmidius, in the Iſis Siberica, gives it the following character and name: *Cimicifuga fœtida* with the leaves of the herb Chriſtopher, bearing a thyrſis of yellow male flowers with a red villous ſeed, the ſeed-veſſel in form of a horn. This whole plant ſo reſembles the actea racemoſa, that it is difficult to diſtinguiſh them when not in flower; but in the fructification it greatly differs from it, the cimicifuga having four piſtills, the actea but one. Jacquin ſays, that it is a native of the Carpathian mountains. It has obtained the name of *cimicifuga*, or *bugbane*, both in Siberia and Tartary, from its property of driving away thoſe inſects; and the botaniſts of thoſe parts of Europe which are infeſted by them, have long deſired to naturaliſe it in their ſeveral countries.

CIVIL LIST. See LIST, (*Encycl.*)

CIVIL *Society*. For LAW, *Part I.* read *Part II.*

CLAVARIA. Par. 2. line 1. For *Mr Miller*, read *Mr Muller*.

CLEPSYDRA, (*Encycl.*) See alſo HYDROSTATICS, n° 42. (*Encycl.*)

CLYDESDALE. See LANERKSHIRE, (*Encycl.*)

COAL, (*Encycl.*) See alſo PITCH and TAR, (*Encycl.*)

CAPE COAST, the name of the chief Britiſh ſettlement on the coaſt of Guinea in Africa. The name is thought to be a corruption of *Cabo Corſo*, the ancient Portugueſe appellation. This cape is formed by an angular point, waſhed on the ſouth and eaſt by the ſea, on which ſtands the Engliſh fort. Here the Portugueſe ſettled in 1610, and built the citadel of Cape Coaſt upon a large rock that projects into the ſea. A few years afterwards they were diſlodged by the Dutch, to whom this place is principally indebted for its ſtrength. In 1664 it was demoliſhed by Admiral

Holmes, and in 1665 the famous Dutch admiral De Ruyter was ordered by the ſtates to revenge the inſults of the Engliſh. With a ſquadron of 13 men of war he attacked all the Engliſh ſettlements along the coaſt, ruined the factories, took, burnt, and ſunk all the ſhipping of the Engliſh Company: however, after all his efforts, he was baffled in his attempts on Cape Coaſt. By the treaty of Breda it was confirmed to the Engliſh, and the king granted a new charter in 1672; on which the Company applied all their attention to the fortifying and rendering it commodious.

COBALT. At the end, for *Zaffre*, read *Regulus*.

COCCINELLA, (*Encycl.*). Dele the whole article, and read as follows:

Plate CCCXIII. COCCINELLA, a genus of inſects of the order of coleoptera; the characters of which are theſe: The antennæ are ſubclavated; the palpi are longer than the antennæ, the laſt articulation heart-ſhaped; the body is hemiſpheric; the thorax and elytra are margined; the abdomen is flat. This genus is divided into ſections, from the colour of the elytra, and of the ſpots with which they are adorned. The females, impregnated by the males, depoſit their eggs, which turn to ſmall larvæ, ſlow in their progreſs, and enemies to the plant-louſe. Thoſe larvæ are frequently found upon leaves of trees covered with plant-lice. On the point of being metamorphoſed, they ſettle on a leaf by the hinder part of their body, then bend and ſwell themſelves, forming a kind of hook. The ſkin extends, grows hard; and in a fortnight's time the chryſalis opens along the back. The inſect in its perfect ſtate receives the impreſſions of the air, that gives its elytra a greater degree of conſiſtence. It ſeldom flies, and cannot keep long on the wing. Of all the different larvæ of the coccinella, the moſt curious is the white hedgehog, a name given it by M. de Reaumur on account of the ſingularity of its figure, and the tufts of hair which render it remarkable. It ſeeks its food on the leaves of trees. After a fortnight, it ſettles on one ſpot, and, without parting with its fur, turns to a chryſalis; three weeks after which, it becomes a coccinella. The ſlough appears nowiſe impaired by its transformation. M. de Reaumur has obſerved it on a plum-tree. It is likewiſe found upon the roſe-tree.

When the coccinellæ firſt arrive at the ſtate of perfection, the colours of their elytra are very pale, nearly bordering upon white or cream colour; and the elytra are very ſoft and tender, but ſoon grow hard, and change to very lively brilliant colours. Their eggs are of an oblong form, and of the colour of amber.

The cochineal-inſect, deſcribed by miſtake under this title in the *Encyclopædia*, belongs to a different genus. See COCCUS, below.

COCCUS, the COCHINEAL, was by miſtake confounded with the COCCINELLA, (*Encycl.*) which is a genus belonging to a different order. See COCCINELLA, above.

After "frequent," line 6th of the article Coccus, in *Encycl.* ſupply as follows.

Plate CCCXIII. The moſt remarkable ſpecies are:

1. The coccus heſperidum, or green-houſe bug, is oval, oblong, of a brown colour, covered with a kind of varniſh: It has ſix legs; with a notch and four briſtles at the tail. It infeſts orange-trees, and other ſimilar plants in green-houſes. When young, it runs upon the trees; but afterwards fixes on ſome leaf, where it hatches an infinity of eggs, and dies. The male is a very ſmall fly.

2. The coccus phalaridis. The male of this cochineal is ſmall. Its antennæ are long for its ſize. The feet and body are of a reddiſh colour, nearly pink, and ſprinkled with a little white powder. Its two wings, and the four threads of its tail, are ſnow white, and of thoſe threads two are longer than the reſt. It is to be found upon the ſpecies of gramen which Linnæus calls *phalaris*. The female contrives, along the ſtalks of that dog-graſs, little neſts, of a white cottony ſubſtance, in which ſhe depoſits her eggs. The ſmall threads of her tail are ſcarce perceptible.

3. The coccus cacti, or famous Mexican cochineal, (ſee COCHINEAL, below), a native of the warm parts of America. In Mexico this ſpecies is nurſed with great care. It naturally fixes upon the leaves of various kinds of plants. The Indians gather them, put 10 or 12 into little beds made of moſs or of the flue of coco; after which they hang them upon the thorns of the plant known under the various names of *racket*, *cardaſſia*, *Indian fig-tree*, *opuntia*, *nopal*. There grow great quantities of that plant round their habitations. The gall-inſects give birth to myriads of young ones. They diſperſe, feed on the juice of the plant, and there produce a freſh generation. There are three gatherings of them every year. The firſt is performed by taking off the neſts brought and placed upon the plants; the ſecond, by looſening the cochineal from off the leaves with pincers; and the third, at the approach of winter, by cutting off the leaves that are yet loaded with the inſects. Thoſe plants remaining green for a conſiderable time, afford them ſuſtenance. When they have attained their full ſize, they are taken off by ſcraping the leaf. This laſt cochineal is not of ſo fine a quality, becauſe a little of the epiderm of the leaf is blended with it. The Spaniards call it *granilla*. As ſoon as the inſects are brought together, they are deſtroyed. The method taken to effect this has great influence upon the colour. It then goes by various names. That which they kill by the gentle heat of ovens, is of an aſh-grey or mottled, and is named *jaſpeada*. Dillon's Travels through Spain. If the inſects are deprived of life by plunging them with baſkets into hot water, it then goes by the appellation of *renegrida*, which is not covered over with a white powder. Laſtly, it bears the name of *negra*, if deſtroyed upon the hot plates that have been uſed for roaſting of maize. By this laſt proceſs it ſometimes receives too great a degree of heat, from which it turns ſomewhat black. Three pounds of freſh-gathered cochineals weigh but one when dried. The cochineal thus nurſed upon cultivated plants, yields a more beautiful colour, and in greater quantity, than does the wild. Dried cochineals will preſerve their colouring particles for ages, as no other inſect fixes on them; neither do they ever decay. This valuable inſect is uſed for dyeing, where it produces a red colour of an excellent tincture, in variety of ſhades. It is made into ſcarlet and crimſon. The Engliſh mix it with gum-lac to dye their cloths. This dye is more expeditious, as good, and cheaper. The cochineal furniſhes painters with the moſt lively colours and moſt beautiful ſhades; and the ſame ſubſtance, ground and prepared, produces carmine, which, ſkilfully laid on over

the ladies cheeks, emulates nature. At Conſtantinople they ſell a crape or very fine lawn dyed in cochineal; and the ſame is imitated at Straſburgh. This lawn, dipped in water, may be uſed equally with the nacarat-wool of Portugal to the ſame purpoſes as cochineal, one of which is to give a colour to liquors. It is computed that there are imported yearly into Europe, in the courſe of trade, 880,000 pounds of cochineals.

The female cochineal had been long known, and well deſcribed, by ſeveral naturaliſts; but the male having been ſeldom ſeen, the hiſtory of this valuable inſect has hitherto been very defective. Mr Ellis, being informed that this inſect bred in great abundance on the cactus opuntia of Linnæus, in South Carolina and Georgia, as well as on the cactus coccinelifer in Mexico and Jamaica, obtained from Dr Garden ſome branches of the former, with the inſects upon them. In examining ſeveral of theſe ſpecimens, he at laſt diſcovered three or four minute dead flies with white wings; and having moiſtened them in ſpirit of wine, and obſerving them with a microſcope, found that they were of a bright red colour, which convinced him that theſe were the true male inſects. Dr Garden, to whom this diſcovery was communicated, made ſeveral obſervations on the male ſpecies. This is very rarely found; ſo that he imagines there may be 150 or 200 females for one male. The male is much leſs than the female, more active, and better made; and the body of it is of a lighter red than that of the other.

4. The coccus ilicis, or that forming the kermes grains, inhabits the quercus coccifera of the ſouthern parts of Europe. Mr Hellot of the French Academy of Sciences, in his Art of Dyeing, chap. 12. ſays it is found in the woods of Vauvert, Vendeman, and Narbonne; but more abundantly in Spain, towards Alicant and Valencia. It not only abounds in Valencia, but alſo in Murcia, Jaen, Cordova, Seville, Eſtremadura, la Mancha, Serranias de Cuenca, and other places.

Dillon's Travels through Spain.

In Xixona and Tierra de Relleu, there is a diſtrict called *De la Grana*, where the people of Valencia firſt began to gather it, whoſe example was followed all over Spain. It has ſome years produced 30,000 dollars (5000l.) to the inhabitants of Xixona.

Both ancients and moderns ſeem to have had very confuſed notions concerning the origin and nature of the kermes; ſome conſidering it as a fruit, without a juſt knowledge of the tree which produced it; others taking it for an excreſcence formed by the puncture of a particular fly, the ſame as the common gall obſerved upon oaks. Tournefort was of this number. Count Marſigli, and Dr Niſole a phyſician of Montpelier, made experiments and obſervations, with a view of further diſcoveries; but did not perfectly ſucceed. Two other phyſicians at Aix in Provence, Dr Emeric and Dr Garidel, applied themſelves about the ſame time, and with greater ſucceſs; having finally diſcovered that the kermes is in reality nothing elſe but the body of an inſect transformed into a grain, berry, or huſk, according to the courſe of nature.

The progreſs of this transformation muſt be conſidered at three different ſeaſons. In the firſt ſtage, at the beginning of March, an animalcule, no larger than a grain of millet, ſcarce able to crawl, is perceived ſticking to the branches of the tree, where it fixes itſelf, and ſoon becomes immoveable; at this period it grows the moſt, appears to ſwell and thrive with the ſuſtenance it draws in by degrees. This ſtate of reſt ſeems to have deceived the curious obſerver, it then reſembling an excreſcence of the bark; during this period of its growth, it appears to be covered with a down, extending over its whole frame like a net, and adhering to the bark: its figure is convex, not unlike a ſmall ſloe; in ſuch parts as are not quite hidden by this ſoft garment, many bright ſpecks are perceived of a gold colour, as well as ſtripes running acroſs the body from one ſpace to another.

At the ſecond ſtage, in April, its growth is completed, its ſhape is then round, and about the ſize of a pea: it has then acquired more ſtrength, and its down is changed into duſt, and ſeems to be nothing but a huſk or a capſule, full of a reddiſh juice not unlike diſcoloured blood.

Its third ſtate is towards the end of May, a little ſooner or later, according to the warmth of the climate. The huſk appears replete with ſmall eggs, leſs than the ſeed of a poppy. Theſe are properly ranged under the belly of the inſect, progreſſively placed in the neſt of down that covers its body, which it withdraws in proportion to the number of eggs: after this work is performed, it ſoon dies, though it ſtill adheres to its poſition, rendering a further ſervice to its progeny, and ſhielding them from the inclemency of the weather, or the hoſtile attacks of an enemy. In a good ſeaſon they multiply exceedingly, having from 1800 to 2000 eggs, which produce the ſame number of animalcules. When obſerved with the microſcope in July or Auguſt, we find, that what appeared as duſt, are ſo many eggs or open capſules, as white as ſnow, out of each of which iſſues a gold-coloured animalcule, of the ſhape of a cockroach, with two horns, ſix feet, and a forked tail.

In Languedoc and Provence the poor are employed to gather the kermes, the women letting their nails grow for that purpoſe, in order to pick them off with greater facility.

The cuſtom of lopping off the boughs is very injudicious, as by this means they deſtroy the next year's harveſt. Some women will gather two or three pounds a-day; the great point being to know the places where they are moſt likely to be found in any quantity, and to gather them early with the morning-dew, as the leaves are more pliable and tender at that time, than after they have been dried and parched by the rays of the ſun: ſtrong dews will occaſionally make them fall from the trees ſooner than uſual: when the proper ſeaſon paſſes, they fall off of themſelves, and become food for birds, particularly doves. Sometimes there will be a ſecond production, which is commonly of a leſs ſize with a fainter tinge. The firſt is generally found adhering to the bark, as well as on the branches and ſtalks; the ſecond is principally on the leaves, as the worms chooſe that part where the nutritious juice preſerves itſelf the longeſt, is moſt abundant, and can be moſt eaſily devoured in the ſhort time that remains of their exiſtence, the bark being then drier and harder than the leaves.

Thoſe who buy the kermes to ſend to foreign parts ſpread it on linen, taking care to ſprinkle it with vinegar, to kill the worms that are within, which produces a red duſt, which in Spain is ſeparated from the huſk. Then they let it dry, paſſing it through a ſearce, and make it up into bags. In the middle of each, its proportion of red duſt, put in a little leather bag, alſo belongs to the buyer; and then it is ready for exportation, being always in demand on the African coaſt.

The people of Hinojos, Bonares, Villalba, and other parts of the kingdom of Seville, dry it on mats in the ſun, ſtirring it about, and ſeparating the red duſt, which is the fineſt part, and being mixed with vinegar goes by the name of *paſtel*. The ſame is done with the huſks; but theſe have but half the value of the duſt.

The kermes of Spain is preferred on the coaſt of Barbary, on account of its goodneſs. The people of Tunis mix it with that of Tetuan, for dyeing thoſe ſcarlet caps ſo much uſed in the Levant. The Tuniſians export every year above 150,000 dozen of theſe caps, which yields to the Dey a revenue of 150,000 hard dollars (33,750 l.) *per annum* for duties; ſo that, excluſive of the uſes and advantages of kermes in medicine, it appears to be a very valuable branch of commerce in Spain.

5. The coccus polonicus. See COCCUS *Polonicus*, (*Encycl.*)

COCHINEAL, or COCHENEEL, a drug uſed by the dyers, &c. for giving red colours, eſpecially crimſons and ſcarlets, and for making carmine; and likewiſe in medicine as a cardiac, cordial, ſudorific, alexipharmic, and febrifuge.

The cochineal, in the ſtate in which it is brought to us, is in ſmall bodies of an irregular figure, uſually convex, and ridged and furrowed on one ſide, and concave on the other. The colour of the beſt is a purpliſh grey, powdered over with a ſort of white duſt. All that the world knew of it for a long time was, that it was gathereed from certain plants in Mexico; and therefore it was naturally ſuppoſed to be a ſeed, till in the year 1692 Father Plumier gave Pomet an account of its being an animal. And this, though then diſregarded, has been confirmed by ſubſequent obſervations. Indeed, to determine the point, we have now the means in our own hands, even in this part of the world.—We need only moiſten and ſoak in water, or in vinegar, a number of cochineals till they are ſwelled and diſtended, to know that every one is the more or leſs perfect body of an inſect; the moſt imperfect and mutilated ſpecimens always ſhow the rings of the body; and from obſerving others, it will be eaſy to find the number and diſpoſition of the legs; parts, or even whole ones, being left on ſeveral, and often complete pairs. In this way the legs, antennæ, and proboſcis, may be diſcovered. See COCCUS above.

COCKBURNE (Mrs Catharine), a moſt accompliſhed lady and celebrated writer, was the daughter of captain David Trotter, a native of Scotland, and a ſea-commander in the reign of king Charles II. She was born in London, Aug. 16. 1679, and baptized in the Proteſtant church, according to which ſhe was bred up in her infancy a Proteſtant; but being a ſprightly, ingenious, and beautiful child, ſhe was particularly careſſed by ſome conſiderable families among the Papiſts. This favour naturally wrought a good opinion of ſuch friends; and entering into an intimacy with them as ſhe grew up, ſhe became an eaſy conqueſt to their faith, in which ſhe continued many years. In the mean time her genius ripened apace, and ſhot forth proofs of her talents for poetry, even before ſhe had paſſed her childhood. In her 17th year ſhe produced a tragedy called *Agnes de Caſtro*, which was acted in 1695. This performance, and ſome verſes addreſſed to Mr Congreve upon his *Mourning Bride* in 1697, brought her into the acquaintance of that gentleman. Thus encouraged in her firſt attempt, her Muſe brought upon the ſtage three plays more, before the death of Mr Dryden in 1701, to whoſe memory ſhe joined with ſeveral other ladies in paying a tribute of verſe. However, poetry and dramatic writing was not the moſt diſtinguiſhed of Miſs Trotter's talents; ſhe had a remarkable philoſophic turn, and capacity equal to ſuch reſearches. Mr Locke's Eſſay on Human Underſtanding came out during this interval: that famous philoſopher had dreſſed out logic and metaphyſics in ſuch a new mode as was very agreeable to the taſte of the ſex in general, and particularly engaged the attention and admiration of our young authoreſs. She had begun to project a defence of the eſſay againſt ſome remarks of Dr Burnet of the Charter-houſe, which was finiſhed ſo early as the beginning of December 1701. She had but lately paſſed the 22d year of her age; and the maſterly way in which the piece was drawn muſt needs have given ſingular pleaſure to her great champion, who accordingly expreſſed his ſatisfaction by a preſent of books to his fair defendreſs. Philoſophy ſojourns in the neighbourhood of religion; theſe philoſophic reveries would naturally lead a thoughtful mind to that ſubject; and taking into her conſideration the tenets of her preſent faith, ſhe began to diſcover their indefenſible grounds: ſhe therefore reſolved to renounce it, and publiſhed a vindication of her change in 1707; and returning to the eſtabliſhed church of Scotland, ſhe changed her condition likewiſe the next year, 1708, and was married to Mr Cockburne, a learned divine of that church. The duties of a wife and mother called Mrs Cockburne from her books and pen many years; and domeſtic cares engaging her attention, we hear nothing of her as a writer till 1726, when her zeal for Mr Locke's opinions drew her again into public light. She exerciſed her pen afterwards as occaſion offered; and in 1739 ſhe entered into the controverſy concerning the foundation of moral duty and obligation. In that controverſy ſhe wrote two treatiſes, the firſt of which ſhe tranſmitted in manuſcript to Mr afterwards Dr Warburton, the late biſhop of Glouceſter, who publiſhed it, with a preface of his own, in 1747. Mrs Cockburne ſurvived this publication two years only. She died in 1749, and was interred at Long Horſley, near her huſband, who died the year before her, with this ſhort ſentence upon the tomb, "Let their works praiſe them in the gates," Prov. xxx. 31. Her works were collected and publiſhed in 1751, in two volumes 8vo, with an account of her life prefixed.—This collection is an inconteſtible proof of the author's genius. But her abilities as a writer will not be ſeen without attending to the peculiar circumſtances in which her writings were produced: her early youth, for inſtance, when ſhe wrote ſome; her very advanced age, and ill ſtate of health, when ſhe drew up others; the uneaſy ſituation of her fortune during the whole courſe of her life; and an interval of near 20 years, in the vigour of it, ſpent in the cares of a family, without the leaſt leiſure for reading or contemplation; after which, with a mind ſo long diverted and encumbered, reſuming her ſtudies, ſhe inſtantly recovered its entire powers; and, in the hours of relaxation from domeſtic employments, purſued to the utmoſt limits ſome of the deepeſt reſearches the human underſtanding is capable of. Her character is that of a moſt uncommon lady, no leſs celebrated for her beauty in her younger years, than for her genius and accompliſhments. She was ſmall of ſtature, but had a remarkable livelineſs in her eyes, and a delicacy of complexion which continued to her death.

COCKROACH. See Blatta, (*Encycl.*)

COINING. For *Plate LXXXIV.* read *Plate LXXXII.*

COINS, (*Encycl.*) p. 2061, middle of col. 2. The harper there mentioned has been diſuſed for a century paſt. See Money-*Table.*—For *ninepence*, read $11\frac{3}{400}$*d.*; and for "$\frac{1}{3}$ of ours, or 15s." read 18*s.* $5\frac{1}{2}$*d.*

COLLINSON (Peter), an eminent naturaliſt and antiquarian, deſcended of an ancient family, was born on the paternal eſtate called *Hugal-Hall*, or *Height of Hugal*, near Windermere lake, in the pariſh of Stavely, about ten miles from Kendal in Weſtmoreland. Whilſt a youth he diſcovered his attachment to natural hiſtory. He began early to make a collection of dried ſpecimens of plants, and had acceſs to the beſt gardens at that time in the neighbourhood of London. He became early acquainted with the moſt eminent naturaliſts of his time; the Drs Derham, Woodward, Dale, Lloyd, and Sloane, were amongſt his friends. Among the great variety of articles which form that ſuperb collection, now (by the wiſe diſpoſition of Sir Hans and the munificence of parliament) the Britiſh Muſeum, ſmall was the number of thoſe with whoſe hiſtory Mr Collinſon was not well acquainted; he being one of thoſe few who viſited Sir Hans at all times familiarly; their inclinations and purſuits in reſpect to natural hiſtory being the ſame, a firm friendſhip had nearly been eſtabliſhed between them. Peter Collinſon was elected a fellow of the Royal Society on the 12th of December, 1728; and perhaps was one of the moſt diligent and uſeful members, not only in ſupplying them with many curious obſervations himſelf, but in promoting and preſerving a moſt extenſive correſpondence with learned and ingenious foreigners, in all countries, and on every uſeful ſubject. Beſides his attention to natural hiſtory, he minuted every ſtriking hint that occurred either in reading or converſation; and from this ſource he derived much information, as there were very few men of learning and ingenuity who were not of his acquaintance at home; and moſt foreigners of eminence in natural hiſtory, or in arts and ſciences, were recommended to his notice and friendſhip. His diligence and œconomy of time was ſuch, that though he never appeared to be in a hurry, he maintained an extenſive correſpondence with great punctuality; acquainting the learned and ingenious in diſtant parts of the globe, with the diſcoveries and improvements in natural hiſtory in this country, and receiving the like information from the moſt eminent perſons in almoſt every other. His correſpondence with the ingenious Cadwallader Colden, Eſq; of New York, and the juſtly celebrated Dr Franklin of Philadelphia, furniſh inſtances of the benefit reſulting from his attention to all improvements. The latter of theſe gentlemen communicated his firſt eſſays on electricity to Mr Collinſon, in a ſeries of letters, which were then publiſhed, and have been reprinted in a late edition of the Doctor's ingenious diſcoveries and improvements. Perhaps, in ſome future period, the account procured of the management of ſheep in Spain, publiſhed in the Gentleman's Magazine for May and June 1764, may not be conſidered among the leaſt of the benefits accruing from his extenſive and inquiſitive correſpondence. His converſation, cheerful and uſefully entertaining, rendered his acquaintance much deſired by thoſe who had a reliſh for natural hiſtory, or were ſtudious in cultivating rural improvements; and ſecured him the intimate friendſhip of ſome of the moſt eminent perſonages in this kingdom, as diſtinguiſhed by their taſte in planting and horticulture, as by their rank and dignity. He was the firſt who introduced the great variety of ſeeds and ſhrubs, which are now the principal ornaments of every garden; and it was owing to his indefatigable induſtry, that ſo many perſons of the firſt diſtinction are now enabled to behold groves tranſplanted from the Weſtern continent flouriſhing ſo luxuriantly in their ſeveral domains, as if they were already become indigenous to Britain. He had ſome correſpondents in almoſt every nation in Europe, ſome in Aſia, and even at Pekin; who all tranſmitted to him the moſt valuable ſeeds they could collect, in return for the treaſures of America. The great Linnæus, during his reſidence in England, contracted an intimate friendſhip with Mr Collinſon, which was reciprocally increaſed by a multitude of good offices, and continued to the laſt. Beſides his attachment to natural hiſtory, he was very converſant in the antiquities of our own country, having been elected a member of the Society of Antiquaries April 7th, 1737; and he ſupplied them often with many curious articles of intelligence and obſervations, reſpecting both our own and other countries. He died in 1768, leaving behind him many materials for the improvement of natural hiſtory.

COLUBER naja, or *Cobra de Capello*, a very deadly kind of ſerpent in the Eaſt Indies. The root of the lignum colubrinum (*ophiorrhiza*) is ſaid to have been pointed out to the Indians as an antidote againſt the bite of this ſerpent by the viverra ichneumon, a creature which fights with this ſerpent, and cures itſelf by eating of this plant when wounded. The Indians, when bit, inſtantly chew it, ſwallow the juice, and apply the maſticated root to the puncture.

COMPASS. For Navigation, *Sect.* i. 15. read *p.* 5359, par. 15.

COMPASSES, proportional, are thoſe whoſe joint lies between the points terminating each leg: they are either *ſimple* or *compound.* In the former ſort the centre is fixed, ſo that one pair of theſe ſerves only for one proportion.

Plate CCCXIII.

Compound proportional Compasses conſiſt of two branches, each pointed at either end with ſteel: the length of the branches is cut through, for a curſor to ſlide up and down; in the middle of which curſor is a ſcrew, ſerving to join the branches, and to fix them at any point required. On the one leg are diviſions, ſerving to divide lines into any number of equal parts, for reducing of figures, &c. On the other are numbers, for inſcribing any regular polygon in a circle propoſed.

The uſe of the firſt is eaſy. Suppoſe, *v. gr.* a right line required to be divided into three equal parts; puſh the curſor till the ſcrew be juſt on the figure 3; where fixing it, take the length of the given line between the longeſt part of the legs: the diſtance between the two ſhorteſt will be one-third of the given line. In the ſame manner may the line be divided into any other number of parts.

For the uſe of the line of polygons. Suppoſe, *v. gr.* a pentagon required to be inſcribed in a circle; puſh the curſor till the middle of the ſcrew be againſt 5, the number of ſides in a pentagon; between the ſhorteſt parts of the legs take the diameter of the circle: the legs thus opened, the diſtance between the points of the longeſt parts will be the ſide of the pentagon to be inſcribed in the circle. And thus for a figure of any other number of ſides.

Proportional COMPASSES *with the ſector lines.* The ſtructure of theſe is ſo like that of the common proportional compaſſes, only a little nicer, that it needs no particular deſcription.

The lines on the firſt face are the line of lines, marked *lines;* it is divided into 100 equal parts, every tenth numbered; and the line of chords, which goes to 60°, is marked *chords.*

On the other face are a line of ſines to 90°, and a line of tangents to 45°. On the other ſide are the tangents from 45° to 71° 34′; on the other, ſecants from 0° to 70° 30′.

For the uſe of theſe compaſſes. 1. To divide a line into any number of equal parts leſs than 100: Divide 100 by the number of parts required; ſlip the curſor till the line on the ſliding dovetail be againſt the quotient on the line of lines; then, the whole line being taken between the points of the compaſſes moſt remote from the centre, the aperture of the other will ſhow the diviſion required. 2. A right line given, ſuppoſed to be divided into 100 parts, to take any number of thoſe parts: ſlip the line on the ſliding dovetail to the number of parts required; the whole line being taken between the points fartheſt from the centre, the aperture of the other two will include the number of diviſions required. 3. The radius being given, to find the chord of any arch under 60°: ſlip the line on the ſliding dovetail to the degrees required on the line of chords; the radius being taken between the points fartheſt from the centre of the curſor, the aperture of the other line will be the chord required, provided the number of degrees be greater than 29: if it be leſs, the aperture taken from the radius will leave the chord required. 4. If the chord of an arch under 60° be given, and the radius required; ſlip the line on the dovetail to the degrees given on the line of chords; the given chord being taken between the two points next the curſor, the aperture of the other will be the radius required. 5. The radius being given, to find the ſine of any number of degrees: ſlip the line on the dovetail to the degree on the line of ſines whoſe ſine is required; the radius taken between the points fartheſt from the curſor, the aperture of the other will give the ſine of the angle required: but if the ſine ſought be leſs than 30°, the difference of the apertures of the oppoſite points will be the ſine required. 6. The radius being given, to find the tangent of any number of degrees under 71: if the tangent required be under 26° 30′, then ſlip the line on the dovetail to the degree propoſed on the tangent line; the radius taken between the points fartheſt from the curſor, the aperture of the others will be the tangent of the degrees required: if the tangent required be above 26° 30′, but under 45°, the line on the curſor muſt be ſlipped to the degrees given on the tangent line; then the radius being taken between the points fartheſt from the curſor, the aperture of the others will be the tangent. If the tangent required be greater than 45°, but leſs than 56° 20′, ſlip the notch on the tangent ſide of the turned cheek to the degree 0 in the tangent line on the ſide of the compaſs; the radius taken between the points fartheſt from the curſor, the difference between the aperture of the other and theſe added together, will be the tangent required. Thus, for the tangents of other degrees under 71. After the like manner may the ſecant of any number of degrees under 71 be found.

Mr Heath, a mathematical-inſtrument maker in London, conſtructed a pair of proportional compaſſes in 1746, with a curious and uſeful contrivance for preventing the ſhorter legs from changing their poſition when theſe compaſſes were uſed. It conſiſted of a ſmall beam ſoldered to a ſcrew, and running parallel to the leg of the compaſſes, nearly of the length of the groove: in this beam a ſlit was made, which admitted of a ſliding-nut, the other end of which fell into a hole in the bottom of the ſcrew belonging to the great nut of the compaſſes. The ſcrew-pin of the beam paſſed through an adjuſter, by means of which the mark on the ſlider might be brought exactly to any diviſion. But the *proportional compaſſes* have been much out of uſe ſince the invention of the ſector.

COMPOSITION, (*Encycl.*) See alſo the articles DIALOGUE, EPISTLE, and HISTORY, (*Encycl.*)

COMUS, in mythology, the god of jollity or feſtivity. There is great reaſon to believe he was the Chamos of the Moabites; Beel-Phegor, Baal-Peor, Priapus, and Bacchus. He is repreſented under the appearance of a young man, with an inflamed red countenance, his head inclined, and crowned with flowers; his air drowſy; leaning on a huntſman's ſpear in his left hand, and holding an inverted torch in his right. His ſtatue was placed at the chamber doors of new married perſons; his pedeſtal crowned with flowers.

CONCEPTION, in medicine, denotes the firſt formation of the embryo, or fœtus, in the womb.

Conception is no other than ſuch a concourſe and commixture of the prolific ſeed of the male with that of the female, in the cavity of the uterus, as immediately produces an embryo.

The ſymptoms of conception or pregnancy are, when, in a few days after the conjugal act, a ſmall pain is perceived about the navel, and is attended with ſome gentle commotions in the bottom of the abdomen; and within one, two, three, or even four, months, the menſes ceaſe to flow, or prove in leſs quantity than uſual. Upon the firſt failure of this kind, Conception. kind, the woman begins to count the ſeries of her weeks, without taking any notice of the time before elapſed; after this, or between the ſecond or third months, but generally about the third, the motions of the embryo become perceivable to the mother; who hereupon becomes troubled with a nauſea, vomiting, loathing, longing, &c. About this time the breaſts begin to ſwell, grow hard and painful, and contain a little milk; the nipples alſo become larger, firmer, and darker coloured, a livid circle appearing round them: the eyes ſeem ſunk and hollow. During the two firſt months of pregnancy, the woman grows thinner and ſlenderer; the abdomen being alſo depreſſed; though it afterwards diſtends, and grows gradually larger.

The manner wherein conception is effected is thus laid down by the modern writers. In the ſuperficies of the ovaries of women, there are found little pellucid ſpherules, conſiſting of two concentric membranes filled with a lymphatic humour, and connected to the ſurface of the ovaria, underneath the tegument, by a thick calix, contiguous to the extremities of the minute ramifications of the Fallopian tubes.

Theſe ſpherules, by the uſe of venery, grow, ſwell, raiſe and dilate the membrane of the ovary into the form of papillæ; till, the head propending from the ſtalk, it is at length ſeparated from it; leaving behind it a hollow cicatrix in the broken membrane of the ovary; which, however, ſoon grows up again.

Now, in theſe ſpherules, while ſtill adhering to the ovary, fœtuſes have been frequently found; whence it appears, that theſe are a kind of ova, or eggs, deriving their ſtructure from the veſſels of the ovary, and their liquor from the humours prepared therein.

Hence alſo it appears, that the Fallopian tubes being ſwelled and ſtiffened by the act of venery, with their muſcular fimbriæ, like fingers, may embrace the ovaries, compreſs them, and by that compreſſion expand their own mouths: and thus the eggs, now mature, and detached as before, may be forced into their cavities, and thence conveyed into the cavity of the uterus; where they may either be cheriſhed and retained, as when they meet with the male ſeed; or, if they want that, again expelled.

Hence the phenomena of falſe conceptions, abortions, fœtuſes found in the cavity of the abdomen, the Fallopian tubes, &c. For in coition, the male-ſeed, abounding with living animalcules, agitated with a great force, a briſk heat, and probably with a great quantity of animal-ſpirits, is violently impelled through the mouth of the uterus, which on this occaſion is opener, and through the valves of the neck of the uterus, which on this occaſion are laxer than ordinary, into the uterus itſelf; which now, in like manner, becomes more active, turgid, hot, inflamed, and moiſtened with the flux of its lymph and ſpirits, by means of the titillation excited in the nervous papillæ by the attrition againſt the rugæ of the vagina.

The ſemen thus diſpoſed in the uterus, is retained, heated, and agitated, by the convulſive conſtriction of the uterus itſelf; till meeting with the ova, the fineſt and moſt animated part enters through the dilated pores of the membranula of the ovum, now become glandulous; is there retained, nouriſhed, dilated; grows to its umbilicus, or navel; ſtifles the other leſs lively animalcules; and thus is conception effected.

Hence it appears, that conception may happen in any part where the ſemen meets with an ovum: thus, whether it be carried through the Fallopian tube to the ovary, and there caſt upon the ovum; or whether it meet with it in ſome receſs of the tube itſelf; or, laſtly, whether it join it in the cavity of the uterus, it may ſtill have the ſame effect, as it appears from obſervation actually to have done. But it is probable, that conception is then moſt perfect when the two, viz. the ſemen and ovum, are carried at the ſame time into the uterus, and there mixed, &c.

Other anatomiſts chooſe to ſuppoſe the male-ſeed taken up, before it arrives in the uterus, by the veins which open into the vagina, &c. and thus mixed with the blood; by which, in the courſe of circulation, it is carried, duly prepared, into the ovary, to impregnate the eggs.

It has been advanced by ſeveral writers, that women may poſſibly conceive in their ſleep, and be with child without any knowledge of the occaſion of it. As ridiculous and abſurd as this doctrine may appear to the generality of the world, no leſs an author than Genſili has thought it worthy a particular diſſertation.

Cook. COOK (Captain James), a late celebrated navigator, was born at Marton, a village about four miles from Great Ayton, in the county of York, and chriſtened there, as appears from the pariſh-regiſter, November 3. 1728. His father formerly uſed to be employed as a fiſherman, and ſometimes as a day-labourer; and his ſon divided his early life between the loweſt duties in huſbandry and the little ſchool-learning which could be afforded him. He afterwards lived with a grocer in that country: but not liking his ſituation, he bound himſelf an apprentice to the maſter of a collier trading from Newcaſtle to London; with whom he might have continued, had not the want of ſeamen in the royal navy occaſioned his removal into the ſervice of his ſovereign before the expiration of his indentures.

The time which intervened between this and his being raiſed to be a commiſſion-officer, was not paſſed in ſuch a manner as to render it worthy of any detail. He ſoon acquired all the requiſites which belonged to his profeſſion; and deported himſelf ſo much to the ſatisfaction of his ſuperiors, that he received a commiſſion as lieutenant on the firſt day of April 1760; and ſoon after gave a ſpecimen of thoſe abilities which recommended him to the commands which he executed ſo highly to his credit.

In the year 1765 he was with Sir William Burnaby on the Jamaica ſtation; and that officer having occaſion to ſend diſpatches to the governor of Jucatan, relative to the logwood cutters in the Bay of Honduras, lieutenant Cook was ſelected for that employment; and he peformed it in a manner which intitled him to the approbation of the admiral. A relation of this voyage and journey was publiſhed in the year 1769, under the title of "Remarks on a Paſſage from the River Baliſe, in the Bay of Honduras, to Merida, the capital of the province of Jucatan in the Spaniſh Weſt Indies, by Lieutenant Cook," in an 8vo pamphlet.

To a perfect knowledge of all the duties belonging to a ſea-life, Mr Cook had added a great ſkill in aſtronomy. In the year 1767, the Royal Society reſolved, that it would be proper to ſend perſons into ſome part of the South Seas, to obſerve the tranſit of the planet Venus over the ſun's diſk; and by a memorial delivered to his majeſty, they recommended the iſlands of Marqueſas de Mendoſa, or thoſe of Rotterdam or Amſterdam, as the propereſt place then known for making ſuch obſervation. To this memorial a favourable anſwer was returned; and the Endeavour, a ſhip built for the coal trade, was put in commiſſion, and the command of her given to lieutenant Cook. But before the veſſel was ready to ſail, captain Wallis returned from his voyage, and pointed out Otaheite as a place more proper for the purpoſe of the expedition than either of thoſe mentioned by the Royal Society. This alteration was approved of; and our navigator was appointed by that learned body, with Mr Charles Green, to obſerve the tranſit. On this occaſion lieutenant Cook was promoted to be captain, and his commiſſion bore date the 25th of May 1768. He immediately hoiſted the pennant, and took command of the ſhip; in which he ſailed down the river on the 30th of July. In this voyage he was accompanied by Joſeph Banks, Eſq; and Dr Solander; and on 12th June 1771 returned to England, after having been abſent almoſt three years. The narrative of this expedition was written by Dr Hawkeſworth.

Soon after captain Cook's return to England, it was reſolved to equip two ſhips to complete the diſcovery of the ſouthern hemiſphere. It had long been a prevailing idea, that the unexplored part contained another continent. To aſcertain the fact was the principal object of this expedition; and that nothing might be omitted that could tend to facilitate the enterpriſe, two ſhips were provided, furniſhed with every neceſſary which could promote the ſucceſs of the undertaking. The firſt of theſe ſhips was called the Reſolution, under the command of captain Cook; the other the Adventure, commanded by captain Furneaux. Both of them ſailed from Deptford on the 9th of April 1772, and arrived at the Cape of Good Hope on the 30th of October. They departed from thence on the 22d of November; and from that time until the 17th of January 1773, continued endeavouring to diſcover the continent, when they were obliged to relinquiſh the deſign, obſerving the whole ſea covered with ice from the direction of S. E. round by the ſouth to weſt. They then proceeded into the South Seas, and made many other diſcoveries, and returned to the Cape of Good Hope on the 21ſt of March 1774, and from thence to England on the 14th of July; having, during three years and eighteen days (in which time the voyage was performed), loſt but one man by ſickneſs in captain Cook's ſhip; although he had navigated throughout all the climates from 52° north to 71° ſouth, with a company of 118 men.

The relation of this voyage was given to the public by captain Cook himſelf, and by Mr George Forſter, ſon of Dr Forſter, who had been appointed by government to accompany him for the purpoſe of making obſervations on ſuch natural productions as might be found in the courſe of the navigation. That publiſhed by captain Cook has generally been aſcribed to a gentleman of great eminence in the literary world; but if the teſtimony of one who was on board the ſhip, and who made an extract from the journal in its rude uncorrected ſtate, may be relied on, there ſeems no reaſon to aſcribe the merit of the work to any other perſon than him whoſe name it goes under.

The want of ſucceſs which attended captain Cook's attempt to diſcover a ſouthern continent, did not diſcourage another plan being reſolved on, which had been recommended ſome time before. This was no other than the finding out a north-weſt paſſage, which ſome had conceived to be a practicable ſcheme. The dangers which our navigator had twice braved, would have exempted him from being ſolicited a third time to venture his perſon in unknown countries, amongſt deſart iſlands, inhoſpitable climates, and in the midſt of ſavages; but, on his opinion being aſked concerning the perſon who would be moſt proper to execute this deſign, he once more relinquiſhed the quiet and comforts of domeſtic life, to engage in ſcenes of turbulence and confuſion, of difficulty and danger. His intrepid ſpirit and inquiſitive mind induced him again to offer his ſervices; and they were accepted without heſitation. The manner in which he had deported himſelf on former occaſions, left no room to ſuppoſe that a fitter man could be ſelected. He prepared for his departure with the utmoſt alacrity, and actually ſailed in the month of July 1776.

A few months after his departure from England, notwithſtanding he was then abſent, the Royal Society voted him Sir Godfrey Copley's gold-medal as a reward for the account which he had tranſmitted to that body, of the method taken to preſerve the health of the crew of his ſhip; and Sir John Pringle, in his oration of 30th November, pronounced an high eulogium upon him.

This honourable teſtimony to the merit of our gallant commander, never came to his knowledge.—— While his friends were waiting with the moſt earneſt ſolicitude for tidings concerning him, and the whole nation expreſſed an anxious impatience to be informed of his ſucceſs, advice was received from captain Clerke, in a letter dated at Kamſchatka, the 8th day of June 1779; from which, and from other accounts, we learn, "That captain Cook, after he had paſſed the Cape of Good Hope, had continued his courſe along Van Diemen's Land and New Zealand. He arrived happily in Auguſt 1777 at the iſland of Otaheite, where he landed Omiah, a native of the iſland, in perfect health: That ſince the laſt voyage of captain Cook to that iſland, the Spaniards had been there twice, and ſtaid ſome months, and their ſhips had left all ſorts of birds and domeſtic animals, but only of the male ſpecies; ſo that they received the cows and the ſhe-goats that captain Cook brought with great pleaſure. He left that iſland in the month of December following; and after having made ſeveral new diſcoveries in the South Sea, he arrived in the month of March 1778 on the coaſts of America, ſituated in the ſouth of Kamſchatka. A leak being diſcovered in captain Cook's ſhip the Reſolution, and finding a very ſtormy ſea, he was obliged to anchor in a bay in that part of the coaſt. After having repaired his own ſhip, they both put to ſea; and ſailing along the coaſt, they at laſt diſtinctly diſcovered the ſtrait between Aſia and America. The two parts of the world preſented only, at that height of latitude, a low barren land without any ſhelter, and a ſea of a very middling depth. They continued their route till they perceived diſtinctly the American coaſt extending to the north-eaſt. He then thought himſelf arrived near to the bounds of his wiſhes; but when he came to 70° 45′ Lat. and 198° of Long. (probably reckoning from Greenwich), he met with impenetrable mountains of ice, which obliged him to turn towards the ſouth. He caſt anchor near the iſland Unalaſchka, whence his letter is dated. He fixes that iſland in 53, 55 Lat. and 192, 30 Long. conſequently giving that iſland a more weſtern and ſouthern poſition than is in the new general chart of Ruſſia.

"As he then found himſelf to the eaſt of Sandwich Iſland, which he had paſſed in his voyage, he reaſonably thought he muſt meet with other iſlands; he therefore ſailed again, in order to paſs the autumn and the winter in a more temperate climate. He actually diſcovered divers other iſlands, which appeared to him extremely fertile, and where the inhabitants had raiſed ſtone-walls upon the heights for their defence. He caſt anchor at one of theſe iſlands, named *O-wy-he*, in the gulph of Caracah-Coſſa, and treated very amicably with the natives, who paid him almoſt divine honours. After he had refreſhed his people, one of whom only had died in the voyage, and two others had fallen ſick, he was already got under ſail, when a furious ſtorm hurt his mizen-maſt, which obliged him to return to the gulph to repair it. The iſlanders became every day more bold, and moſt clearly demonſtrated their inclination for theft; which went ſo far as to ſteal one of his boats. Captain Cook, willing to ſeek juſtice for this robbery, went on ſhore with his lieutenant, and ten or twelve of his crew. He advanced towards a large body of the inhabitants, who always paid him great reſpect, and accoſted their chief. Whilſt the negociation was carrying on, the inſolence of one of the iſlanders, who was in the throng, obliged him to fire on him with his muſket, loaded only with ſmall-ſhot, which did not even penetrate the mat with which he was covered. The Indians began then to be enraged; and when the lieutenant had at length fired and killed his man, the whole troop fell on the body: and as ſoon as the ſailors had diſcharged their pieces, they did not give them time to load again, but killed captain Cook and four of his people, forcing the others, partly wounded, to make their eſcape under the favour of the fire of their pinnace.

"This fatal event happened on the 14th February 1779. A council was then called of the officers, to determine whether their commander's death ſhould not be revenged in an exemplary manner; but it was thought moſt adviſable to keep on the defenſive until the maſt was repaired. In the mean time captain Clerke made friends with the ſavages, and quitted the iſland to return to Kamſchatka, where he wintered in Port Awatſcha, from the 1ſt of January that year till the month of June, and then ſailed to diſcover (as he writes word) more exactly the iſlands between Kamſkatca and America."

Captain Cook was a married man, and left ſeveral children behind him. On each of theſe his majeſty has ſettled a penſion of 25 l. a-year, and 200 l. a-year on his widow. It is remarkable, if true as reported, that captain Cook was godfather to his wife; and at the very time ſhe was chriſtened, declared that he had determined on the union which afterwards took place between them.

Few men have been more regretted than captain Cook. He poſſeſſed all the qualities which could inſure the eſteem of mankind. To the moſt undaunted courage he added a moſt perſevering reſolution. He acquired the love of his ſeamen, as well by the ſoft as by ſtern virtues; being equally gentle and humane as he was commanding and intrepid. Without being poſſeſſed of much literature, or cultivating letters, he acquitted himſelf with credit even where the talents of writing were required. No man ſeemed ſo well formed for enterpriſes ſuch as he was engaged in. He was fond of the purſuit, and ſacrificed every conſideration to them. He owed his riſe entirely to his merit; and retained the modeſty of his early ſtate after he had riſen beyond the expectations of his friends, and equal to his own.

COPPERPLATE. See ENGRAVING, (*Encyl.*)

COPYHOLD, (*Encycl.*) See TENURE and VILLENAGE, (*Encycl.*)

CORAL, (*Encycl.*) The nature and origin of coral has long been a ſubject of much diſpute. Some have ſuppoſed that it is a ſtone; others a plant; and it has been almoſt univerſally believed that it was ſoft while in the ſea, but grew hard on being taken out of it. But Boccone examined coral in the water, before it was taken up into the air, and invariably found it hard, except at its extremities, whence, by preſſing it, flowed a ſmall quantity of milky fluid, already taken notice of. We may therefore infer, that there is more of imagination than of truth in the name *gorgonium*, which the ancients gave to coral, and deſigned to ſhow that Meduſa's head did not convert objects into ſtone, more ſurely than coral became petrified as ſoon as it appeared in the air.

M. de Peyſſonnel of Marſeilles, has, in conſequence of a ſeries of experiments and obſervations from about the year 1720 to 1750, introduced a new ſyſtem with reſpect to the nature and production of coral, and ſimilar marine ſubſtances. Thoſe bodies, which the count de Marſigli imagined to be flowers, this ingenious naturaliſt diſcovered to be inſects inhabiting the coral; for upon taking branches of it out of the water, the flowers, which proceeded from a number of white points anſwering to the holes that pierced the bark, and the radiation of which reſembled the flower of the olive-tree, entered into the bark and diſappeared; but upon being again reſtored to the water, they were ſome hours after perceptible. Theſe flowers ſpread on white paper loſt their tranſparency, and became red as they dried. The holes in the bark correſpond to ſmall cavities upon the ſubſtance of the coral; and when the bark is removed, there may be ſeen an infinite quantity of little tubes connecting the bark with the inner ſubſtance, beſides a great number of ſmall glands adhering to them; and from theſe tubes and glands the milky juice of coral iſſues forth: the holes in the bark are the openings through which the inſects that form theſe ſubſtances for their habitation come forth; and thoſe cavities which are partly in the bark and partly in the ſubſtance, are the cells which they inhabit. The organs of the animal are contained in the tubes, and the glandules are the extremities of his feet, and the milky liquor is the blood and juice

Coral.

of the animal, which are more or leſs abundant in proportion to its health and vigour. When the inſects are dead, they corrupt, and communicate to the water the ſmell of putrid fiſh. This juice or liquor runs along the furrows perceived upon the proper ſubſtance or body of coral, and ſtopping by little and little becomes fixed and hard, and is changed into ſtone; and being ſtopped in the bark, cauſes the coral to increaſe proportionably and in every direction. In forming coral, and other marine productions of this claſs, the animal labours like thoſe of the teſtaceous kind, each according to his ſpecies; and their productions vary according to their ſeveral forms, magnitudes, and colours.

The coral inſect, or polype, M. Peyſſonnel obſerves, expands itſelf in water, and contracts itſelf in air, or when it is touched with the hand in water, or acid liquors are poured upon it: and he actually ſaw theſe inſects move their claws or legs, and expand themſelves, when the ſea-water containing coral was placed near the fire, and keep them in their expanded ſtate when ſeparated from the coral in boiling water. Broken branches of coral have been obſerved to faſten themſelves to other branches, and have continued to grow; and this is the caſe, when they are connected with detached pieces of rock and other ſubſtances, from which no nouriſhment could be derived. The coral inſects in their cells, not having been injured, continue their operations; and as they draw no nouriſhment from the ſtone of the coral, they are able to increaſe in a detached and ſeparate ſtate. Coral was found to be equally red in the ſea as out of it; and it was more ſhining when juſt taken out of the water, than even when it is poliſhed; and the bark by being dried becomes ſomewhat pale. M. Peyſſonnel found that it grows in different directions, ſometimes perpendicularly downwards, ſometimes horizontally, and ſometimes upwards; and in the caverns of the ſea, open to every expoſure.

This ſyſtem was little regarded, though firſt communicated to the Academy of Sciences at Paris in 1727, till Mr Trembley's diſcovery of the freſh-water polype; but ſince that time, it has been confirmed by the obſervations of M. Bernard de Juſſieu on the ſea-coaſts of Normandy, and thoſe of M. de Reaumur near Rochelle. M. Donati of Turin has alſo adopted the ſame hypotheſis, viz. that coral is a maſs of animals of the polype kind; and inſtead of repreſenting the polype beds and cells which they contain as the work of polypes, he thinks it more juſt to ſay, that coral and other coralline bodies have the ſame relation to the polypes united to them, that there is between the ſhell of a ſnail and the ſnail itſelf, or the bones of an animal and the animal itſelf.

The ſame ſyſtem has alſo been excellently illuſtrated and eſtabliſhed by Mr Ellis, in anſwer to the objections of Dr Baſter of Zealand, and Dr Pallas of Berlin, who ſtill refer corallines to the vegetable kingdom.

There are properly but three kinds of coral; red, white, and black: the black is the rareſt, and moſt eſteemed; but the red was formerly uſed in medicine. It muſt be choſen thick, ſmooth, and ſhining, and of a beautiful red, not covered with any tartareous matter. However, this ſubſtance is now ſcarce ever preſcribed by any intelligent practitioner.

Corallines.

CORALLINES, in natural hiſtory, were formerly reckoned a genus of plants, and Mr Tournefort enumerates 36 ſpecies of them; but in the Linnæan ſyſtem they belong to the claſs of zoophytes, and are defined by modern naturaliſts to be ſubmarine plant-like bodies, that conſiſt of many ſlender finely divided and jointed branches, reſembling ſome ſpecies of moſs; or animals growing in the form of plants, having their ſtems fixed to other bodies: theſe ſtems are compoſed of capillary tubes, whoſe extremities paſs through a calcareous cruſt, and open into pores on the ſurface. The branches are often jointed, and always ſubdivided into ſmaller branches, which are either looſe and unconnected, or joined as if they were glued together. They are diſtinguiſhed from plants by their texture and hardneſs: they alſo yield in diſtillation a conſiderable quantity of volatile ſalt; and their ſmell, in burning, reſembles that of burnt horns and other animal ſubſtances. Many of the corallines ſeem to conſiſt of a ſingle tube, containing a ſingle parent animal. Every branch emitted contains an offspring of this parent dependent upon it, and yet capable of producing its like in the emiſſion of a new branch. Others conſiſt of many ſuch tubes united, riſing up together, and encircling the deſerted tubes of their progenitors, whoſe exuviæ become the ſubſtratum of a riſing generation. Mr Ellis diſtributes corallines into the *veſiculated*, *tubular*, *celliferous*, and *articulated* kinds.

Veſiculated corallines are diſtinguiſhed by their horny hollow ramifications: moſt of them are furniſhed with little denticles on their branches, like leaves on moſſes; and at certain ſeaſons of the year they are furniſhed with ſmall bodies like bladders, proceeding from their ſtems and branches, and differing in form according to the different ſpecies. Their colour, when dry, is of a yellowiſh or pale brown, and their nature is elaſtic. They are found adhering to rocks, ſhells, and fucuſes, by ſmall root-like tubes: they recover their form in water, after having been dried; and when put into vinegar, they cauſe no efferveſcence. See Plate CCCXV. fig. 1. *a* which repreſents the ſea-tamariſk in its natural ſize, and A in which the denticles are magnified. Fig. 2. *b*, B, is the ſea-cypreſs; fig. 3. *c d*, CD, the ſmall climbing coralline with well-ſhaped cups.

Tubular corallines are compoſed of a number of ſimple tubes, growing up nearly together; or of ſuch branched ones as have neither denticles nor veſicles. Theſe are horny and elaſtic like the former, and recover their original form in water. Some of them appear wrinkled like the wind-pipe, and others like the inteſtines of ſmall animals. See fig. 4. E.

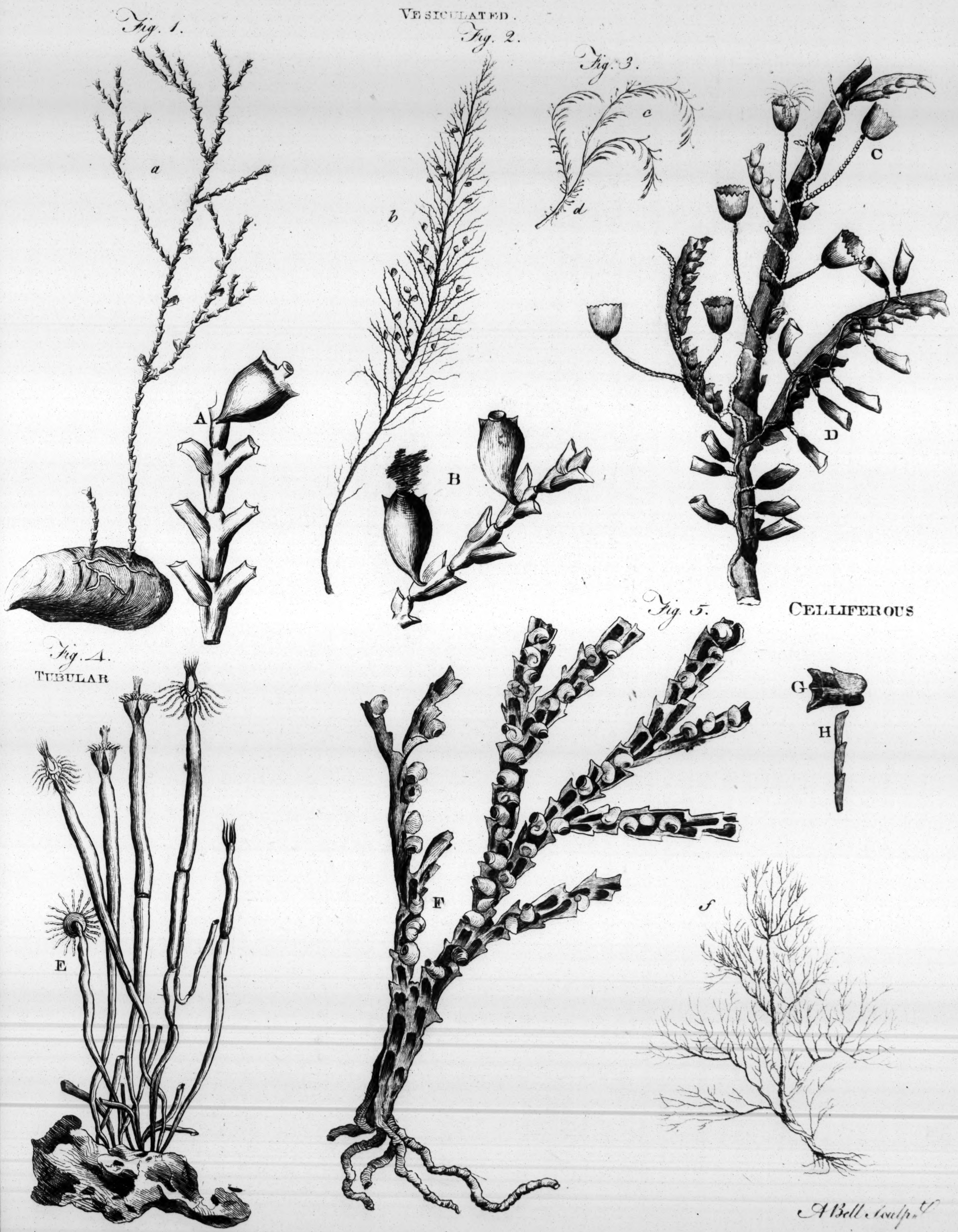
Celliferous corallines are thoſe which appear, when magnified, to be fine thin cells, the habitations of ſmall animals connected together, and diſpoſed in a variety of elegant forms like branches. Theſe efferveſce with acids. See fig. 5. *f* and F.

Articulated corallines conſiſt of ſhort pieces of a ſtony or cretaceous brittle matter, whoſe ſurface is covered with pores or cells, which are joined by a tough, membranous, flexile ſubſtance, compoſed of many ſmall tubes of the like nature compacted together. The ſtony part is ſoluble in vinegar, and the other part remains entire. See Plate CCCXVI. fig. 1.

See the deſcription and drawings of a great variety of

CORALLINES.

Plate. CCCXV.

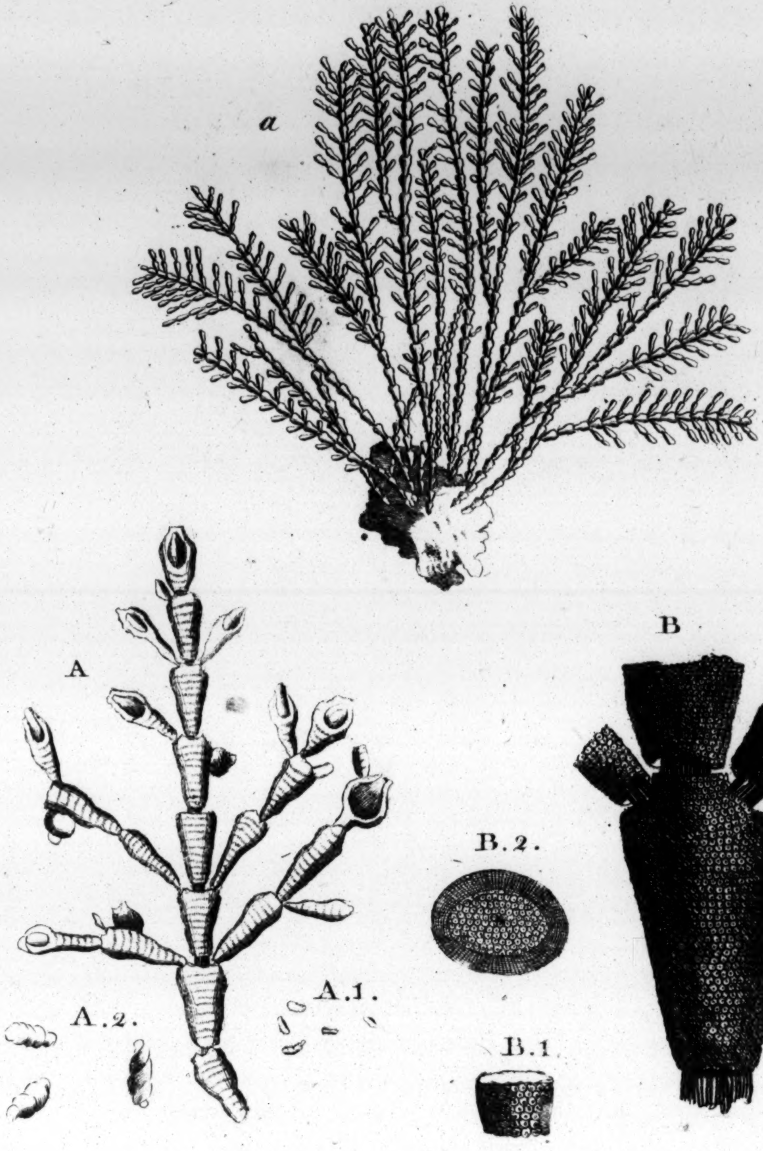

VESICULATED.
Fig. 1.
a
A
Fig. 2.
b
B
Fig. 3.
c
d
C
D
Fig. 4.
TUBULAR
E
Fig. 5.
CELLIFEROUS
F
G
H
f

A Bell Sculp^t.

3 MA 53

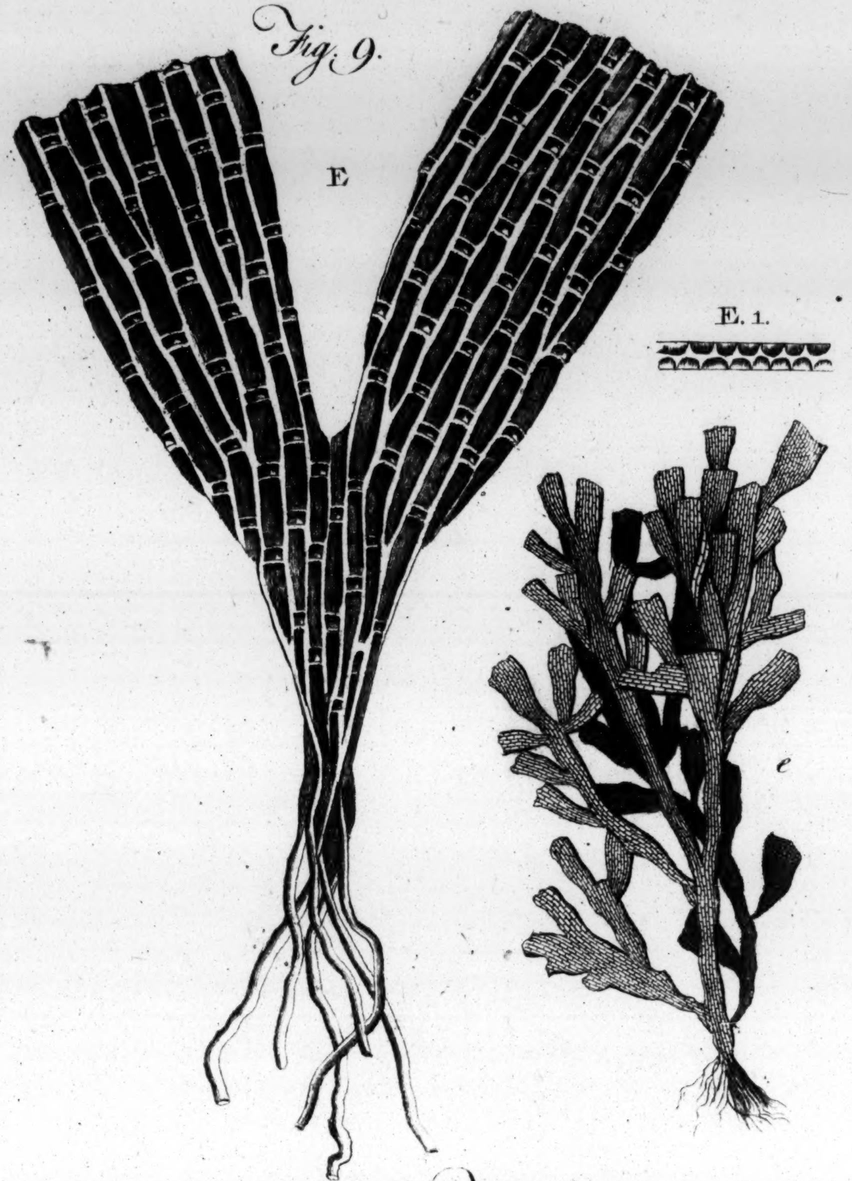
Fig. 6.

ARTICULATED.


a
A
A.1.
A.2.
B
B.1
B.2.

ESCHARA.

Fig. 9.



KERATOPHYTA.

Fig. 7.

Fig. 8.

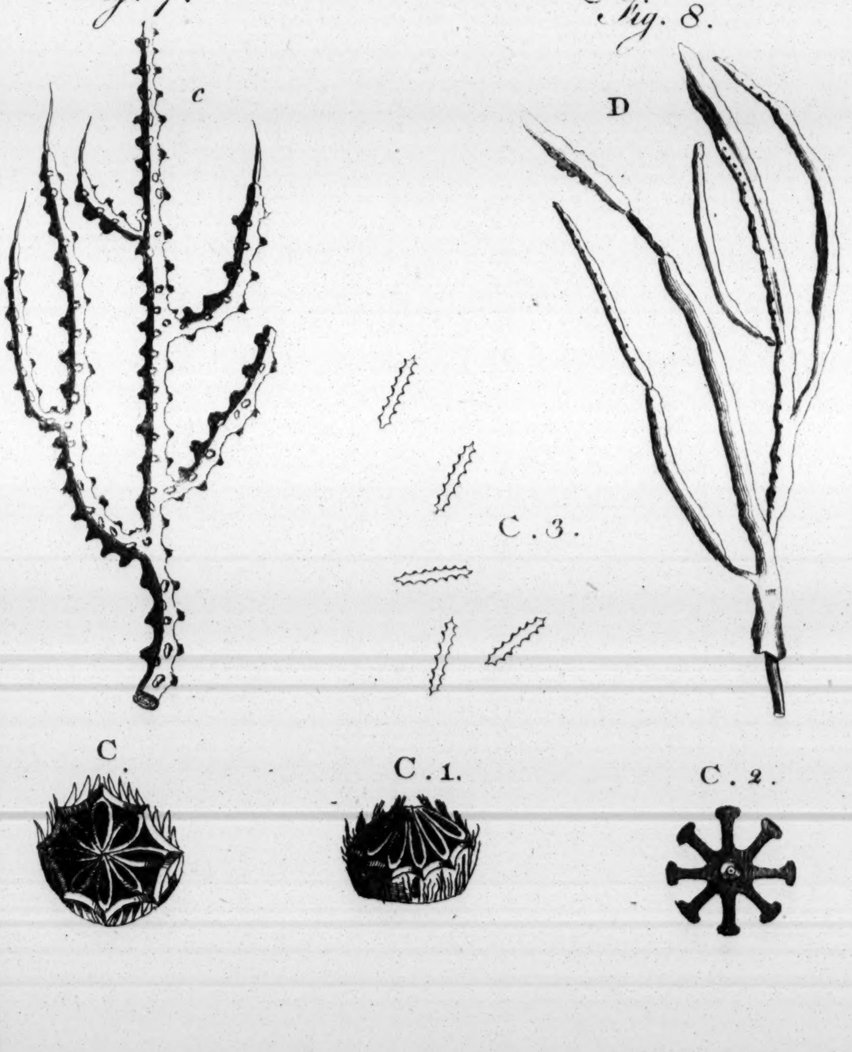
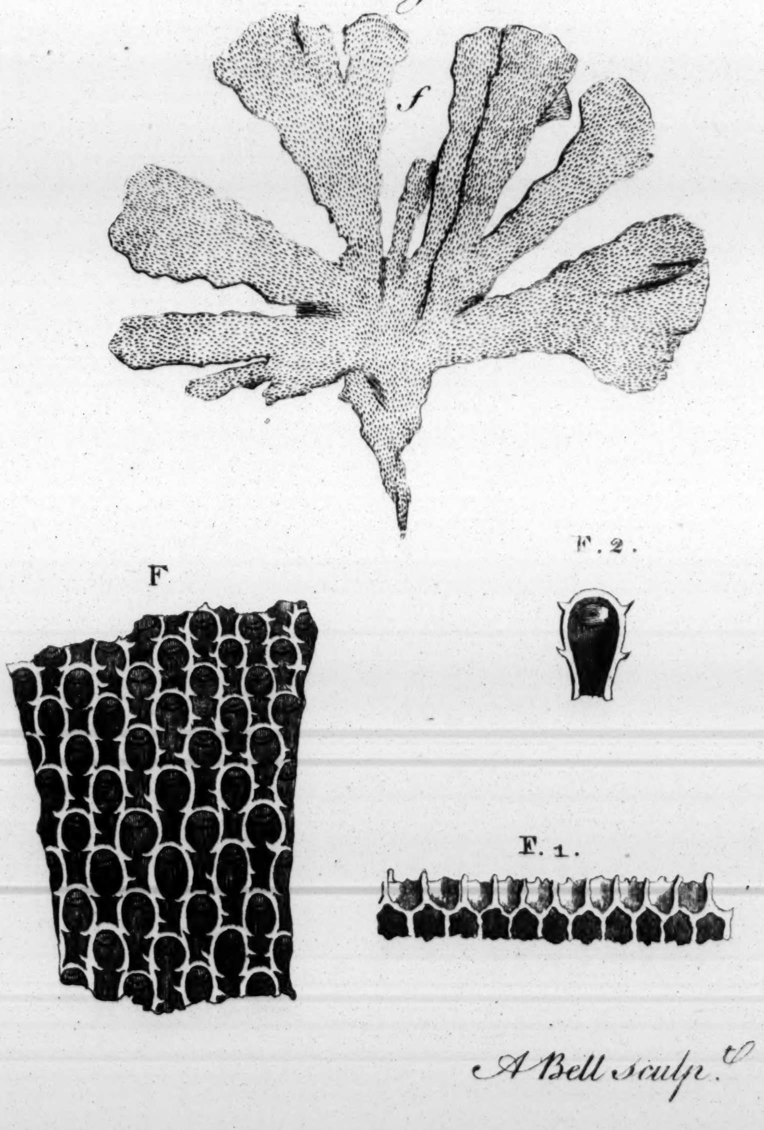


Fig. 10.



A Bell sculpt

3 MA 53

Plate CCCXVI.

of ſpecies belonging to each claſs, in Ellis's Nat. Hiſt. above cited. *a*, A, (fig. 6.) is the coralline of the ſhops. It is fixed to rocks and ſhells by ſtony joints, which, as they riſe, are united to others by extremely fine and ſlender tubes: Theſe may be diſcovered by a good eye, or a common magnifier. As the ſtems extend themſelves, they become pennated by ſide-branches, which come out oppoſite to each other, and are jointed in the ſame manner; the joints of this ſpecies are like the upper part of an inverted cone, but a little compreſſed: The whole ſurface is covered over with very minute circular-ſhaped cells like pores; ſee B, and B 1, where they are higher magnified. B 2, ſhows the croſs ſection highly magnified. If a branch of this coralline is put into vinegar, theſe cells are diſſolved with the whole cretaceous ſurface; inſtead of which there appear rows of minute ramifications, which ſeem to have communicated with each of theſe cells. Upon ſome ſpecimens of this coralline, we may obſerve little ſmall figures like ſeed-veſſels, with which the branches frequently terminate: They are alſo found on the ſides, as may be ſeen at A, where they are magnified.—When a branch is rendered ſoft by being ſteeped in vinegar, there may be ſqueezed out from the little knobs at the ends and ſides, ſmall twiſted figures, like thoſe at A 1, which are magnified higher at A 2.—We frequently find this coralline of different colours, as red, green, aſh, and white; but all of it, by being expoſed to the ſun and air on the ſhore, becomes white.

The ancients have ſaid great things of the virtues of the common coralline. Dioſcorides preſcribes it for mitigating the pain of the gout, and for preventing ſtagnations of the humours in any part; he ſays nothing of its virtues againſt worms, which are what we alone eſteem it for. We give it in powder from 10 grains to a ſcruple or half a dram twice a day in theſe caſes, and that with a conſiderable good effect.

Beſides the above, Mr Ellis enumerates other genera of marine productions; as the keratophyta, eſchara, ſponges, and alcyonium; all which are the neſts or matrices of ſea-animals. See Polype. The laſt claſs of marine bodies is formed like funguſes of various figures, and with different ſorts of covering: ſome having a gritty, and ſome a callous ſkin, with a ſpongy ſubſtance in the inſide: other ſpecies are of a fleſhy ſubſtance.

CORRALLOIDES (frutices.) See Eschara and Keratophyta, in this APPENDIX.

CORNS, in ſurgery, hard excreſcences, conſiſting of indurations of the ſkin ariſing on the toes, and ſometimes on the ſides of the feet, where they are much expoſed to the preſſure of the ſhoes. By degrees they preſs themſelves farther down between the muſcular fibres on theſe parts, and by their irritation occaſion extreme pain. Many cures have been preſcribed, but the total removal of them is always found to be attended with great difficulty. It has been recommended to ſoften them with plaſters and then to pull them up by the roots, to apply cauſtic, &c. A piece of raw beef laid on by way of plaſter, and frequently ſhifted, is alſo ſaid to be effectual; but the beſt cure is to bathe them frequently in warm water, and pare away as much as poſſible of the indurated ſkin without drawing blood.

CORRODY, in law. See Revenue, (*Encycl.*)

CORYLUS, (*Encycl.*) See alſo Hazel, (*Encycl.*)

CORYPHA, Mountain-*Palm*, or *Cabbage-Tree*, in botany; a genus of the order of palmæ, belonging to the monœcia claſs of plants. There is only one ſpecies, the umbracula, a native of the Weſt Indies, where it is ſaid to riſe to the height of 150 and 200 feet. It is by ſome authors called the *palmetto royal;* and well, ſays Hughes in his Natural Hiſtory of Barbadoes, may it be called *royal*, ſince neither the tall cedars of Lebanon, nor any of the trees of the foreſt, are equal to it in height, beauty, or proportion. It is generally as ſtraight as an arrow: near the earth it is about ſeven feet in circumference, but tapers as it aſcends. The bark is of an aſh-colour, till within 25 or 30 feet of the extremity of the tree; when it alters at once to a deep ſea-green, which continues to the top. Upon removing the large leaves, or branches, which ſurround the top of the trunk a little way above the beginning of the green bark juſt mentioned, what is called the *cabbage* is diſcovered lying in many thin, ſnow-white, brittle flakes, in taſte reſembling an almond, but ſweeter. This ſubſtance, which cannot be procured without deſtroying the tree, is boiled, and eaten with mutton by the inhabitants of the Weſt Indies, in the ſame manner as turnips and cabbage are with us; it is likewiſe pickled, and ſent to Europe, where it is eſteemed an exquiſite delicacy.

In the pith of the trunk of the cabbage-palms, when felled, there breeds a kind of worms, or grubs, which are eaten and eſteemed a great delicacy by the French of Martinico, St Domingo, and the adjoining iſlands. Theſe worms, ſays father Labat, are about two inches long, and of the thickneſs of one's finger; the head is black, and attached to the body without any diſtinction of neck. Their preparation for the table is as follows: They are ſtrung on wooden ſkewers before a fire, and as ſoon as heated, are rubbed over with raſpings of cruſt, ſalt, pepper, and nutmeg; this powder abſorbs all the fat, which during the cookery would otherwiſe eſcape; when properly roaſted they are ſerved up with orange or citron ſauce. Theſe worms being expoſed for ſome time to the ſun, are ſaid to yield an oil which is of great efficacy in the piles. The oil in queſtion, ſays Labat, is never to be heated before its application to the part affected; as repeated experiments have evinced that its ſpirit is totally diſſipated by the fire.

COURTS *of* Conscience. See *Courts of* Requests, (*Encycl.*)

Courts, *Eccleſiaſtical.* See Ecclesiastical, (*Encycl.*)

Courts, *Military.* See Chivalry, *Court of*, (*Encycl.*)

Courts, *Maritime.* See Admiralty, (*Encycl.*)

Foreſt Courts. See Forest, (*Encycl.*).

CRADLE, (*Encycl.*) Add, *See Plate* LXXXII. *fig.* 8.

CRANE. For n° 65. read n° 69, 70.

CREST, in heraldry. For n° 49. read p. 3608.

CRICETUS. See Mus, (*Encycl.*)

CRICKET, (*Encycl.*) Crickets are thought to be ruminating animals, and certainly are furniſhed with ſeveral different ſtomachs. In medicine they are believed to be diuretic, and leſs dangerous than cantharides; for which intention they are dried and powdered, and given in doſes from 12 grains to a ſcruple. The houſe cricket only flies from the light, as many other inſects do; it feeds almoſt on every thing. The males only chirp; and their monotony, however diſagreeable to ſome people, is pleaſant enough to their own females, for it is the voice of love; and it is continual, night and day, except in very cold weather. They become habituated to bear all kinds of noiſe; but the field cricket is very timorous, and chirps only in the heat of the fineſt days of ſummer.

CRIMEN FALSI. See FALSI *Crimen*, (*Encycl.*)

CRUSADES. See CROISADES, (*Encycl.*)

Plate CCCXIII.

Barbut's Genera of Inſects.

CULEX, the GNAT; a genus of inſects belonging to the order of diptera. The mouth is formed by a flexible ſheath, incloſing briſtles pointed like ſtings. The antennæ of the males are filiform; thoſe of the females feathered. There are ſeven ſpecies. Theſe inſects, too well known by the ſevere punctures they inflict, and the itchings thence ariſing, afford a moſt intereſting hiſtory. Before they turn to flying inſects, they have been in ſome manner fiſhes, under two different forms. You may obſerve in ſtagnating waters, from the beginning of May till winter, ſmall grubs with their heads downwards, their hinder-parts on the ſurface of the water; from which part ariſes ſideways a kind of vent-hole, or ſmall hollow tube like a funnel, and this is the organ of reſpiration. The head is armed with hooks, that ſerve to ſeize on inſects and bits of graſs on which it feeds. On the ſides are placed four ſmall fins, by the help of which the inſect ſwims about, and dives to the bottom. Theſe larvæ retain their form during a fortnight or three weeks, after which period they turn to chryſalids. All the parts of the winged inſect are diſtinguiſhable through the outward robe that ſhrouds them. The chryſalids are rolled up into ſpirals. The ſituation and ſhape of the windpipe is then altered; it conſiſts of two tubes near the head, which occupy the place of the ſtigmata, through which the winged inſect is one day to breathe. Theſe chryſalids, conſtantly on the ſurface of the water in order to draw breath, abſtain now from eating; but upon the leaſt motion are ſeen to unroll themſelves, and plunge to the bottom, by means of little paddles ſituated at their hinder-part. After three or four days ſtrict faſting, they paſs to the ſtate of gnats. A moment before, water was its element; but now, become an aerial inſect, he can no longer exiſt in it. He ſwells his head, and burſts his incloſure. The robe he lately wore turns to a ſhip, of which the inſect is the maſt and ſail. If at the inſtant the gnat diſplays his wings there ariſes a breeze, it proves to him a dreadful hurricane; the water gets into the ſhip, and the inſect, who is not yet looſened from it, ſinks and is loſt. But in calm weather, the gnat forſakes his ſlough, dries himſelf, flies into the air, ſeeks to pump the alimentary juice of leaves, or the blood of man and beaſts. The ſting which our naked eye diſcovers, is but a tube, containing five or ſix ſpicula of exquiſite minuteneſs; ſome dentated at their extremity like the head of an arrow, others ſharp-edged like razors. Theſe ſpicula introduced into the veins, act as pump-ſuckers, into which the blood aſcends by reaſon of the ſmallneſs of the capillary tubes. The inſect injects a ſmall quantity of liquor into the wound, by which the blood becomes more fluid, and is ſeen through the microſcope paſſing through thoſe ſpicula. The animal ſwells, grows red, and does not quit its hold till it has gorged itſelf. The liquor it has injected, cauſes by its fermenting, that diſagreeable itching which we experience; and which may be removed by volatile alkali, or by ſcratching the part newly ſtung, and waſhing it with cold water; for later, the venom ferments, and you would only increaſe the tumour and the itching. Rubbing one's ſelf at night with fuller's-earth and water, leſſens the pain and inflammation. Gnats perform their copulation in the air. The female depoſits her eggs on the water; by the help of her moveable hinder part and her legs, placing them one by the ſide of another in the form of a little boat. This veſſel, compoſed of two or three hundred eggs, ſwims on the water for two or three days, after which they are hatched. If ſtorm ariſes, the boats are ſunk. Every month there is a freſh progeny of theſe inſects. Were they not devoured by ſwallows, other birds, and by ſeveral carnivorous inſects, the air would be darkened by them.

Gnats in this country, however troubleſome they may be, do not make us feel them ſo ſeverely as the muſketo-flies (*culex pipiens*) do in foreign parts. In the day-time or at night they come into the houſes; and when the people are gone to bed they begin their diſagreeable humming, approach always nearer to the bed, and at laſt ſuck up ſo much blood that they can hardly fly away. Their bite cauſes bliſters in people of a delicate complection. When the weather has been cool for ſome days, the muſquetoes diſappear; but when it changes again, and eſpecially after a rain, they gather frequently in ſuch quantities about the houſes, that their numbers are aſtoniſhing. In ſultry evenings they accompany the cattle in great ſwarms, from the woods to the houſes or to town; and when they are drove before the houſes, the gnats fly in wherever they can. In the greateſt heat of ſummer, they are ſo numerous in ſome places, that the air ſeems to be quite full of them, eſpecially near ſwamps and ſtagnate waters, ſuch as the river Morris in New Jerſey. The inhabitants therefore make a fire before their houſes to expel theſe diſagreeable gueſts by the ſmoke.

CULLODEN, a place in Scotland within two miles of Inverneſs, chiefly remarkable for a complete victory gained over the rebels on the 16th of April 1746. That day the royal army, commanded by the late duke of Cumberland, began their march from Nairn, formed into five lines of three battalions each; headed by major-general Huſke on the left, lord Sempill on the right, and brigadier Mordaunt in the centre; flanked by the horſe under the generals Hawley and Bland, who at the ſame time covered the cannon on the right and left. In this order they marched about eight miles, when a detachment of Kingſton's horſe, and of the Highlanders, having advanced before the reſt of the army, diſcovered the van of the rebels commanded by the young pretender. Both armies immediately formed in the order and numbers, ſhown in the annexed ſcheme.

About two in the afternoon the rebels began to cannonade the king's army: but their artillery being ill ſerved, did little execution; while the fire from their enemies was ſeverely felt, and occaſioned great disorder. The rebels then made a puſh at the right of the royal army, in order to draw the troops forward; but finding themſelves diſappointed, they turned their whole force on the left; falling chiefly on Barrell's and Monro's regiments, where they attempted to flank the king's front-line. But this deſign alſo was defeated by the advancing of Wolfe's regiment, while in the mean time the cannon kept playing upon them with cartridge-ſhot. General Hawley, with ſome Highlanders, had opened a paſſage through ſome ſtone-walls to the right for the horſe which advanced on that ſide; while the horſe on the king's right wheeled off upon their left, diſperſed their body of reſerve, and met in the centre of their front-line in their rear; when being repulſed in the front, and great numbers of them cut off, the rebels fell into very great confuſion. A dreadful carnage was made by the cavalry on their backs; however, ſome part of the foot ſtill preſerved their order: but the Kingſton's horſe, from the reſerve, galloped up briſkly, and falling on the fugitives, did terrible execution. A total defeat inſtantly took place, with the loſs of 2500 killed, wounded, and priſoners, on the part of the rebels; while the royaliſts loſt not above 200. The young pretender had his horſe ſhot under him during the engagement; and after the battle retired to the houſe of a factor of lord Lovat, about ten miles from Inverneſs, where he ſtaid that night. Next day he ſet out for Fort-Auguſtus, from whence he purſued his journey through wild deſarts with great difficulty and diſtreſs, till at laſt he ſafely reached France, as related under the article BRITAIN, n° 418. (*Encycl.*)

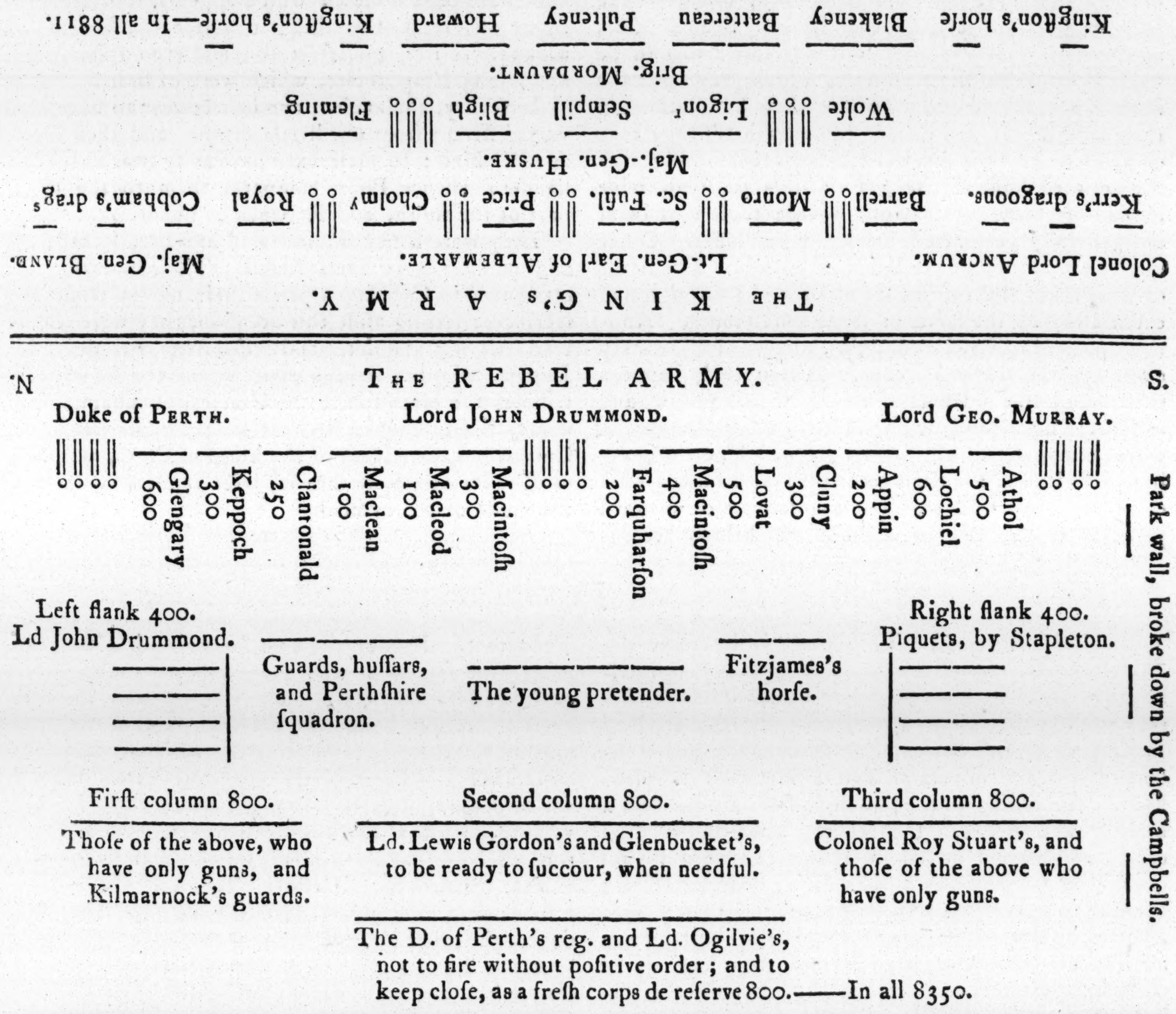

Kingſton's horſe
Blakeney
Battereau
Pulteney
Howard
Kingſton's horſe—In all 8811.
Brig. MORDAUNT.
Wolfe
Ligon'
Sempill
Bligh
Fleming
Maj.-Gen. HUSKE.
Kerr's dragoons.
Barrell
Monro
Sc. Fuſil.
Price
Cholmy
Royal
Cobham's drags
Colonel Lord ANCRUM.
Lt.-Gen. Earl of ALBEMARLE.
Maj. Gen. BLAND.
THE KING'S ARMY.
N.
THE REBEL ARMY.
S.
Duke of PERTH.
Lord JOHN DRUMMOND.
Lord GEO. MURRAY.
Glengary 600
Keppoch 300
Clanronald 250
Maclean 100
Macleod 100
Macintoſh 300
Farquharſon 200
Macintoſh 400
Lovat 500
Cluny 300
Appin 200
Lochiel 600
Athol 500
Park wall, broke down by the Campbells.
Left flank 400.
Ld John Drummond.
Guards, huſſars, and Perthſhire ſquadron.
The young pretender.
Fitzjames's horſe.
Right flank 400.
Piquets, by Stapleton.
First column 800.
Thoſe of the above, who have only guns, and Kilmarnock's guards.
Second column 800.
Ld. Lewis Gordon's and Glenbucket's, to be ready to ſuccour, when needful.
Third column 800.
Colonel Roy Stuart's, and thoſe of the above who have only guns.
The D. of Perth's reg. and Ld. Ogilvie's, not to fire without poſitive order; and to keep cloſe, as a freſh corps de reſerve 800.——In all 8350.

Plate CCCXIII.

CURCULIO, (*Encycl.*) Theſe inſects are divided into the following families. 1. Thoſe which have the roſtrum longer than the thorax, and whoſe thighs are ſimple. 2. Thoſe which have the roſtrum longer than the thorax, and the thighs thicker and made for leaping. 3. Thoſe which have the roſtrum longer than the thorax, and the thighs dentated. 4. Thoſe which have dentated thighs, and a roſtrum ſhorter than the thorax. 5. Thoſe whoſe thighs are without teeth or ſpines, and the roſtrum ſhorter than the thorax.

The larvæ of the curculiones differ not from thoſe of moſt coleopterous inſects. They bear a reſemblance to oblong ſoft worms. They are provided anteriorly with ſix ſcaly legs, and their head is likewiſe ſcaly. But the places where thoſe larvæ dwell, and their transformations, afford ſome ſingularities. Some ſpecies of them, that are dreaded for the miſchief they do in granaries, find means to introduce themſelves, while yet ſmall, into grains of corn, and there make their abode. It is very difficult to diſcover them, as they lie concealed within the grain. There they grow at leiſure, enlarging their dwelling-place as they grow, at the

Barbut on Inſects.

expence of the interior meal of the grain on which they feed. Corn-lofts are often laid waſte by theſe inſects, whoſe numbers are ſometimes ſo great as to devour and deſtroy all the corn. When the inſect, after having eat up the meal, is come to its full ſize, it remains within the grain, hidden under the empty huſk, which ſubſiſts alone; and there transformed, it becomes a chryſalis, nor does it leave it till a perfect inſect, making its way through the huſk of the grain. It is no eaſy matter to diſcover by the eye the grains of corn thus attacked and hollowed out by theſe inſects, as they outwardly appear large and full: but the condition the curculio has reduced them to, renders them much lighter; and if you throw corn infeſted by theſe inſects into water, all the tainted grains will ſwim, and the reſt ſink to the bottom. Other larvæ of curculiones are not ſo fond of corn, but fix in the ſame manner on ſeveral other ſeeds. Beans, peaſe, and lentils, that are preſerved dry, are liable to be ſpoiled by theſe little animals, which prey upon the inward part of the grain, where they have taken up their habitation, and do not come forth till they have completed their transformation, by breaking through the outward huſk of the grain: this is diſcoverable by caſting thoſe grains into water; thoſe that ſwim are generally perforated by the curculiones. Other ſpecies are lodged in the inſide of plants. The heads of artichokes and thiſtles are often bored through and eaten away by the larvæ of large curculiones. Another ſpecies ſmaller, but ſingular, pierces and inwardly conſumes the leaves of elms. It frequently happens that almoſt all the leaves of an elm appear yellow, and as it were dead towards one of their edges, while the whole remainder of the leaf is green. Upon inſpecting thoſe leaves, the dead part appears to form a kind of bag or ſmall bladder. The two laminæ or outward pellicles of the leaf, as well above as below, are entire, but diſtant and ſeparated from each other, whilſt the parenchyma that lies between them has been conſumed by ſeveral ſmall larvæ of the curculio, that have made themſelves that dwelling, in which they may be met with. After their transformation they come forth, by piercing the kind of bladder, and give being to a curculio that is brown, ſmall, and hard to catch, by reaſon of the nimbleneſs with which it leaps. The property of leaping, allotted to this ſingle ſpecies, depends on the ſhape and length of its hinder legs.

CUSTOM *and* HABIT. Delete the References to EMOTIONS *and Paſſions.*

CYMBAL, (*Encycl.*) Caſſiodorus and Iſidore call this inſtrument *acetabulum*, the name of a cup or cavity of a bone wherein another is articulated; and Xenophon compares it to a horſe's hoof; whence it muſt have been hollow: which appears, too, from the figure of ſeveral other things denominated from it; as a baſin, caldron, goblet, caſk; and even a ſhoe, ſuch as thoſe of Empedocles, which were of braſs.

In reality, the ancient cymbals appear to have been very different from our kettle-drums, and their uſe of another kind: to their exterior cavity was faſtened a handle; whence Pliny compares them to the upper part of the thigh, and Rabanus to phials.

They were ſtruck againſt one another, in cadence, and made a very acute ſound. Their invention was attributed to Cybele; whence their uſe in feaſts and ſacrifices: ſetting aſide this occaſion, they were ſeldom uſed but by diſſolute and effeminate people. M. Lampe, who has written expreſsly on the ſubject, attributes the invention to the Curetes, or inhabitants of mount Ida in Crete: it is certain theſe, as well as the Corybantes, or guards of the kings of Crete, and thoſe of Rhodes and Samothracia, were reputed to excel in the muſic of the cymbal.

D.

DÆMON, (*Encycl.*) This word is by ſome derived from the Greek δαιμαν, "knowing, or intelligent;" by ſome from δάιομαι, "to diſtribute." Either of theſe derivations agrees with the office aſcribed to dæmons by the ancient heathens, as the ſpirits intruſted with the inſpection and government of mankind. According to the philoſophers, dæmons held a middle rank between the celeſtial gods and men on earth, and carried on all intercourſe between them; conveying the addreſſes of men to the gods, and divine benefits to men. Many were of opinion that the celeſtial divinities did not concern themſelves with human affairs, but left the management of them entirely to theſe ſubaltern deities. Hence they became the objects of worſhip, though thoſe who were more immediately ſo were the ſpirits of men who were thought to have become dæmons or deities after departing from their bodies. Heſiod and other poets who have written concerning the ancient hiſtory or traditions on which the public faith was founded, aſſert, that the men of the golden age, who were very good, became dæmons after death, and diſpenſers of good things to mankind. In this ſenſe, according to ſome, the word *dæmon* (though conſtantly tranſlated *devil*) is alſo frequently taken in Scripture, both in the Old and New Teſtament. Beſides the two foregoing kinds of dæmons, the fathers as well as philoſophers aſſerted the exiſtence of another, viz. ſuch as ſpring from the congreſs of ſuperior beings with women; and in the theology of the fathers, theſe were the worſt of all.

DAMPS, (*Encycl.*) Among the other uſes to which dephlogiſticated air might be applied, Mr Cavallo reckons that of ſecuring people from the dangerous effects of damps in mines, and other ſubterraneous places. "If a large bladder," ſays he, "into which a ſolution of lime in water is introduced, be filled with dephlogiſticated air, and a ſmall wooden or glaſs pipe be adapted to its neck, a man may hold that pipe in his mouth, and may breathe the dephlogiſticated air; and thus equipped he may enter into theſe ſubterranean places, amidſt the various elaſtic fluids contained in them. A large bladder of dephlogiſticated air will ſerve for above a quarter of an hour, which is a length of time ſufficient for various purpoſes; beſides, if longer time is required to be ſpent in theſe places, a perſon may have two or more bladders of dephlogiſticated air along with him, and may ſhift as ſoon as the air of one is contaminated. Without the neceſſity of any more complicated apparatus, the bladders full of dephlogiſticated air may be kept ſtopped by putting corks into the glaſs or wooden pipes that are tied to their necks. This air might alſo be uſed for diving-bells."

DEBT, *National.* See NATIONAL and FUNDS. (*Encycl.*)

DEFORMITY, (*Encycl.*) Deformity is either natural or moral. Theſe are both referred by Mr Hutchiſon to an internal ſenſe; and our perceptions of them, as he ſuppoſes, ariſes from an original arbitrary ſtructure of our own minds, by which certain objects, when obſerved, are rendered the occaſions of certain ſenſations and affections.

That many objects give no pleaſure to our ſenſe, is obvious. Many are certainly void of beauty; but then, ſays this author, there is no form which ſeems neceſſarily diſagreeable of itſelf, when we dread no other evil from it, and compare it with nothing better of the kind. Many objects are naturally diſpleaſing and diſtaſteful to our external ſenſes, as well as others pleaſing and agreeable; as ſmells, taſtes, and ſome ſeparate ſounds: but with regard to our ſenſe of beauty, no compoſition of objects which give not unpleaſant ſimple ideas, ſeems poſitively unpleaſant or painful of itſelf, had we never obſerved any thing better of the ſame kind.

Had there been a ſpecies of the form which we now denominate *ugly* or *deformed*, and had we never ſeen or expected greater beauty, we ſhould have received no diſguſt from it; though the pleaſure would not have been ſo great in this form as in thoſe we now admire. Our ſenſe of beauty ſeems deſigned to give us poſitive pleaſure; but not poſitive pain or diſguſt, any farther than what ariſes from diſappointment.

There are indeed many faces which, at firſt view, are apt to raiſe diſlike. But this is generally not from any poſitive deformity; but either from want of expected beauty, or from the carrying ſome natural indications of morally bad diſpoſitions, which we all acquire a faculty of diſcerning in countenances, airs, and geſtures. That this is not occaſioned by any form poſitively diſguſting, appears hence, that if, upon long acquaintance, we are ſure of finding ſweetneſs of temper, humanity, and cheerfulneſs, though the bodily form continues, it ſhall give us no diſguſt. There are horrors raiſed by ſome objects, which are only the effect of fear for ourſelves, or compaſſion towards others, when either reaſon, or ſome fooliſh aſſociation of ideas, makes us apprehend danger; and not the effect of any thing in the form itſelf. For we find, that moſt of thoſe objects which excite horror at firſt, when experience or reaſon has removed the fear, may become the occaſion of pleaſure.

The caſual conjunction of ideas gives us diſguſt, where there is nothing diſagreeable in the form itſelf, And this, in effect, is the cauſe of moſt of our fantaſtic averſions to the figures of divers animals, &c. Thus ſerpents of all kinds, and many inſects, really beautiful enough, are beheld with averſion by many people, who have got ſome accidental ideas of miſchief aſſociated to them. A ſimilar reaſoning is applied to our perception of moral beauty and deformity. *Inquiry into the original of our Ideas of Beauty and Virtue*, paſſim.

But it is more juſt to diſtinguiſh between the ſentiments of delight or diſguſt, excited in us by beautiful or deformed objects, which are effects of ſome cauſes, and the natural and real qualities of the perceived objects by which they are produced. There are objects, ſays an excellent writer, which have a natural aptitude to pleaſe or offend, or between which and the contemplating mind there is a neceſſary congruity or incongruity; and though the actual perception of the underſtanding, and conſequent feeling of the heart, in contemplating the actions and affections of moral agents, may exiſt in very different degrees, on account of the incidental obſtructions ariſing from bodily indiſpoſition, mental prejudices and biaſſes, and the aſſociation of ideas; yet, to every rational mind properly diſpoſed, morally good actions muſt for ever be acceptable, and can never of themſelves offend; and morally evil actions muſt for ever be diſagreeable, and can never of themſelves pleaſe. What is right in actions and characters is beautiful and amiable, and gives pleaſure; what is wrong is deformed and odious, and excites diſguſt: right and pleaſure, wrong and pain, are as diſtinct as cauſe and effect. It is no leſs abſurd to maintain, that the perception of virtue is nothing diſtinct from the reception of the pleaſure reſulting from it, than to infer, with ſome metaphyſicians, that ſolidity, extenſion, and figure, are only particular modes of ſenſation, becauſe attended, whenever they are perceived, with ſome ſenſations of ſight or touch. Thus does this author ſhow, that moral beauty and deformity are real qualities of certain actions; in which conſiſts their aptitude to pleaſe or diſguſt. With reſpect to natural beauty, he obſerves, that uniformity amidſt variety pleaſes, becauſe of the natures of variety and uniformity, which are ſuch, that, whenever united, they are adapted to pleaſe every free unbiaſſed mind that diſcerns them. He accounts for the pleaſure they afford, without referring them to an arbitrary internal ſenſe, by the following circumſtances that attend them. They are more eaſily comprehended by the mind: order and ſymmetry give things their ſtability and ſtrength, and ſubſerviency to any valuable purpoſe; regularity and order evidence art and deſign. Diſorder and confuſion, whence deformity ariſes, denote only the negation of regularity and order; or any arrangement and diſpoſition of things, which are not according to a law, rule, or plan, and prove not deſign. Theſe are not poſitively diſpleaſing; except where we previouſly expected order, or where impotence or want of ſkill appear, and the contriver has either failed of his deſign or executed it ill. See on this ſubject Dr Price's Review of the principal Queſtions and Difficulties in Morals, ch. ii. *paſſim.* See an admirable Eſſay on bodily Deformity, by Mr Hay, in the *Fugitive Pieces*, vol. i. p. 93. &c.

DEMESNE LANDS, (*Encycl.*) See REVENUE, n° 5. (*Encycl.*)

DIACHYLON. For n° 967. read 975.

DIASCORDIUM. For n° 888. read 899.

DISSENTERS, (*Encyl.*) See alſo NONCONFORMISTS, (*Encycl.*)

DODD (Dr William), an unfortunate diſſenting Engliſh divine, eldeſt ſon of the Rev. William Dodd, many years vicar of Bourne in Lincolnſhire, was born May 29. 1729. He was ſent, at the age of 16, to the univerſity of Cambridge; and admitted, in the year 1745, a ſizar of Clare-Hall. In 1749-50 he took the degree of B. A. with great honour, being upon that occaſion in the liſt of wranglers. Leaving the univerſity, he imprudently married a Miſs Mary Perkins in 1751, was ordained a deacon the ſame year, prieſt in 1753, and ſoon became a celebrated and popular preacher. His firſt preferment was the lectureſhip of Weſt-Ham. In 1754 he was alſo choſen lecturer of St Olave's, Hart-Street; and in 1757 took the degree of M. A. at Cambridge. On the foundation of the Magdalen Hoſpital in 1758, he was a ſtrenuous ſupporter of that charity, and ſoon after became preacher at the chapel of it. By the patronage of Biſhop Squire, he in 1763 obtained a prebend of Brecon, and by the intereſt of ſome city-friends procured himſelf to be appointed one of the king's chaplains; ſoon after which, he had the education of the preſent earl of Cheſterfield committed to his care. In 1766, he went to Cambridge, and took the degree of LL.D. At this period, the eſtimation in which he was held by the world was ſufficient to give him expectations of preferment, and hopes of riches and honours; and theſe he might probably have acquired, had he poſſeſſed a common portion of prudence and diſcretion. But, impatient of his ſituation, and eager for advancement, he raſhly fell upon means, which in the end were the occaſion of his ruin. On the living of St George, Hanover-Square, becoming vacant, he wrote an anonymous letter to the chancellor's lady, offering 3000 guineas if by her aſſiſtance he was promoted to it. This being traced to him, complaint was immediately made to the king, and Dr Dodd was diſmiſſed with diſgrace from his office of chaplain. From this period he lived neglected, if not deſpiſed; and his extravagance ſtill continuing, he became involved in difficulties, which tempted him to forge a bond from his late pupil lord Cheſterfield, Feb. 4. 1777, for 4200 l. which he actually received: but being detected, he was tried at the Old Bailey, found guilty, and received ſentence of death; and, in ſpite of every application for mercy, was executed at Tyburn, June 27. 1777. Dr Dodd was a voluminous writer, and poſſeſſed conſiderable abilities, with little judgment and much vanity. An accurate liſt of his various writings is prefixed to his "Thoughts in Priſon," ed. 1781.

Nicholls's Anecdotes of Bowyer, &c.

DODONIAN, (*Encycl.*) The origin and occaſion of this fable we have from Herodotus, who obſerves it was founded on this, that πελειας, which in the Theſſalian language ſignifies a pigeon, does likewiſe ſignify a witch, or propheteſs. But what is more extraordinary is, another tradition among the poets, as if the very oaks of the foreſt of Dodona ſpoke, and delivered oracles. This fable is eaſily deduced from the former; the pigeons in the oaks being ſuppoſed to ſpeak, it was no great flight of poetical fancy, to introduce the trees themſelves ſpeaking, &c.

The fountain of Dodona was in the temple of Jupiter. The ancient naturaliſts aſſure us, it had a property of rekindling torches, &c. when newly extinguiſhed. This, no doubt, it did, by means of ſome ſulphureous fumes exhaling from it; as we ſtill find a fountain in Dauphiné, called the *burning fountain*, do. It is alſo ſaid to have extinguiſhed lighted torches; which is no great miracle, ſince plunging them into a place where the ſulphur was too denſe, or into the water, muſt have that effect.

DOWER, (*Dotarium*), is the portion which a widow hath of the lands of her huſband after his deceaſe, for the ſuſtenance of herſelf and education of her children.

DOWN *of* PLANTS. See HAIR, (*Encycl.*)

DRAPERY, (*Encycl.*) See alſo MINIATURE-*Painting*, (*Encycl.*)

DULSE, DILSE, or *Sweet Fucus*. See FUCUS, in this APPENDIX.

DUNSTAFFNAGE, a caſtle ſituated in the iſland of Skie, fabled to have been founded by Ewin a Pictiſh monarch, cotemporary with Julius Cæſar, naming it after himſelf, *Evonium*. In fact, the founder is unknown; but it is certainly of great antiquity, and the firſt ſeat of the Pictiſh and Scottiſh princes. In this place was long preſerved the famous ſtone the Palladium of North Britain; brought, ſays legend, out of Spain, where it was firſt uſed as a ſeat of juſtice by Gathelus, coeval with Moſes. It continued here as the coronation-chair till the reign of Kenneth II. who removed it to Scone, in order to ſecure his reign; for according to the inſcription,

Ni fallat fatum, Scoti quocunque locatum
Invenient lapidem, regnare tenantur ibidem.

The caſtle is ſquare; the inſide only 87 feet; partly ruinous, partly habitable. At three of the corners are round towers; one of them projects very little. The entrance is towards the ſea at preſent by a ſtaircaſe, in old times probably by a draw-bridge, which fell from a little gate-way. The maſonry appears very ancient; the tops battlemented. This pile is ſeated on a rock, whoſe ſides have been pared to render it precipitous, and to make it conform to the ſhape of the caſtle.

In 1307, this caſtle was poſſeſſed by Alexander Macdougal lord of Argyle, a friend to the Engliſh; but was that year reduced by Robert Bruce, when Macdougal ſued for peace with that prince, and was received into favour.

Plate CCCXIII

We find, about the year 1455, this to have been a reſidence of the lords of the iſles; for here James laſt earl of Douglas, after his defeat in Annandale, fled to Donald, the regulus of the time, and prevailed on him to take arms and carry on a plundering war againſt his monarch James II.

At a ſmall diſtance from the caſtle is a ruined chapel, once an elegant building; and at one end an incloſure, a family-cemetery. Oppoſite to theſe is a high precipice, ending abrupt and turning ſuddenly toward the ſouth-eaſt. A perſon concealed in the receſs of the rock, a little beyond the angle, ſurpriſes friends ſtationed at ſome diſtance beneath the precipice, with a very remarkable echo of any word, or even ſentence, he pronounces; which reaches the laſt diſtinct and unbroken. The repetition is ſingle, but remarkably clear.

DYEING, (*Encycl.*) See alſo LINEN, (*Encycl.*)

DYEING *Plants*. The following is a liſt of the Britiſh plants which are, or poſſibly might be, uſeful in dyeing.

YELLOWS.

Bark of	buck-thorn,	*Rhamnus catharticus.*
	berry-bearing alder,	———*frangula.*
	berbery,	*Berberis vulgaris.*
	plum-tree,	*Prunus domeſtica.*
	apple-tree,	*Pyrus malus.*

Bark

Dyeing,

Bark of horn-beam,	*Carpinus betulus.*
Root of meadow-rue,	*Thalictrum flavum.*
common nettle,	*Urtica dioica.*
Herb, ſaw-wort,	*Serratula tinctoria.*
buſhy hawkweed,	*Hieracium umbellatum.*
hemp-agrimony,	*Bidens tripartita.*
gale, or Dutch myrtle,	*Myrica gale.*
ſweet willow,	*Salix pentandra.*
birch-tree,	*Betula alba.*
hedge-nettle,	*Stachys ſylvatica.*
ſpotted arſmart,	*Polygonum perſicaria.*
Herb, yellow looſeſtriſe,	*Lyſimachia vulgaris.*
devil's-bit,	*Scabioſa ſucciſa.*
kidney-vetch,	*Anthyllis vulneraria.*
common yellow liverwort,	*Lichen parietinus.*
Flowers of St John's wort,	*Hypericum perforatum.*
REDS.	
Roots of ladies bedſtraw,	*Galium verum.*
herb woodroof,	*Aſperula tinctoria.*
ſorrel,	*Rumex acetoſa.*
tormentil,	*Tormentilla erecta.*
purple cinquefoil,	*Comarum paluſtre.*
PURPLES.	
Herb, or tops of wild marjoram,	*Origanum ſylveſtre.*
BLUES.	
Bark of the aſh,	*Fraxinus excelſior.*
Flowers of larkſpur,	*Delphinium conſolida.*
bell-flower,	*Campanula rotundifolia.*
Berries of black heath,	*Empetrum nigrum.*
GREENS.	
Herb of ragwort,	*Senecio Jacobæa.*
cow-weed,	*Chærophyllum ſylveſtre.*
Panicle of brome-graſs,	*Bromus ſecalinus.*
common reed,	*Arundo phragmites.*
BLACKS.	
Bark of oak,	*Quercus robur.*
Water horehound,	*Lycopus europæus.*

Dytiſcus.

DYTISCUS, (*Encycl.*) The larvæ of the dytiſci, water-beetle, or diver, are often met with in water. They are oblong, and have ſix ſcaly feet. Their body conſiſts of eleven ſegments. The head is large, with four filiform antennæ and a ſtrong pair of jaws. The laſt ſegments of their body have rows of hairs on the ſides; and the abdomen is terminated by two ſpines charged with the like hairs, forming a kind of plumes. Theſe larvæ are frequently of a greeniſh variegated brown: they are lively, active, and extremely voracious: they devour and feed upon other water-inſects, and often tear and deſtroy each other. The perfect inſect is little inferior to its larvæ in voraciouſneſs, but it can only exerciſe its cruelty on the larvæ; the perfect inſects, like himſelf, being ſheltered by the kind of ſcaly cuiraſs with which they are armed. This creature muſt be touched cautiouſly; for beſides its power of giving a ſevere gripe with its jaws, it has moreover, under the thorax, another weapon, a long ſharp ſpine, which it will drive into one's fingers by the effort it makes to move backwards. The eggs of the dytiſci are rather large, and are by them incloſed in a kind of ſilky duſkiſh cod, of a ſtrong and thick texture, in form round, and terminated by a long appendix, or ſlender tail, of the ſame ſubſtance. Theſe cods are often found in the water, and from them are brought forth the eggs and larvæ of the dytiſci. The ſtrength of theſe cods probably ſerves the inſect to defend their eggs from the voraciouſneſs of ſeveral other aquatic inſects, and even from that of their fellow-dytiſci, who would not ſpare them.

Plate CCCXIII.

Many ſpecies of the perfect inſect are common in ſtagnated waters, which they quit in the evening to fly about. They ſwim with incredible agility, making uſe of their hinder-legs after the faſhion of oars. The elytra of the females are in general furrowed, and thoſe of the male plain: when they firſt arrive at their perfect ſtate, their elytra are almoſt tranſparent, and in many ſpecies of a beautiful dun colour, mingled with ſhades of greeniſh brown. The beſt method of catching them is with a hand-net or ſieve; for they are ſo nimble, and exerciſe their defenſive weapons ſo often, and with ſuch painful ſucceſs, to thoſe who endeavour to catch them, that they are very often obliged to let them eſcape; the eaſieſt way to kill them, is to let them fall into boiling hot water, which inſtantly deſtroys them.

E.

EAR-ACH, in medicine. This diſorder affects the concha, and the whole meatus auditorius. It is attended with inflammation, tumours, punction, eroſion, tenſion, pulſation, and a ſenſe of weight.

Extraneous bodies falling into the meatus auditorius, or whatever excites pain in other parts, may cauſe it here.

The quality of the wax may be faulty, and be a cauſe; but the moſt frequent cauſes are heat and cold: ſometimes an acrid ſerum is ſecreted in the glands of the ear.

If the pain is violent, it ſeldom fails to bring on a fever, which is early attended with great reſtleſſneſs; and a delirium, fainting, and often convulſions, are the conſequence: for the membrane that lines the ear is exquiſitely ſenſible, and fully ſtored with nerves; beſides, membranes which adhere to bones have a more than ordinary ſenſibility.

In the beginning, whilſt the pain is not very conſiderable, a little warm olive-oil dropped into the ear will often relieve. If cold is the cauſe, keep the head warm. If there is inflammation and tumour, which will be known by the throbbing pain, a ſuppuration may be encouraged by cataplaſms applied warm on the outer ear; but if the ſtate of ſuppuration is not manifeſtly near, endeavour by bleeding, purging, and diſcutients applied to the ear, to remove the inflammation and pain. If external heat was the cauſe, bleed, and give daily a moderate doſe of Glauber's ſalt as a purge, until the pain abates, or until there is reaſon to ſuſpect a ſuppuration: an opiate may be given at night when the pain is violent. When acrid defluxions are the cauſe, inject a warm infuſion of poppy-heads in water. When living inſects have crept into the ear, blow the ſmoke of tobacco therein, and then pour in warm oil. If purulent matter diſcharges itſelf, inject tepid water, mixed with a little ſoap or honey of roſes. Beſides the above-mentioned, bliſters behind the ears, blad-

Motherby's Med. Dict.

bladders of warm water laid on the affected ear, and the pediluvium, are occaſionally uſeful.

EAU DE CARMES. For n° 571. read n° 569.

EAU *de Luce*. Dele PHARMACY, n° 671.

ECSTASY. See EXTASY, (*Encycl.*)

EDDOES. For ARUM *Peregrinum*, read ARUM *Eſculentum*.

EDUCATION, (*Encycl.*) The follies of a too delicate education are well expreſſed in that device of an ape; which by over careſſing and hugging its younges, ſtrangles them; with this motto, *complectando necat*. Octavius Ferrarius has a very good Latin treatiſe on the ſubject of education, intitled *Chiron*, the name of the centaur who was Achilles's tutor.

Mr Locke's excellent treatiſe of education is known to every body. Quintilian employs the ſecond chapter of his firſt book in inquiring whether a domeſtic or a college education be preferable, *i. e.* whether it be better to bring up one's children at home, or ſend them to the colleges and public ſchools. After urging all that can be ſaid on either ſide, he concludes for a college or ſchool education.

The plan of education, whether it be domeſtic or collegiate, ſhould be ſuited to the ſtation and views of parents, and to the genius of their children; and it is alſo right to conſult their conſtitution and inclination. It is of great importance, that thoſe who are deſtined to occupy ſuperior ſtations in ſociety, ſhould enjoy the benefits of an enlarged and liberal education; that they ſhould be furniſhed with every ſubſtantial and ornamental accompliſhment; and thoſe that are intended for any particular profeſſion or employment, ſhould be principally directed to thoſe ſtudies which ate appropriated to their reſpective views; and in every rank of life, an attention to the morals of youth ſhould be a primary object. Though the municipal laws of moſt countries have made no proviſion for conſtraining a parent to beſtow a proper education on his children; yet in the caſe of religion, they are under peculiar reſtrictions in our own country. Some of theſe reſtrictions, as they affect proteſtants who diſſent from the religion of the ſtate, may be thought both impolitic and injurious, and have, therefore, lately been conſiderably relaxed; but thoſe which are to prevent the progreſs of popery, are prudent and neceſſary. Thus, if any perſon ſends a child under his care beyond the ſeas, to be inſtructed in any Popiſh college, &c. in the principles of the Popiſh religion, or ſhall contribute towards his maintenance, he ſhall forfeit one hundred pounds, beſides the diſabilities incurred by the child ſo ſent, (1 Jac. I. cap. 4. and 3 Jac. I. cap. 5. 11 and 12 W. III. cap. 4.); and both ſhall be incapable of ſuing in law or equity, of being executor or adminiſtrator, of enjoying any legacy or deed of gift, or of bearing any office in the realm; and he ſhall forfeit all his goods and chattels, and likewiſe all his real eſtate for life, 3 Car. I. cap. 2.

EFFLORESCENCE, (*Encycl.*) Beſides the common cryſtallization of ſalts, all of them have the property of appearing in the form of an effloreſcence, or ſmall ſaline ſpiculæ, when mixed with any thick ſubſtance, particularly lime. Whatever ſalt happens to be made uſe of, there is little or no difference in the effloreſcence. Thus, in butter very much ſalted, the ſea-ſalt ſhoots in the form of long ſpiculæ, though the ſea-ſalt itſelf never ſhoots but in the form of cubical cryſtals. In like manner Glauber's ſalt will appear in the form of an effloreſcence, as well as the foſſile alkali, &c. nor will the form of the cryſtals of the effloreſcence be perceptibly different from thoſe of ſea-ſalt. The effloreſcences which we ſee very commonly upon walls are in general Glauber's ſalt. In ſome caſes (but ſeldom in ſuch effloreſcences as we have examined), they are compoſed of foſſile alkali. The reaſon of theſe differences is not known. In almoſt all caſes of this kind there ſeems to be a real growth of ſalt. On one ſpot of a plaſter wall about two feet ſquare, which we obſerved particularly, this growth was very evident. The produce was a true Glauber's ſalt; and by frequently taking off the effloreſcence, eight ounces were procured; nor did the prolific virtue of the wall ſeem to be in the leaſt impaired by the waſte.

ELECTRICITY, p. 2673. col. 1. line 8. for *Biſmuth*, read *Zinc*.—P. 2701. col. 1. line 4. for THUNDER, read LIGHTNING.

ELECTUARY. For 883, read 893.

ELEGY. Marginal note, for n°62, read p. 6311.

ELEMI, (*Encycl.*) See alſo BURSERA, in this APPENDIX.

EMBALMING, (*Encycl.*) See alſo SURGERY, § xx. (*Encycl.*)

EMULSION. Marginal note, for 910 read 922.

ENGLAND. P. 2769. marginal note 45. for *Henry II.* read *Henry III.*

ENTOMOLOGY.

ENTOMOLOGY, the ſcience of inſects, or that part of zoology which treats of inſects.

Whoever is deſirous of attaining a ſyſtematic knowledge of inſects, ought primarily to be ſolicitous about acquiring the terms made uſe of in the ſcience, that ſo he may be able rightly to denominate every part of an inſect. The ſtudent is firſt to know what an inſect is, leſt he miſtake hippocampi, and other amphibious animals, for them, as was formerly done; or confound them with the *vermes*, which Linnæus firſt diſtinguiſhed from inſects, and which differ as eſſentially from them as the claſs mammalia do from birds. Every inſect is furniſhed with a head, antennæ, and feet, of all which the vermes are deſtitute. All inſects have ſix or more feet; they reſpire through pores placed on the ſides of their bodies, and which are termed *ſpiracula*; their ſkin is externally hard, and ſerves them inſtead of bones, of which they have internally none. From this definition, the acus marina is evidently no inſect. But the antennæ placed on the fore-part of the head, conſtitute the principal diſtinction. Theſe are jointed and moveable in every part, in which they differ from the horns of other animals: they are organs conveying ſome kind of ſenſe; but we have no more idea of what this kind of ſenſe is, than a man has, who, without eyes, attempts to determine the particular action of the rays of light on the retina of the eye, or to explain the changes which from thence take place in the human mind. That they are the organs of ſome kind of ſenſe, is apparent from their perpetually moving them

Organs of Hearing in Inſects.

them forward ; yet the hard cruſt with which they are inveſted, and their ſhortneſs in flies and other inſects, would induce one to believe them not to be the organs of touch : Mr Barbut ſuppoſes them to conſtitute or to contain the organs of hearing. That they are tubular, and filled with air, and ſome kind of humour, appears from the antennæ of butterflies immerſed in water.—To come now to the terms of the art. A knowledge of the external parts of the body is firſt to be eſtabliſhed ; which, after the method of anatomiſts, we divide into head, trunk, abdomen, and extremities.

Sect. I. *External parts of the Body.*

Fundamenta Entomologiæ, A. J. Bladh, Amæn. acad. nº 133.

I. CAPUT, the Head. This part in inſects without brain. The difference between the brain and ſpinal marrow conſiſts in the former being a medullary part organized. We do not deny the exiſtence of a medullary thread in the heads of inſects, but we never could diſcover it to be organized : hence the hippoboſca equina, or horſe-fly, will live, run, nay even copulate, after being deprived of its head ; to ſay nothing of many others which are capable of living a long while in the ſame ſituation.

As they are not apparently furniſhed with ears, they have been apprehended incapable of hearing ; as we can no more conceive that ſenſe to exiſt without ears, than viſion without eyes. That they are nevertheleſs ſuſceptible of any ſhrill or loud noiſe, as well as fiſhes, is indiſputable ; but it has been ſuppoſed to be in a manner different from that of hearing. Mr Barbut, however, ſuppoſes them to poſſeſs this ſenſe in a very diſtinct manner. Many inſects, he obſerves, are well known to be endowed with the power of uttering ſounds, ſuch as large beetles, the bee, waſp, common fly, gnat, &c. The ſphinx atropos ſqueaks, when hurt, nearly as loud as a mouſe. Now, if inſects are endowed with the power of uttering ſounds, it certainly muſt be for ſome purpoſe. As they vary their cry occaſionally, it muſt certainly be deſigned either to give notice of pleaſure or pain, or ſome affection in the creature who poſſeſſes it. "The knowledge of their ſounds (ſays our author) is undoubtedly confined to their tribe, and is a language intelligible to them only ; ſaving when violence obliges the animal to exert the voice of nature in diſtreſs, craving compaſſion ; then all animals underſtand the doleful cry. For inſtance, attack a bee or waſp near the hive or neſt, or a few of them : the conſequence of that aſſault will be, the animal or animals, by a different tone of voice, will expreſs his or their diſapprobation or pain ; that ſound is known to the hive to be plaintive, and that their brother or brethren require their aſſiſtance ; and the offending party ſeldom eſcapes with impunity. Now, if they had not the ſenſe of hearing, they could not have known the danger their brother or brethren were in by the alteration of their tone."

Another proof, which he reckons ſtill more deciſive, was taken from an obſervation made by himſelf a large ſpider in St James's park. This creature had made a very large web on a wooden railing ; and was, at the time of obſervation, on one of the rails at a conſiderable diſtance from the place where a large fly entangled itſelf. Nevertheleſs, the moment the fly was entangled, the ſpider became ſenſible of it ; though, from the ſituation of the rail, he could not poſſibly have ſeen it. In this, however, Mr Barbut might poſſibly be deceived ; becauſe the ſpider was perhaps alarmed by the tremulous motion of the threads, occaſioned by the fluttering of the fly ; which he might well know how to diſtinguiſh from their vibration by the wind. The organ of hearing, in our author's opinion, is ſituated in the antennæ ; both from their ſituation in the part of the head moſt favourable to ſuch organs, their inward ſtructure being moveable, the ears of moſt inferior animals being ſo. He has never conſidered the antennæ as either offenſive or defenſive, but has obſerved them to be endowed with an exquiſite ſenſe of feeling ; that the animal appeared to be in agony when its antennæ were pinched ; and that it takes care to avoid the touching any hard ſubſtance with them roughly. "This tenderneſs in the organ of hearing (ſays he) is common to all animals ; and inſects ſeem to be particularly tender in theſe parts by quickly withdrawing them from the touch."

Organs of Smell in Inſects.

Our author further obſerves, that the antennæ of all inſects are compoſed of joints varying in ſize, form, and number. Thoſe who are chiefly confined to live under water have their antennæ in general ſhorter than thoſe who live on land. Some who roam at large in the air, have them long and ſlender. They are all hollow, and are rendered flexible by the joints, which are very viſible in the horns of the crab and lobſter. This hollowneſs, in our author's opinion, is to receive the ſound communicated to the extremities of the antennæ by the repercuſſion of the air affected by any noiſe, and convey it, by means of the joints, from one to another, till it arrives in that leſſened degree of tone beſt ſuited to the timid nature of the animal. In this circumſtance there may be many variations in point of perfection in thoſe organs : the ſtrength, utility, and degree of power in receiving ſound being proportioned to the neceſſities of the animals, different in their nature and requiſites. In moſt animals, the entrance to the auricular organ is patulous ; but in this caſe the animal would ſuffer great inconvenience from ſuch an organiſation, as the organ would often be clogged with dirt, &c.

It has alſo appeared dubious if they have the ſenſe of ſmell, no organ being found in them adapted to that purpoſe : and although it was evident they had a perception of agreeable and fetid effluvia, it was thought to be in a manner altogether unknown to us. Mr Barbut is of opinion that the organs of ſmell reſide in the palpi or feelers. Many inſects have four and ſome ſix, two of which are in general cheliform, in order to aſſiſt the inſect in conveying its food to its mouth. It may be likewiſe obſerved, that the palpi are in continual motion ; the animal thruſting them into every kind of putrid or other matter, as a hog would do his noſe, ſmelling and ſearching after food. Inſects which apparently do not poſſeſs palpi or ſpiral tongues, have undoubtedly ſome organ concealed within the mouth analogous to them in function and utility ; the fleſhy proboſcis of the fly is thruſt into every ſubſtance in which the animal expects to find food ; and when it is extended, nearly in the middle are ſituated, in our author's opinion, two upright palpi, which, no doubt, perform in their turn ſome office, perhaps that of ſmell.

Eyes, Antennæ, &c. of Inſects.

Many inſects have no tongue, nor make any ſound with their mouth; but for this purpoſe ſome uſe their feet, others their wings, and others ſome elaſtic inſtrument with which they are naturally furniſhed.

Eyes. Moſt inſects have two; but the gyrinus has four, the ſcorpion ſix, the ſpider eight, and the ſcolopendra three. They have no eye-brows, but the external tunic of their eyes is hard and tranſparent like a watch-glaſs; their eyes have no external motion, unleſs it be in the crab. They conſiſt for the moſt part of one lens only; but in thoſe of the butterfly, dipteræ, and many of the beetles, they are more numerous. Pugett diſcovered 17,325 lenſes in the cornea of a butterfly, and Lieuwenhoek 800 in a fly.

Antennæ. Of theſe there are in general two (unleſs four are allowed to ſome kind of crabs), and placed on the fore-part of the head: they are peculiar to inſects; and are plainly diſtinguiſhable from the tentaculæ of the vermes, in being cruſtaceous; and from the palpi of inſects, which are more numerous, placed near the mouth, and are ſometimes wanting. As the antennæ are of great moment in diſtinguiſhing the various kinds of inſects, we ſhall enumerate and explain the ſeveral different forms of them.

Setaceæ, are thoſe which grow gradually taper towards the extremity.

Filiformes, ſuch as are of the ſame thickneſs throughout.

Moniliformes, are filiform, like the preceding, but conſiſt of a ſeries of round knobs, like a necklace of beads.

Clavatæ, ſuch as gradually increaſe in ſize toward the extremity.

Capitatæ, are *clavatæ*, but have the extremity ſomewhat round.

Fiſſiles, are *capitatæ*; but have the capitulum, or knob, divided longitudinally into three or four parts, or laminæ, as in the ſcarabæi.

Perſoliatæ, are alſo *capitatæ*; but have the capitulum horizontally divided, as in the dermeſtes.

Pectinatæ, ſo called from their ſimilitude to a comb, tho' they more properly reſemble a feather, as in the moths and elateres. This is moſt obvious in the male.

Ariſtatæ, ſuch as have a lateral hair, which is either naked or furniſhed with leſſer hairs, as in the fly: *Breviores*, thoſe which are ſhorter than the body; *longiores*, thoſe which are longer than the body; *mediocres*, thoſe which are of the ſame length with the body; all three of which varieties are diſtinguiſhable in the cerambyces.

Palpi, or *Feelers*, reſemble filiform, articulated, moveable antennæ. They are moſt commonly four in number, ſometimes ſix; they are ſufficiently diſtinguiſhed from antennæ, in being naked, ſhort, and always placed at the mouth.

Os, the *Mouth*, is generally placed in the anterior part of the head, extending ſomewhat downwards. In ſome inſects, it is placed under the breaſt, as in the chermes, coccus, cancer (crab), and curculio.

Rostrum, or *Proboſcis*, is the mouth drawn out to a rigid point: in many of the hemiptera claſs it is bent downward toward the breaſt and belly, as in the cicada, nepa, notonecta, cimex (bug), aphis, and remarkably ſo in ſome curculiones.

Maxillæ, the *Jaws*, are two in number, ſometimes four, and at other times more; they are placed horizontally; the inner edge of them in ſome inſects is ſerrated, or furniſhed with little teeth.

Tongue, Legs, &c. of Inſects.

Lingua, the *Tongue*, in ſome inſects is taper and ſpiral, as in the butterfly; in others it is fleſhy, reſembling a proboſcis, and tubular, as in the fly.

Labium *ſuperius*, the *upper Lip*, is ſituated above the jaws; as in the ſcarabæus and gryllus.

Stemmata, or *Crown*, are three ſmooth hemiſpheric dots, placed generally on the top of the head; as in moſt of the hymenoptera, and others.

II. TRUNCUS, the Trunk, is that part which comprehends the breaſt or thorax: it is ſituated between the head and abdomen; and has the legs inſerted into it, that its parts may be diſtinctly determined. It is divided into *thorax*, *ſcutellum*, and *ſternum*.

Thorax, the *Thorax*, is the back part of the breaſt; and is very various in its ſhape. It is called *dentatus*, when its ſides are armed with points; *ſpinoſus*, when its back is furniſhed with them, as in the cerambyx; and *marginatus*, when its margin is laterally dilated, as in the ſilpha and caſſida.

Scutellum, or *Eſcutcheon*, is the poſterior part of the thorax: it is frequently triangular; and appears to be divided from the thorax by an intervening ſuture, as in moſt of the coleoptera.

Sternum, the *Sternum*, is ſituated on the inferior part of the thorax; it is pointed behind in the elateres, and bifid in ſome of the dytiſci.

III. ABDOMEN, the Abdomen is in moſt inſects diſtinct from the thorax; it is the poſterior part of the body of the inſect; and is compoſed of a number of annular ſegments, which ſerve occaſionally to lengthen or ſhorten it, and to contain the organs of chylification, &c.

Spiracula, are little holes or pores, placed ſingly on each ſide of every ſegment of the abdomen: thro' theſe the inſect breathes; and if oil be applied ſo as to ſtop them up, it proves fatal to moſt of them.

Tergum, the *Back*, is the ſuperior part of the abdomen.

Venter, the *Belly*, is the inferior part.

Anus, is the poſterior part of the abdomen, perforated for the evacuation of the excrement. This part alſo frequently contains the organs of generation.

IV. ARTUS, the Limbs or Extremities, are the various inſtruments of motion.

Pedes, the *Legs*, are generally ſix. There is an exception to this, however, in the claſs Aptera, many of which have eight; as acari (mites), phalangii, moſt of the aranei, (ſpiders) ſcorpiones, (ſcorpions) and cancri (crabs.) The oniſcus has 14, and the Iuli and ſcolopendri ſtill more.

The firſt joint of the leg, which is generally thickeſt, is called *femur*; the ſecond, which is generally of the ſame ſize throughout, *tibia*; the third, which is jointed, is diſtinguiſhed by the name of *tarſus*; and the laſt, which in moſt inſects is double, by that of *unguis*. The legs of inſects, in general, are named from the various motions they produce: *Curſorii*, from that of running, which are the moſt numerous; *ſal-*

Claws, &c. of Inſects.

ſaltatorii, from that of leaping; *natatorii*, from that of ſwimming, &c.—In the *ſaltatorii*, the thighs are remarkably large, by which means they are able to leap to a conſiderable diſtance, as in the gryllus, (graſshopper), &c. In thoſe of the *Natatorii*, the feet are flat, and edged with hairs, which anſwer the purpoſe of oars in aſſiſting them to ſwim, as in the dytiſcus.—*Mutici*, are ſuch feet as have no claws. —*Chelæ*, or claws, are the fore-feet enlarged towards their extremities, each of which is furniſhed with two leſſer claws, which act like a thumb and finger; as in the crab.

ALÆ, *Wings*, the inſtruments which enable them to fly. Theſe are membranous, and undivided, except in the inſtance of the phalænæ alucitæ, in which they are in part divided. Moſt inſects have four; the diptera-claſs, and the coccus, however, have two only.

The wing is divided into its ſuperior and inferior ſurfaces: its anterior part in a butterfly, is that towards the anterior margin, or next to the head; its poſterior part, that towards the anus; its exterior part, that towards the outer edge; and the interior, that next the abdomen.

They are called *plicatiles*, when they are folded at the time the inſect is at reſt, as in the waſp; oppoſite to theſe are the *planæ*, which are incapable of being folded.

Erectæ, ſuch as have their ſuperior ſurfaces brought in contact when the inſect is at reſt; as in the ephemera, libellula puella and virgo, and papiliones (butterflies.)

Patentes, which remain horizontally extended when the inſect is at reſt; as in the phalænæ geometræ, and moſt of the libellulæ.

Incumbentes, ſuch as cover horizontally the ſuperior part of the abdomen when the inſect is at reſt.

Deflexæ, are incumbentes, but not horizontally, the outer edges declining toward the ſides.

Reverſæ, are deflexæ, with this addition, that the edge of the inferior wings projects from under the anterior part of the ſuperior ones.

Dentatæ, in which the edge is ſerrated, or ſcolloped.

Caudatæ, in which one or more projections in the hinder wings are extended into proceſſes.

Reticulatæ, when the veſſels of the wings put on the appearance of network, as in the hemerobius perla; the two anterior wings generally become ſuperior, and the poſterior ones inferior, in moths, when their wings are cloſed; but the anterior wings are called *primary*, and the inferior ones *ſecondary*, in butterflies, as they cannot with propriety be called *inferior* when the wings are erect.

Colores, the colours, theſe are ſelf-apparent: but according to their ſeveral ſhapes, they take the different names of *punctæ*, dots; *maculæ*, ſpots; *faſciæ*, bands, which frequently run acroſs and ſometimes ſurround the edge of the wings; *Strigæ*, ſtreaks, which are very ſlender faſciæ; and *lineæ*, lines, which are longitudinally extended.

Ocellus, is a round ſpot, containing a leſſer ſpot of a different colour in its centre.

Stigmata, another term lately introduced by Linnæus, ſignifies the ſpot, or anaſtamoſis, in the middle of the wing near the anterior margin; it is conſpicuous in moſt of the hymenoptera and neuroptera, and even in the coleoptera. The ſingle or double kidney-ſhaped ſpot, ſituated in the ſame part of the anterior wings, and frequently occurring in the phalænæ paganæ, is diſtinguiſhed likewiſe by the name of *ſtigma*.

Wings of Inſects.

Elytra (in the ſingular number elytron.) The upper wings, which are of a hard ſubſtance, in ſome degree reſembling leather, and which in moſt inſects are of a very hard texture, but in others flexible, are called *elytra*; their ſuperior ſurface is generally convex, their inferior one concave. When the inſect flies, they are extended; and ſhut when it reſts, cloſing together, and forming a longitudinal ſuture down the middle of the back, as in the coleoptera.

They are of various ſhapes. *Abbreviata*, when ſhorter than the abdomen. *Truncata*, when ſhorter than the abdomen, and terminating in a tranſverſe line. *Faſtigiata*, when of equal or greater length than the abdomen, and terminating in a tranſverſe line. *Serrata*, when the exterior margin towards the apex is notched or ſerrated, as in ſome of the bupreſtes. *Spinoſa*, when their ſurface is covered with ſharp points or prickles. *Scabra*, when their ſurface is ſo uneven as to grate againſt the fingers. *Striata*, when marked with ſlender longitudinal furrows. *Porcata*, when with elevated longitudinal ſulci or ridges. *Sulcata*, when theſe ridges are concave. *Hemelytra*, when the ſuperior wings are of a middle ſubſtance betwixt leather and membrane; either totally ſo, as in the grylli; or partially ſo, as in the cimices, nepæ, and notonectæ: Theſe are commonly diſtinguiſhed by the name *hemiptera*.

Halteres, poiſers, (a term alſo introduced by Linnæus), are little heads placed on a ſtalk or peduncle, moſt frequently under a little arched ſcale. They are found only in the claſs diptera, and appear to be nothing more than the rudiments of the hinder wings.

CAUDA, the *Tail*, in moſt inſects is,

Simplex, ſimple, capable of being extended, and again drawn back at pleaſure. In the crab and ſcorpion, however, it is

Elongata, elongated, or lengthened out.

Setacea, briſtle-ſhaped, or taper; as in the raphidia.

Triſeta, conſiſting of three briſtles; as in the ephemera.

Furcata, being forked, as in the podura.

Forcipata, reſembling a pair of forceps; as in the forficula.

Folioſa, reſembling a leaf; as in the blatta, grylli, and ſome ſpecies of cancri.

Telifera, ſuch as are armed with a dart or ſting; as in the ſcorpion and panorpa.

Aculeus, an inſtrument with which they wound, and at the ſame time inſtill a poiſon; with ſuch the bee, waſp, ſcorpion, &c. are furniſhed.

EXPLANATION *of* PLATE CCCXVIII. *upper Compartment*.

Fig. 1. ANTENNÆ PECTINATÆ, or feather'd; as in the *phalænæ*, *moths*.

2. ——— PERFOLIATÆ, or perfoliated; as in the *dermeſtes* and *dytiſcus*.

3. ——— FISSILES, or fiſſile, divided into la-

Of the Sexes of Inſects.

minæ at the extremity, as in the *ſcarabæi*, beetles.

4. Antennæ clavatæ, or club-ſhaped, as in the *papilio*, butterfly.
5. ——— moniliformes, like a necklace of beads; as in the *chryſomela*.
6. ——— setaceæ, ſetaceous, or briſtle-ſhaped; as in many of the *phalænæ*.
7. ——— aristatæ, furniſhed with a lateral hair, as in the *fly*.

8 9. *a* Caput, the head.
b Palpi, or feelers.
c Antennæ, or horns.
d Oculi, the eyes.
e Thorax.
f Scutellum, or eſcutcheon.
g Pectus, or breaſt.
h Sternum, or breaſt-bone.
i Abdomen, and its ſegments.
k Anus.
l Elytra, or ſhells.
m Membranous wings.
n Pedes, or feet, which are natatorii.
10. *o* Femur, or thigh.
p Tibia, or leg.
q Tarſus, or foot.
r Unguis, or claw.
11. *a* The anterior part of the wing.
b The poſterior part.
c The exterior part.
d The interior part.
e The margin.
f The diſk, or middle.
g Oculus, or eye.
12, 13, 14, 15. Repreſent the inſect in its egg, caterpillar, pupa, and perfect ſtate.

Sect. II. *Of the* Sexes *of* Insects.

The ſame difference of ſex exiſts in inſects as in other animals, and they even appear more diſpoſed to increaſe their ſpecies than other animals; many of them, when become perfect, ſeeming to be created for no other purpoſe but to propagate their ſpecies. Thus the ſilk-worm, when it arrives at its perfect or moth-ſtate, is incapable of eating, and can hardly fly: it endeavours only to propagate its ſpecies; after which the male immediately dies, and the female as ſoon as ſhe has depoſited her eggs.

In many inſects, the male and female are with difficulty diſtinguiſhed; and in ſome they differ ſo widely, that an unſkilful perſon might eaſily take the male and female of the ſame inſect for different ſpecies; as for inſtance, in the phalæna humuli, piniaria, ruſſula; each ſex of which differs in colour. This unlikeneſs is ſtill more apparent in ſome inſects, in which the male has wings and the female none; as in the coccus, lampyris, phalæna antiqua, brumata, lichenella. And as moſt inſects remain a long while in copulation, as we may ſee in the tipula and ſilk-worm, the winged males fly with the wingleſs females, and carry them about from one place to another; as in the phalæna antiqua. It is, however, no certain rule, that when one inſect of the ſame ſpecies is found to have wings, and the other to be without, the former muſt neceſſarily be the male, and the latter the female. The aphides, for inſtance, are an exception; and beſides theſe, individuals of both ſexes, and of the ſame ſpecies, are found without wings, as the carabi majores, tenebriones, meloes, cimices. The gryllus pedeſtris is likewiſe deſtitute of wings; and might have paſſed for a gryllus in its pupa ſtate, had it not been ſeen in copulation; for it is well known that no inſect can propagate its ſpecies till it arrives at its laſt or perfect ſtate.

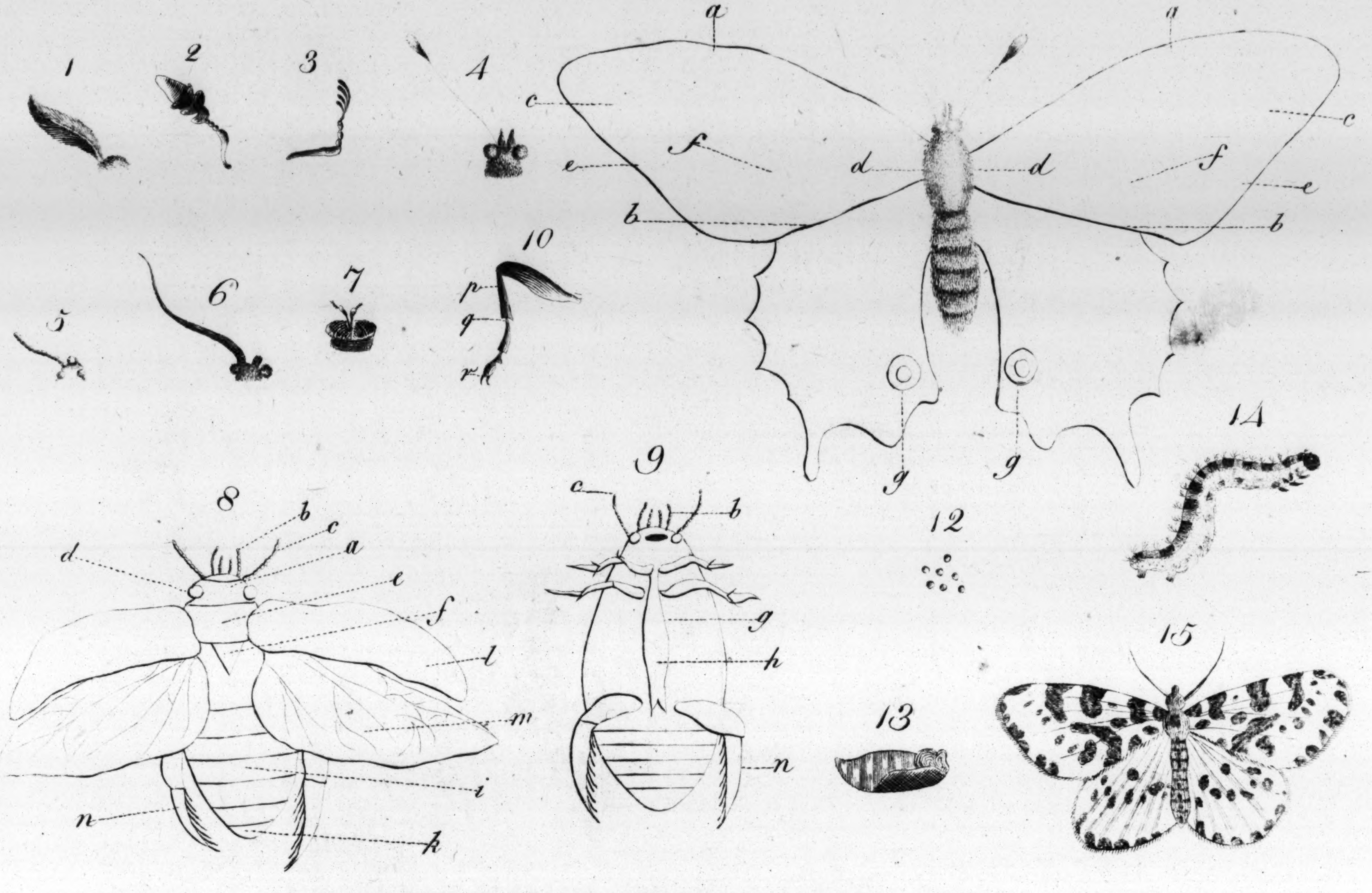
Propagation of Inſects.

“ Pleraque inſectorum genitalia ſua intra anum ha-
“ bent abſcondita, et penes ſolitarios, ſed nonnulla
“ penem habent bifidum: Cancri autem et Aranei
“ geminos, quem admodum nonnulla amphibia, et
“ quod mirandum in loco alieno, ut Cancer, ſub baſi
“ caudæ. *Araneus mas* palpos habet clavatos, qui
“ penes ſunt, juxta os utrinque unicum, quæ clavæ
“ ſexum nec ſpeciem diſtinguunt; et fœmina vulvas
“ ſuas habet in abdomine juxta pectus. Heic vero ſi un-
“ quam vere dixeris, “Res plena timoris amor:” ſi enim
“ procus in auſpicato acceſſerit, fœmina ipſum devorat;
“ quod etiam fit, ſi non ſtatim ſe retraxerit. Libel-
“ lula fœmina genitale ſuum ſub apice gerit caudæ,
“ et mas ſub pectore; adeo ut cum mas collum fœmi-
“ na forcipe caudæ arripit, illa caudam ſuam pectori
“ ejus adplicet, ſicque peculiari ratione connexæ voli-
“ tent.”

Beſides thoſe of the male and female, a third ſex exiſts in ſome inſects which we call *neuter:* As theſe have not the diſtinguiſhing parts of either ſex, they may be conſidered as eunuchs or infertile.

We know of no inſtance of this kind in any other claſs of animals, nor in vegetables, except in the claſs Syngeneſiæ, and in the Opulus. This kind of ſex is only found among thoſe inſects which form themſelves into ſocieties, as bees, waſps, and ants: and here theſe kind of eunuchs are real ſlaves, as on them lies the whole buſineſs of the œconomy; while thoſe of the other ſex are idle, only employing themſelves in the increaſe of the family. Each family of *Bees* has one female only (called the *queen*), many males, and an almoſt innumerable quantity of neuters. Of thoſe, the neuters (whoſe antennæ have 11 joints) do the working part; they extract and collect honey and wax, build up the cells, keep watch, and do a variety of other things. The males, whoſe antennæ conſiſt of 15 joints, do no work; they ſerve the female once, and that at the expence of their lives; they may be conſidered in the light of a ſet of paraſites, or ceciſbei; but as ſoon as their buſineſs of impregnation is over, they are expelled by their ſervants the neuters, who now ſhake off the yoke, but yet pay all due reſpect to their common mother the queen. The ſame œconomy nearly takes place in *Waſps*, where the young females, which are impregnated in the autumn, live through the winter, and in the ſpring propagate their ſpecies; but the queen, together with all the males, periſh in the winter. Among *Ants*, the neuters form a hill in the ſhape of a cone, that the water may run off it, and place thoſe which are in the pupa ſtate on that ſide of it which is leaſt expoſed to the heat of the ſun. At a conſiderable diſtance from theſe are found the habitations of the males and females, to whom the moſt ready obedience is yielded by the neuters, till a new offspring ſucceeds, and then they oblige them to quit their habitations. But thoſe ants which live entirely under ground,

ENTOMOLOGY.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ICHTHYOLOGY.

Fig. 1.

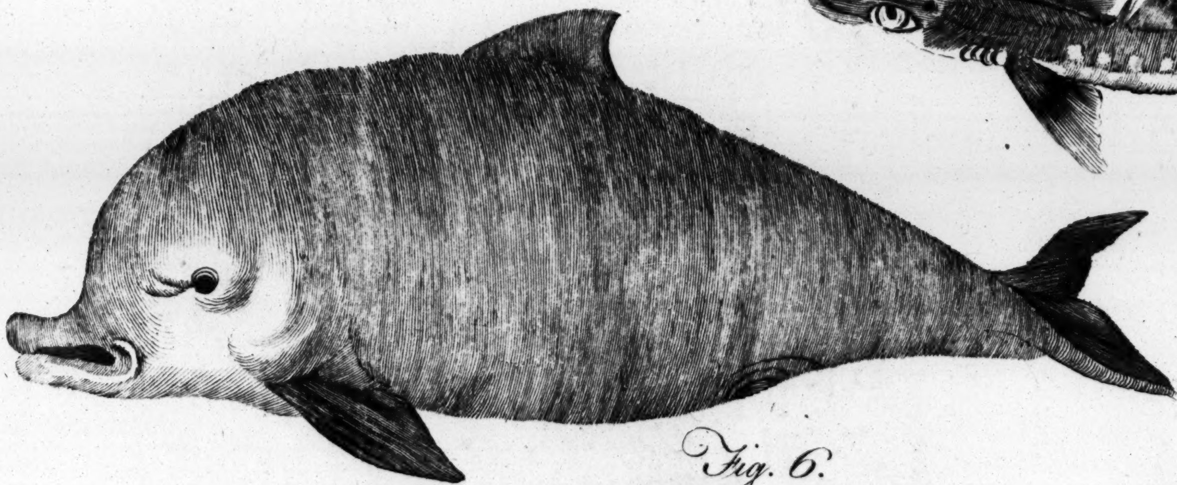


Fig. 2.

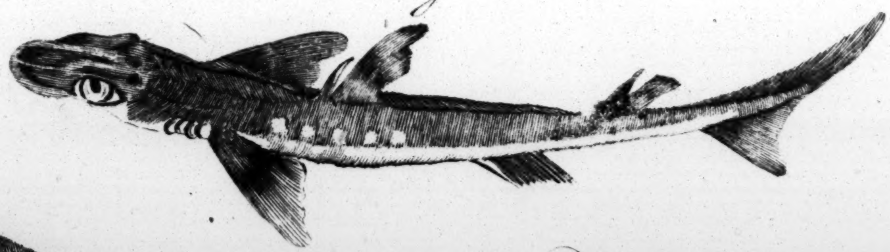


Fig. 3.

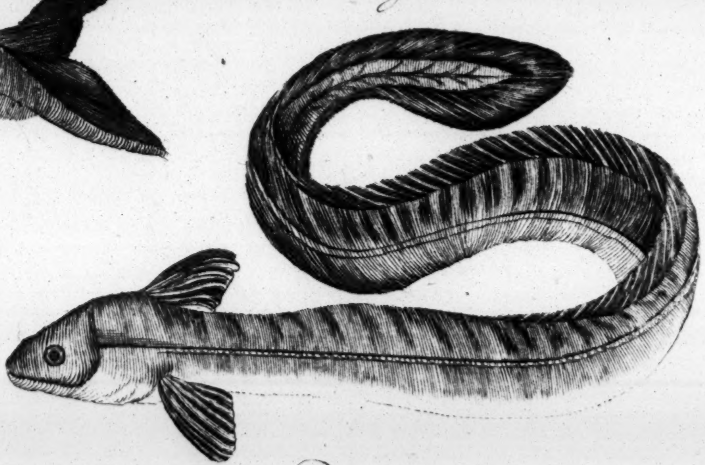


Fig. 6.

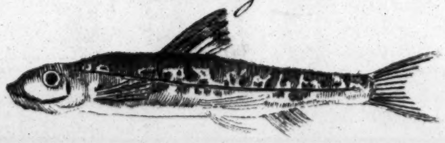


Fig. 4.

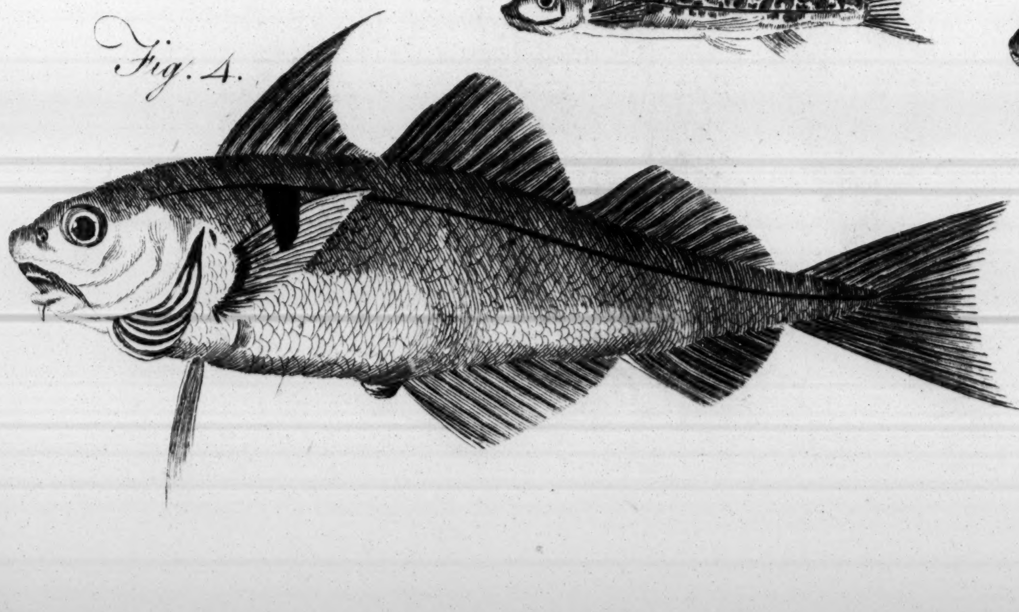
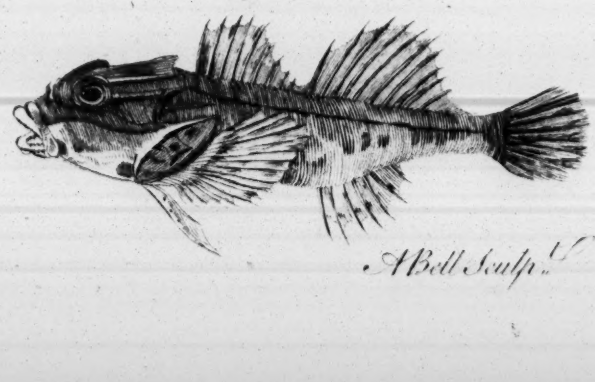


Fig. 5.



A Bell Sculp.

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ground, provide better for themſelves in this reſpect: for a little before their nuptials, they quit their habitation of their own accord, and after ſwarming in the manner of bees, they copulate in the air; and each retiring to ſome new habitation, founds a new family.

No *hermaphrodites* have as yet been diſcovered among inſects. There is ſomething very ſingular, however, in the propagation of the aphides. A female aphis once impregnated, can produce young, which will continue to produce others without any freſh impregnation, even to the fifth progeny; afterwards a new impregnation muſt take place. See APHIS, (*Encycl.*)

The male inſects, like male hawks, are always ſmaller than the females.

In the propagation of their ſpecies they are remarkably careful; ſo that it is with the greateſt difficulty that flies are kept from depoſiting their eggs on freſh meat, the cabbage butterfly from laying them on cabbage, and other inſects from depoſiting them in the ſeveral places peculiar to each. The ſcarabæus pilularius and carnifex, are deſerving of our attention, as they afford a mutual aſſiſtance to each other: for when the female has laid her eggs in a little ball of dung, the males, with their feet, which are axiform, aſſiſt the female to roll it to ſome ſuitable place; as Ariſtotle and Pliny formerly, and Loefling has lately obſerved.

It is very wonderful to obſerve, that in the coccus and oniſcus, the female has no ſooner brought forth her young, than ſhe is devoured by it; and that the ſphex ſhould be able ſo readily to kill the caterpillar of a moth, then bury it in the earth, and there depoſited her eggs in it. Nor can we without admiration behold the ſame ſpecies of aphis, which was viviparous in the ſummer, become oviparous in the autumn.

Almoſt innumerable examples might be brought of the ſingularities in the eggs of inſects; we ſhall, however, only mention thoſe of the hemerobius, which are depoſited on a footſtalk; thoſe of the phalæna neuſtria, which are placed regularly in a ring round the branch of ſome tree; and the compound eggs of the blatta.

SECT. III. *Metamorphoſes of Inſects.*

THERE are no inſects, except thoſe of the aptera claſs, but what are continually undergoing ſome transformation Inſects change firſt from the (ovum) egg, into the (larva) caterpillar or maggot; then into the (pupa) chryſalis; and laſtly into the (imago) fly or perfect ſtate. During each of thoſe changes, their appearance differs as much as night and day.

The inſect, as ſoon as it came out of the egg, was by former entomologiſts called *eruca;* but as this is ſynonymous with the botanic name *ſiſymbrium,* it was changed by Linnæus for the term *larva,* a name expreſſive of the inſect's being, in this ſtate, as it were maſked, having its true appearance concealed. Under this maſk or ſkin the entire inſect, ſuch as it afterwards appears when perfect, lies concealed, inveloped only in its tender wings, and putting on a ſoft and pulpy appearance; inſomuch that Swammerdam was able to demonſtrate the butterfly with its wings to exiſt in a caterpillar, though it bore but a faint reſemblance to its future perfection. The inſect, therefore, in this ſtate, undergoes no other alteration but the change of its ſkin.

The larvæ are, for the moſt part, larger than the inſect when perfect, and are very voracious. The caterpillar of the cabbage-butterfly eats double what it would ſeem to require from its ſize; but its growth is not adequate to its voracity.

Pupa. The inſect in this ſtate was formerly called *chryſalis,* or *aurelia:* but as the appearance of gilding is confined to a few butterflies only, the term of *pupa* has been adopted in its ſtead; becauſe the lepidoptera, eſpecially, reſemble an infant in ſwaddling clothes; and in this ſtate all, except thoſe of the hemiptera claſs, take no nouriſhment.

Imago, is the third ſtate. This name is given by Linnæus to this third change, in which the inſect appears in its proper ſhape and colours; and as it undergoes no more transformations, it is called *perfect.* In this ſtate it flies, is capable of propagating its ſpecies, and receives true antennæ; which before, in moſt inſects, were ſcarce apparent.

As the ſhape of the Pupa is different, in different claſſes of inſects, it aſſumes different names; thus it is called

Coarctata, when it is round, and as it were turned, without the leaſt reſemblance of the ſtructure of the inſect; as in the diptera.

Obtecta, when it conſiſts as it were of two parts, one of which ſurrounds the head and thorax, and the other the abdomen.

Incompleta, when they have wings and feet, but are not capable of moving them; as in moſt of the hymenoptera.

Semicompleta, in which they walk or run, but have only the rudiments of wings.

Completa, in which they immediately obtain the perfect form of the inſect, without undergoing any more change; as in thoſe of the aptera claſs, except only the flea. The bed bug alſo belongs to this claſs.

The ſpider undergoes frequent transformations, though only in the colour of its ſkin. The cruſtaceous inſects, as crabs, lobſters, &c. yearly caſt their ſhells, as their growth would otherwiſe be impeded.

The ſcolopendri, when young, have fewer feet than when they are full grown.

All inſects, as ſoon as they undergo the third change, are arrived at their full growth; nor do we find any difference in the ſize of the ſame ſpecies of inſect in the ſame countries, unleſs, during its caterpillar ſtate, it has not had a ſufficiency of proper food.

SECT. IV. *Claſſification of Inſects.*

As inſects are endowed with the various powers of creeping, flying, and ſwimming, there is ſcarce any place, however remote and obſcure, in which they are not to be found. The great confuſion which appeared to the ancients to ariſe from their number, made them never dream of reducing them to any ſyſtem. Swammerdam, that indefatigable inquirer into nature, obſerved that their metamorphoſes were divided by nature into ſeveral ſtates or orders. Their external appearance alſo carried with it ſome mark of diſtinction: ſo that entomologiſts called all thoſe of the coleoptera claſs, *Scarabæi* (beetles); thoſe of the lepidoptera, *Papiliones;* and thoſe of the gymnoptera claſs that had two wings only, *Muſcæ* (flies); thoſe of the ſame claſs that had four wings, were called *Apes* (bees). No far-

Claſſification of Inſects.

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Carabus	*Bupreſtis*
Myrmeleon	*Formicaleo*
Sirex	*Uroceros*

New genera of authors.

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Boſtricius. Dermeſutes capecinus
Ciſtela. Byrrhus Pilula
Rhinomancer. Attelabus roſtro producto fere Curculionis
Anthribus. Silpha
Bruchus. Ptinus Fur ob ſpinas thoracis
Melolontha. Chryſomela cylindrica
Altica. ——— ſaltatoria
Diaperis. ——— fungorum
Pyrochora. Cantharis
Telephorus. Cantharis
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Mylabris. Necydalis minor
Acridium. Gryllus Muticus
Locuſta. ——— Tettigonia
Tettigonia. Cicada
Corixa. Notonecta.
Naucoceris. Nepa
Perla. Hemerobius cauda biſeta
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Strationymus. Muſca
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Theſe genera appear to be in a great meaſure like thoſe which were introduced into botany by the followers of Rivinus. Paying too little regard to nature, they diſunited natural genera, on account of the moſt trifling diſtinctions. This made their continuance in the ſcience of very ſhort duration; our buſineſs here is not to ſuppoſe, but to examine, what nature will allow of, and what ſhe will not. Knowledge of this kind, built on opinion only, will not ſtand. We are therefore to look into the ſcience with great accuracy; and the larva of the inſect, its manner of changing, and other things of moment, are to be known, before we preſume to form a new genus.

Coining of new names, and changing of one old one for another, has been the ſource of the greateſt confuſion. Thus, in order to reduce the cicindela and carabus to the ſame genus, *bupreſtis* has been adopted for the generic name; but as that genus had long ago received a very different application, it was changed for that of *cucujus.*

Again, that the officinal cantharides might be ranged among the cerambyces, the cantharides have been removed from the genus of meloë (to which they naturally belong), and referred to the genus of cicindela, obtaining thus a new name. And ſo of many others.

Thus alſo, to mention no more, how needleſs and raſh was it to ſeparate the acridium and locuſta from the genus of gryllus, the crabro from the tenthredines, and the mylabris from the necydalis!

TRIVIAL NAMES. The trivial names placed under their reſpective genera will occaſion little or no controverſy; they are current like money, and of the ſame utility as the proper names of men, Peter or Paul, &c. Inſects living on vegetables ſhould receive their names from the particular plants on which they moſtly feed, as they are preferable to all others. Thus the names of the *phalæna mori,* &c. are excellent; and when we are able to give ſuch to inſects, the old ones are to be dif-

Claſſification of Inſects.

diſcarded. But we are to be cautious of not being too haſty in our judgment in this reſpect; as inſects, when they cannot get their favourite food, will often eat other plants. Thus the ſilk-worm, for want of mulberry leaves, will eat thoſe of lettuce, though it will not thrive ſo well on them.

Many other inſtances of the invention of trivial names will be met with in the Syſtema Naturæ, particularly among the butterflies and moths. To prevent confuſion from the great number of ſpecies which conſtitute the genus of phalæna, they are diſtributed into ſections, and diſtinguiſhed by the terms of *bombyces*, *noctuæ*, *geometræ*, *tortrices*, *pyralides*, *tineæ*, and *alucitæ*. The bombyces and noctuæ, which are ſo much alike, that the females of the bombyces are with great difficulty diſtinguiſhed from the noctuæ, are named promiſcuouſly.

All thoſe of the geometræ have their names terminating in *aria* and *ata*, according as their antennæ are ſetaceous or pectinated. The tortrices, in *aria;* the pyralides, in *alis;* the tineæ, in *ella;* and the alucitæ, in *dactyla:* ſo that it is evident from the termination itſelf to what ſection the inſect is to be referred.

It were to be wiſhed that ſimilar inſtitutions could be formed throughout the whole ſcience, as here the name itſelf ſerves to diſtinguiſh the inſect.

Butterflies are divided into ſections, by the names of *Equites*, *Heliconii*, *Danai*, *Nymphales*, and *Plebeii*.

In ſuch a multitude of butterflies, the greateſt part of which are foreign and extra-european, and to whoſe food and manner of life we are utter ſtrangers, it was impoſſible to give ſignificant trivial names. Linnæus, therefore, by way of ſimile, has taken the names of the *Equites* from the Trojan hiſtory. Theſe conſiſt, as it were, of two troops or bodies; of which one contains the ſable, and as it were mourning nobles, having red or bloody ſpots at the baſis of their wings. Theſe receive names from the Trojan nobles; and as Priam was king of Troy, the moſt ſplendid among theſe bear his name. The other body, ornamented with a variety of gay colours, are diſtinguiſhed by the names of the Grecian heroes; and as in both armies there were kings as well as officers of an inferior rank, thoſe elegant butterflies, whoſe hinder-wings reſembled tails, were diſtinguiſhed by ſome royal name. Thus when Paris is mentioned, (knowing from hiſtory that he was a Trojan, and of royal blood), I find him among thoſe of the firſt ſection; that is, thoſe of a ſable colour, ſpotted in the breaſt with red, and having their hinder-wings reſembling tails. When Agamemnon is named, I remember him to be a noble Greek, and find him among thoſe nobles which have variegated and ſwallow-tailed wings. But when Nereus is ſpoken of, I readily know him to belong to the laſt ſection, with wings having no tails.

Claſſification of Inſects.

The ſecond claſs, which contains the *Heliconii*, derive their names from the muſes, as Urania. The names of the ſons and daughters of Danaus are beſtowed on the third ſection. And as theſe ſpecies are ſubdivided into two other ſections, viz. the white and parti-coloured, the metaphor is ſo conducted, that the white ones preſerve the names of the daughters of Danaus, and the parti-coloured ones thoſe of the ſons of Egyptus; ſo that it is evident from the name itſelf to what ſection the butterfly is to be referred.

The names of the fourth ſection, *Nymphales*, are taken from various nymphs of antiquity; and thoſe of the fifth ſection, *Plebeii*, are ſelected from different men among the ancients whoſe names are worthy of remembrance: ſo that by this means a knowledge of the ancients may be interſperſed, and this agreeable ſcience be made doubly pleaſing.

Thoſe, therefore, who ſhall find new lepidoptera, and give them new names, will do well to follow this method, unleſs it be apparent what food the inſect chiefly ſubſiſts on.

EPACTS, in chronology, the exceſſes of the ſolar month above the lunar ſynodical month, and of the ſolar year above the lunar year of twelve ſynodical months; or of ſeveral ſolar months above as many ſynodical months, and ſeveral ſolar years above as many dozen of ſynodical months.

The epacts, then, are either *annual* or *menſtrual*.

Menſtrual epacts are the exceſſes of the civil or calendar month above the lunar month. Suppoſe, *e. gr.* it were new-moon on the 1ſt day of January; ſince the lunar month is 29 days $12^{h}\,44'\,3''$, and the month of January contains 31 days, the menſtrual epact is 1 day $11^{h}\,15'\,57''$.

Annual epacts are the exceſſes of the ſolar year above the lunar. Hence, as the Julian ſolar year is 365 days 6^{h}, and the Julian lunar year 354 days $8^{h}\,48'\,38''$, the annual epact will be 10 days $21^{h}\,11'\,22''$; that is, nearly 11 days. Conſequently the epact of 2 years is 22 days; of 3 years, 33 days; or rather 3, ſince 30 days make an *emboliſmic* or intercalary month.

Thus the epact of 4 years is 14 days, and ſo of the reſt; and thus, every 19th year, the epact becomes 30 or 0; conſequently the 20th year the epact is 11 again; and ſo the cycle of epacts expires with the golden number, or lunar cycle of 19 years, and begins with the ſame, as in the following table:

Gold. Numb.	Epacts.	Gold. Numb.	Epacts.	Gold. Numb.	Epacts.
1	XI	7	XVII	13	XXIII
2	XXII	8	XXVIII	14	IV
3	III	9	IX	15	XV
4	XIV	10	XX	16	XXVI
5	XXV	11	I	17	VIII
6	VI	12	XII	18	XIX
				19	XXX

Again, as the new moons are the ſame, that is, as they fall on the ſame day every 19 years, ſo the difference between the lunar and ſolar years is the ſame every 19 years. And becauſe the ſaid difference is always to be added to the lunar year, in order to adjuſt or make it equal to the ſolar year; hence the ſaid difference reſpectively belonging to each year of the moon's cycle is called the *epact of the ſaid year*, that is, the number to be added to the ſaid year, to make it equal to the ſolar year; the word being formed from the Greek επαγω, *induco*, *intercalo*.

Upon this mutual reſpect between the cycle of the moon and the cycle of the epacts, is founded this rule for

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farther progreſs was made in the ſyſtematic part of this ſcience till the time of Linnæus. He was the firſt that undertook to determine the genera, and aſſign them their proper characters, in the *Syſtema Naturæ;* and thus reduced this ſcience to a ſyſtematic form. This ſyſtem, in ſubſequent editions, was conſiderably enriched and amended by him, inſomuch that the ſcience of inſects now ſhines forth in its full luſtre. He it was who firſt inſtituted natural orders, and reduced them into genera by expreſſive names; determined an infinite number of ſpecies in the *Fauna Suecica*, and *Muſeum Reginæ;* collected with incredible pains the ſynonymous names of the various authors who had written on them; and laſtly, added their deſcriptions, and the places in which they were to be found. So that the ſyſtem of this illuſtrious author will lead any perſon, without the aſſiſtance of a maſter, for the moſt part, eaſily to aſcertain the name of any inſect he may meet with. Before his time ſcarce any more than 200 inſects were known; whereas, in the laſt edition of his ſyſtem, he has determined the names of nearly 3000 diſtinct ſpecies.

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Volucella. Muſca.

Theſe genera appear to be in a great meaſure like thoſe which were introduced into botany by the followers of Rivinus. Paying too little regard to nature, they diſunited natural genera, on account of the moſt trifling diſtinctions. This made their continuance in the ſcience of very ſhort duration; our buſineſs here is not to ſuppoſe, but to examine, what nature will allow of, and what ſhe will not. Knowledge of this kind, built on opinion only, will not ſtand. We are therefore to look into the ſcience with great accuracy; and the larva of the inſect, its manner of changing, and other things of moment, are to be known, before we preſume to form a new genus.

Coining of new names, and changing of one old one for another, has been the ſource of the greateſt confuſion. Thus, in order to reduce the cicindela and carabus to the ſame genus, *bupreſtis* has been adopted for the generic name; but as that genus had long ago received a very different application, it was changed for that of *cucujus*.

Again, that the officinal cantharides might be ranged among the cerambyces, the cantharides have been removed from the genus of meloë (to which they naturally belong), and referred to the genus of cicindela, obtaining thus a new name. And ſo of many others.

Thus alſo, to mention no more, how needleſs and raſh was it to ſeparate the acridium and locuſta from the genus of gryllus, the crabro from the tenthredines, and the mylabris from the necydalis!

TRIVIAL NAMES. The trivial names placed under their reſpective genera will occaſion little or no controverſy; they are current like money, and of the ſame utility as the proper names of men, Peter or Paul, &c. Inſects living on vegetables ſhould receive their names from the particular plants on which they moſtly feed, as they are preferable to all others. Thus the names of the *phalæna mori*, &c. are excellent; and when we are able to give ſuch to inſects, the old ones are to be dif-

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diſcarded. But we are to be cautious of not being too haſty in our judgment in this reſpect; as inſects, when they cannot get their favourite food, will often eat other plants. Thus the ſilk-worm, for want of mulberry leaves, will eat thoſe of lettuce, though it will not thrive ſo well on them.

Many other inſtances of the invention of trivial names will be met with in the Syſtema Naturæ, particularly among the butterflies and moths. To prevent confuſion from the great number of ſpecies which conſtitute the genus of phalæna, they are diſtributed into ſections, and diſtinguiſhed by the terms of *bombyces*, *noctuæ*, *geometræ*, *tortrices*, *pyralides*, *tineæ*, and *alucitæ*. The bombyces and noctuæ, which are ſo much alike, that the females of the bombyces are with great difficulty diſtinguiſhed from the noctuæ, are named promiſcuouſly.

All thoſe of the geometræ have their names terminating in *aria* and *ata*, according as their antennæ are ſetaceous or pectinated. The tortrices, in *aria;* the pyralides, in *alis;* the tineæ, in *ella;* and the alucitæ, in *dactyla:* ſo that it is evident from the termination itſelf to what ſection the inſect is to be referred.

It were to be wiſhed that ſimilar inſtitutions could be formed throughout the whole ſcience, as here the name itſelf ſerves to diſtinguiſh the inſect.

Butterflies are divided into ſections, by the names of *Equites*, *Heliconii*, *Danai*, *Nymphales*, and *Plebeii*.

In ſuch a multitude of butterflies, the greateſt part of which are foreign and extra-european, and to whoſe food and manner of life we are utter ſtrangers, it was impoſſible to give ſignificant trivial names. Linnæus, therefore, by way of ſimile, has taken the names of the *Equites* from the Trojan hiſtory. Theſe conſiſt, as it were, of two troops or bodies; of which one contains the ſable, and as it were mourning nobles, having red or bloody ſpots at the baſis of their wings. Theſe receive names from the Trojan nobles; and as Priam was king of Troy, the moſt ſplendid among theſe bear his name. The other body, ornamented with a variety of gay colours, are diſtinguiſhed by the names of the Grecian heroes; and as in both armies there were kings as well as officers of an inferior rank, thoſe elegant butterflies, whoſe hinder-wings reſembled tails, were diſtinguiſhed by ſome royal name. Thus when Paris is mentioned, (knowing from hiſtory that he was a Trojan, and of royal blood), I find him among thoſe of the firſt ſection; that is, thoſe of a ſable colour, ſpotted in the breaſt with red, and having their hinder-wings reſembling tails. When Agamemnon is named, I remember him to be a noble Greek, and find him among thoſe nobles which have variegated and ſwallow-tailed wings. But when Nereus is ſpoken of, I readily know him to belong to the laſt ſection, with wings having no tails.

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The ſecond claſs, which contains the *Heliconii*, derive their names from the muſes, as Urania. The names of the ſons and daughters of Danaus are beſtowed on the third ſection. And as theſe ſpecies are ſubdivided into two other ſections, viz. the white and parti-coloured, the metaphor is ſo conducted, that the white ones preſerve the names of the daughters of Danaus, and the parti-coloured ones thoſe of the ſons of Egyptus; ſo that it is evident from the name itſelf to what ſection the butterfly is to be referred.

The names of the fourth ſection, *Nymphales*, are taken from various nymphs of antiquity; and thoſe of the fifth ſection, *Plebeii*, are ſelected from different men among the ancients whoſe names are worthy of remembrance: ſo that by this means a knowledge of the ancients may be interſperſed, and this agreeable ſcience be made doubly pleaſing.

Thoſe, therefore, who ſhall find new lepidoptera, and give them new names, will do well to follow this method, unleſs it be apparent what food the inſect chiefly ſubſiſts on.

EPACTS, in chronology, the exceſſes of the ſolar month above the lunar ſynodical month, and of the ſolar year above the lunar year of twelve ſynodical months; or of ſeveral ſolar months above as many ſynodical months, and ſeveral ſolar years above as many dozen of ſynodical months.

The epacts, then, are either *annual* or *menſtrual*.

Menſtrual epacts are the exceſſes of the civil or calendar month above the lunar month. Suppoſe, *e. gr.* it were new-moon on the 1ſt day of January; ſince the lunar month is 29 days $12^h\,44'\,3''$, and the month of January contains 31 days, the menſtrual epact is 1 day $11^h\,15'\,57''$.

Annual epacts are the exceſſes of the ſolar year above the lunar. Hence, as the Julian ſolar year is 365 days 6^h, and the Julian lunar year 354 days $8^h\,48'\,38''$, the annual epact will be 10 days $21^h\,11'\,22''$; that is, nearly 11 days. Conſequently the epact of 2 years is 22 days; of 3 years, 33 days; or rather 3, ſince 30 days make an *emboliſmic* or intercalary month.

Thus the epact of 4 years is 14 days, and ſo of the reſt; and thus, every 19th year, the epact becomes 30 or 0; conſequently the 20th year the epact is 11 again; and ſo the cycle of epacts expires with the golden number, or lunar cycle of 19 years, and begins with the

ſame, as in the following table:

Gold. Numb.	Epacts.	Gold. Numb.	Epacts.	Gold. Numb.	Epacts.
1	XI	7	XVII	13	XXIII
2	XXII	8	XXVIII	14	IV
3	III	9	IX	15	XV
4	XIV	10	XX	16	XXVI
5	XXV	11	I	17	VIII
6	VI	12	XII	18	XIX
				19	XXX

Again, as the new moons are the ſame, that is, as they fall on the ſame day every 19 years, ſo the difference between the lunar and ſolar years is the ſame every 19 years. And becauſe the ſaid difference is always to be added to the lunar year, in order to adjuſt or make it equal to the ſolar year; hence the ſaid difference reſpectively belonging to each year of the moon's cycle is called the *epact of the ſaid year*, that is, the number to be added to the ſaid year, to make it equal to the ſolar year; the word being formed from the Greek επαγω, *induco*, *intercalo*.

Upon this mutual reſpect between the cycle of the moon and the cycle of the epacts, is founded this rule for finding the Julian epact, belonging to any year of the moon's cycle. Multiply the year given of the moon's cycle into 11; and if the product be leſs than 30, it is the epact ſought; if the product be greater than 30, divide it by 30, and the remainder of the dividend is the epact. For inſtance, I would know the epact for the year 1712, which is the third year of the moon's cycle. Wherefore 3 is the epact for 1712; for 11×3=33, and 33 being divided by 30, there is left 3 of the dividend for the epact. But the difference of the Julian and Gregorian years being equal to the exceſs of the ſolar above the lunar year, or 11 days, it happens that the Gregorian epact for one year is the ſame with the Julian epact for the preceding year.

EPHEMERA, (*Encycl.*) Theſe flies, who take their name from the ſhortneſs of their life, are diſtinguiſhed into ſeveral ſpecies. Some live ſeveral days, others do not take flight till the ſetting of the ſun, and live not to ſee the riſing of that luminary. Some exiſt but one hour, others but half that time; in which ſhort period they comply with the call of nature. With reſpect to thoſe that live ſeveral days, there is a peculiarity obſerved, incident to themſelves alone. They have to caſt off one ſlough more, an operation which ſometimes takes 24 hours to complete. To bring this about, they cling faſt to a tree. The ephemeræ, before they flutter in air, have in ſome manner been fiſhes. They remain in the ſtates of larva and chryſalis for one, two, or three years. The chryſalis only differs from the larva by there being obſervable on its back caſes for wings. Both have on their ſides ſmall fringes of hair, which, when put into motion, ſerve them as fins. Nothing can be more curious than the plying of thoſe little oars in the water. Their abdomen is terminated, as well as in their ſtate of flies, by three threads. Theſe larvæ ſcoop themſelves out dwellings in the banks of rivers; and they are ſmall tubes made like ſiphons, the one ſerving for an entrance, the other affording them an outlet. The banks of ſome rivers are often perforated with them. When the waters decreaſe, they dig freſh holes lower down, in order to enjoy their element the water. The ſeaſon and hour when the chryſalids of the different ſpecies of the ephemeræ turn into flies, maintain a kind of regularity. The heat, the riſe or fall of the waters, accelerate, however, or poſtpone their final diſplay. The ephemeræ of the Rhine appear in the air two hours before ſunſet. Theſe flies are hatched almoſt all at the ſame inſtant in ſuch numbers as to darken the air. The moſt early of thoſe on the Marne and Seine in France do not begin to fly till two hours after the ſetting of the ſun, towards the middle of Auguſt. They are ſeen fluttering and ſporting on the brink of their tomb. The glare of light attracts them, round which they perform a thouſand circles with amazing regularity. Their coming together for the purpoſe of generation can only be ſurmiſed, the ſhortneſs of their life requiring that all its functions ſhould be proportionable in their duration. Some naturaliſts have been of opinion, that the males impregnated the eggs after the manner of fiſhes. The females, by the help of the threads of their tail and the flapping of their wings, ſupport themſelves on the ſurface of the water, and in that almoſt upright ſituation drop their eggs in cluſters. One ſingle female will lay 700 or 800 eggs, which ſink to the bottom. The larvæ that eſcape from the voraciouſneſs of the fiſhes, ſet about the conſtruction of habitations to ſhelter them from every kind of danger. When the flies have propagated, they are ſeen to die and fall by heaps. The land and water are ſtrewed with them to a conſiderable thickneſs. The fiſhermen conſider theſe multitudes of deſtroyed inſects as manna for the fiſhes.

Plate CCCXIII.

Barbut's Inſects.

EPHORI, (*Encycl.*) Some authors deny that the ephori were eſtabliſhed by Lycurgus, dating their origin 130 years after the time of that legiſlator. Thus Plutarch, in his Life of Cleomenes, aſcribes their inſtitution to Theopompus king of Sparta; which is alſo confirmed by the authority of Ariſtotle.

EPIC. For POETRY, *chap. ii.* read *Part II. chap. i.*

EPILOBIUM, (*Encycl.*) An infuſion of the leaves of the anguſtifolium, or roſebay willow-herb, has an intoxicating quality, as the inhabitants of Kamtſchatka have learned. Theſe people alſo eat the white young ſhoots which creep under the ground, and have a ſort of ale brewed from the dried pith of it. The down of the ſeeds has been lately manufactured by mixing it with cotton or beaver's hair.

EPITHEM. For 1015, read 1026.

ERYTHRINA, (*Encycl.*) Of the wood of this tree the inhabitants of Malabar make ſheaths for ſwords and knives. They uſe the ſame, together with the bark, in waſhing a ſort of garment which they call *ſaraſſas;* and make of the flowers, the confection caryl. The leaves pulveriſed and boiled with the mature *nux Indica*, or coccoa-nut, conſume venereal buboes, and eaſe pains in the bones; bruiſed and applied to the temples, they cure the cephalea and ulcers; mixed with the ſugar called *jagra*, they mitigate pains in the belly, eſpecially in women; and the ſame effect follows from the uſe of the bark levigated with vinegar, or ſwallowing the kernel ſtripped of its red pellicle. The juice of the leaves taken with oil ſergelim, mitigates venereal pains; drank with an infuſion of rice, it ſtops fluxes; made into a cataplaſm with the leaves of beteleira, it deſtroys worms in old ulcers; and worked with oil, it cures the pſora and itching.

Ray.

ESCHEAT, (*Encycl.*) Eſcheat is one of the conſequences of tenure in chivalry. See FEODAL *Syſtem*, KNIGHT-*Service*, and TENURE. It is the determination of the tenure, or diſſolution of the mutual bond between the lord and tenant, from the extinction of the blood of the latter by either natural or civil means: if he died without heirs of his blood, or if his blood was corrupted and ſtained by commiſſion of treaſon or felony; whereby every inheritable quality was entirely blotted out and aboliſhed. In ſuch caſes the land eſcheated or fell back to the lord of the fee; that is, the tenure was determined by breach of the original condition, expreſſed or implied in the feodal donation. In the one caſe, there were no heirs ſubſiſting of the blood of the firſt feudatory or purchaſer, to which heirs alone the grant of the feud extended: in the other, the tenant, by perpetrating an atrocious crime, ſhowed that he was no longer to be truſted as a vaſſal, having forgotten his duty as a ſubject; and therefore forfeited his feud, which he held under the implied condition that he ſhould not be a traitor or a felon. The conſequence of which in both caſes was, that the gift, being determined, reſulted back to the lord who gave it.

ESCHARA, in natural hiſtory, the name of a ſpecies of coralline, &c. the characters of which are theſe: they are of a ſtony or coral-like hardneſs, and reſemble a woven cloth in their texture; and the microſcope informs us, that they conſiſt of arrangements of very ſmall cells, whoſe ſurfaces appear much in that form. Linnæus makes it a ſpecies of millepora, in the claſs of lithophytes. See Plate CCCXVI. fig. 9. 10.

The narrow-leaved hornwrack, fig. 9. divides as it riſes, into narrow leaves made up of regular rows of oblong ſquare-ſhaped cells placed alternately by each other, and oppoſite to an equal number on the other ſide of the leaf, like an honeycomb: from theſe leaves proceed other ſtill ſmaller foliaceous ramifications, many of which ſeem to be connected at the lower part by tubuli, as in the corallines; by which means they can ply to and fro more freely in the water.—*e*, Gives the natural appearance of this coralline. E repreſents two leaves with their tubuli and cells magnified. E 1 is a croſs ſection of one of the leaves at E, ſhowing the partition and inner form of their cells.

The broad-leaved hornwrack, fig. 10. when freſh taken out of the ſea is of a ſpongy ſoft texture and ſmells very fiſhy; but when it has lain for ſome time on the ſhore, it becomes ſtiff and horny, like ſome ſort of withered leaves. Both ſurfaces, when examined by glaſſes, appear to be covered with cells; and, when a piece of it is cut acroſs, one may diſcover the thin membrane that ſerves as a baſe to the cells of each ſurface. The form of the cells is very remarkable, each one being arched at the top, and contracted a little at the lower part of the ſides to make way for the arches of the two next adjoining cells; ſo that by this particular conſtruction no room is loſt. The entrance of the cells is immediately under the arch of each cell, and the walls of the cells ſeem to be fortified with ſpines. Juſſieu diſcovered ſmall polypes extending themſelves out of theſe cells, which he has deſcribed in the memoirs of the Academy of Sciences 1742.—*f*, Gives the natural appearance of a leafy branch of this coralline. F is a part of a leaf magnified to ſhow the ſuperficial figure of the cells, and the manner in which they are diſpoſed. F1 ſhows a croſs ſection of a leaf, and diſcovers the ſeveral partitions of the cells.

At the entrance of many of the cells a ſmall teſtaceous body like a bivalve ſhell is diſcovered: F2, the figure of the cell, with the ſhell in it; it is of a tranſparent amber colour, ſo clear that one may ſee the dead animal through it, repreſented by the black ſpot.

ESTRAY, or STRAY, ſignifies any tame beaſt, as ſheep, oxen, ſwine, and horſes, or ſwans, found within a lordſhip, and not owned by any man; in which caſe being cried, according to law, in the church, and two market towns adjoining, if it be not claimed by the owner within a year and a day, it becomes the lord's of the ſoil where found. If the owner claims it within the year and day, he muſt pay the charges of finding, keeping, and proclaiming them; and he may ſeize it, without telling the marks, or proving his property, which may be done at the trial if conteſted. If the beaſt ſtray within the year to another lordſhip, the firſt lord cannot retake it. An eſtray muſt be fed and kept, uninjured, and without labour, till it is reclaimed, or the limited time expires.

EUPATORIUM, (*Encycl.*) See alſo HEMP *Agrimony*, (*Encycl.*)

EXERCISE, in military affairs, (*Encycl.*) See alſo WORDS *of Command*, (*Encycl.*)

EYE, (*Encycl.*) A new-born child ſhall be obſerved, perhaps, never to keep its eyes fixed on any one object, but continually changing from one to another, and if you put your hand before them, the child will not wink. Hence ſome have thought, that new-born infants have no ſight: but this is a miſtake; and the true reaſon why their eyes are in perpetual motion is, that they have not yet acquired the habit of examining one thing at once with their eyes: their not winking at the approach of the hand, ariſes from their want of experience how eaſily their eyes may be hurt; but in a few days they get the habit of winking, ſo that afterwards their eyes do it ſpontaneouſly at the approach of danger.—See a deſcription of the eye and its adjacent parts, by J. Warner.

Artificial eyes are made of concave plates of gold, ſilver, or glaſs, and are ſtained ſo as to reſemble the natural eye. They muſt, when fixed in the orbit, be taken out and cleaned every night, and replaced in the morning. If no more of a diſeaſed eye is removed than what is preternaturally projected, or if enough is left to preſerve the muſcles unhurt, the artificial eye will have a little motion from the muſcles that remain. If the eye does not fit well, it irritates and inflames the other eye; in which caſe lay it aſide, until one can be had that fits better.

F.

FARTHING, a ſmall Engliſh copper coin, amounting to one-fourth of a penny. It was anciently called *fourthing*, as being the fourth of the integer or penny.

FARTHING *of Gold*, a coin uſed in ancient times, containing in value the fourth part of a noble, or 20*d.* ſilver. It is mentioned in the ſtat. 9 Hen. V. cap. 7. where it is enacted, that there ſhall be good and juſt weight of the noble, half-noble, and farthing of gold.

FARTHING *of Land* ſeems to differ from FARDING-*deal*. For in a ſurvey-book of the manor of Weſt-Hapton in Devonſhire, there is an entry thus: A. B. holds ſix farthings of land at 126 *l. per ann.* So that the farthing of land muſt have been a conſiderable quantity, far more than a rood.

FAWKES (Francis), an ingenious poet, had his ſchool-education at Leeds; from whence he was tranſplanted to Jeſus-college, Cambridge, where he took the degrees in arts. Entering early into holy orders, he ſettled firſt at Bramham in Yorkſhire, near the elegant ſeat of that name (Mr Lane's), which he celebrated in verſe in 1745, in a 4to pamphlet anonymous. His firſt poetical publications were "Gawen Douglas's Deſcription of May and Winter moderniſed." Removing afterwards to the curacy of Croydon in Surry, he recommended himſelf to the notice of

Archbiſhop Herring, then reſident there on account of his health, to whom beſides other pieces he addreſſed an Ode on his recovery in 1754, printed in Mr Dodſley's Collection. In conſequence, his Grace collated him in 1755 to the vicarage of Orpington with St Mary Cray, in Kent; and Mr Fawkes lamented his patron's death in 1757 in a pathetic Elegy ſtyled *Aurelius*, firſt printed with his Grace's "Seven Sermons," in 1763. He married about the ſame time Miſs Purrier of Leeds. In April 1774, by the late Dr Plumptree's favour, he exchanged his vicarage for the rectory of Hayes. He was alſo one of the chaplains to the Princeſs Dowager of Wales. He publiſhed a volume of Poems by ſubſcription in 8vo, 1761; the "Poetical Calendar, 1763," and "Poetical Magazine 1764," in conjunction with Mr Woty; "Partridge-ſhooting, an Eclogue, to the Honourable Cha. Yorke, 1797," 4to, and a "Family Bible," with notes, in 4to, a compilation. But his great ſtrength lay in tranſlation, in which, ſince Pope, few have equalled him. Witneſs his fragments of Menander (in his Poems); his "Works of Anacreon, Sappho, Bion, Moſchus, and Muſæus," 12mo, 1760; his "Idylliums of Theocritus," by ſubſcription, 8vo, 1767; and his "Argonautics of Apollonius Rhodius," by ſubſcription alſo, (a poſthumous publication, completed by the Reverend Mr Meen of Emanuel College, Cambridge), 8vo, 1780. He died Auguſt 26. 1777.

FEOFFMENT, (*Encycl.*) is a ſubſtantive derived from the verb, to enfeoff, *feoffare* or *infeudare*, "to give one a feud;" and therefore feoffment is properly *donatio feudi*. It is the moſt ancient method of conveyance, the moſt ſolemn and public, and therefore the moſt eaſily remembered and proved. And it may properly be defined, the gift of any corporeal hereditament to another. He that ſo gives, or enfeoffs, is called the *feoffor*; and the perſon enfeoffed is denominated the *feoffee*.

This is plainly derived from, or is indeed itſelf the very mode of, the ancient feodal donation; for though it may be performed by the word "enfeoff" or "grant," yet the apteſt word of feoffment is "*do* or *dedi*." And it is ſtill directed and governed by the ſame feodal rules; inſomuch that the principal rule relating to the extent and effect of the feodal grant, *tenor eſt qui legem dat feudo*, is in other words become the maxim of our law with relation to feoffments, *modus legem dat donationi*. And therefore as in pure feodal donations the lord, from whom the feud moved, muſt expreſsly limit and declare the continuance or quantity of eſtate which he meant to confer, *ne quis plus donaſſe præſumatur, quam in donatione expreſſerit*; ſo, if one grants by feoffment lands or tenements to another, and limits or expreſſes no eſtate, the grantee (due ceremonies of law being performed) hath barely an eſtate for life. For, as the perſonal abilities of the feoffee were originally preſumed to be the immediate or principal inducements to the feoffment, the feoffee's eſtate ought to be confined to his perſon and ſubſiſt only for his life; unleſs the feoffor, by expreſs proviſion in the creation and conſtitution of the eſtate, hath given it a longer continuance. Theſe expreſs proviſions are indeed generally made: for this was for ages the only conveyance, whereby our anceſtors were wont to create an eſtate in fee-ſimple, by giving the land to the feoffee, to hold to him and his heirs for ever; though it ſerves equally well to convey any other eſtate of freehold.

But by the mere words of the deed the feoffment is by no means perfected: there remains a very material ceremony to be performed, called *livery of ſeiſin*; without which the feoffee has but a mere eſtate at will. See Seisin, (*Encycl.*)

FERETTO, (*Encycl.*) Another way of making feretto is as follows. Make a number of ſtratifications of plates of copper and white vitriol alternately in a crucible; which place on the floor of the glaſs furnace near the eye; and let it ſtand there three days; then take it out, and make a new ſtratification with more freſh vitriol; calcine again as before. Repeat this operation ſix times, and a moſt valuable feretto will be obtained.

FICUS, (*Encycl.*) That part of the hiſtory of the fig-tree, which for many ages was ſo enigmatical, and which nothing but the doctrine of the ſexes of plants has completely cleared up, namely, the huſbandry or *caprification*, as it is called, is more particularly worthy of attention, not only as a ſingular phenomenon in itſelf, but as it has furniſhed one of the moſt convincing proofs of the reality of the ſexes of plants. Our limits will not allow us to detail this ſubject; in brief it is this: It is now known, that the flowers of the fig-tree are ſituated within a pulpy receptacle, which we call the fig, or fruit of this tree; of theſe receptacles, in the wild fig-tree, ſome have male flowers only, and others have male and female, both diſtinct, though placed in the ſame receptacle. In the garden, or cultivated fig, theſe are found to contain only female flowers; which are fecundated by means of a kind of gnat bred in the fruit of the wild fig-trees, which pierces that of the cultivated, in order to depoſit its eggs within; at the ſame time diffuſing within the receptacle the farina of the male flowers. Without this operation the fruit may ripen, but no effective ſeeds are produced: hence the garden fig can only be propagated by layers and cuttings, in thoſe countries where the wild fig is not known. The proceſs of thus ripening the fruit, in the oriental countries, is not left to nature, but is managed with great art, and different degrees of dexterity, ſo as to reward the ſkilful huſbandman with a much larger increaſe of fruit than would otherwiſe be produced. A tree of the ſame ſize, which, in Provence, where caprification is not practiſed, may produce about 25 pounds of fruit, will, by that art, in the Grecian iſlands, bring ten times that quantity.

FIFE, (*Encycl.*) This county, anciently called *Roſs*, including the ſhire of Kinroſs, is a peninſula lying between the Friths of Forth and Tay. It is bounded on the north by the Frith of Tay; on the ſouth by the Frith of Forth, which divides it from the Lothians; on the weſt by the Ochil hills; and on the eaſt by the German Ocean.

FINE drawing, in the manufactories. See Rentering.

The term is particularly uſed for a rent or hole happening in the dreſſing or preparing of a piece of cloth, artfully ſewed up or mended with ſilk.

All fine-drawings are reputed defects or blemiſhes, and ought to be allowed for in the price of the piece.—Hence, M. Savary eſtabliſhes it as a rule, which is certainly founded on natural equity, that every manufacturer mark the fine drawings of his cloths with a piece of packthread tied to the liſt; to direct the draper to the ſpot; and that the draper apprize the taylor or other perſon to whom he ſells it of the ſame, that he may not come to damage in the cutting; there being inſtances of drapers condemned to take back their cloth, when cut to pieces, for omitting to mention the fine-drawings and other flaws.

On this occaſion M. Savary extols the procedure of an Engliſh merchant, who ſending a piece of cloth damaged in one ſpot, to his correſpondent at Paris, put a piece of gold in the damaged place, to make up the damage.—But as this example is perhaps the only one of its kind, that author recommends it to the merchant or draper to unfold all the pieces entirely as they come to him; to diſcover the fine-drawings and other flaws, in order to make the clothier accountable for them.

FINGAL, king of Morven, or ancient Caledonia. He flouriſhed in the third century; and according to the Iriſh hiſtories died in the year 283, although there is ſome reaſon from Oſſian's poems for placing his death a few years latter. Fingal was deſcended in all probability from thoſe Celtic tribes who were the firſt inhabitants of Britain. Tradition, and the poems of Oſſian, give him a long line of royal anceſtors, ſuch as Combal, Trenmor, Trathal, &c. who had all reigned over the ſame territory. Whether this territory was bounded by the Caledonian foreſt, or extended ſomewhat farther to the ſouth, towards the Roman province, is uncertain; but there is no doubt of its having extended over all the north and weſt Highlands, comprehending the Hebrides, whoſe petty chiefs were all ſubject to the king of Morven. His principal place of reſidence was Selma, which was probably in the neighbourhood of Glenco, ſuppoſed to be the Cona of Oſſian; though ſome imagine it to have been in Strath-Conan in Moray. The truth ſeems to be, that as Fingal and his people lived by hunting, they often ſhifted their habitation. Hence, in all parts of the Highlands we find, in the names of places, buildings, &c. ſuch monuments as juſtify their ſeveral claims for the honour of Fingal's reſidence. Fingal acquired great fame by his prowеſs in arms. He made many ſucceſsful incurſions into the Roman province, from whence he carried away thoſe ſpoils which his ſon ſo often mentions under the names of the *wine of the ſtranger*, and the *wax of the ſtranger*. By ſea we find him frequently making voyages to Scandinavia, the Orkneys, and Ireland; called by Oſſian *Lochlin*, *Iniſtore*, and *Ullin*. Several of theſe expeditions were celebrated by his ſon in epic poems, of which two only remain, Fingal and Temora. In the laſt of theſe poems, we find Fingal fighting together with his grandſon Oſcar. How long he lived afterwards is uncertain. He is ſaid to have died a natural death; and therefore none of his ſon's poems relate to this event, though it is occaſionally mentioned in many of them. "Did thy beauty laſt, O Ryno? Stood the ſtrength of car-borne Oſcar? Fingal himſelf paſſed away; and the halls of his fathers have forgot his ſteps. The blaſt of the north opens thy gates, O king, and I behold thee ſitting on miſt, dimly gleaming in all thine arms. Thy form now is not the terror of the valiant; but like a watery cloud, when we ſee the ſtars behind it, with their weeping eyes. Thy ſhield is like the aged moon; thy ſword vapour half kindled with fire. Dim and feeble is the chief who travelled in brightneſs before.—But thy ſteps are on the winds of the deſart, and the ſtorms darken in thy hand. Thou takeſt the ſun in thy wrath, and hideſt him in thy clouds. The ſons of little men are afraid, and a thouſand ſhowers deſcend."—*Berrathon.*

"The character of Fingal is perhaps the moſt perfect that was ever drawn by a poet, for we may boldly defy all the writers of antiquity to ſhow us any hero equal to Fingal. Throughout the whole of Oſſian's works, he is preſented to us in all that variety of lights which give the full diſplay of a character. In him concur almoſt all the qualities that can ennoble human nature; that can either make us admire the hero, or love the man. He is not only unconquerable in war, but he makes his people happy by his wiſdom in the days of peace. He is truly the father of his people. He is known by the epithet of "Fingal of the mild ſt look," and diſtinguiſhed on every occaſion by humanity and generoſity. He is merciful to his foes, full of affection to his children, full of concern about his friends, and never mentions Agandecca, his firſt love, without the utmoſt tenderneſs. He is the univerſal protector of the diſtreſſed: none ever went ſad from Fingal.—'O Oſcar! bend the ſtrong in arms, but ſpare the feeble hand. Be thou a ſtream of many tides againſt the foes of thy people; but like the gale that moves the graſs to thoſe who aſk thine aid: ſo Trenmor lived; ſuch Trathal was; and ſuch has Fingal been. My arm was the ſupport of the injured; the weak reſted behind the lightning of my ſteel.' Theſe were the maxims of true heroiſm, to which he formed his grandſon. His fame is repreſented as every where ſpread; the greateſt heroes acknowledge his ſuperiority; his enemies tremble at his name; and the higheſt encomiums that can be beſtowed on one whom the poet would moſt exalt, is to ſay, That his ſoul was like the ſoul of Fingal. Wherever he appears, we behold the hero. The objects he purſues are always great; to bend the proud, to protect the injured, to defend his friends, to overcome his enemies by generoſity more than by force.

"Some ſtrokes of human imperfection and frailty are what uſually give us the moſt clear view and the moſt ſenſible impreſſion of a character, becauſe they preſent to us a man ſuch as we have ſeen; they recal known features of human nature. When poets go beyond this range, and attempt to deſcribe a faultleſs hero, they, for the moſt part, ſet before us a ſort of vague undiſtinguiſhable character, ſuch as the imagination cannot lay hold of, or realize to itſelf as the object of affection. But Fingal, though exhibited without any of the common human failings, is nevertheleſs a real man; a character which touches and intereſts every reader." *Dr Blair.*

We may obſerve, that Fingal appears to have been no leſs a poet than a warrior; at leaſt in all thoſe paſſages aſcribed to him in the poems of his ſon, there is a grandeur and loftineſs that elevates them above the common ſtyle even of Oſſian. The following paſſage from the poem of *Carthon* may be taken as a ſpecimen of Fingal's poetry.—" Raiſe, ye bards," ſaid the mighty Fingal, " the praiſe of unhappy Moina. Call her ghoſt, with your ſongs, to our hills; that ſhe may reſt with the fair of Morven, the ſunbeams of other days, and the delight of heroes of old.—I have ſeen the walls of Balclutha, but they were deſolate. The fire had reſounded in the halls; and the voice of the people is heard no more. The ſtream of Clutha was removed from its place by the fall of the walls. The thiſtle ſhook, there, its lonely head: the moſs whiſtled to the wind. The fox looked out from the windows; the rank graſs of the wall waved round his head. Deſolate is the dwelling of Moina: ſilence is in the houſe of her fathers. Raiſe the ſong of mourning, O bards, over the land of ſtrangers. They have but fallen before us; for, one day we muſt fall.—Why doſt thou build the hall, ſon of the winged days? Thou lookeſt from thy towers to-day; yet a few years, and the blaſt of the deſart comes; it howls in thy empty court, and whiſtles round thy half-worn ſhield.—And let the blaſt of the deſart come! We ſhall be renowned in our day. The mark of my arm ſhall be in the battle, and my name in the ſong of bards. Raiſe the ſong; ſend round the ſhell: and let joy be heard in my hall. When thou, ſun of heaven, ſhalt fail! if thou ſhalt fail, thou mighty light! if thy brightneſs is for a ſeaſon, like Fingal; our fame ſhall ſurvive thy beams."

'Such was the joy of Fingal in the day of his joy. His thouſand bards leaned forward from their ſeats, to hear the voice of the king. It was like the muſic of the harp on the gale of the ſpring. Lovely were thy thoughts, O Fingal! Why had not Oſſian the ſtrength of thy ſoul? But thou ſtandeſt alone, my father; and who can equal the king of Morven?'

FIRE, *Method of ſecuring* BUILDINGS *againſt it.*—Dr Hales propoſes to check the progreſs of fires by covering the floors of the adjoining houſes with earth. The propoſal is founded on an experiment which he made with a fir-board half an inch thick, part of which he covered with an inch depth of damp garden mould, and then lighted a fire on the ſurface of the mould: though the fire was kept up by blowing, it was two hours before the board was burnt through, and the earth prevented it from flaming. The thicker the earth is laid on the floors, the better: however, Dr Hales apprehends that the depth of an inch will generally be ſufficient; and he recommends to lay a deeper covering on the ſtairs, becauſe the fire commonly aſcends by them with the greateſt velocity.

Mr Hartley made ſeveral trials in the years 1775 and 1776, in order to evince the efficacy of a method which he had invented for reſtraining the ſpread of fire in buildings. For this purpoſe thin iron plates are well nailed to the tops of the joiſts, &c. the edges of the ſides and ends being lapped over, folded together, and hammered cloſe. Partitions, ſtairs, and floors, may be defended in the ſame manner; and plates applied to one ſide have been found ſufficient. The plates are ſo thin as not to prevent the floor from being nailed in the joiſts, in the ſame manner as if this preventative were not uſed: they are kept from ruſt by being painted or varniſhed with oil and turpentine. The expence of this addition, when extended through a whole building, is eſtimated at about 5 *per cent.* Mr Hartley has a patent for this invention, and parliament has voted a ſum of money towards defraying the expence of his numerous experiments. The ſame preſervative may alſo be applied to ſhips, furniture, &c.

Lord Mahon has alſo diſcovered and publiſhed a very ſimple and effectual method of ſecuring every kind of building againſt all danger of fire. This method he has divided into three parts, viz. under-flooring, extra-lathing, and inter-ſecuring.

The method of underflooring is either ſingle or double. In ſingle underflooring, a common ſtrong lath of oak or fir, about one-fourth of an inch thick, ſhould be nailed againſt each ſide of every joiſt, and of every main timber, ſupporting the floor which is to be ſecured. Other ſimilar laths are then to be nailed along the whole length of the joiſts, with their ends butting againſt each other. The top of each of theſe laths or fillets ought to be at 1½ inch below the top of the joiſts or timbers againſt which they are nailed; and they will thus form a ſort of ſmall ledge on each ſide of all the joiſts. Theſe fillets are to be well bedded in a rough plaſter hereafter mentioned, when they are nailed on, ſo that there may be no interval between them and the joiſts; and the ſame plaſter ought to be ſpread with a trowel upon the tops of all the fillets, and along the ſides of that part of the joiſts which is between the top of the fillets and the upper edge of the joiſts. In order to fill up the intervals between the joiſts that ſupport the floor, ſhort pieces of common laths, whoſe length is equal to the width of theſe intervals, ſhould be laid in the contrary direction to the joiſts, and cloſe together in a row, ſo as to touch one another: their ends muſt reſt upon the fillets, and they ought to be well bedded in the rough plaſter, but are not to be faſtened with nails. They muſt then be covered with one thick coat of the rough plaſter, which is to be ſpread over them to the level of the tops of the joiſts: and in a day or two this plaſter ſhould be trowelled over cloſe to the ſides of the joiſts, without covering the tops of the joiſts with it.

In the method of double-flooring, the fillets and ſhort pieces of laths are applied in the manner already deſcribed; but the coat of rough plaſter ought to be little more than half as thick as that in the former method. Whilſt this rough plaſter is laid on, ſome more of the ſhort pieces of laths above-mentioned muſt be laid in the intervals between the joiſts upon the firſt coat, and be dipped deep in it. They ſhould be laid as cloſe as poſſible to each other, and in the ſame direction with the firſt layer of ſhort laths. Over this ſecond layer of ſhort laths there muſt be ſpread another coat of rough plaſter, which ſhould be trowelled level with the tops of the joiſts without riſing above them. The rough plaſter may be made of coarſe lime and hair; or inſtead of hair, hay chopped to about three inches in length may be ſubſtituted with advantage. One meaſure of common rough ſand, two meaſures of ſlacked lime, and three meaſures of chopped hay, will form in general a very good proportion, when ſufficiently beat up together in the manner of common mortar. The hay ſhould be put in after the two other ingredients are well beat up together with water. This plaſter ſhould be made ſtiff; and when the flooring boards are required to be laid down very ſoon, a fourth or fifth part of quicklime in powder, formed by dropping a ſmall quantity of water on the limeſtone a little while before it is uſed, and well mixed with this rough plaſter, will cauſe it to dry very faſt. If any cracks appear in the rough plaſter-work near the joiſts when it is thoroughly dry, they ought to be cloſed by waſhing them over with a bruſh wet with mortar-waſh: this waſh may be prepared by putting two meaſures of quicklime, and one of common ſand, in a pail, and ſtirring the mixture with water till the water becomes of the conſiſtence of a thin jelly.

Before the flooring boards are laid, a ſmall quantity of very dry common ſand ſhould be ſtrewed over the plaſter-work, and ſtruck ſmooth with an hollow rule, moved in the direction of the joiſts, ſo that it may lie rounding between each pair of joiſts. The plaſter-work and ſand ſhould be perfectly dry before the boards are laid, for fear of the dry rot. The method of under-flooring may be ſucceſsfully applied to a wooden ſtair-caſe; but no ſand is to be laid upon the rough plaſter-work. The method of extra-lathing may be applied to cieling joiſts, to ſloping roofs, and to wooden partitions.

The third method, which is that of inter-ſecuring, is very ſimilar to that of under-flowering; but no ſand is afterwards to be laid upon it. Inter-ſecuring is applicable to the ſame parts of a building as the method of extra-lathing, but it is ſeldom neceſſary.

Lord Mahon has made ſeveral experiments in order to demonſtrate the efficacy of theſe methods. In moſt houſes it is only neceſſary to ſecure the floors; and the extra-expence of under-flooring, including all materials, is only about nine pence per ſquare yard, and with the uſe of quicklime a little more. The extra-expence of extra-lathing is no more than ſix pence per ſquare yard for the timber ſide-walls and partitions; but for the cieling about nine pence per ſquare yard. But in moſt houſes no extra-lathing is neceſſary.

FIRE-*Eater*. We have a great number of mountebanks who have procured the attention and wonder of the public by eating of fire, walking on fire, waſhing their hands in melted lead, and the like tricks.

The moſt celebrated of theſe was our countryman Richardſon, much talked of abroad. His ſecret, as related in the *Journal des Sçavans*, of the year 1680, conſiſted in a pure ſpirit of ſulphur, wherewith he rubbed his hands, and the parts that were to touch the fire; which burning and cauteriſing the epidermis, hardened and enabled the ſkin to reſiſt the fire.

Indeed, this is no new thing: Amb. Paré aſſures us he had tried it on himſelf, that after waſhing the hands in urine, and with unguentum aureum, one may ſafely waſh them in melted lead.

He adds alſo, that by waſhing his hands in the juice of onions he could bear a hot ſhovel on them while it melted lard.

FLATUS. For INDEX *ſubjoined to Medicine*, read MEDICINE, n° 384.

FLAX-PLANT, (*Phormium tenax*, Forſt.) is a name which we may give to a plant that ſerves the inhabitants of New Zealand inſtead of hemp and flax. Of this plant there are two ſorts; the leaves of both reſemble thoſe of flags, but the flowers are ſmaller, and their cluſters more numerous; in one kind they are yellow, and in the other a deep red. Of the leaves of theſe plants, with very little preparation, they make all their common apparel, and alſo their ſtrings, lines, and cordage, for every purpoſe; which are ſo much ſtronger than any thing we can make with hemp, that they will not bear a compariſon. From the ſame plant, by another preparation, they draw long ſlender fibres, which ſhine like ſilk, and are as white as ſnow: of theſe, which are very ſtrong, they make their fineſt cloaths; and of the leaves, without any other preparation than ſplitting them into proper breadths, and tying the ſtrips together, they make their fiſhing-nets, ſome of which are of an enormous ſize.

The ſeeds of this valuable plant have been brought over into England; but, upon trial, appeared to have loſt their vegetating power.

The filamentous parts of different vegetables have been employed in different countries for the ſame mechanic uſes as hemp and flax among us. Putrefaction, and in ſome degree alkaline lixivia, deſtroy the pulpy or fleſhy matter, and leave the tough filaments entire. By curiouſly putrefying the leaf of a plant in water, we obtain the fine flexible fibres, which conſtituted the baſis of the ribs and minute veins, and which form as it were a ſkeleton of the leaf. In Madagaſcar, different kinds of cloth are prepared from the filaments of the bark of certain trees boiled in ſtrong ley; and ſome of theſe cloths are very fine, and approach to the ſoftneſs of ſilk, but in durability come ſhort of cotton: others are coarſer and ſtronger, and laſt thrice as long as cotton; and of theſe filaments they make ſails and cordage to their veſſels. The ſtalks of nettles are ſometimes uſed for like purpoſes, even in France; and Sir Hans Sloane relates, in one of his letters to Mr Ray, that he has been informed by ſeveral, that muſlin and callico, and moſt of the Indian linens, are made of nettles. A ſtrong kind of cloth is ſaid to be prepared, in ſome of the provinces of Sweden, of hop-ſtalks; and in the Tranſactions of the Swediſh Academy for 1750, we have an account of an experiment relating to this ſubject: A quantity of the ſtalks was gathered in autumn, which was equal in bulk to a quantity of flax ſufficient to yield a pound after preparation. The ſtalks were put into water, and kept covered with it during the winter. In March they were taken out, dried in a ſtove, and dreſſed as flax. The prepared filaments weighed nearly a pound, and proved fine, ſoft, and white; they were ſpun and wove into ſix ells of fine ſtrong cloth. Unleſs the ſtalks are fully rotted, which will take much longer time than flax, the woody part will not ſeparate, and the cloth will prove neither white nor fine.

FLETCHER (Andrew) of Salton, a celebrated Scots patriot and political writer, was deſcended from an ancient family who trace their origin to one of the followers of William the Conqueror. He was the ſon of Sir Robert Fletcher of Salton and Innerpeffer, and born in the year 1650. The tuition of our author was committed by his father, on his deathbed, to Mr (afterwards Biſhop) Burnet, then his pariſh-miniſter; by whoſe care he received a pious, learned, and polite education. Endowed with uncommon genius, and poſſeſſed of virtues and abilities peculiarly ſuited to the times in which he lived, Mr Fletcher quickly ſhone forth the ornament of his country, and the champion of its freedom. Having in the courſe of his claſſical ſtudies and hiſtorical reading been impreſſed with an enthuſiaſtic admiration both of ancient and modern republics, he had early contracted an ardent love of liberty, and an averſion to arbitrary rule. Hence his ſpirit the more readily took alarm at certain meaſures in the reign of Charles the Second. Being knight of the ſhire for Lothian to that parliament where the duke of York was commiſſioner, he oppenly oppoſed the deſigns of that prince, and the bill of acceſſion. He had a ſhare with lord viſcount Stair in framing the teſt-act, by which the duke of York complained that he loſt Scotland. On theſe accounts, he became peculiarly obnoxious to the duke; and was at laſt obliged to flee to Holland, to avoid the fatal conſequences of proſecutions which on various pretences were commenced againſt him: being cited before the privy-council and juſticiary courts, and not appearing, he was declared traitor, and his eſtate confiſcated.

In Holland he and Mr Baillie of Jerviſwood were the only perſons whom the earl of Argyle conſulted concerning the deſigns which were then in agitation. In 1681 they came over to England, in order to concert matters with their party in that country; and were the only two who were intruſted ſo far as to be admitted to the ſecrets of lord Ruſſel's council of ſix. Mr Fletcher managed his part of the negociation with ſo much addreſs, that adminiſtration could find no pretext for ſeizing him: nor could they fix upon him thoſe articles on account of which Mr Baillie was condemned; to whoſe honour let it be remembered, that although offered a pardon on condition of his accuſing his friend, he perſiſted in rejecting the propoſal with indignation.

Mr Fletcher having joined the duke of Monmouth upon his landing, received a principal command under him. But the duke was deprived of his ſervices on the following occaſion, as related by Sir John Dalrymple. Being ſent upon an expedition, and not eſteeming "times of danger to be times of ceremony, he had ſeized for his own riding the horſe of a country gentleman [the mayor of Lynne] which ſtood ready equipt for its maſter. The maſter, hearing this, ran in a paſſion to Fletcher, gave him opprobrious language, ſhook his cane, and attempted to ſtrike. Fletcher, though rigid in the duties of morality, yet having been accuſtomed to foreign ſervices both by ſea and land, in which he had acquired high ideas of the honour of a ſoldier and a gentleman, and of the affront of a cane, pulled out his piſtol, and ſhot him dead on the ſpot. The action was unpopular in countries where ſuch refinements were not underſtood. A clamour was raiſed againſt it among the people of the country: in a body, they waited upon the duke with their complaints; and he was forced to deſire the only ſoldier, and almoſt the only man of parts, in his army, to abandon him. With Fletcher all Monmouth's chances of ſucceſs in war left him." But, in a manuſcript memoir belonging to the family, we have the following notice concerning Mr Fletcher's connection with Monmouth, in which his ſeparation from that prince is very differently accounted for: "To lord Mariſchal Mr Fletcher explained the motives which induced him firſt to join, and afterwards abandon, the duke of Monmouth. The former he aſcribed to the duke's manifeſto in Scotland relating to religion, and in England to liberty. For the latter he accounted by the diſguſt produced in his own mind and that of his aſſociates, when the duke declared himſelf king, and broke faith with all who embarked with him on his principles. He complained heavily of the account commonly given of the death of the mayor of Lynne; and mentioned to Lord Mariſchal, in proof of the contrary, that he did not leave the duke till he came to Taunton, where he was proclaimed king, ſeveral weeks after the death of the mayor of Lynne."

Memoirs of Great Britain and Ireland, p. 60, 61.

Seeing all the efforts of himſelf and his friends in favour of liberty fruſtrated at Taunton, he endeavoured to ſecure his own perſonal freedom by taking his paſſage in the firſt ſhip bound to a foreign country. It was his misfortune to land in Spain; where he was immediately arreſted, caſt into priſon, and guarded by three different bands of ſoldiers, till a veſſel ſhould be prepared to carry him a victim in chains to the court of London. But on the morning before the ſhip could ſail, whilſt he looked penſive through the bars that ſecured the window of his room, he was hailed by a venerable perſonage who made ſigns to ſpeak with him. The priſon-doors he found open, and whilſt his friendly conductor waved to him to follow him, he paſſed thro' three different guards of ſoldiers all faſt aſleep. Without being permitted to offer his thanks to his deliverer, he found himſelf obliged to proſecute with all ſpeed the journey, in which he was directed by a perſon concerning whom he could never collect any information; and in diſguiſe he proceeded in ſafety through Spain. He felt a peculiar pleaſure in relating to his friends inſtances of the care of Providence which he had experienced during his exile; and entertained them often with narratives of this kind, which he always mingled with religious reflections. Of theſe, another may be here mentioned. Happening in the evening to paſs the ſkirt of a wood at a few miles diſtance from a city where he intended to lodge, he came to a place where two roads met. After he had entered upon the road on the right, he was accoſted by a female of a reſpectable figure, who warned him to turn back, and take the road on the left; for that in the other there was danger which he could not eſcape if he continued to proceed. After which ſhe ſuddenly retired into the wood, out of which ſhe had iſſued no leſs unexpectedly. Having arrived at the city, the inhabitants were ſoon after alarmed by an account of the robbery and murder of ſeveral travellers who that evening had fallen into the hands of a banditti upon the very way in which he had intended to travel. From theſe and other inſtances of preſervation from dangers, the devotion of his mind, habituated from his infancy to an intercourſe with heaven, led him to conclude that he was in a peculiar manner the care of Providence; and that in critical caſes his underſtanding received its direction from a ſupernatural impulſe.

Memoirs of the family of Salton, MS.

During his exile, he maintained a frequent and extenſive correſpondence with the friends of liberty at home; and he partly employed himſelf in making a curious collection of books, which compoſe the beſt private library in Scotland. But his genius alſo prompted him to engage in more active employments. He repaired to Hungary, and ſerved ſeveral campaigns as a volunteer under the duke of Lorrain with great reputation. At length, underſtanding that the great deſign then projecting in Holland, and upon the iſſue of which he conſidered the liberties of Britain to be ſuſpended, had attained a conſiderable degree of maturity, he haſtened thither; where his counſels and addreſs were of eminent ſervice. He came over with king William; and in zeal, activity, penetration, and political ſkill, proved inferior to none of the leaders in the Revolution.

Such, however, was his magnanimity, that from a ſurvey of K. William's papers it appears, that while others laboured to turn this grand event to the emolument of themſelves and the aggrandiſement of their family, Mr Fletcher aſked nothing. His eſtate had been forfeited, and his houſe abandoned to military diſcretion; his fortune was greatly ſhattered, and his family reduced to circumſtances of diſtreſs. Nothing was given him in recompence of all his ſufferings. On the contrary, he, together with the duke of Hamilton, was diſtinguiſhed by marks of royal and miniſterial diſlike. Still, whatever private reſentment he might entertain, it appeared that his ruling principle was the good of his country; and that to this grand object of his heart he was willing to ſacrifice all private reſentments. For when, in 1692, the abdicated king meditated an invaſion, Mr Fletcher addreſſed a letter (preſerved in Sir John Dalrymple's Collection) to the duke of Hamilton, in which every argument is employed with ſkill and energy to engage his Grace to forget his injuries, and in the preſent criſis to employ the extenſive influence and authority he then poſſeſſed in the cauſe of freedom and of his country. This letter produced its full effect; and the duke returned to his duty, from which he had in part declined.

To follow our author through all the mazes of his political life ſubſequent to the Revolution, is beyond our purpoſe, and would exceed our limits. One or two circumſtances more ſhall therefore ſuffice. Being elected a member for the parliament 1683, he ſhowed an uniform zeal for the intereſt of his country. The thought of England's domineering over Scotland was what his generous ſoul could not endure. The indignities and oppreſſion which Scotland lay under galled him to the heart; ſo that in his learned and elaborate diſcourſes, he expoſed them with undaunted courage and pathetical eloquence.—In that great event, the Union, he performed eſſential ſervice. He got the act of ſecurity paſſed, which declared that the two crowns ſhould not paſs to the ſame head till Scotland was ſecured in her liberties civil and religious. Therefore lord Godolphin was forced into the Union, to avoid a civil war after the queen's demiſe. Although Mr Fletcher diſapproved of ſome of the articles, and indeed of the whole frame of the Union; as the act of ſecurity was his own work, he had all the merit of that important tranſaction.

We muſt not omit mentioning, that in the ardour of his political career Mr Fletcher forgot not the intereſts of the place that gave him birth. He eſteemed the education of youth one of the nobleſt objects of government. On this ſubject he wrote a treatiſe, ſtill exſtant, moſt characteriſtic of himſelf; and he eſtabliſhed at Salton a foundation for the ſame purpoſe, of great utility while it laſted.

This great man died at London in 1716, aged 66. His remains were conveyed to Scotland, and depoſited in the family vault at Salton.

That Mr Fletcher received neither honours nor emoluments from king William, may perhaps be in part attributed to himſelf; a circumſtance, however, which muſt add greatly to the luſtre of his character. His uncomplying virtue, and the ſternneſs of his principles, were ill calculated to conciliate courtly favour. He was ſo zealous an aſſertor of the liberties of the people, that he was too jealous of the growing power of all princes; in whom he thought ambition ſo natural, that he was not for truſting the beſt of kings with the power which ill ones might make uſe of againſt their ſubjects: he was of opinion that all princes were made by, and for the benefit of, the people; and that they ſhould have no power but that of doing good. This, which made him oppoſe king Charles and invade king James, led him alſo to oppoſe the giving ſo much power to king William, whom he would never ſerve after his eſtabliſhment. So we are told by the author of *Short political Characters*, a MS. in the library of the late T. Rawlinſon, Eſq.—Mr Lockhart, in his *Memoirs*, p. 72. expreſſes a belief that his averſion to the Engliſh and to the Union was ſo great, that, in revenge to them, he was inclined to ſide with the abdicated family: "But (adds he) as that was a ſubject not fit to be entered upon with him, this is only a conjecture from ſome inuendos I have heard him make: but ſo far is certain, he liked, commended, and converſed with high-flying Tories, more than any other ſet of men; acknowledging them to be the beſt countrymen, and of moſt honour, integrity, and ingenuity." It ſeems difficult to reconcile this with Mr Fletcher's avowed principles and the general tenor of his conduct. May we ſuppoſe, that chagrin, if not at the neglect or the ill treatment which he had himſelf received from government ſince the Revolution, yet at the public meaſures relating to his native country, might have occaſioned him to relent in his ſentiments with regard to the exiled family?—In the family-memoirs already quoted, we are informed, That "Lord Mariſchal held Mr Fletcher's character in high admiration;" and that, "when governor of Neufchatel, where Rouſſeau reſided about the year 1766, he prevailed with this very extraordinary genius to write the life of a man whoſe character and actions he wiſhed to have tranſmitted to poſterity with advantage. For this purpoſe, his lordſhip applied to an honourable relation of Mr Fletcher's for materials, which by him were tranſmitted to lord Mariſchall: but the deſign failed through Rouſſeau's deſultory and capricious diſpoſition." This anecdote muſt appear incompatible with the known loyalty and attachments of the Earl Mariſchal, unleſs we ſuppoſe him to have been privy to ſome ſuch ſentiments of Mr Fletcher, as thoſe alluded to by Mr Lockhart: for how could we ſuppoſe him anxious to promote a compoſition, in which the taſk would be to celebrate principles diametrically oppoſite to his own, and to applaud actions ſubverſive of that royal family in whoſe cauſe he had ventured his life, and forfeited his fortune, and forgone his country!—But however theſe circumſtances may be reconciled,—as the integrity, diſintereſtedneſs, and public ſpirit of Mr Fletcher, have been univerſally acknowledged, there is reaſon to believe, that all his ſentiments and actions were founded in honour, and that he never once purſued a meaſure further than he judged it to be for the intereſt of his country.

Mr Fletcher was maſter of the Engliſh, Latin, Greek, French, and Italian languages; and well verſed in hiſtory, the civil law, and all kinds of learning. In his travels, he had not only acquired conſiderable knowledge in the art of war, but alſo became verſant in the reſpective intereſts of the ſeveral princes and ſtates of Europe. In private life, he was affable to his friends, and free from all manner of vice. He had a penetrating, clear, and lively apprehenſion; but is ſaid to have been too much wedded to opinions, and impatient of contradiction.—He poſſeſſed an uncommon elevation of mind, accompanied with a warmth of temper, which would ſuffer him to brook from no rank among men, nor in any place, an indignity. Of this he exhibited a ſingular proof in the Scots parliament. The Earl of Stair, ſecretary of ſtate and miniſter for Scotland, having in the heat of debate uſed an improper expreſſion againſt Mr Fletcher, he ſeized him by his robe, and inſiſted upon public and immediate ſatisfaction. His Lordſhip was obliged inſtantly to beg his pardon in preſence of parliament.

Mr Fletcher was by far the fineſt ſpeaker in the parliament of Scotland: the earl of Stair alone rivalled him. The latter was famed for a ſplendid, the former for a cloſe and nervous eloquence. He formed his ſtyle on the models of antiquity; and the ſmall volume of his works, Sir John Dalrymple obſerves, tho' imperfectly collected, is one of the very few claſſical compoſitions in the Engliſh language.

FLOS MASCULUS, in botany, a flower which contains the ſtamen, reckoned by the ſexualiſts the male organ of generation; but not the ſtigma or female organ. All the plants of the claſs diœcia of Linnæus have male and female flowers upon different roots: thoſe of the claſs monœcia bear flowers of different ſexes on the ſame root. The plants, therefore, of the former are only male and female: thoſe of the latter are androgynous; that is, contain a mixture of both male and female flowers.

FOSSILS, (*Encycl.*) The adventitious or extraneous foſſils, or thoſe which include the ſubterraneous exuviæ of different ſea and land animals, and even vegetables, as ſhells, teeth, leaves, ſtalks, &c. which are found buried in great abundance in diverts parts of the earth, have employed the curioſity of ſeveral of our lateſt naturaliſts, who have each their ſeveral ſyſtem to account for the ſurpriſing appearances of petrified ſea-fiſhes, in places far more remote from the ſea, and on the tops of mountains; ſhells in the middle of quarries of ſtone; and of elephants teeth, and bones of divers animals, peculiar to the ſouthern climates, and plants only growing in the eaſt, found foſſile in our northern and weſtern parts. See Plate CCCXVII.

Some will have theſe ſhells, &c. to be real ſtones, and ſtone plants, formed after the uſual manner of other figured ſtones; of which opinion is our learned Dr Liſter.

Another opinion is, that theſe foſſil ſhells, with all other foreign bodies found within the earth, as bones, trees, plants, &c. were buried therein at the time of the univerſal deluge; and that, having been penetrated either by the bituminous matter abounding chiefly in watery places, or by the ſalts of the earth, they have been preſerved entire, and ſometimes petrefied.

Others think, that thoſe ſhells, found at the tops of the higheſt mountains, could never have been carried thither by the waters, even of the deluge; inaſmuch as moſt of theſe aquatic animals, on account of the weight of their ſhells, always remain at the bottom of the water, and never move but cloſe along the ground.

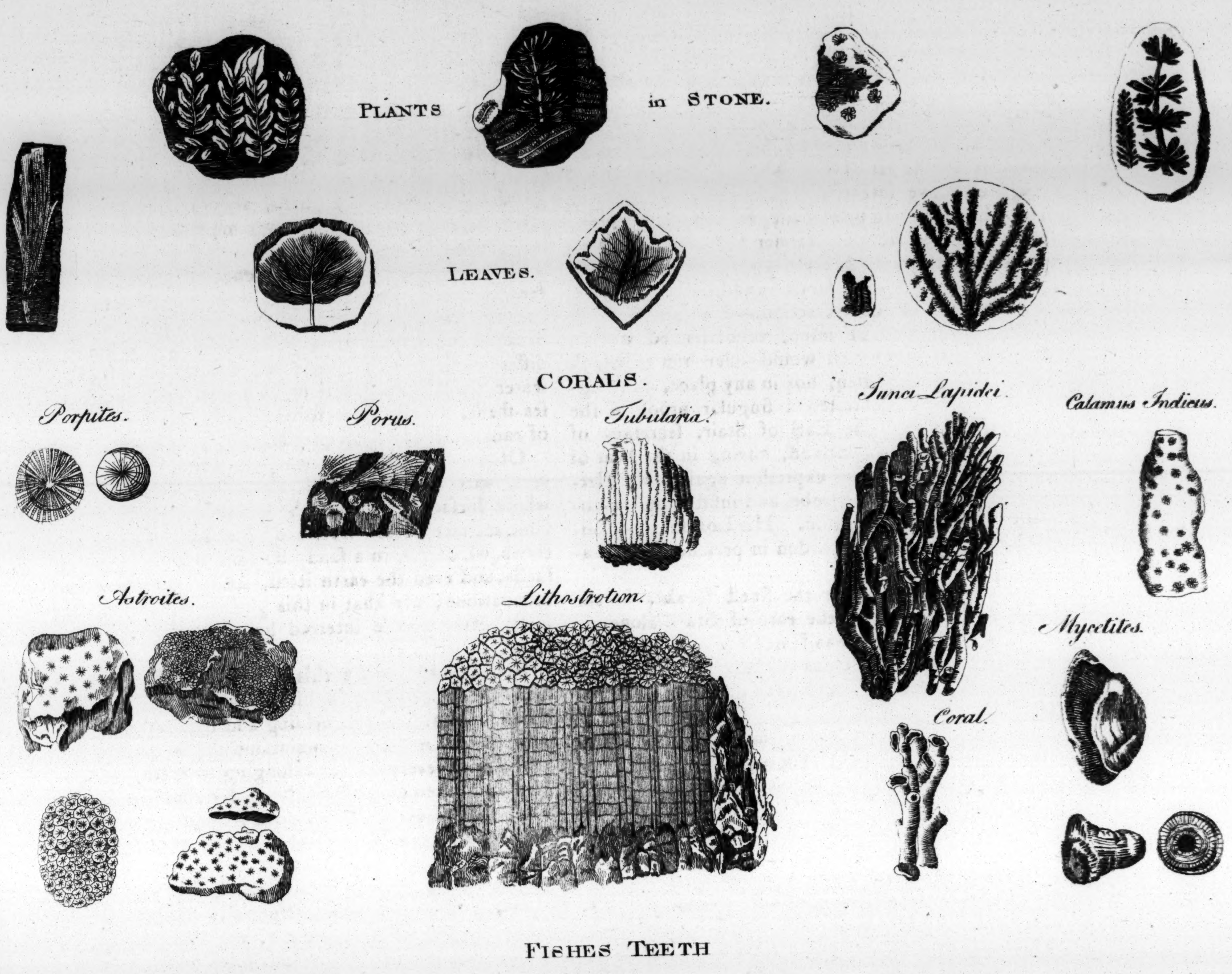
They imagine, that a year's continuance of the waters of the deluge, intermixed with the ſalt waters of the ſea, upon the ſurface of the earth, might well give occaſion to the production of ſhells of diverſe kinds in different climates; and that the univerſal ſaltneſs of the water was the real cauſe of their reſemblance to the ſea-ſhells, as the lakes formed daily by the retention of rain or ſpring water produce different kinds.

Others think, that the waters of the ſea, and the rivers, with thoſe which fell from heaven, turned the whole ſurface of the earth upſide down; after the ſame manner as the waters of the Loire, and other rivers, which roll in a ſandy bottom, overturn all their ſands, and even the earth itſelf, in their ſwellings and inundations; and that in this general ſubverſion, the ſhells came to be interred here, fiſhes there, trees there, &c.

But nobody has ſet this ſyſtem in a better light than Dr Woodward, in his Natural Hiſtory of the Earth. That author, purſuing and improving the hypotheſis of Dr Burnet, maintains the whole maſs of earth, with every thing belonging thereto, to have been ſo broken and diſſolved at the time of the deluge, that a new earth was then formed in the boſom of the water, conſiſting of different ſtrata, or beds of terreſtrial matter, ranged over each other uſually according to the order of their ſpecific gravities. By this means, plants, animals, and eſpecially fiſhes and ſhells, not yet diſſolved among the reſt, remained mixed and blended among the mineral and foſſil matters; which preſerved them, or at leaſt aſſumed and retained their figures and impreſſions either indentedly, or in relievo.

FOTHERGILL (Dr John), a late eminent phyſician, was born in 1712, at Wenſley-dale in Yorkſhire. His father had been bred to the profeſſion of huſbandry, and occupied a ſmall eſtate of his own in that country. The Doctor was the ſecond of five children (four ſons and a daughter), and received his education in the ſeminary belonging to the Quakers; and afterwards ſerved his time to one Mr Bartlett an apothecary at Bradford. From thence he removed to London, and became a pupil of Dr (afterwards Sir Edward) Wilmot, at St Thomas's Hoſpital. He then went to the univerſity of Edinburgh, where he took his degree in 1736. From Edinburgh he went to Leyden; whence, after a ſhort ſtay, he returned to London, and began to practiſe phyſic about the year 1740, in a houſe in White-hart Court, Lombard-ſtreet, where he reſided during the greateſt part of his life, and acquired moſt of his fortune. In 1744 he was admitted a licentiate of the college of phyſicians in London; and in 1754 a fellow of that of Edinburgh, to which he was a conſiderable benefactor. He afterwards became a member of the Royal Medical Society at Paris,

FOSSILS extraneous or PETRIFACTIONS. Plate CCCXVII.


PLANTS in STONE.
LEAVES.
CORALS.
Porpites.
Porus.
Tubularia.
Junci Lapidei
Calamus Indicus.
Astroites.
Lithostrotion.
Mycetites.
Coral.
FISHES TEETH
Glossopetræ.
Plectronitæ.
Buffonitæ.
Ichthyperia.
A Bell Sculp.

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ris, and a member both of the Royal and Antiquarian Societies. He continued his practice with unremitted attention and ſucceſs, till his illneſs, during the two laſt years of his life, obliged him to give up a conſiderable part of it. The diſorder which haſtened his death, was a ſcirrhus of the proſtate gland, and an obſtruction in the bladder, in which were found two quarts of water after his deceaſe. This had been gradually coming upon him for ſix years, by reaſon of his delicacy, which made him unwilling to alight often from his carriage; and when, after his temporary recovery from it the year before he died, he ſubmitted to uſe relief in his carriage, it was too late. He died in his houſe in Harpur-ſtreet, Dec. 26. 1780.

Dr Fothergill, beſides his attention to medicine, had imbibed an early taſte for natural hiſtory, which was improved by his friend Mr Collinſon. He was for many years a valuable contributor to the Gentleman's Magazine; which, in return, conſiderably aſſiſted his riſing fame. His obſervations on the Weather and Diſeaſes were begun in 1751, and continued monthly for ſome years. He did not add to the medical art any great or valuable improvements. His pamphlet on the Ulcerous Sore Throat is in every reſpect the beſt of his performances, and owes much of its merit to the information of the late Drs Leatherland and Sylveſter. It was firſt printed in 1748, on the re-appearance of that fatal diſorder, which, in 1739, had carried off the two ſons of Mr Pelham. At the expence of Dr Fothergill alſo was made and publiſhed a new tranſlation of the whole Bible, by Anthony Purver a Quaker, who, by his own induſtry, acquired a knowledge of the Hebrew, Greek, and Latin languages. This publication is ſaid to have coſt the Doctor not leſs than 2000 l. It appeared in 1764 in two vols folio; and in 1780 was publiſhed an edition of Dean Percy's Key to the New Teſtament, adapted to the uſe of a ſeminary of young Quakers at Ackworth, near Leeds in Yorkſhire. This was founded in 1778 by the ſociety, who purchaſed by ſubſcription, in which Dr Fothergill's name ſtood foremoſt, the houſe and eſtate of 30 acres poſſeſſed by the Foundling Hoſpital, but which they found inconvenient for their purpoſe on account of diſtance. The Doctor firſt projected this on the plan of a ſmaller inſtitution of the ſame kind at Gilderſomes. He alſo endowed it handſomely by his will. It now contains above 300 children of both ſexes, who are fed and inſtructed.

The fortune acquired by Dr Fothergill was immenſe; and, taking all things together, the computation cannot be leſs than 80,000 l. His buſineſs, when in full practice, was valued at 7000 l. a-year. In the the influenza of 1775 and 1776, he is ſaid to have had 60 patients daily on his liſt, and his profit was eſtimated at 8000 l.—When the infirmities of old age obliged him to relax his cloſe attention to buſineſs, he quitted his houſe in the city, and reſided in Harpur-ſtreet, Red-lion Square. He alſo furniſhed himſelf with a pleaſant retreat at Upton, which he uſed to viſit on Saturdays during the winter, and ſometimes more frequently in ſpring and ſummer. For ſeveral years before his death he was accuſtomed to retire in the month of July to Lea-Hall, a pleaſant eſtate in the neighbourhood of Middlewich, which he rented from Sir John Leiceſter. He generally reſided at this place till the latter end of September; and while here took no fees, but uſed to go once a-week to an inn at Middlewich, and preſcribe gratis to all who applied to him.

Dr Fothergill's character was excellent. A tranſaction, indeed, with regard to one Dr Leeds gave occaſion to ſome of his enemies to blame him; but how unjuſtly, has been abundantly ſhown by his biographers Dr Elliot and Dr Lettſome.

Dr Fothergill wrote a conſiderable number of Tracts, which are now collected into one vol. 8vo, by Dr Elliott. He ſometimes wrote in the newſpapers, and is ſaid to have been the author of more than 100 letters in the Gazetter concerning the New Pavement.

FRAXINELLA, in botany. See Dictamnus, (*Encycl.*)—It is remarkable of this odorous plant, that, when in full bloſſom, the air which ſurrounds it in a ſtill night, may be inflamed by the approach of a lighted candle. Dr Watſon doubts whether this inflammability proceeds from an inflammable air which is exhaled by the plant, or from ſome of the finer parts of the eſſential oil of the plant being diſſolved in the common atmoſpherical air. The latter is the moſt probable ſuppoſition; for were it the pure inflammable air, as Mr Cavallo obſerves, it would, on account of its ſmall ſpecific gravity, leave the plant as ſoon as it was produced. Common air acquires the property of becoming inflammable, by being tranſmitted through ſeveral eſſential oils.

FRŒNUM, in anatomy, the ſame with the *ligamentum annulare*, or annular ligament.—This name is given to a ligament on each ankle and each wriſt, and this more on account of their uſe than their figure. They bridle the tendons of the muſcles which paſs through them.

FROST, (*Encycl.*) The great power of froſt on vegetables is a thing ſufficiently known; but the differences between the froſts of a ſevere winter, and thoſe which happen in the ſpring mornings, in their effects on plants and trees, were never perfectly explained, till by Meſſ. Du Hamel and Buffon in the Memoirs of the Paris Academy.

The froſts of ſevere winters are much more terrible than thoſe of the ſpring, as they bring on a privation of all the products of the tenderer part of the vegetable world; but then they are not frequent, ſuch winters happening perhaps but once in an age; and the froſts of the ſpring are in reality greater injuries to us than theſe, as they are every year repeated.

In regard to trees, the great difference is this, that the froſts of ſevere winters affect even their wood, their trunks and large branches; whereas thoſe of the ſpring have only power to hurt the buds.

The winter froſts happening at a time when moſt of the trees in our woods and gardens have neither leaves, flowers, nor fruits upon them, and have their buds ſo hard as to be proof againſt ſlight injuries of weather, eſpecially if the preceding ſummer has not been too wet; in this ſtate, if there are no unlucky circumſtances attending, the generality of trees bear moderate winters very well; but hard froſts, which happen late in the winter, cauſe very great injuries even to thoſe trees which they do not utterly deſtroy. Theſe are, 1. Long cracks following the direction of the fibres. 2. Parcels of dead wood incloſed round with wood yet in a living ſtate. And, 3. That diſtemperature which the foreſters call the *double blea*, which is a perfect circle of blea, or ſoft white wood, which, when the tree is afterwards felled, is found covered by a circle of hard and ſolid wood.

The opinions of authors about the expoſitions of trees to the different quarters, have been very different, and moſt of them grounded on no rational foundation. Many are of opinion that the effects of froſt are moſt violently felt on thoſe trees which are expoſed to the north; and others think the ſouth or the weſt the moſt ſtrongly affected by them. There is no doubt but the north expoſure is ſubject to the greateſt cold. It does not, however, follow from this, that the injury muſt be always greateſt on the trees expoſed to the north in froſts: on the contrary, there are abundant proofs that it is on the ſouth ſide that trees are generally more injured by froſt: and it is plain from repeated experiments, that there are particular accidents, under which a more moderate froſt may do more injury to vegetables, than the moſt ſevere one which happens to them under more favourable circumſtances.

It is plain from the accounts of the injuries trees received by the froſts in 1709, that the greateſt of all were owing to repeated falſe thaws, ſucceeded by repeated new froſts. But the froſts of the ſpring-ſeaſon furniſh abundantly more numerous examples of this truth; and ſome experiments made by the Count de Buffon, at large in his own woods, prove inconteſtably, that it is not the ſevereſt cold, or moſt fixed froſt, that does the greateſt injury to vegetables.

This is an obſervation directly oppoſite to the common opinion; yet is not the leſs true, nor is it any way diſcordant to reaſon. We find by a number of experiments, that humidity is the thing that makes froſt fatal to vegetables; and therefore every thing that can occaſion humidity in them, expoſes them to theſe injuries, and every thing that can prevent or take off an over proportion of humidity in them, every thing that can dry them, though with ever ſo increaſed a cold, muſt prevent or preſerve them from thoſe injuries. Numerous experiments and obſervations tend to prove this. It is well known that vegetables always feel the froſt very deſperately in low places where there are fogs. The plants which ſtand by a river ſide are frequently found deſtroyed by the ſpring and autumnal froſts, while thoſe of the ſame ſpecies, which ſtand in a drier place, ſuffer little, or perhaps not at all by them; and the low and wet parts of foreſts are well known to produce worſe wood than the high and drier. The coppice wood in wet and low parts of common woods, though it puſh out more vigorouſly at firſt than that of other places, yet never comes to ſo good a growth; for the froſt of the ſpring killing theſe early top-ſhoots, obliges the lower part of the trees to throw out lateral branches: and the ſame thing happens in a greater or leſſer degree to the coppice wood that grows under cover of larger trees in great foreſts; for here the vapours not being carried off either by the ſun or wind, ſtagnate and freeze, and in the ſame manner deſtroy the young ſhoots, as the fogs of marſhy places. It is a general obſervation alſo, that the froſt is never hurtful to the late ſhoots of the vine, or to the flower-buds of trees, except when it follows heavy dews, or a long rainy ſeaſon, and then it never fails to do great miſchief, tho' it be ever ſo ſlight.

The froſt is always obſerved to be more miſchievous in its conſequences on newly cultivated ground than in other places; and this is becauſe the vapours which continually ariſe from the earth, find an eaſier paſſage from thoſe places than from others. Trees alſo which have been newly cut, ſuffer more than others by the ſpring froſts, which is owing to their ſhooting out more vigorouſly.

Froſts alſo do more damage on light and ſandy grounds, than on the tougher and firmer ſoils, ſuppoſing both equally dry; and this ſeems partly owing to their being more early in their productions, and partly to their lax texture ſuffering a greater quantity of vapours to tranſpire.

It alſo has been frequently obſerved, that the ſide-ſhoots of trees are more ſubject to periſh by the ſpring froſts than thoſe from the top; and M. Buffon, who examined into this with great accuracy, always found the effects of the ſpring froſts much greater near the ground than elſewhere. The ſhoots within a foot of the ground quickly periſhed by them; thoſe which ſtood at two or three feet high, bore them much better; and thoſe at four feet and upwards frequently remained wholly unhurt, while the lower ones were entirely deſtroyed.

There are a ſeries of obſervations, which have proved beyond all doubt, that it is not the hard froſts which ſo much hurt plants, as thoſe froſts, tho' leſs ſevere, which happen when they are full of moiſture; and this clearly explains the account of all the great damages done by the ſevere froſts being on the ſouth ſide of the trees which are affected by them, tho' that ſide has been plainly all the while leſs cold than the north. Great damage is alſo done to the weſtern ſides of trees and plantations, when after a rain with a weſt wind the wind turns about to the north at ſun-ſet, as is frequently the caſe in ſpring, or when an eaſt wind blows upon a thick fog before ſun-riſing.

FUCUS, in botany, a genus of the order of algæ, belonging to the cryptogamia claſs of plants. The moſt remarkable ſpecies are,

1. The ſerratus, ſerrated fucus, or ſea-wrack. This is frequent at all ſeaſons of the year upon the rocks at low-water mark, but produces its ſeeds in July and Auguſt. It conſiſts of a flat, radical, and dichotomous leaf, about two feet long; the branches half an inch wide, ſerrated on the edges with dents of unequal ſize, and at unequal diſtances, having a flat-ſtalk or rib divided like the leaf, and running in the middle of it through all its various ramifications. A ſmall ſpecies of coralline, called by Linnæus *Sertularia pumila*, frequently creeps along the leaf. All the ſpecies of fucus afford a quantity of impure alkaline ſalt; but this much leſs than ſome others, eight ounces of the aſhes yielding only three of fixed ſalt. The Dutch cover their crabs and lobſters with this fucus to keep them alive and moiſt; and prefer it to any other, as being deſtitute of thoſe mucous veſicles with which ſome of the reſt abound, and which would ſooner ferment and become putrid.

2. The veſiculoſus, bladder fucus, common ſea-wrack, or ſea-ware. It grows in great abundance on the ſea-rocks about low-water mark; producing its fructifications in July and Auguſt. It has the ſame habit, colour, and ſub-

ſtance

6. The ſaccharinus, ſweet fucus, or ſea-belt, is very common on the ſea-coaſt. The ſubſtance of this is cartilaginous and leathern; and the leaf is quite ribleſs. By theſe characters it is diſtinguiſhed from the preceding, to which it is nearly allied. It conſiſts only of one ſimple, linear, elliptic leaf, of a tawney green colour, about five feet long, and three inches wide, in its full-grown ſtate; but varies ſo exceedingly as to be found from a foot to four yards in length. The ordinary length of the ſtalk is two inches, but it varies even to a foot. The root is compoſed of branched fibres, which adhere to the ſtones like claws. This plant is often infeſted with the ſertularia ciliata.

The inhabitants of Iceland make a kind of pottage of this fucus; boiling it in milk, and eating it with a ſpoon. They alſo ſoak it in freſh water, dry it in the ſun, and then lay it up in wooden veſſels, where in a ſhort time it is covered with a white effloreſcence of ſea-ſalt, which has a ſweet taſte like ſugar. This they eat with butter; but if taken in too great a quantity, the ſalt is apt to irritate the bowels and bring on a purging. Their cattle feed and get fat upon this plant, both in its recent and dry ſtate; but their fleſh acquires a bad flavour. It is ſometimes eaten by the common people on the coaſt of England, being boiled as a pot-herb.

6. The ciliatus, ciliated, or ligulated fucus, is found on the ſhores of Jona and other places, but is not common. The colour of this is red, the ſubſtance membranous and pellucid, without rib or nerve; the ordinary height of the whole plant about four or five inches. It is variable in its appearance, according to the different ſtages of its growth. This fucus is eaten by the Scotch and Iriſh promiſcuouſly with the fucus palmatus or dilſe.

7. The prolifer, or proliferous fucus, is found on the ſhores of the weſtern coaſt, adhering to ſhells and ſtones. The colour is red; the ſubſtance membranaceous, but tough, and ſomewhat cartilaginous, without rib or nerve, though thicker in the middle than at the edges. The whole length of the plant is about four or five inches, the breadth of each leaf about a quarter of an inch. The growth of this fucus, when examined with attention, appears to be extremely ſingular and wonderful. It takes its origin either from a ſimple, entire, narrow, elliptic leaf, about an inch and a half long; or from a dilated forked one, of the ſame length. Near the extremity of the elliptic leaf, or the points of the forked one, (but out of the ſurface, and not the edge), ariſes one or more elliptic or forked leaves, which produce other ſimilar ones, in the ſame manner, near the ſummits; and ſo on continually one or more leaves from near the ends of each other, in a proliferous and dichotomous order, to the top of the plant; which in the manner of its growth reſembles in a good meaſure the cactus opuntia, or flat-leaved Indian fig. Sometimes two or three leaves, or more, grow out of the middle of the diſc of another leaf; but this is not the common order of their growth. The fructifications are red, ſpherical, rough warts, leſs than the ſmalleſt pin's head, ſcattered without order on the ſurface of the leaves. Theſe warts, when highly magnified, appear to be the curled rudiments of young leaves; which in due time either drop off and form new plants, or continue on and germinate upon the parent. This plant is very much infeſted with the fluſtra piloſa, the madrepora verrucaria, and other corallines, which make it appear as if covered with white ſcabs.

8. The pinnatifidus, jagged fucus, or pepper-dilſe, is frequent on ſea-rocks which are covered by the tides, both on the eaſtern and weſtern coaſts. It is of a yellow olive-colour, often tinged with red. The ſubſtance is cartilaginous, but yet tender and tranſparent; the height about two or three inches. This fucus has a hot taſte in the mouth, and is therefore called *pepper-dilſe* by the people in Scotland, who frequently eat it as a ſalad in the ſame manner they do the fucus palmatus.

9. The plocamium, or pectinated fucus, is frequent on the ſea-rocks, and in baſins of water left by the receſs of the tides. Its natural colour is a moſt beautiful bright red or purple, but is often variegated with white or yellow. Its ſubſtance is cartilaginous, but extremely thin, delicate, and tranſparent. Its height commonly about three or four inches. The ſtalk is compreſſed, about half a line in diameter, erect, but waved in its growth, and divided almoſt from the baſe into many widely expanded branches. Theſe primary branches are very long, alternate, exactly like the ſtalk, and ſubdivided into alternate ſecondary branches, which are again frequently compounded in like manner, and theſe diviſions decorated with ſubulated teeth growing in alternate rows, curiouſly pectinated or finely toothed on the upper ſide like a comb, the ſmalleſt of theſe teeth ſcarcely viſible to the naked eye. The fructifications are minute ſpherical capſules, or ſmooth dark-red globules, ſcattered without order on the ſides of the branches; generally ſeſſile, but ſome few of them ſupported on ſhort peduncles. This fucus, on account of its elegant colours and fine diviſions, is the ſpecies moſt admired by the ladies who are fond of pictures and mimic landſcapes compoſed of marine vegetables.

10. The filum, thread-fucus, or ſea-laces, is found on the ſea-rocks, and waving under the water like long ſtrings, frequent on many parts of the coaſt. The ſubſtance of this is opaque and cartilaginous, but not difficult to be broken. The colour, when recent, a dull olive-green; when dry, fuſcous, or nearly black; and when expoſed for ſome time on the ſhores to the ſun and air, it becomes yellow, ſtraw-coloured, or white. It conſiſts only of a ſimple, unbranched, naked, cylindrical ſtalk, three or four yards long, more or leſs, from the ſize of a large fiddle-ſtring to that of a thick whip-cord; ſmalleſt at the baſe and ſummit; ſmooth on the outſide, full of mucus within; often twiſted, and always intercepted by numerous tranſverſe diaphragms, viſible when the plant is held between the eye and the light. The fructifications have not yet been diſcovered; but from the tranſverſe ſepta in its ſtructure, it is reaſonable to ſuppoſe this plant to belong rather to the genus of conferva than that of fucus. The ſtalks, ſkinned when half dry and twiſted, acquire ſo conſiderable a degree of ſtrength and toughneſs, that we were informed the Highlanders ſometimes uſed them for the ſame intentions as Indian graſs.

11. The giganteus, or gigantic fucus, is a native of the Straits Le Maire; and grows on rocky ground, which in thoſe countries is diſtinguiſhed from ſand or

ſtance as the foregoing; but differs from it in the following reſpects: The edges of the leaf have no ſerratures, but are quite entire. In the diſc or ſurface are immerſed hollow, ſpherical, or oval air-bladders, hairy within, growing generally in pairs, but often ſingle in the angles of the branches, which are moſt probably air-bladders, deſtined to buoy up the plant in the water. Laſtly, on the ſummits or extreme ſegments of the leaves, appear tumid veſicles about three quarters of an inch long, ſometimes oval and in pairs, ſometimes ſingle and bifid, with a clear viſcid mucus interſperſed with downy hairs.—This ſpecies is an excellent manure for land; for which purpoſe it is often applied in the maritime parts of Scotland and other countries. In the iſlands of Jura and Skye it frequently ſerves as a winter-food for cattle, which regularly come down to the ſhores at the receſs of the tides to ſeek for it. And ſometimes even the ſtags have been obſerved, after a ſtorm, to deſcend from the mountains to the ſea-ſides to feed upon this plant.

Linnæus informs us, that the inhabitants of Gothland in Sweden boil this fucus in water, and mixing therewith a little coarſe meal or flour feed their hogs with it; for which reaſon they call the plant *ſwintang*. And in Scania, he ſays, the poor people cover their cottages with it, and ſometimes uſe it for fuel.

In Jura, and ſome other of the Hebrides, the inhabitants dry their cheeſes without ſalt, by covering them with the aſhes of this plant; which abounds with ſuch quantity of ſalts, that from five ounces of the aſhes may be procured two ounces and a half of fixed alkaline ſalts, that is, half of their whole weight.

But the moſt beneficial uſe to which the fucus veſiculoſus is applied, in the way of œconomy, is in making pot-aſh or kelp, a work much practiſed in the weſtern iſles.

There is great difference in the goodneſs and price of this commodity, and much care and ſkill required in properly making it. That is eſteemed the beſt which is hardeſt, fineſt grain'd, and free from ſand or earth. The price of kelp in Jura is 3 l. 10 s. *per* ton, and about 40 or 50 tons are exported annually from that iſland. So great a value is ſet upon this fucus by the inhabitants of that place, that they have ſometimes thought it worth their while to roll fragments of rocks and huge ſtones into the ſea, in order to invite the growth of it.

Its virtues in the medical way have been much celebrated by Dr Ruſſel, in his Diſſertation concerning the uſe of Sea-water in the Diſeaſes of the Glands. He found the ſaponaceous liquor or mucus in the veſicles of this plant to be an excellent reſolvent, extremely ſerviceable in diſperſing all ſcorbutic and ſcrophulous ſwellings of the glands. He recommends the patient to rub the tumour with theſe veſicles bruis'd in his hand, till the mucus has thoroughly penetrated the part, and afterwards to waſh with ſea-water. Or otherwiſe, to gather two pounds of the tumid veſicles, in the month of July, when they are full of mucus, and infuſe them in a quart of ſea-water, in a glaſs-veſſel, for the ſpace of 15 days, when the liquor will have acquired nearly the conſiſtence of honey. Then ſtrain it off through a linen cloth, and rub this liquor with the hand, as before, three or four times a-day upon any hard or ſcrophulous ſwellings, waſhing, the parts afterwards with ſea-water, and nothing can be more efficacious to diſperſe them. Even ſcirrhoſities, he ſays, in women's breaſts, have been diſpelled by this treatment.

The ſame author, by calcining the plant in the open air, made a very black ſalt powder, which he called *vegetable æthiops*; a medicine much in uſe as a reſolvent and deobſtruent, and recommended alſo as an excellent dentrifice, to correct the ſcorbutic laxity of the gums, and take off the foulneſs of the teeth.

3. The plicatus, matted, or Indian-graſs fucus, grows on the ſea-ſhores in many places both of Scotland and England. It is generally about three or four, but ſometimes ſix inches long. Its colour, after being expoſed to the ſun and air, yellowiſh, or auburn. Its ſubſtance pellucid, tough, and horny, ſo as to bear a ſtrong reſemblance to what the anglers call *Indian graſs*, that is, the tendrils iſſuing from the ovary of the dog-fiſh.

4. The palmatus, palmated, or ſweet fucus, commonly called *dulſe*, or *dilſe*. This grows plentifully on the ſea-coaſts of Scotland, and the adjoining iſlands. Its ſubſtance is membranaceous, thin, and pellucid; the colour red, ſometimes green with a little mixture of red; its length generally about five or ſix inches, but varies from three inches to a foot; its manner of growth fan-ſhaped, or gradually dilated from the baſe upwards. Its diviſions extremely various. The inhabitants both of Scotland and England take pleaſure in eating this plant, without expecting any medical virtues from it. The inhabitants of the Archipelago alſo are fond of this plant, as we learn from Steller. They ſometimes eat it raw, but eſteem it moſt when added to ragouts, oglios, &c. to which it gives a red colour; and, diſſolving, renders them thick and gelatinous. In the Iſle of Skye it is ſometimes uſed in fevers to promote a ſweat, being boiled in water with the addition of a little butter. In this manner it alſo frequently purges. The dried leaves, infuſed in water, exhale the ſcent of violets.

5. The eſculentus, eatable fucus, or bladder-locks, commonly called *tangle* in Scotland, is likewiſe a native of the Britiſh ſhores. It is commonly about four feet long, and ſeven or eight inches wide, but is ſometimes found three yards or more in length, and a foot in width. Small ſpecimens are not above a cubit long, and two inches broad. The ſubſtance is thin, membranaceous, and pellucid; the colour green or olive. The root conſiſts of tough, cartilaginous fibres. The ſtalk is about ſix inches long, and half an inch wide, nearly ſquare, and pinnated in the middle, between the root and origin of the leaf, with ten or a dozen pair of thick, cartilaginous, oval-obtuſe, foliaceous ligaments, each about two inches long, and crowded together. The leaf is of an oval-lanceolate, or long elliptic form, ſimple and undivided, waved on the edges, and widely ribbed in the middle from bottom to top, the ſtalk running through its whole length, and ſtanding out on both ſides of the leaf. This fucus is eaten in the north both by men and cattle. Its proper ſeaſon is in the month of September, when it is in greateſt perfection. The membranous part is rejected, and the ſtalk only is eaten. It is recommended in the diſorder called a *pica*, to ſtrengthen the ſtomach and reſtore the appetite.

ooze by the enormous length of the ſea-weeds that grow upon it. The leaves are four feet long, and ſome of the ſtalks, though not thicker than a man's thumb, are 120. Mr Banks and Dr Solander ſounded over ſome of them which were 84 feet long; and as they made a very acute angle with the bottom, they were thought to be at leaſt one half longer.

FULGORA, in zoology, a genus of inſects belonging to the order of hemiptera; the characters of which are. The front, or fore-part of the head, is drawn extended and empty. The antennæ are ſeated below the eyes, having two articulations, whereof the exterior is larger, and of a globular form. The roſtrum is inflected, or bent inwards under the body. The feet are made for walking. There are nine ſpecies, the moſt remarkable of which is the lanternaria. See LANTERN-FLY, (*Encycl.*) and Plate CCCXIII.

FUNGI, (*Encycl.*) The piperatus, or pepper-agaric, though the moſt acrid and ſuſpicious of the whole tribe, is eaten in great quantities by the Ruſſians. They fill large veſſels with them in the autumn, ſeaſon or pickle them with ſalt, and eat them in the enſuing Lent. But as the free uſe of theſe and others of the genus has frequently been attended with fatal conſequences, it may not be amiſs in this place, once for all, to admoniſh the reader of the general nature and dangerous qualities of them; which we cannot do better than in the words of the great and ingenious Haller. "All fungi are crude in their nature, of ſpeedy growth and ſudden decay. They ſpring up, arrive at maturity, and periſh in a few days, moſt of them diſſolving away in a black corrupted liquor, of a fetid nauſeous ſmell. They are the food of ſnails, beetles, flies, maggots, and the nidus where they depoſit their young.

"The Ruſſians indeed devour almoſt every ſpecies, even thoſe which other nations eſteem the moſt poiſonous; ſuch as the agaricus muſcarius, piperatus, &c.; but all of them are a doubtful and ſuſpicious food, and the moſt innocent have proved ſometimes prejudicial.

"By analyſis it is found, that ſeven parts of eight in their compoſition are watery. They yield by fire a yellow ſpirit like hartſhorn, a yellow empyreumatic oil, and a dry, volatile, cryſtalline ſalt; ſo that their nature is evidently alkaline, extremely prone to corruption.

"Their fibres are tough and very difficult to digeſt, ſwelling in the ſtomach like a ſponge; ſo that there are inſtances of their remaining undigeſted for three days before their bad effects have appeared. The maladies they occaſion are, a ſwelling of the abdomen, reſtleſſneſs, heartburns, vomitings, colics, difficult breathings, hiccoughs, melancholy, diarrhœas accompanied with a teneſmus, and gangrenes. To which dreadful complaints the acrimonious quality of ſome fungi bring on, beſides, inflammations in the mouth, with bloody lotions and bloody ſtools. Laſtly, it is certain that ſome ſpecies have an intoxicating quality, followed often by deliriums, tremblings, watchings, faintings, apoplexies, cold ſweats, and death itſelf. Some have fancied that ſkilful cookery would deprive them of their bad effects, and that oils would ſheath their noxious qualities; but theſe are fatal deceits, not to be truſted.

"To perſons ſuffering from eating any ſpecies of fungi, the moſt approved and ſpeedy remedy is to uſe emetics and cathartics."

FURIA, in zoology, a genus of inſects belonging to the order of vermes zoophyta. There is but one ſpecies, viz. the infernalis. This has a linear ſmooth body ciliated on each ſide, with reflexed feelers preſſed to its body. In Finland, Bothnia, and the northern provinces of Sweden, it was not unfrequently that people were ſeized with a pungent pain, confined to a point, in the hand or other expoſed part of the body, which preſently increaſed to a moſt excruciating degree, and hath ſometimes been ſuddenly fatal. This diſorder was more particularly obſerved in Finland, eſpecially about boggy and marſhy places, and always in autumn. At length it was diſcovered that this pain inſtantly ſucceeded ſomewhat that dropped out of the air, and in a moment penetrated and buried itſelf in the fleſh. The Finlanders had tried variety of applications to no purpoſe, until at length a poultice of curds or cheeſe was found the moſt effectual in eaſing the pain: and the event confirmed that the inſect was allured by this application to leave the fleſh; as, on its removal, this worm, no longer than the ſixth of an inch, was found in it, and thus the cauſe of this painful diſeaſe explained. But by what means this creature is raiſed into the air, is as yet unknown.

FUST, (*Encycl.*) Line 5. for 1460, read 1443; and line 67. for "their types were cut in wood and fixed, not moveable as at preſent;" read "they uſed ſeparate wooden types, or cut metal types, of which Guttemberg was the inventor." See *Hiſtory of* PRINTING, (*Encycl.*)

G.

GAELIC LANGUAGE. For *See* GAELIC *in Appendix*, read *See* HIGHLANDS.

GARDENS (HANGING), in antiquity, gardens raiſed on arches by Nebuchadnezzar king of Babylon, in order to gratify his wife Amyctis, daughter of Aſtyages king of Media. Q. Curtius makes them equal in height to the walls of the city, viz. 50 feet. They contained a ſquare of 400 feet on every ſide, and were carried up into the air in ſeveral terraſſes laid above one another, and the aſcent from terraſs to terraſs was by ſtairs 10 feet wide. The arches ſuſtaining the whole pile were raiſed above one another, and it was ſtrengthened by a wall, ſurrounding it on every ſide, of 22 feet in thickneſs. The floors of each of the terraſſes were laid in the following manner: on the top of the arches were firſt laid large flat ſtones 16 feet long and 4 broad, and over them was a layer of reed mixed with a great quantity of bitumen, over which were two rows of bricks cloſely cemented together by plaſter, and over all were laid thick ſheets of lead; and laſtly, upon the lead was laid the mould of the garden. The mould or earth was of ſuch a depth as to admit the largeſt trees to take root and grow; and it was covered with various kinds of trees, plants, and flowers. In the upper terraſs there was an aqueduct or engine, whereby water was drawn up out of the river for watering the whole garden.

GAS, (*Encycl.*) The compoſition of aerial vapours or gaſes, is a ſubject which has drawn the attention of the curious, though little can be known with preciſion. What can be known with any degree of probability is drawn entirely from the effects of latent heat upon terreſtrial bodies. By means of this element almoſt all ſubſtances become for a time aeriform; and if they do not conſtantly remain ſo, it is becauſe of their inability to abſorb the heat in a permanent manner. From analogy, however, we muſt be apt to conclude, that thoſe aerial fluids which continue permanently elaſtic are formed in like manner by the union of a vaſt quantity of latent heat with ſome ſmall portion of terreſtrial matter, in ſuch a manner that they cannot afterwards be ſeparated, at leaſt ſo eaſily as the latent heat of mere aqueous or other vapours is abſorbed. This will be in ſome meaſure confirmed by the two following conſiderations. 1. There is no kind of aerial vapour which does not expand by heat to a very great degree. Terreſtrial bodies, whoſe texture is cloſe and compact, expand but little by heat. Theſe, we know, are formed of a great quantity of inactive matter, together with a very fine inviſible fluid with which their pores are filled. The expanſion probably takes place by means of an agitation in this fluid excited by heat. Air is exceedingly expanſible; whence its terreſtrial particles are probably few in number, while the quantity of fluid interpoſed betwixt them is very great. 2. All kinds of air ſeem to be produced from ſome terreſtrial matter and heat, at leaſt heat in ſome way or other ſeems to be concerned in the formation of all that are yet known. In the firſt proceſs publiſhed by Dr Prieſtley for making dephlogiſticated air, a violent heat was employed. Oil of vitriol poured on red-lead was afterwards found to yield dephlogiſticated air alſo: but the red-lead had been previouſly ſubjected to a ſtrong heat; and, even in the very act of producing the air, a great degree of heat is ſpontaneouſly generated. In the natural proceſſes for producing dephlogiſticated air, the *light* of the ſun, and conſequently his heat, in ſome degree is neceſſary for its formation. Beſides, all the different airs or gaſes we know, fixed air, inflammable, nitrous, marine acid, vitriolic acid, fluor acid, vegetable acid, phlogiſticated airs, &c. are every one of them produced from terreſtrial materials. In theſe materials we know that an inviſible fluid, the ſame with elementary heat or fire, is continually acting; whence it is exceedingly probable that all of theſe vapours are nothing elſe than combinations of the two.

GAUBIUS (Hieronymus David), a celebrated phyſician of Holland, ſtudied under the illuſtrious Boerhaave; and became ſo much the favourite of his profeſſor, that he reſigned the chemical chair in his favour. He taught at Leyden with great applauſe for 40 years. In the year 1775 he laid down his office, as being no longer able to ſupport the fatigues of it. He was ſucceeded by John David Hahn, then profeſſor at Utrecht. His reputation was extended all over Europe by ſeveral valuable publications, particularly by his *Inſtitutiones Pathologiæ Medicinalis*, and his *Adverſaria*, which have contributed not a little to the improvement both of the theory and practice of medicine. He died at Leyden 29th November 1780, in the 76th year of his age.

GENERATION OF INSECTS. The world is now generally convinced, that inſects are not bred of corruption, but *ex ovo;* though the contrary was believed by the ancients, becauſe of the vaſt numbers that were ſometimes hatched, as it were at once, and becauſe they could not diſcern the particular manner of their propagation.

Malpighi, Swammerdam, and Redi, have abundantly diſproved the doctrine of equivocal generation, as well as the chimerical transformation of the caterpillar into the butterfly, and other the like metamorphoſes; and have ſhown, that all the members of the butterfly were originally incloſed under the ſkin or nympha of the caterpillar, as the parts of a plant are in the ſeed.

Inſects take particular care to depoſit their eggs or ſeed in ſuch places where they may have a ſufficient incubation, and where the young, when hatched, may have the benefit of proper food till they become able to ſhift for themſelves. Thoſe whoſe food is in the water, lay their eggs in the water; thoſe to whom fleſh is a proper food, in fleſh; and thoſe to whom the fruits or leaves of vegetables are food, are accordingly depoſited, ſome in this fruit, ſome in that tree, and ſome in one plant, and ſome in another; but conſtantly the ſame kind in the ſame tree or plant. As for others that require a more conſtant and greater degree of warmth, they are provided by the parent animal with ſome place in or about the body of other animals; ſome in the feathers of birds, ſome in the hair of beaſts; ſome in the ſcales of fiſhes, ſome in the noſe, ſome in the fleſh, nay, ſome in the bowels and inmoſt receſſes of man and other creatures. And as for others, to whom none of thoſe methods are proper, the parents make them neſts by perforation in the earth, in woods, in combs, and the like; carrying in and ſealing up proviſions that ſerve both for the production of their young, and for their food, when produced. In flies, butterflies, &c. it is obſerved, there is a kind of gluten, by which the female faſtens her eggs to the bearing buds of trees, &c. ſo that the rains cannot waſh them off. Theſe eggs will not be hurt by the greateſt froſt.

GENTOOS, in modern hiſtory, according to the common acceptation of the term, denote the profeſſors of the religion of the bramins or brachmans, who inhabit the country called *Hindoſtan*, in the Eaſt Indies, from the word *ſtan*, a "region," and *hind* or *hindoo;* which Feriſhteh, as we learn from colonel Dow's tranſlation of his hiſtory, ſuppoſes to have been a ſon of Ham the ſon of Noah. It is obſerved, however, that Hindoo is not the name by which the inhabitants originally ſtyled themſelves; but, according to the idiom of the *ſchanſcrit* which they uſe, *jumbodeep*, from *jumboo*, a "jackall," an animal common in their country; and *deep*, a large portion of land ſurrounded by the ſea; or *bhertekhunt*, from *khunt*, i. e. a "continent," and *bherrhut*, the name of one of the firſt Indian rajahs. It is alſo to be obſerved, that they have aſſumed the name of Hindoos only ſince the æra of the Tartar government, to diſtinguiſh themſelves from their conquerors the Muſſulmen. The term *Gentoo* or *Gent*, in the Shanſcrit dialect, denotes *animal* in general, and in its more confined ſenſe *mankind*, and is never appropriated particularly to ſuch as follow the doctrines of Brhima. Theſe are divided into four great tribes, each of which has its own ſeparate appellation; but they have no common or collective term that comprehends the whole nation under the idea affixed by the Europeans to the word *Gentoo*. Mr Halhed, in the preface to his tranſlation of the Code of Gentoo Laws, conjectures, that the Portugueſe, on their firſt arrival in India, hearing the word frequently in the mouths of the natives, as applied to mankind in general, might adopt it for the domeſtic appellation of the Indians themſelves, or perhaps their bigotry might force from the word *Gentoo* a fanciful alluſion to Gentile or Pagan. The Hindoos, or Gentoos, vie with the Chineſe as to the antiquity of their nation. They reckon the duration of the world by four jogues, or diſtinct ages: the firſt is the Suttee jogue, or age of purity, which is ſaid to have laſted about 3,200,000 years; during which the life of man was 100,000 years, and his ſtature 21 cubits: the ſecond, the Tirtah jogue, or the age in which one-third of mankind were reprobate; which conſiſted of 2,400,000 years, when men lived to the age of 10,000 years: the third, the Dwapar jogue, in which half of the human race became depraved; which endured to 600,000 years, when mens lives were reduced to 1000 years: and fourthly, the Collee jogue, in which all mankind were corrupted, or rather diminiſhed, which the word *collec* imports. This is the preſent æra, which they ſuppoſe will ſubſiſt for 400,000 years, of which near 5000 are already paſt; and man's life in this period is limited to 100 years. It is ſuppoſed by many authors, that moſt of the Gentoo *ſhaſters*, or ſcriptures, were compoſed about the beginning of the collee jogue: but an objection occurs againſt this ſuppoſition, viz. that the ſhaſters take no notice of the deluge; to which the bramins reply, that all their ſcriptures were written before the time of Noah, and the deluge never extended to Hindoſtan. Nevertheleſs, it appears from the ſhaſters themſelves, that they claim a much higher antiquity than this; inſtances of which are recited by Mr Halhed.

The doctrine of tranſmigration is one of the diſtinguiſhing tenets of the Gentoos. With regard to this ſubject, it is their opinion, according to Mr Holwell, that thoſe ſouls which have attained to a certain degree of purity, either by the innocence of their manners or the ſeverity of their mortifications, are removed to regions of happineſs proportioned to their reſpective merits; but that thoſe who cannot ſo far ſurmount the prevalence of bad example, and the powerful degeneracy of the times, as to deſerve ſuch a promotion, are condemned to undergo continual puniſhment in the animation of ſucceſſive animal-forms, until, at the ſtated period, another renovation of the four jogues ſhall commence, upon the diſſolution of the preſent. They imagine ſix different ſpheres above this earth; the higheſt of which, called *ſuttee*, is the reſidence of Brhima and his particular favourites. This ſphere is alſo the habitation of thoſe men who never uttered a falſehood, and of thoſe women who have voluntarily burned themſelves with their huſbands; the propriety of which practice is expreſsly enjoined in the code of the Gentoo laws. This code, printed by the Eaſt-India Company in 1776, is a very curious collection of Hindoo juriſprudence, which was ſelected by the moſt experienced pundits or lawyers, from curious originals in the Shanſcrit language, who were employed for this purpoſe from May 1773 to February 1775; afterwards tranſlated into the Perſian idiom, and then into the Engliſh language, by Mr Halhed.

The ſeveral inſtitutes contained in this collection are interwoven with the religion of the Gentoos, and revered as of the higheſt authority. The curious reader will diſcover an aſtoniſhing ſimilarity between the inſtitutes of this code and many of the ordinances of the Jewiſh law; between the character of the bramins or prieſts, and the Levites; and between the ceremony of the ſcape-goat under the Moſaic diſpenſation, and a Gentoo ceremony called the *aſhummed jug*, in which a horſe anſwers the purpoſe of the goat. Many obſolete cuſtoms and uſages alluded to in many parts of the Old Teſtament, may alſo receive illuſtration from the inſtitutes of this code. It appears from the code, that the bramins, who are the prieſts and legiſlators of the country, have reſigned all the ſecular and executive power into the hands of another caſt or tribe; and no bramin has been properly capable of the magiſtracy ſince the time of the ſuttee jogue. The only privilege of importance which they have appropriated to themſelves, is an exemption from all capital puniſhment: they may be degraded, branded, impriſoned for life, or ſent into perpetual exile; but it is every where expreſsly ordained, that a bramin ſhall not be put to death on any account whatſoever.

We have already obſerved, that the Hindoos are divided into four great and original tribes, which, according to the Gentoo theology, proceeded from the four different members of Brhima, the ſuppoſed immediate agent of the creation under the ſpirit of the Almighty. Theſe tribes are the bramins, which proceeded from his mouth, and whoſe office is to pray, read, and inſtruct; the Chehteree, which proceed from his arms, whoſe office is to draw the bow, to fight, and to govern; the Bice, proceeding from the belly or thighs, who are to provide the neceſſaries of life by agriculture and traffic; and the Sooder, from the feet, which are ordained to labour, ſerve, and travel.

Few Chriſtians, ſays the tranſlator of the Gentoo code, have expreſſed themſelves with a more becoming reverence of the grand and impartial deſigns of Providence in all its works, or with a more extenſive charity towards all their fellow-creatures of every profeſſion, than the Gentoos. It is indeed an article of faith among the bramins, that God's all-merciful power would not have permitted ſuch a number of different religions, if he had not found a pleaſure in beholding their varieties.

GEOFFRŒA, in botany, a genus of the decandria order, belonging to the diadelphia claſs of plants. There is only one ſpecies, viz. the cabbage-bark tree. The wood of this tree is uſed in building; but it is chiefly valued for its bark, which is adminiſtered in different forms, viz. in decoctions, ſyrup, powder, and extract, as an anthelmintic medicine. From this medical property it is alſo called the *worm-bark tree*. The decoction made by boiling an ounce of the bark in a quart of water, is moſtly uſed in Jamaica; and it ſeldom fails to perform every thing that can be expected from an anthelmintic medicine, by deſtroying worms in the inteſtines, and bringing them away in great quantities. This bark is externally of a grey colour, and internally black and furrowed; its taſte, when freſh, is mucilaginous and ſweet; and its ſmell, which it retains in the decoction, diſagreeable. Dr Wright of Jamaica recommends it as a very valuable remedy.

GEOGRAPHY. At n° 33. dele *Plate CXVI. fig.* 2. on the margin; and at the end of the ſection add, "See Plate XLVIII. fig. 2. and Astronomy, p. 802."

GILLICRANKY. See Killicranky, (*Encycl.*)

GLOSSOPETRA, or glottopetra, in natural hiſtory, a kind of extraneous foſſil, ſomewhat in form of a ſerpent's tongue; frequently found in the iſland of Malta, and divers other parts. See Plate CCCXVII.

The vulgar notion is, that they are the tongues of ſerpents petrified; and hence their name, which is a compound of γλωσσα, "tongue," and πετρα, "ſtone." Hence alſo their traditionary virtue in curing the bites of ſerpents. The general opinion of naturaliſts is, that they are the teeth of fiſhes, left at land by the waters of the deluge, and ſince petrified.

The ſeveral ſizes of the teeth of the ſame ſpecies, and thoſe of the ſeveral different ſpecies of ſharks, afford a vaſt variety of theſe foſſil ſubſtances. Their uſual colours are black, blueiſh, whitiſh, yellowiſh, or brown; and in ſhape they uſually approach to a triangular figure. Some of them are ſimple; others are tricuſpidate, having a ſmall point on each ſide of the large one: many of them are quite ſtraight; but they are frequently found crooked, and bent in all directions; many of them are ſerrated on their edges, and others have them plain; ſome are undulated on their edges, and ſlightly ſerrated on theſe undulations. They differ alſo in ſize as much as in figure; the larger being four or five inches long, and the ſmaller leſs than a quarter of an inch.

They are moſt uſually found with us in the ſtrata of blue clay, though ſometimes alſo in other ſubſtances, and are frequent in the clay pits of Richmond and other places. They are very frequent alſo in Germany, but nowhere ſo plentiful as in the iſland of Malta.

The Germans attribute many virtues to theſe foſſil teeth; they call them cordials, ſudorifics, and alexipharmics: and the people of Malta, where they are extremely plentiful, hang them about their childrens necks to promote dentition. They may poſſibly be of as much ſervice this way as an anodyne necklace; and if ſuſpended in ſuch a manner that the child can get them to its mouth, may, by their hardneſs and ſmoothneſs, be of the ſame uſe as a piece of coral.

GNAT, (*Encycl.*) Line 1. for *See* Musca, read "*See* Culex in the Appendix."

GORDON (Alexander), an excellent draughtſman, and a good Grecian, who reſided many years in Italy, viſited moſt parts of that country, and had alſo travelled into France, Germany, &c. was ſecretary to the Society for Encouragement of Learning; and afterwards to the Egyptian Club, compoſed of gentlemen who had viſited Egypt (viz. lord Sandwich, Dr Shaw, Dr Pococke, &c.) He ſucceeded Dr Stukely as ſecretary to the Antiquarian Society, which office he reſigned in 1741 to Mr Joſeph Ames. He went to Carolina with governor Glen, where, beſides a grant of land, he had ſeveral offices, ſuch as regiſter of the province, &c.; and died a juſtice of the peace, leaving a handſome eſtate to his family. He publiſhed, 1. "Itinerarium Septentrionale, or a Journey through moſt parts of the Counties of Scotland, in two parts, with 66 copperplates, Lond. 1726," folio. 2. "Additions and Corrections, by way of Supplement, to the Itinerarium Septentrionale; containing ſeveral Diſſertations on, and Deſcriptions of, Roman Antiquities, diſcovered in Scotland ſince publiſhing the ſaid Itinerary. Together with Obſervations on other ancient Monuments found in the North of England, never before publiſhed. Lond. 1732," folio. 3. "The Lives of Pope Alexander VI. and his ſon Cæſar Borgia, comprehending the wars in the reign of Charles VIII. and Lewis XII. kings of France; and the chief Tranſactions and Revolutions in Italy, from the year 1492 to the year 1516. 4. "A complete Hiſtory of the ancient Amphitheatres, more particularly regarding the Architecture of theſe Buildings, and in particular that of Verona, by the marquis Scipio Maffei; tranſlated from the Italian, 1730," 8vo. afterwards enlarged in a ſecond edition. 5. "An Eſſay towards explaining the hieroglyphical figures on the Coffin of the ancient Mummy belonging to Captain William Lethieuller. Lond. 1737," folio, with cuts. 6. "Twenty-five plates of all the Egyptian Mummies, and other Egyptian Antiquities in England," about 1739, folio.

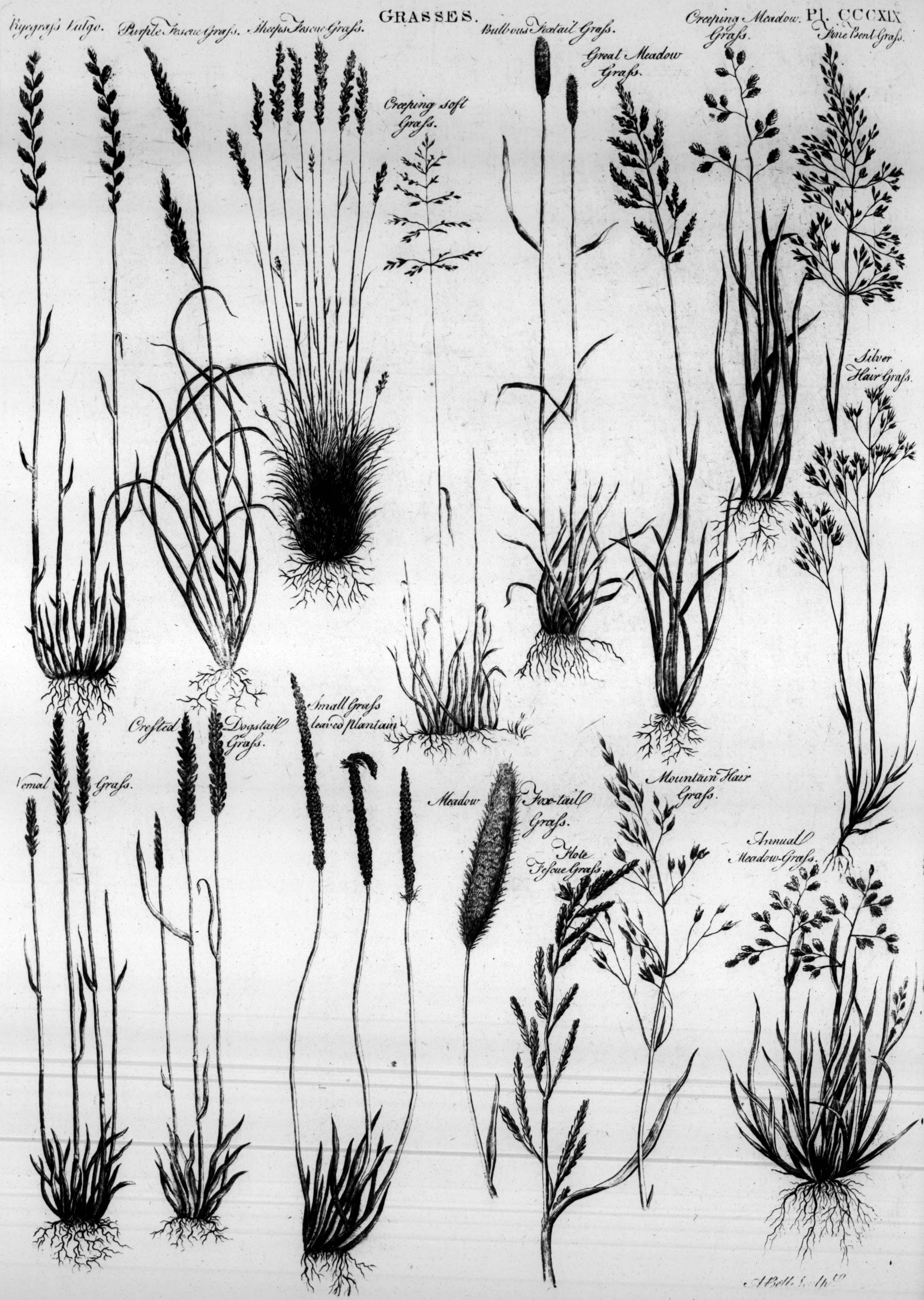
GORDONIA, loblolly bay, a genus of the polyandria order, belonging to the monodelphia claſs of plants. This is a tall and very ſtraight tree, with a regular pyramidal head. Its leaves are ſhaped like thoſe of the common bay, but ſerrated. It begins to bloſſom in May, and continues bringing forth its flowers the greateſt part of the ſummer. The flowers are fixed to foot-ſtalks, four or five inches long; are monopetalous, divided into five ſegments, encompaſſing a tuft of ſtamina headed with yellow apices; which flowers, in November, are ſucceeded by a conic capſula having a divided calix. The capſula, when ripe, opens, and divides into five ſections, diſcloſing many ſmall half-winged ſeeds. This tree retains its leaves all the year, and grows only in wet places, and uſually in water. The wood is ſomewhat ſoft; yet Mr Cateſby mentions his having ſeen ſome beautiful tables made of it. It grows in Carolina, but not in any of the more northern colonies.

GORGONIA, in natural hiſtory, a name given by ſome writers to coral, on occaſion of its ſuppoſed change from a ſoft ſubſtance to an abſolute ſtone, on being brought out of the water into the air: but this is known now to be a fabulous opinion, coral being as hard while growing to the rocks as when it has been ever ſo long out of the ſea.

The gorgoniæ are a genus of zoophytes, which formerly were called *ceratophytons*, and are known in Engliſh by the names of *ſea-fans*, *ſea-feathers*, and *ſea-whips*. Dr Linnæus and Dr Pallas conſider them as of a mixed nature in their growth, between animals and vegetables; but Mr Ellis has clearly proved that they are true animals of the polype kind, growing up in a branched form reſembling a ſhrub, and in no part vegetable. They differ from the freſh-water polype

3 MA 53

GRASSES.


Rygraſs Vulgo.
Purple Feſcue Graſs.
Sheeps Feſcue Graſs.
Bulbous Foxtail Graſs.
Creeping Meadow Graſs.
Fine Bent Graſs.
Great Meadow Graſs.
Creeping soft Graſs.
Silver Hair Graſs.
Creſted Dogstail Graſs.
Small Graſs leaved plantain
Vernal Graſs.
Meadow Fox-tail Graſs.
Mountain Hair Graſs.
Flote Feſcue Graſs.
Annual Meadow-Graſs.

A Bell s. Abo

in many of its qualities, and particularly in producing from its own ſubſtance a hard and ſolid ſupport, ſerving many of the purpoſes of the bone in other animals. This is formed by a concreting juice thrown out from a peculiar ſet of longitudinal parallel tubes, running along the internal ſurface of the fleſhy part: in the coats of theſe tubes are a number of ſmall orifices, through which the oſſeous liquor exudes, and, concreting, forms the layers of that part of the hard annular circles which ſome, judging from the conſiſtence rather than the texture, have erroneouſly denominated *wood.* The ſurface of the gorgonia is compoſed of a kind of ſcales, ſo well adapted to each other as to ſerve for defence from external injuries: and the fleſh, or, as ſome have called it, the *bark* or *cortex*, conſiſts of proper muſcles and tendons for extending the openings of their cells, for ſending forth from thence their polype ſuckers in ſearch of food, and for drawing them in ſuddenly and contracting the ſphincter muſcles of theſe ſtarry cells, in order to ſecure theſe tender parts from danger; and alſo of proper ſecretory ducts, to furniſh and depoſit the oſſeous matter that forms the ſtem and branches as well as the baſe of the bone. Mr Ellis affirms, that there are ovaries in theſe animals, and thinks it very probable that many of them are viviparous.

GRASS, (*Encycl.*) By graſſes are meant all thoſe plants which have a round, jointed, and hollow ſtem, ſurrounded at each joint with a ſingle leaf, long, narrow, and pointed, and whoſe ſeeds are contained in chaffy huſks. It appears by this definition, which is Ray's, that all the kinds of grain, as wheat, oats, barley, &c. are properly graſſes; and that the broad, the white, the hop, &c. clovers are not graſſes, though ſo frequently called by that name.

Culmiferous graſſes might be divided into two general claſſes for the purpoſes of the farmer, that it might be of uſe for him to attend to; viz. 1ſt, Thoſe which, like the common annual kinds of corn, run chiefly to ſeed-ſtalks; the leaves gradually decaying as theſe advance towards perfection, and become totally withered or fall off entirely when the ſeeds are ripe. Rye-graſs belongs to this claſs in the ſtricteſt ſenſe. To it likewiſe may be aſſigned the vernal-graſs, dogs-tail-graſs, and fine bent-graſs. 2dly, Thoſe whoſe leaves continue to advance even after the ſeed-ſtalks are formed, and retain their verdure and ſucculence during the whole ſeaſon, as is the caſe with the feſcue and poa tribe of graſſes, whoſe leaves are as green and ſucculent when the ſeeds are ripe and the flower-ſtalks fading, as at any other time.

“It is wonderful, Mr Stillingfleet † remarks, to ſee how long mankind has neglected to make a proper advantage of plants of ſuch importance, and which, in almoſt every country, are the chief food of cattle. The farmer, for want of diſtinguiſhing and ſelecting graſſes for ſeed, fills his paſtures either with weeds or bad or improper graſſes; when, by making a right choice, after ſome trials, he might be ſure of the beſt graſs, and in the greateſt abundance that his land admits of. At preſent, if a farmer wants to lay down his land to graſs, what does he do? he either takes his ſeeds indiſcriminately from his own foul hay-rick, or ſends to his next neighbour for a ſupply. By this means, beſides a certain mixture of all ſorts of rubbiſh, which muſt neceſſarily happen, if he chances to have a large proportion of good ſeeds, it is not unlikely but that what he intends for dry land may come from moiſt, where it grew naturally, and the contrary. This is ſuch a ſlovenly method of proceeding, as one would think could not poſſibly prevail univerſally: yet this is the caſe as to all graſſes except the darnel-graſs, and what is known in ſome few counties by the name of the *Suffolk graſs;* and this latter inſtance is owing, I believe, more to the ſoil than any care of the huſbandman. Now, would the farmer be at the pains of ſeparating once in his life half a pint or a pint of the different kinds of graſs-ſeeds, and take care to ſow them ſeparately, in a very little time he would have wherewithal to ſtock his farm properly, according to the nature of each ſoil, and might at the ſame time ſpread theſe ſeeds ſeparately over the nation, by ſupplying the ſeed-ſhops. The number of graſſes fit for the farmer is, I believe, ſmall, perhaps half a dozen or half a ſcore are all he need to cultivate; and how ſmall the trouble would be of ſuch a taſk, and how great the benefit, muſt be obvious to every one at firſt ſight. Would not any one be looked on as wild who ſhould ſow wheat, barley, oats, rye, peaſe, beans, vetches, buck-wheat, turneps, and weeds of all ſorts together? yet how is it much leſs abſurd to do what is equivalent in relation to graſſes? Does it not import the farmer to have good hay and graſs in plenty? and will cattle thrive equally on all ſorts of food? We know the contrary. Horſes will ſcarcely eat hay that will do well enough for oxen and cows. Sheep are particularly fond of one ſort of graſs, and fatten upon it faſter than any other, in Sweden, if we may give credit to Linnæus. And may they not do the ſame in Britain? How ſhall we know till we have tried?”

As the generality of farmers know ſcarce any of the graſſes by name, and as without ſuch knowledge little improvement can be made in this branch of huſbandry, we have on Plate CCCXIX. given figures of thoſe ſorts which have been recommended as the moſt profitable, viz.

1. *Hordeum murinum*, Rye-grass *vulgò*. [Rye-graſs *propriè* is the *ſecale villoſum.* Perennial darnel, *lollium perenne*, is alſo, in ſome counties of England, improperly called *rye-graſs.*]

2. *Feſtuca rubra*, purple Fescue-grass. See Agriculture, n° 52.

3. *Feſtuca ovina*, Sheeps ditto. See Agriculture, n° 54.

4. *Holcus lanatus*, Creeping Soft-grass. See Agriculture, n° 57.

5. *Alopecurus bulboſus*, Bulbous Foxtail-grass, is recommended by Mr Anderſon †, as promiſing on ſome occaſions to afford a valuable paſture-graſs. It ſeems chiefly, he obſerves, to delight in a moiſt ſoil, and therefore promiſes to be only fit for a meadow paſture-graſs. The quality that firſt recommended it to his notice, was the unuſual firmneſs that its matted roots gave to the ſurface of the ground, naturally ſoft and moiſt, in which it grew; which ſeemed to promiſe that it might be of uſe upon ſuch ſoils, chiefly in preventing them from being much poached by the feet of cattle which might paſture upon them. Moſſy ſoils eſpecially are ſo much hurt by poaching, that any thing that promiſes to be of uſe in preventing it deſerves to be attended to.

† *Tracts relating to Nat. Hiſt.* &c.

† *Eſſays on Agriculture,* &c.

6. *Poa pratenſis*, Great Meadow-grass, ſeems to approach in many reſpects to the nature of the purple-feſcue; only that its leaves are broader, and not near ſo long; being only about a foot or 16 inches at their greateſt length. Like it, it produces few ſeed-ſtalks and many leaves, and is an abiding plant.

7. *Poa compreſſa*, Creeping Meadow-grass, according to Mr Anderſon, ſeems to be the moſt valuable graſs of any of this genus. Its leaves are firm and ſucculent, of a dark Saxon-green colour; and grow ſo cloſe upon one another, as to form the richeſt pile of paſture-graſs. The flower-ſtalks, if ſuffered to grow, appear in ſufficient quantities; but the growth of theſe does not prevent the growth of the leaves, both advancing together during the whole ſummer; and when the ſtalks fade, the leaves continue as green as before. Its leaves are much larger and more abundant than the common meadow-graſs, *poa trivialis;* and therefore it better deſerves to be cultivated.

8. *Anthoxanthum odoratum*, Vernal Grass, grows very commonly on dry hills, and likewiſe on ſound rich meadow-land. It is one of the earlieſt graſſes we have; and from its being found on ſuch kinds of paſtures as ſheep are fond of, and from whence excellent mutton comes, it is moſt likely to be a good graſs for ſheep-paſtures. It gives a grateful odour to hay. It is very eaſy to gather, as it ſheds its ſeeds upon the leaſt rubbing.

9. *Cynoſurus criſtatus*, Crested Dog's-tail Grass. Mr Stillingfleet imagines this graſs to be proper for parks, from his having known one, where it abounds, that is famous for excellent veniſon. He recommends it alſo, from experience, as good for ſheep; the beſt mutton he ever taſted, next to that which comes from hills where the purple and ſheeps feſcue, the fine bent, and the ſilver hair graſſes abound, having been from ſheep fed with it. He adds, that it makes a very fine turf upon dry ſandy or chalky ſoils: but unleſs ſwept over with the ſcythe, its flowering-ſtems will look brown; which is the caſe of all graſſes which are not fed on by variety of animals. For that ſome animals will eat the flowering-ſtems is evident by commons, where ſcarcely any parts of graſſes appear but the radical leaves.

10. *Stipa pennata*, Cock's-tail or Feather Grass.

11. *Agroſtis capillaris*, Fine Bent, is recommended by Mr Stillingfleet, from his having always found it in great plenty on the beſt ſheep-paſtures, in the different counties of England that are remarkable for good mutton.

12. *Areira flexuoſa*, Mountain Hair.
13. ——— *caryophillea*, Silver Hair.
The ſame may be ſaid of theſe two graſſes as of the preceding one.

14. *Feſtuca fluitans*, Flote Fescue. In a piece publiſhed in the Amœnitates Academicæ, vol. 3. intitled *Plantæ Eſculentæ*, we are informed, that "the ſeeds of this graſs are gathered yearly in Poland, and from thence carried into Germany, and ſometimes into Sweden, and ſold under the name of *manna ſeeds*. Theſe are much uſed at the tables of the great, on account of their nouriſhing quality and agreeable taſte. It is wonderful, (adds the author), that amongſt us theſe ſeeds have hitherto been neglected, ſince they are ſo eaſily collected and cleanſed." There is a clammineſs on the ear of the flote-feſcue, when the ſeeds are ripe, that taſtes like honey; and for this reaſon perhaps they are called *manna ſeeds*.

Linnæus (*Flor. Suec.* art. 95.) ſays that the bran of this graſs will cure horſes troubled with botts, if kept from drinking for ſome hours.

Concerning this graſs we have the following information by Mr Stillingfleet. "Mr Dean, a very ſenſible farmer at Ruſcomb, Berkſhire, aſſured me that a field, always lying under water, of about four acres, that was occupied by his father when he was a boy, was covered with a kind of graſs, that maintained five farm-horſes in good heart from April to the end of harveſt, without giving them any other kind of food, and that it yielded more than they could eat. He, at my deſire, brought me ſome of the graſs, which proved to be the flote-feſcue with a mixture of the marſh-bent; whether this laſt contributes much towards furniſhing ſo good paſture for horſes, I cannot ſay. They both throw out roots at the joints of the ſtalks, and therefore likely to grow to a great length. In the index of dubious plants at the end of Ray's Synopſis, there is mention made of a graſs under the name of *gramen caninum ſupinum longiſſimum*, growing not far from Saliſbury, 24 feet long. This muſt by its length be a graſs with a creeping ſtalk; and that there is a graſs in Wiltſhire growing in watery meadows, ſo valuable, that an acre of it lets from 10 to 12 pounds, I have been informed by ſeveral perſons. Theſe circumſtances incline me to think it muſt be the flote-feſcue; but whatever graſs it be, it certainly muſt deſerve to be inquired after."

15. *Alopecurus pratenſis*, Meadow Foxtail. Linnæus ſays that this is a proper graſs to ſow on grounds that have been drained.—Mr Stillingfleet was informed, that the beſt hay which comes to London is from the meadows where this graſs abounds. It is ſcarce in many parts of England, particularly Herefordſhire, Berkſhire, and Norfolk. It might be gathered at almoſt any time of the year from hay-ricks, as it does not ſhed its ſeeds without rubbing, which is the caſe of but few graſſes. It is amongſt the moſt grateful of all graſſes to cattle.

16. *Poa annua*, Annual Meadow Grass. "This graſs (ſays Mr Stillingfleet) makes the fineſt of turfs. It grows every where by way ſides, and on rich ſound commons. It is called in ſome parts the *Suffolk graſs*. I have ſeen whole fields of it in High Suffolk without any mixture of other graſſes; and as ſome of the beſt ſalt-butter we have in London comes from that county, it is moſt likely to be the beſt graſs for the dairy. I have ſeen a whole park in Suffolk covered with this graſs; but whether it affords good veniſon, I cannot tell, having never taſted of any from it. I ſhould rather think not, and that the beſt paſture for ſheep is alſo the beſt for deer. However, this wants trial. I remarked on Malvern-hill ſomething particular in relation to this graſs. A walk that was made there for the convenience of the water-drinkers, in leſs than a year was covered in many places with it, though I could not find one ſingle plant of it beſides in any part of the hill. This was no doubt owing to the frequent treading, which above all things makes this graſs flouriſh; and therefore it is evident that rolling muſt be very ſerviceable to it.

Plate CCCX

"It has been objected, that this graſs is not free from *bents*, by which word is meant the flowering-ſtems. I anſwer, that this is moſt certainly true, and that there is no graſs without them. But the flowers and ſtems do not grow ſo ſoon brown as thoſe of other graſſes; and being much ſhorter, they do not cover the radical leaves ſo much; and therefore this graſs affords a more agreeable turf without mowing, than any other whatever that I know of."

GROWTH, (*Encycl.*) See alſo NUTRITION, (*Encycl.*)

GUIDON, in ancient military hiſtory, the name of a ſort of ſtandard carried by the king's life-guards; ſo called from its being broad at one extreme, almoſt pointed at the other, and ſlit or divided in two.

GUNNERY. P. 4543. marginal note, n° 15. for Plate CXLIV. read Plate CXLII.

H.

HARMATTAN, a very extraordinary kind of wind and fog on the coaſt of Guinea, of which an account, taken from Dr Lind's works, is given under the article MEDICINE, p. 4657. col. 2. An account remarkably different, however, from that of the Doctor, may be ſeen in the Philoſophical Tranſactions, vol. lxxi.

HEAT, (*Encycl.*) See alſo PHLOGISTON, (*Encycl.*)

HEBRIDES. P. 3556. col. 2. line 2. for MULK read MULL.

HEDGE-NETTLE, the *ſtachys ſylvatica*. Horſes abominate this plant. Cows, notwithſtanding its fetid ſmell, will eat it; and Gunner ſays it undoubtedly increaſes their milk greatly.

HEDGE-*Sparrow*, a ſpecies of MOTACILLA, omitted under that article. Its head is of a deep brown, mixed with aſh-colour; the cheeks marked with oblong ſpots of dirty white: the back and coverts of the wings are duſky, edged with reddiſh brown; the quill-feathers and tail duſky: the rump brown, tinged with green: the throat and breaſt are of a dull aſh-colour; the belly of a dirty white: the ſides, thighs, and vent-feathers are of a pale tawny brown; the legs of a dull fleſh-colour.—This bird frequents low hedges, eſpecially thoſe of gardens. It makes its neſt in ſome ſmall buſh, and lays four or five eggs of a fine pale-blue colour; during the breeding ſeaſon it has a remarkable flirt with its wings. The male has a ſhort but very ſweet plaintive note, which it begins with the firſt froſty mornings, and continues till a little time in the ſpring. This is the *motacilla modularis* of Linnæus; the bird which he ſuppoſes to be our hedge-ſparrow, and deſcribes under the title of *motacilla curruca*, differs in colours of plumage as well as eggs.

HEIR-*Looms*, (*Encycl.*) See *Heir*-LOOMS, (*Encycl.*)

HELM. For Plate CXLVIII. read CLVIII.

Plate CCCXIII.

HEMEROBIUS, (*Encycl.*) This inſect takes the name of *hemerobius* from the ſhortneſs of its life, which, however, continues ſeveral days. In the ſtate of larva it is a great devourer of plant-lice, for which it has had beſtowed upon it the appellation of *lion of the plant-lice*. The hemerobii, even after their transformation, preſerve their carnivorous inclination. Not ſatisfied with making war upon the plant-lice, who tamely let themſelves be devoured, they do not ſpare each other. The eggs of this inſect are borne upon ſmall pedicles, which are nothing but a gum ſpun out by the hemerobius by raiſing up the hinder-part of its abdomen, and by that means the egg remains faſtened to the upper part of the thread. Thoſe eggs are depoſited upon leaves, and ſet in the form of bunches. They have been taken for paraſitic plants. The larva, when hatched, finds there its food in the midſt of plant-lice. In 15 or 16 days it has attained to its full growth. With its ſpinning-wheel at its tail, it makes itſelf a ſmall, round, white, ſilky cod, of a cloſe texture. In ſummer, at the end of three weeks, the hemerobius iſſues forth with its wings; but when the cod has not been ſpun till autumn, the chryſalis remains in it the whole winter, and does not undergo its final metamorphoſe till the enſuing ſpring. The flight of this inſect is heavy: ſome ſpecies have an excrementitious ſmell. One goes by the name of the *water-hemerobius*, becauſe it lives moſtly at the water-ſide.

Barbut's Inſects.

HEMSKERCK (Egbert), called the *Old*, a celebrated Flemiſh painter of drolls and converſations, of whom, though ſo univerſally known, we have no information as to the time in which he flouriſhed, or the ſchool in which he was taught. Though the taſte of his compoſitions is but low, yet it ought to be conſidered that he took his ſubjects from nature; from perſons in the meaneſt occupations, whoſe dreſs, actions, and manners, could not furniſh the imagination with any ideas of elegance: and to expreſs their paſſions and undiſguiſed humours, ſeems to have been the utmoſt of his ambition. By frequenting fairs, merry-meetings, gaming-houſes, and inns, he acquired a ſurpriſing power of connecting humorous circumſtances; he deſigned and drew correctly, and his pictures have a ſtrong effect from his accurate management of the chiaro obſcuro. Some of his pictures have ſuffered from unſkilful cleaners, and many things are ſold as his which diſhonour him; but his genuine works, well preſerved, have a clearneſs and force equal to any of the Flemiſh artiſts.

HEMSKERCK (Egbert), called the *Young*, was the diſciple of Peter Grebber, but imitated the manner of Brouwer and of the elder Hemſkerk. He was born at Haerlem in 1645, but ſettled at London, where for a long time his works were exceedingly eſteemed, tho' they are now much ſunk in their value. He had a whimſical imagination, and delighted in compoſing uncommon and fanciful ſubjects; ſuch as the temptation of St Anthony, nocturnal intercourſes of witches and ſpectres, enchantments, &c. which he executed with a free pencil and a ſpirited touch. It was cuſtomary with him to introduce his own portrait among the converſations he deſigned; and for that purpoſe had a ſmall looking-glaſs placed near his caſe. He died in 1704.

HERALDRY. P. 3593. col. 2. for 19 *argent*, read 20 *argent*.

HERB-ROBERT. This plant is in great reputation with ſome farmers on account of its prevailing virtues againſt ſtaling of blood, and the bloody-flux in cattle; in which caſes it is ſaid to be the beſt among a great variety of means commonly uſed on theſe occaſions.

HERIOT, in law, a cuſtomary tribute of goods and chattels, payable to the lord of the fee on the deceaſe of the owner of the land. See TENURE, (*Encycl.*)

Heriot is of two ſorts—viz. 1. Heriot-cuſtom, where heriots have been paid time out of mind by cuſtom, after the death of a tenant for life. In ſome places, there is a cuſtomary compoſition in money, as 10 or 20 ſhillings in lieu of a heriot, by which the lord and tenant are both bound, if it be an indiſputably ancient cuſtom; but a new compoſition of this ſort will not bind the repreſentatives of either party. 2. Heriot-ſervice, when a tenant holds by ſuch ſervice to pay heriot at the time of his death; which ſervice is expreſſed in the deed of feoffment.—For this latter the lord ſhall diſtrain; and for the other he ſhall ſeize, and not diſtrain. If the lord purchaſe part of the tenancy, heriot-ſervice is extinguiſhed; but it is not ſo of heriot-cuſtom.

HERNANDIA, (*Encycl.*) The ſonora is a native of Java, and other parts of the Eaſt Indies. It affords a ſure antidote againſt poiſon, if you either put its ſmall roots on the wounds or eat them; as was diſcovered to Rumphius by a captive woman in the war between the people of Macaſar and the Dutch in the year 1667. The ſoldiers of the former always carry this root about them, as a remedy againſt wounds with poiſonous arrows. The leaves of this tree are thick and ſmooth. Another tree like this, which likewiſe grew here, had not ſuch thick and ſmooth leaves.

HINDOOS. See GENTOOS in this APPENDIX.

HIRUNDO. P. 3647. col. 2. dele l. 4.

HOLOTHURIA, in zoology, a genus belonging to the order of vermes molluſca. There are nine ſpecies, all inhabitants of the ocean. The phyſalis, called by the Dutch *beſantyes*, by Dampier *cutters*, and by the Engliſh ſailors *man-of-war*, has a half-round body, ſtands directly upwards, has many long and many ſhort tentacula, is ſlimy, tranſparent, ſomewhat bluiſh, ſhines in dark nights, is poiſonous, and ſo light that it will ſcarce ſink in Spaniſh brandy. Beyond the Cape they are ſmall; in the ocean they are larger and very numerous, eſpecially in March.

HOOKE (Nathaniel), author of an eſteemed Roman hiſtory and other performances.—Of this learned gentleman the earlieſt particulars to be met with are furniſhed by himſelf, in the following modeſt but manly addreſs to the Earl of Oxford, dated Oct. 7. 1722: "My Lord, the firſt time I had the honour to wait upon your Lordſhip ſince your coming to London, your lordſhip had the goodneſs to aſk me, what way of life I was then engaged in; a certain *mauvaiſe honte* hindered me at that time from giving a direct anſwer. The truth is, my lord, I cannot be ſaid at preſent to be in any form of life, but rather to live extempore. The late epidemical diſtemper ſeized me, I endeavoured to be rich, imagined for a while that I was, and am in ſome meaſure happy to find myſelf at this inſtant but juſt worth nothing. If your Lordſhip, or any of your numerous friends, have need of a ſervant, with the bare qualifications of being able to read and write, and to be honeſt, I ſhall gladly undertake any employments your Lordſhip ſhall not think me unworthy of. I have been taught, my lord, that neither a man's natural pride, nor his ſelf-love, is an equal judge of what is fit for him; and I ſhall endeavour to remember, that it is not the ſhort part we act, but the manner of our performance, which gains or loſes us the applauſe of him who is finally to decide of all human actions. My lord, I am juſt now employed in tranſlating from the French, a Hiſtory of the Life of the late archbiſhop of Cambray; and I was thinking to beg the honour of your lordſhip's name to protect a work which will have ſo much need of it. The original is not yet publiſhed. 'Tis written by the author of the "Diſcourſe upon Epic Poetry," in the new edition of Telemaque. As there are ſome paſſages in the book of a particular nature, I dare not ſolicit your lordſhip to grant me the favour I have mentioned, till you firſt have peruſed it. The whole is ſhort, and pretty fairly tranſcribed. If your lordſhip could find a ſpare hour to look it over, I would wait upon your lordſhip with it, as it may poſſibly be no unpleaſing entertainment. I ſhould humbly aſk your lordſhip's pardon for ſo long an addreſs in a ſeaſon of ſo much buſineſs. But when ſhould I be able to find a time in which your lordſhip's goodneſs is not employed? I am, with perfect reſpect and duty, my lord, your lordſhip's moſt obliged, moſt faithful, and moſt obedient humble ſervant, NATHANIEL HOOKE." The tranſlation here ſpoken of was afterwards printed in 12mo, 1723. From this period till his death, Hr Hooke enjoyed the confidence and patronage of men not leſs diſtinguiſhed by virtue than by titles. In 17. . he publiſhed a tranſlation of Ramſay's Travels of Cyrus, in 4to; in 1733 he reviſed a tranſlation of "The Hiſtory of the Conqueſt of Mexico by the Spaniards, by Thomas Townſend, Eſq;" printed in 2 vols 8vo; and in the ſame year he publiſhed in 4to, the firſt volume of "The Roman Hiſtory, from the building of Rome to the ruin of the Commonwealth; illuſtrated with maps and other plates." In the dedication to this volume, Mr Hooke took the opportunity of "publicly teſtifying his juſt eſteem for a worthy friend, to whom he had been long and much obliged," by telling Mr Pope, that the diſplaying of his name at the head of thoſe ſheets was "like the hanging out a ſplendid ſign, to catch the traveller's eye, and entice him to make trial of the entertainment the place affords. But," he proceeds, "when I can write under my ſign, that Mr Pope has been here, and was content, who will queſtion the goodneſs of the houſe?" The volume is introduced by "Remarks on the Hiſtory of the Seven Roman Kings, occaſioned by Sir Iſaac Newton's objections to the ſuppoſed 244 years duration of the royal ſtate of Rome." His nervous pen was next employed in digeſting "An Account of the conduct of the Dowager-ducheſs of Marlborough, from her firſt coming to Court to the Year 1710. In a Letter from herſelf to Lord ——. 1742." 8vo. His reward on this occaſion was conſiderable; and the reputation he acquired by the performance much greater. The circumſtances of this tranſaction are thus related by Dr Maty, in his *Memoirs of Lord Cheſterfield*, vol. i. p. 116. "The relict of the great duke of Marlborough, being deſirous of ſubmitting to poſterity her political conduct, as well as her lord's, applied to the earl of Cheſterfield for a proper perſon to receive her information, and put the memoirs of her life into a proper

Nichols's Anecdotes of Bowyer, &c.

dreſs. Mr Hooke was recommended by him for that purpoſe. He accordingly waited upon the ducheſs, while ſhe was ſtill in bed, oppreſſed by the infirmities of age. But, knowing who he was, ſhe immediately got herſelf lifted up, and continued ſpeaking during ſix hours. She delivered to him, without any notes, her account, in the moſt lively as well as the moſt connected manner. As ſhe was not tired herſelf, ſhe would have continued longer the buſineſs of this firſt ſitting, had not ſhe perceived that Mr Hooke was quite exhauſted, and wanted refreſhment as well as reſt. So eager was ſhe for the completion of the work, that ſhe inſiſted upon Mr Hooke's not leaving her houſe till he had finiſhed it. This was done in a ſhort time; and her Grace was ſo well pleaſed with the performance, that ſhe complimented the author with a preſent of 5000 l. a ſum which far exceeded his expectations. As ſoon as he was free, and permitted to quit the houſe of his benefactreſs, he haſtened to the earl, to thank him for his favour, and communicated to him his good fortune. The perturbation of mind he was under, occaſioned by the ſtrong ſenſe of his obligation, plainly appeared in his ſtammering out his acknowledgments: and he, who had ſucceeded ſo well as the interpreter of her Grace's ſentiments, could ſcarcely utter his own." The ſecond volume of his "Roman hiſtory" appeared in 1745; when Mr Hooke embraced the fair occaſion of congratulating his worthy friend the earl of Marchmont, on "that true glory, the conſenting praiſe of the honeſt and the wiſe," which his lordſhip had ſo early acquired. To the ſecond volume Mr Hooke added "The Capitoline Marbles, or Conſular Calendars, an ancient Monument accidentally diſcovered at Rome in the year 1545, during the Pontificate of Paul III." In 1758 Mr Hooke publiſhed "Obſervations on, I. The Anſwer of M. l'Abbe de Vertot to the late earl of Stanhope's Inquiry concerning the Senate of ancient Rome: dated December, 1719. II. A Diſſertation upon the Conſtitution of the Roman Senate, by a Gentleman: publiſhed in 1743. III. A Treatiſe on the Roman Senate, by Dr Conyers Middleton: publiſhed in 1747. IV. An Eſſay on the Roman Senate, by Dr Thomas Chapman: publiſhed in 1750;" which he with great propriety inſcribed to Mr Speaker Onſlow. The third volume of Mr Hooke's "Roman Hiſtory," to the end of the Gallic war, was printed under his inſpection before his laſt illneſs; but did not appear till after his death, which happened in 1764. The fourth and laſt volume was publiſhed in 1771. Mr Hooke left two ſons; of whom one is a divine of the church of England; the other, a doctor of the Sorbonne, and profeſſor of aſtronomy in that illuſtrious ſeminary.

HOPE, in ethics, is the deſire of ſome good, attended with a belief of the poſſibility, at leaſt, of obtaining it, and enlivened with joy, greater or leſs, according to the greater or leſs probability of our poſſeſſing the object of our hope. Alexander, preparing for his Aſian expedition, diſtributed his hereditary dominions among his friends; allotting to ſome villages, to others boroughs, to others cities; and being aſked what he had reſerved for himſelf, replied, Hope.

HOPS. See HUMULUS, (*Encycl.*) The cultivation of hops, which is now ſo very general, is not in all places equally ſucceſsful. Very large hop-grounds will for 20 years ſucceſſively appear with the moſt promiſing verdure, yet produce nothing. When the fructification in an early ſtate contracts a mouldineſs, it withers and is deſtroyed. It is then infeſted by the aphides, who produce on it what is commonly called an *honey-dew;* but the plant muſt firſt be in a ſickly ſtate before it is infeſted with theſe inſects. Into this ſituation it is reduced by the caterpillar of the phalæna humuli or other moth, which feeds on its roots; a circumſtance of which the cultivators of this plant are generally ignorant, though ſome of them have diſcovered that a ſound hop will be infected by planting a ſickly one near it, when they tranſplant the roots from a hop-ground that is thus attacked to one that is perfectly healthy. The hop grows naturally among ſtones and fragments of rocks, where it is never damaged by the honey-dew. The reaſon is, that the caterpillar abovementioned, cannot in ſuch a ſoil penetrate to its roots; and therefore, thoſe who cultivate this plant ought to cover the ground with ſtones.

HUMMING-BIRD. See TROCHILUS, (*Encycl.*) We have the following pleaſing account of this little animal in profeſſor Kalm's Travels into America. The deſcription applies to the *trochilus colubris* †. "Its plumage is moſt beautifully coloured, moſt of its feathers being green, ſome grey, and others forming a ſhining red ring round its neck; the tail glows with fine feathers, changing from green into a braſs colour. Theſe birds come here (Penſylvania) in ſpring, about the time when it begins to grow very warm, and make their neſts in ſummer; but towards autumn, they retreat again into the more ſouthern countries of America. They ſubſiſt barely upon the nectar, or ſweet juice of flowers, contained in that part which botaniſts call the *nectarium*, and which they ſuck up with their long bills. Of all the flowers, they like thoſe moſt which have a long tube; and they are obſerved to flutter chiefly about the *impatiens noli tangere*, and the *monarda* with crimſon flowers. An inhabitant of the country is ſure to have a number of theſe beautiful and agreeable little birds before his windows all the ſummer long, if he takes care to plant a bed with all ſorts of fine flowers under them. The flowers of the above-mentioned monarda grow verticillated, that is, at different diſtances they ſurround the ſtalk, as the flowers of our mint (*mentha*), baſtard hemp (*galeopſis*), mother-wort (*leonurus*), and dead nettle (*lamium*). It is therefore diverting to ſee them putting their bills into every flower in the circle. As ſoon as they have ſucked the juice of one flower, they flutter to the next. One that has not ſeen them would hardly believe in how ſhort a ſpace of time they have had their tongues in all the flowers of a plant, which when large, and with a long tube, the little bird, by putting its head into them, looks as if it crept with half its body into them.

"During their ſucking the juice out of the flowers, they never ſettle on it, but flutter continually like bees, bend their feet backwards, and move their wings ſo quick, that they are hardly viſible. During this fluttering, they make a humming like bees, or like that which is occaſioned by the turning of a little wheel. After they have thus, without reſting, fluttered for a while, they fly to a neighbouring tree or poſt, and reſume their vigour again. They then re-

† See Plate LVII.

turn to their humming and ſucking. When ſeveral of them were on the ſame bed, there was always a violent combat between them, in meeting each other at the ſame flower (for envy was likewiſe predominant amongſt theſe little creatures), and they attacked with ſuch impetuoſity, that it would ſeem as if the ſtrongeſt would pierce its antagoniſt through and through with its long bill. During the fight, they ſeem to ſtand in the air, keeping themſelves up by the incredibly ſwift motion of their wings. When the windows towards the garden are open, they purſue each other into the rooms, fight a little, and flutter away again. Sometimes they come to a flower which is withering, and has no more juice in it; they then, in a fit of anger, pluck it off and throw it on the ground, that it may not miſlead them for the future. If a garden contains a great number of theſe little birds, they are ſeen to pluck off the flowers in ſuch quantities, that the ground is quite covered with them, and it ſeems as if this proceeded from a motion of envy.

"Commonly you hear no other ſound than their humming; but when they fly againſt each other in the air, they make a chirping noiſe like a ſparrow or chicken. They are ſo ſmall, that one would eaſily miſtake them for great humble-bees or butterflies; and their flight reſembles that of the former, and is incredibly ſwift. They have never been obſerved to feed on inſects or fruit; the nectar of flowers ſeems therefore to be their only food. Several people have caught ſome humming-birds, on account of their ſingular beauty, and have put them into cages, where they died for want of a proper food. However, Mr Bartram has kept a couple of them for ſeveral weeks together, by feeding them with water in which ſugar had been diſſolved; and I am of opinion, that it would not be difficult to keep them all winter in a hot-houſe.

"The humming-bird always builds its neſt in the middle of a branch of a tree; and it is ſo ſmall, that it cannot be ſeen from the ground, but he who intends to ſee it muſt get up to the branch. For this reaſon it is looked upon as a great rarity if a neſt is accidentally found, eſpecially as the trees in ſummer have ſo thick a foliage. The neſt is quite round, and conſiſts in the inſide of a browniſh and quite ſoft down, which ſeems to have been collected from the leaves of the great mullein or *verbaſcum thapſus*, which are often found covered with a ſoft wool of this colour, and the plant is plentiful here: other materials, however, are often uſed, as flax, hemp, moſs, hair, or ſuch like ſoft ſubſtances. The outſide of the neſt has a coating of green moſs, ſuch as is common on old pales, or encloſures, and on trees; the inner diameter of the neſt is hardly a geometrical inch at the top, and its depth half an inch; they are ſaid to lay two eggs, each of the ſize of a pea."

HUNTER (Dr William), a celebrated anatomiſt, was a native of Kilberge in the county of Lanerk in Scotland. Being deſigned by his father for the church, he was ſent, at a proper age, to the college of Glaſgow: But having ſpent five years in regular academical attendance there, he began to feel ſtrong objections to theological ſtudies; and happening to become acquainted with Dr Cullen, who was at that time juſt eſtabliſhed in practice at Hamilton, he was perſuaded to apply himſelf to phyſic. Dr Cullen's friendſhip made it eaſy to obtain his father's conſent. He was taken into the Doctor's houſe, where he ſpent two of the happieſt years of his life. In Scotland (if we except Edinburgh) there is not that diſtinction between the branches of phyſic that prevails in England. The phyſicians generally diſpenſe their own medicines, and likewiſe practiſe ſurgery. Dr Cullen, though an enthuſiaſtic cultivator of phyſic and chemiſtry, had always a diſlike to the chirurgical part of his practice. It was therefore agreed between him and Mr Hunter, that the latter ſhould go firſt to the college at Edinburgh, and then to London, in order to ſee the practice of the hoſpitals, and improve himſelf in anatomy and ſurgery, and that at his return to Hamilton a partnerſhip ſhould take place between them. Mr Hunter brought with him to London a letter of introduction to his countryman Dr James Douglas, at that time in high reputation as a phyſician and man-midwife, and well known by his "Treatiſe on the Muſcles," and other works. Dr Douglas adviſed him to attend St George's Hoſpital, and Dr Nichols's lectures, as a perpetual pupil, for the opportunity of learning all his arts in making anatomical preparations. At the end of the ſeaſon, when he was preparing to ſet out on his return to Hamilton, Dr Douglas perſuaded him to change his propoſed plan; to aſſiſt him in his anatomical purſuits; to accompany his ſon, at that time a ſtudent in phyſic, to Paris and Holland; and afterwards to ſettle in London, and to teach anatomy. Mr Hunter communicated this propoſal, and the arguments which Dr Douglas had uſed, to Dr Cullen; who, thinking it a fairer proſpect, with his uſual generoſity readily gave his conſent. After the death of his patron Dr Douglas, Mr Hunter began to teach anatomy in London. His eaſy, agreeable manner of lecturing, the new and clear points of view in which he placed the different parts of his ſubject, added to the number and elegance of his preparations, drew to him a great number of pupils. He ſoon became eminent in his profeſſion, and enriched the art with many important diſcoveries. In or about 1747, Mr Hunter was admitted a member of the Surgeon's company. His anatomical reputation ſoon procured him an extenſive practice, particularly in midwifery; and when he came to be eſtabliſhed, the univerſity of Glaſgow complimented him with the degree of M. D. In 1756 he was admitted a member of the College of Phyſicians; and ſoon afterwards was elected F. R. S. having made himſelf known by an ingenious paper "on the Structure of Cartilages," publiſhed in the Phil. Tranſ. ſo early as 1743. He ſince, at different times, communicated ſeveral other valuable papers to the ſociety. When the preſent queen became pregnant, Dr Hunter was conſulted, and at the ſame time honoured with the appointment of phyſician-extraordinary to her majeſty. When the Royal Academy of Arts was founded, he was nominated profeſſor of anatomy to that inſtitution; and lately, upon the death of one of the eight foreign aſſociates of the Academy of Sciences at Paris, he was elected to ſupply the vacancy. To conſider him as a teacher, is to view him in his moſt amiable character: perſpicuity, unaffected modeſty, and a deſire of being uſeful, were his peculiar characteriſtics;

and, of all others, he was moſt happy in blending the *utile* with the *dulce*, by introducing appoſite and pleaſing ſtories to illuſtrate and enliven the more abſtruſe and jejune parts of anatomy; thus fixing the attention of the volatile and the giddy, and enriching the minds of all with uſeful knowledge. Employed as Dr Hunter had been, for a long ſeries of years, by perſons of the higheſt rank in this country, and conſulted as an anatomiſt in difficult caſes of ſurgery by all ranks of people and from every part of the kingdom, his gains muſt have been immenſe; and he employed them in a manner of all others the moſt liberal, the improvement of ſcience. Having never married, and being averſe to oſtentation and luxury, he always conducted his domeſtic expences on a plan adapted to his profeſſion; and his accumulated fees were expended in erecting and furniſhing a muſeum, which, conſidered in every point of view, is certainly not to be equalled in Europe. It is unneceſſary to ſay any thing of the anatomical varieties it contains, becauſe it will be eaſily conceived, that a perſon of the Doctor's diſpoſition, who had ſpent near half a century in the purſuit of a favourite object, muſt have amaſſed every thing that is curious and valuable on that ſubject. But the ſpecimens of human and comparative anatomy form only a ſmall part of the Hunterian Muſeum. The collection of ſcarce and valuable books is to be equalled only by royal libraries; and his cabinet of medals, particularly Greek and Roman, is far more valuable than the Imperial collection at Vienna. The expence of building his houſe and muſeum in Windmill-ſtreet, and furniſhing the latter, is ſaid to have approached near to 100,000 l. His Plates of the Gravid Uterus, and his other publications, ſufficiently evince his profound knowledge and unwearied induſtry; and the deſcription of his Greek coins his boundleſs munificence. It is much to be feared that the other works he had in hand at the time of his death are left too incomplete for the public eye. His muſeum, the moſt comprehenſive and ſelect of any individual's in Europe, was left for thirty years to his ſiſter's ſon, Mr Bailey. If during the above-mentioned period of 30 years Mr Bailey ſhould die, the property of the muſeum for the remainder of the period devolves to Mr Cruikſhank. At the concluſion of the period of 30 years, the entire muſeum, without any participation or entail whatever, is bequeathed to the univerſity of Glaſgow. The ſum of 4000 l. ſterling is left, with the intereſt from time to time growing on it, for the ſupport and augmentation of the collection. His brother, Mr John Hunter, the ſurgeon, on account of ſome difference between them, is not named in the will. The executors are, Dr Pitcairn, Mr Coombe apothecary (the Doctor's learned coadjutor in his literary labours), and Dr Fordyce of Eſſex-ſtreet; to each of whom Dr Hunter has left a legacy of 20 l. a-year, during the period in which they will be executing the purpoſes of the will. Making a pecuniary eſtimate of the muſeum in queſtion, 70,000 l. is ſaid to be the ſum it is worth. Beſides that, the Doctor was poſſeſſed of above 20,000 l. in money; the bulk of which is given to Mr Bailey. We are credibly informed, that the Doctor formerly applied to the miniſters of this country to allot him a piece of ground, on which he might build a muſeum, that he would engage to leave endowed for the public ſervice. His requeſt, however, was not complied with; and he then purchaſed the premiſes in Great Windmill-ſtreet, where he built his muſeum and ſpacious habitation. He died 30th April 1783, of the gout in his ſtomach.

HYDRA, in zoology, a genus of the order of zoophyta, belonging to the claſs of vermes. There are ſeven ſpecies, known by the general name of polypes. See POLYPE, in this APPENDIX.

HYDROCEPHALUS INTERNUS, (*Encycl.*) See MEDICINE, n° 370. 438. Beſides the uſe of mercury, there recommended as effectual in this diſeaſe, formerly ſo fatal, a ſurpriſing inſtance of the efficacy of the vapour-bath is given in the 8th volume of the Medical Commentaries. The inſtance, however, is ſingular, and the medicine ought to be often repeated with ſucceſs before much confidence is put in it.

I.

JACEA, in botany. See CENTAUREA, (*Encycl.*)

JAGO (Richard), an ingenious poet, was vicar of Snitterfield in Warwickſhire, and rector of Kimcote in Leiceſterſhire. He was the intimate friend and correſpondent of Mr Shenſtone, contemporary with him at Oxford, and, it is believed, his ſchoolfellow; was of Univerſity College; took the degree of M.A. July 9. 1739; was author of ſeveral poems in the 4th and 5th volumes of Dodſley's Poems; publiſhed a ſermon, in 1755, on the Cauſes of Impenitence conſidered, preached May 4. 1755, at Harbury in Warwickſhire, where he was vicar, on occaſion of a converſation ſaid to have paſſed between one of the inhabitants and an apparition in the church-yard there; wrote "Edge-hill," a poem, for which he obtained a large ſubſcription in 1767; and was alſo author of "Labour and Genius, 1768," 4to; of "The Blackbirds," a beautiful elegy in the Adventurer; and of many other ingenious performances. He died May 28. 1781.

ICHNEUMON, (*Encycl.*) One diſtinguiſhing and ſtriking character of theſe ſpecies of flies is the almoſt continual agitation of their antennæ. The name of *ichneumon* has been applied to them from the ſervice they do us by deſtroying caterpillars, plant-lice, and other inſects, as the ichneumon or mangouſte deſtroys the crocodiles. The variety to be found in the ſpecies of ichneumons is prodigious: among the ſmaller ſpecies, there are males who perform their amorous preludes in the moſt paſſionate and gallant manner. The poſterior part of the females is armed with a whimble, viſible in ſome ſpecies, nowiſe diſcoverable in others; and that inſtrument, though ſo fine, is able to penetrate through mortar and plaſter: the ſtructure of it is more eaſily ſeen in the long-whimbled fly. The food of the family to be produced by this fly is the larva of waſps or maſon-bees; for it no ſooner eſpies one of thoſe neſts, but it fixes on it with its whimble, and bores through the mortar of which it is built. The whimble itſelf, of an admirable ſtructure, conſiſts of three pieces: two collateral ones, hollowed out into a gutter, ſerve as a ſheath, and contain a compact,

Plate
CCCXXII.

ſolid, dentated ſtem, along which runs a groove that conveys the egg from the animal, who ſupports the whimble with its hinder legs, leſt it ſhould break; and by a variety of movements, which it dexterouſly performs, it bores through the building, and depoſits one or more eggs, according to the ſize of the ichneumon, though the largeſt drop but one or two. Some agglutinate their eggs upon caterpillars; others penetrate through the caterpillar's eggs, though very hard, and depoſite their own on the inſide. When the larva is hatched, its head is ſo ſituated, that it pierces the caterpillar, and penetrates to its very entrails. Theſe larvæ pump out the nutritious juices of the caterpillar, without attacking the vitals of the creature; who appears healthy, and even ſometimes tranſforms itſelf to a chryſalis. It is not uncommon to ſee thoſe caterpillars fixed upon trees, as if they were ſitting upon their eggs, and it is afterwards diſcovered that the larvæ, which were within their bodies, have ſpun their threads, with which, as with cords, the caterpillars are faſtened down, and ſo periſh miſerably. The ichneumons performed ſpecial ſervice in the years 1731 and 1732; by multiplying in the ſame proportion as did the caterpillars, their larvæ deſtroyed more of them than could be effected by human induſtry. Thoſe larvæ, when on the point of turning into chryſalids, ſpin a ſilky cod. Nothing is more ſurpriſing and ſingular, than to ſee thoſe cods leap, when placed on the table or hand. Plant-lice, the larvæ of the curculiones, ſpiders' eggs, are alſo ſometimes the cradle of the ichneumon-fly. Carcaſes of plant-lice, void of motion, are often found on roſe-tree leaves: they are the habitation of a ſmall larva, which, after having eaten up the entrails, deſtroys the ſprings and inward œconomy of the plant-louſe, performs its metamorphoſe under ſhelter of the pellicle which enfolds it, contrives itſelf a ſmall circular outlet, and ſallies forth into open air. There are ichneumons in the woods, who dare attack ſpiders, run them through with their ſting, tear them to pieces, and thus avenge the whole nation of flies of ſo formidable a foe: others, deſtitute of wings, (and thoſe are females) depoſite their eggs in ſpiders neſts. The ichneumon of the bedeguar (or ſweet-briar ſpunge), and that of the roſe-tree, perhaps only depoſite their eggs in thoſe places, becauſe they find other inſects on which they feed. The genus of the ichneumon flies, might with propriety be termed a race of diminutive cannibals.

ICHTHYOLOGY, (*Encycl.*) The moſt judicious arrangement of this branch of Zoology ſeems to be that of Mr Pennant, who diſtributes fiſh into three diviſions; *Cetaceous*, *Cartilaginous*, and *Bony*.

Div. I. CETACEOUS *Fiſh*; the characters of which are the following: No gills; an orifice on the top of the head, through which they breathe and eject water; a flat or horizontal tail; exemplified in Plate CCCXVIII. (lower compartment), fig. 1. by the Beaked Whale, borrowed from Dale's Hiſt. Harw. 411. Tab. xiv.—This diviſion comprehends three genera; the Whale, Cachalot, and Dolphin.

Div. II. CARTILAGINOUS *Fiſh*; the characters of which are: Breathing through certain apertures, generally placed on each ſide the neck; but in ſome inſtances beneath, in ſome above, and from one to ſeven in number on each part, except in the pipe-fiſh, which has only one; the muſcles ſupported by cartilages inſtead of bones. Example, the Picked Dog-fiſh, fig. 2. *a*, The lateral apertures.—The genera are, the Lamprey, Skate, Shark, Fiſhing-frog, Sturgeon, Sun-fiſh, Lump-fiſh, Pipe-fiſh.

Div. III. BONY *Fiſh*, includes thoſe whoſe muſcles are ſupported by bones or ſpines, which breathe thro' gills covered or guarded by thin bony plates, open on the ſide, and dilatable by means of a certain row of bones on their lower part, each ſeparated by a thin web; which bones are called the *radii branchioſtegi*, or the *gill covering rays*. The tails of all the fiſh that form this diviſion are placed in a ſituation perpendicular to the body; and this is an invariable character.

The great ſections of the Bony Fiſh into *Apodal*, *Thoracic*, *Jugular*, and *Abdominal*, he copies from Linnæus: who founds this ſyſtem on a compariſon of the ventral fins to the feet of land-animals or reptiles; and either from the want of them, or their particular ſituation in reſpect to the other fins, eſtabliſhes his ſections.—In order to render them perfectly intelligible, it is neceſſary to refer to thoſe ſeveral organs of movement, and ſome other parts, in a perfect fiſh, or one taken out of the three laſt ſections. In fig. 4. (the Haddock), *a*, is the pectoral fins; *b*, ventral fins; *c*, anal fins; *d*, caudal fin, or the tail; *e*, *e*, *e*, dorſal fins: *f*, bony plates that cover the gills; *g*, branchioſtegous rays and their membranes; *h*, lateral or ſide line.

Sect. 1. APODAL: The moſt imperfect, wanting the ventral fins; illuſtrated by the Conger, fig. 3. This alſo expreſſes the union of the dorſal and anal fins with the tail, as is found in ſome few fiſh.—Genera: The Eel, Wolf-fiſh, Launce, Morris, Sword-fiſh.

Sect. 2. JUGULAR: The ventral fins *b*, placed before the pectoral fins *a*, as in the Haddock, fig. 4.—Genera: The Dragonet, Weever, Codfiſh, Blenny.

Sect. 3. THORACIC: The ventral fins *a*, placed beneath the pectoral fins *b*, as in the Father Laſher, fig. 5.—Genera: The Goby, Bull-head, Doree, Flounder, Gilt-head, Wraſſe, Perch, Stickleback, Mackrel, Surmullet, Gurnard.

Sect. 4. ABDOMINAL: The ventral fins placed behind the pectoral fins, as in the Minow, fig. 6.—Genera: The Loche, Salmon, Pike, Argentine, Atherine, Mullet, Flying-fiſh, Herring, Carp.

ICHTHYPERIA, (*Encycl.*) See Plate CCCXVII.

IDEAS, (*Encycl.*) The origin of ideas has been a long time diſputed among philoſophers. The Peripatetics maintain, that external objects emit ſpecies which reſemble them all around; and that theſe ſpecies, ſtriking on our ſenſes, are by them tranſmitted to the underſtanding; and that, being material and ſenſible, they are rendered intelligible by the active intellect; and are at length received by the paſſive. Others are of opinion, that our ſouls have of themſelves the power of producing ideas of things we would think upon; and that they are excited to produce them by the impreſſions which objects make on the body, tho' theſe impreſſions are not images in any reſpect like the objects that occaſioned them. And in this, ſay they, it is, that man is made after the image of God, and that he partakes of his power; for as God made all things out of nothing, and can reduce them to nothing when he pleaſes, ſo man can create as many ideas as he pleaſes, and annihilate them when he has done.

Others maintain, that the mind has no occaſion for any thing beſide itſelf to perceive objects; and that, by conſidering itſelf, and its own perfections, it is able to diſcover all things that are without. Others, with Des Cartes, hold, that our ideas were created and born along with us.

Malebranche, and his followers, aſſert, that God has in himſelf the ideas of all the beings he has created; that thus he ſees all things, in conſidering his own perfections, to which they correſpond; and that, as he is intimately united to our ſouls, by his preſence, our mind ſees and perceives things in him which repreſent created beings; and that it is thus we come by all our ideas. He adds, that though we ſee all ſenſible and material things in God, yet that we have not our ſenſations in him. When we perceive any ſenſible object, in our perception is included both a ſenſation and a pure idea. The ſenſation is a modification of the ſoul, and it is God who cauſes it in us: but for the idea joined with the ſenſation, it is in God; and it is in him that we ſee it.

The Carteſians diſtinguiſh three kinds of ideas. The firſt, innate; ſuch, they ſay, is that we have of God, as of a Being infinitely perfect. The ſecond, adventitious; which the mind receives in proportion as bodily objects preſent themſelves to our ſenſes: ſuch is the idea of body, ſound, figure, light, &c. The third, according to theſe philoſophers, are factitious; which are thoſe which the mind forms, by uniting and aſſembling the ideas which it already had; and theſe are called *complex*. But Mr Locke ſeems to have put this matter out of diſpute; having made it appear, that all our ideas are owing to our ſenſes; and that all innate, created, and factitious ideas, are mere chimeras.

Our mind, he ſhows, has not abſolutely any ideas beſides thoſe preſented to it by the ſenſes, and thoſe which it forms by its own operations on thoſe others which the ſenſes furniſh; ſo that a man, deſtitute of one of his ſenſes, would never have any idea belonging to that ſenſe; and, ſuppoſing him deſtitute of all the ſenſes, he would never have any idea at all: external objects having no other way of producing ideas in him, but by means of ſenſation, he would have no idea, not even of reflection; becauſe, in wanting all ſenſation, he wants that which would excite in him the operations of his mind, which are the objects of his reflection.

It is plain, therefore, there is no innate idea; no general truth, or firſt principle, inherent in the ſoul, and created with it; no immediate object of the mind, before it had perceived external objects by means of the ſenſes, and reflected on that perception. Thoſe ideas only ſeem to be innate, becauſe we find we have them as ſoon as we come to the uſe of reaſon; but they are, in effect, what we formed from the ideas wherewith the mind was inſenſibly filled by the ſenſes. Thus, when the mind is employed about ſenſible objects, it comes by the ideas of bitter, ſweet, yellow, hard, &c. which we call *ſenſation;* and, when employed about its own operations, perceiving and reflecting on them, as employed about the ideas before got by ſenſation, we get the ideas of perception, thinking, doubting, willing, &c. which we call *inward ſenſation,* or *reflection;* and theſe two, viz. external material things as the objects of ſenſation, and the operations of our own minds as the objects of reflection, are the only originals whence all our ideas have their riſe. When we have conſidered theſe, and their ſeveral modes and combinations, we ſhall find, that they contain our whole ſtock of ideas, inſomuch that the underſtanding does not ſeem to have the leaſt glimmering of any ideas, that it did not receive from one of thoſe ſources.

And thus far the mind appears merely paſſive, as not having it in its power to chooſe whether it will have theſe firſt beginnings, or materials of knowledge, or not. For the objects of ſenſe will obtrude their ideas upon the mind; and the operations of the mind will not let us be without ſome (however obſcure) notion of them.

The origin of our ideas and notions is a perplexed queſtion, and not at all cleared up by the labours of metaphyſicians. As to ideas of ſenſe, ſome philoſophers have pretended, that bodies acting or preſſing upon our nerves, or putting the animal-ſpirits in motion, produce ſenſations; but as the motion communicated to the nerves or ſpirits has nothing in common either with the thing or body moving, or with the idea excited in the mind, and that we do not conceive the leaſt relation between the motion of the nerves or ſpirits and the production of an idea; to ſay that the motion of, or impreſſion upon, the nerves or animal-ſpirits is the cauſe of ideas, is explaining nothing at all.

The ſpecies emitted by objects, and the formation of ideas by the ſoul itſelf, are not more clear. As to innate ideas, it is true indeed, that the arguments of thoſe who maintain them, have been refuted by Mr Locke; but when he goes farther, and denies innate ideas, his arguments have been thought by ſome not to be concluſive.

Dr Price, in his Inquiry into the Original of our Ideas, has taken occaſion to remark, that the ſyſtem of Mr Locke, which aſcribes all our ideas to ſenſation and reflection, is materially defective; for, if by ſenſation we underſtand the effects ariſing from the impreſſions made on our minds by external objects, and by reflection the notice which the mind takes of its own operations, it will be impoſſible to drive ſome of the moſt important of our ideas from them. This excellent reaſoner obſerves, that the power within us that underſtands, the intuition of the mind, or the faculty in it that diſcerns truth, that views, compares, and judges of all ideas and things, is a ſpring of new ſimple ideas, or original, primary, and uncompounded perceptions of the mind. To this ſource he refers our ideas of the impenetrability and *vis inertiæ* of matter, ſubſtance, duration, ſpace, infinity, neceſſity, contingency, poſſibility, impoſſibility, power, cauſation, &c: all our abſtract ideas, and alſo our ideas of moral right and wrong, and of moral obligation. It is, he ſays, of the eſſence of theſe ideas to imply ſomething true or falſe of an object, and that they by no means denote the manner in which we are affected by it; ſo that they cannot with any propriety be referred to that part of our conſtitution, which has been diſtinguiſhed by the appellation of *ſenſe*. Accordingly, our ideas may be divided, firſt, into thoſe implying nothing real without the mind, or nothing real and true beſides its own affections and paſſions: to which claſs we may refer the immediate effects of impreſſions on the bodily ſenſes, without ſuppoſing any previous ideas; as all taſtes, ſmells, colours, &c.: and thoſe that ariſe upon occaſion only of other ideas; as the effects in us of conſidering, order, happineſs, the beauties of poetry, painting, &c. Secondly, into thoſe which are images of ſomething diſtinct from ſenſation, or which imply real, independent of exiſtence and truth; which may be ſubdivided into ſuch as denote the real properties of external objects, and the actions and paſſions of the mind; and thoſe which are derived immediately from intelligence. By the notices conveyed to the mind through the organs of the body, or its obſervation of the neceſſary attendants and concomitants of certain ſenſations and impreſſions, it perceives the figure, extenſion, motion, and other primary qualities of material ſubſtances; by contemplating itſelf, it perceives the properties of ſpiritual ſubſtances, volition, conſciouſneſs, memory, &c. To all theſe ideas it is eſſential that they have real, certain, invariable archetypes, actually exiſting, to which they are referred, and to which they are conformable. Theſe ideas again become objects or archetypes to the intellective faculty; from whence ariſes a new ſet of ideas, which are the perceptions of this faculty, and repreſent not the mind's own affections, but neceſſary truth. Antecedently to theſe, whatever other ideas we may be furniſhed with, nothing is underſtood; whatever ſeeds or ſubjects of knowledge may be in the mind, nothing is known.

The ſyſtem of Mr Locke, with regard to the origin of our ideas, has lately been attacked by Dr Reid and others; and it has been charged as the foundation of univerſal ſcepticiſm. Dr Reid objects to every ſyſtem which ſuppoſes that the mind receives images of things from without by means of the ſenſes, becauſe ſenſations bear no reſemblance to bodies, or any of their qualities. With regard to extenſion, figure, motion, &c. he ſays, if they are not ideas of ſenſation, nor like to any ſenſation, then the ideal ſyſtem is a rope of ſand, and all the laboured arguments of the ſceptical philoſophy againſt a material world, and againſt the exiſtence of every thing but impreſſions and ideas, proceed upon a falſe hypotheſis. To this objection it has been replied, that ideas are only in a figurative ſenſe the images of external things; that certain impreſſions are conveyed to the mind by means of the organs of ſenſe, and their correſponding nerves, between which, and the ſenſations exiſting in the mind, there is a real and neceſſary, though at preſent an unknown connection; and that the ſame reaſoning would lead him to deny that ſounds are produced by bodies ſtriking againſt one another, becauſe he can perceive no proper reſemblance between the cauſe and the effect.

Dr Reid farther objects to the notion generally received among philoſophers, that the images of external objects are conveyed by the organs of ſenſe to the brain, and there perceived by the mind. But from this objection it might be inferred, that the whole ſyſtem of our ſenſes, nerves, and brain, is of no real uſe whatever; becauſe it is impoſſible to ſay how they act upon the mind, or the mind upon them.

It is alſo objected, that Mr Locke's diviſion of ideas into thoſe of ſenſation, and thoſe of reflection, is contrary to all the rules of logic; becauſe the ſecond member of the diviſion includes the firſt. For can we, ſays he, form clear and juſt notions of our ſenſations any other way than by reflection? Senſation is an operation of the mind, of which we are conſcious, and we get the notion of it by reflecting upon that which we are conſcious of. In like manner, doubting and believing are operations of the mind, whereof we are conſcious, and we get the notion of them by reflecting upon what we are conſcious of. The ideas of ſenſation, therefore, are ideas of reflection, as much as the ideas of doubting or believing, or any other idea whatſoever. But it has been alleged, that the author confounds the ideas of ſenſation with the idea of ſenſation itſelf, which is, without doubt, of the ſame claſs with the ideas of doubting, &c. as Mr Locke would have allowed. But the ideas belonging to the claſs of ſenſation do not require any ſcientifical knowledge of that power, or any reflection upon it. If this were the caſe, brute animals, having no proper ideas of reflection, could have no ideas of ſenſation; and the caſe would be the ſame with the bulk of mankind. In another place, Dr Reid acknowledges, that human beings may have ideas of mere ſenſation ſome time before they diſcover any power of reflection, and that this power may diſcover itſelf and come into exerciſe afterwards.

Dr Beattie, Dr Oſwald, and others, have purſued and extended the ſame kind of reaſoning againſt the principles of Mr Locke; and alleged, that Berkeley's reaſoning againſt the exiſtence of a material world, and Hume's reaſoning againſt the exiſtence both of ſoul and body, are deduced from Locke's Eſſay, and the Principia of Des Cartes.

In oppoſition to this ſyſtem, Dr Reid, and thoſe who have adopted his theory, have recurred to certain inſtinctive principles; alleging that our perceptions neceſſarily imply the belief of the preſent exiſtence of external objects; and that the real, ſeparate, and independent exiſtence of matter, is believed, not becauſe it can be proved by argument, but becauſe the conſtitution of our nature is ſuch, and we muſt believe it; and that we cannot, in our own minds, ſeparate the belief of external objects from our ſenſations. However, it has been urged by an ingenious writer, that Mr Locke's doctrine is not ſo favourable to Mr Berkeley's theory as Dr Reid's; and that a ſyſtem which aſcribes our primary mental operations to mere conſtitution and feeling, is more favourable to ſcepticiſm than that in the room of which it is ſubſtituted. According to Mr Hume's ſyſtem, all perceptions are either impreſſions or ideas, and it is not poſſible for us ſo much as to conceive any thing ſpecifically different from ideas and impreſſions; and ſince all ideas are copied from impreſſions, we can, therefore, have no idea or conception of any thing of which we have not received an impreſſion. No man can have any idea of power or energy, becauſe he has never received any impreſſion of it; and for the ſame reaſon no man can have any idea of ſelf. What we call a mind is nothing but a bundle or collection of different perceptions, which ſucceed each other with inconceivable rapidity, and are in a perpetual flux and movement. There is properly, ſays Mr Hume, no ſimplicity in the mind at one time, nor identity at different times, whatever natural propenſion we may have to imagine that ſimplicity and identity. They are the ſucceſſive perceptions only that conſtitute the mind: ſo that

Ideas
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Information.

there is nothing in the univerſe but impreſſions and ideas; all poſſible perceptions being comprehended in thoſe two claſſes. Conſequently, this philoſophy, excluding body and mind, admits of no exiſtence whatſoever, not even of a percipient being to be the ſubject of theſe perceptions. To the ſame purpoſe Dr Reid obſerves, that, according to Mr Locke's ſyſtem, ideas being the only objects of thought, and having no exiſtence but when we are conſcious of them, it neceſſarily follows, that there is no object of our thought which can have a continued and permanent exiſtence. Body and ſpirit, cauſe and effect, time and ſpace, to which we were wont to aſcribe an exiſtence independent of our thought, are all turned out of exiſtence by this ſhort dilemma. Either theſe things are ideas of ſenſation or reflection, or they are not: if they are ideas of ſenſation or reflection, they can have no exiſtence but when we are conſcious of them: if they are not ideas of ſenſation or reflection, they are words without any meaning. To which we ſhall only reply, that we have the ſame reaſon to believe, that mind exiſts as that body exiſts; ſince it is only by that name that we diſtinguiſh the ſubject of certain powers or properties, of which we are conſcious, as perception, memory, will, &c. and we have juſt the ſame reaſon to believe the identity of an idea as that of any external body, or that of our own minds.

Thoſe who wiſh to be farther acquainted with the controverſy relating to the nature and origin of our ideas, muſt be referred to Hume's Treatiſe of Human Nature, vol. i. p. 123, &c. 282, &c. 434, &c. Reid's Inquiry into the Human Mind, paſſim. Beattie's Eſſay on Truth, part ii. chap. 2. Prieſtley's Examination of Reid, Beattie, &c. paſſim.

INEBRIANTS, are defined to be ſuch things as affect the nerves in a particular and agreeable manner, and through them alter and diſturb the functions of the mind. They are properly divided into native and artificial; the former chiefly in uſe among the oriental and other nations, the latter principally throughout Europe.

Natural Inebriants are, 1. Opium; in uſe all over the eaſt, and of which the Turks, through cuſtom, ſwallow a drachm. 2. Peganum harmala, Syrian rue. The ſeeds are ſold in Turkey for this purpoſe; and with theſe, as Bellonius relates, the Turkiſh emperor Solyman kept himſelf intoxicated. 3. Maſlac of the Turks, or bangue of the Perſians; prepared from the duſt of the male-flower of hemp, or from the leaves. 4. Bangue of the Indians, from the leaves of the hibiſcus ſabdariffa. 5. Seeds of various ſpecies of the datura, or thorny apple. 6. Pinang, or betel of the Indians. 7. Roots of black henbane. 8. The hyoſcyamus phyſaloides. 9. Berries of the deadly nightſhade. 10. Leaves of millfoil, are uſed by the Dalekarlians to render their beer intoxicating. 11. Tobacco, and ſeveral others leſs material are mentioned; ſuch as clary, ſaffron, and darnel.

Artificial Inebriants, are fermented liquors from farinaceous ſeeds; wines, and ſpirits drawn by diſtillation. With theſe is ranked the nectar of the gods, and the anodyne medicine of Homer, commonly called *nepenthes;* and the ſpells by which Medea and Circe produced their inchantments.

INFORMATION. Line penult, for *made*, read *mode*.

Injection.

INJECTION, or INJECTING, in ſurgery, the throwing in ſome liquor or medicine into a vein opened by inciſion. This practice, and that of transfuſion, or the conveying the arterial blood of one man, or other animal, into another, were once greatly practiſed, but are now laid aſide.

The method of injecting is this: A vein is to be opened in the arm with a lancet as in bleeding, and the ſmall pipe of a ſyringe being introduced at the orifice, the liquor intended to be mixed with the blood, and contained for that purpoſe in the body of the ſyringe, is to be forcibly injected, or thrown into the vein upwards, or toward the heart; which done, the orifice is to be ſecured with compreſſes and bandage, as in bleeding.

The bold experiment of injecting medicated liquors into the human veins was firſt made in the hoſpital at Dantzick. One of the patients was a luſty robuſt ſoldier dangerouſly infected with the venereal diſeaſe, ſo that he had exoſtoſes on the bones of his arms. While the liquor, (two drachms of a laxative medicine,) was paſſing into the vein of his arms, he complained of great pain in his elbows, and the valves of the vein ſwelled ſo viſibly, that it was neceſſary to ſtroke them up with a finger towards the patient's ſhoulders. In four hours after, it began to operate by ſtool, and continued to do ſo till next day; ſo that the patient had in all five ſtools from it. The diſeaſe diſappeared without any other remedy.

A married woman of 35 years of age, and a young woman of 20, had both been ſo grievouſly afflicted with epileptic fits from their infancy, that little or no hope could be entertained of their cure. Both of them underwent this ſingular treatment: into their veins were injected a laxative roſin diſſolved in an antiepileptical ſpirit; but what the roſin and ſpirit were, we are not told. The married woman had ſeveral gentle ſtools ſome hours after the injection, and alſo next day; ſoon after which the diſeaſe vaniſhed; the young woman, it is ſaid, *caſt herſelf away* by going into the air, catching cold, and not obſerving any diet. It was remarked that all the three patients vomited frequently and ſeverely ſoon after the injection.

Whether this practice of injecting proper medicines into the blood may not be found of uſe in apoplexies, quinſies, hydrophobia, &c. is worthy to be tried by repeated experiments. The method of injecting liquors into the blood of living animals is ſaid to be the invention of Sir Chriſtopher Wren. His method was by making ligatures on the veins, and opening them on the ſide of the ligature towards the heart; then putting into them ſmall ſyringes or quills faſtened to bladders, in the manner of clyſter-pipes, containing the matter to be injected. Mr Boyle ſoon made the experiment upon dogs with infuſions of opium and crocus metallorum; all which he circumſtantially deſcribed in his Uſefulneſs of Experimental Philoſophy, part ii. eſſ. 2.

The ingenious Dr Hales made a variety of experiments of this kind on different animals.

Many diſorders of particular parts are noway curable, unleſs the parts affected are injected with a proper liquor, by means of a ſyringe and proper tube. The method of performing this is too obvious to need any directions; but theſe general cautions are neceſſary in regard to it, that the ſyringe or tube be applied tenderly and carefully to the parts, eſpecially in very ſenſible or nervous parts, to avoid giving the patient any pain; and that the liquor to be injected be neither too hot nor too cold.

In ulcerations and inflammations of the uvula, tonſils, and fauces, injections are generally uſeful: but care muſt be taken to preſs down the tongue with a ſpatula, or with the flat end of a ſpoon; and having introduced the ſyringe two or three fingers breadth into the mouth, the injection is to be carefully and gently thrown in at ſeveral times. In gonorrhœas, injections are often neceſſary, to allay the heat and ſoreneſs of the urethra, and to waſh out the matter. The ſafeſt and beſt injections on this occaſion are warm milk and barley-water, ſweetened with ſugar, honey, or ſyrup of marſhmallows; and towards the end a little ſaccharum ſaturni, diſſolved in plantane-water.

SYMPATHETIC INKS. Line 8. for *inviſible*, read *viſible*.

INSECTS, (*Encycl.*) See alſo GENERATION *of Inſects*, and ENTOMOLOGY, in this APPENDIX.

ISSUE, in law, is the fourth part or ſtage of an action, (ſee SUIT, WRIT, PROCESS, and PLEADINGS); wherein the parties join, and put their cauſe to the trial of the jury.

Iſſues are of two kinds; that upon matter of *fact*, and that upon matter of *law*. An iſſue in fact is when the plaintiff and defendant have agreed upon a point to be tried by a jury; an iſſue in law is when there is a demurrer to a declaration, plea, &c. and a joinder in demurrer, which is an iſſue at law to be determined by the judges.

Iſſues in fact are either *general* or *ſpecial*.

ISSUE *general*, ſeems to be that whereby it is referred to the jury to bring in their verdict, whether or no the defendant hath done any thing as the plaintiff lays to his charge. For example, if it be an offence againſt any ſtatute, and the defendant plead *not guilty*; this being put to the jury, is called the *general iſſue*. So if a man complains of a private wrong, which the defendant denies, and pleads no wrong, nor diſſeiſin, and this be referred to the jury; it is likewiſe the general iſſue.

ISSUE *ſpecial*, is that, wherein ſpecial matters being alleged by the defendant in his defence, both parties join in this point, and ſo go to a demurrer, if it be *quæſtio facti*; as in aſſault and battery, where the defendant pleads that the plaintiff ſtruck firſt.

JUNCI LAPIDEÆ, in natural hiſtory, the name given by authors to a piece of foſſil coral, of the *tubularia kind*, and compoſed of a congeries of ſmall tubules, which are uſually round and ſtriated within. See Plate CCCXVII.

K.

KALMIA, (*Encycl.*) The two ſpecies are the latifolia and the anguſtifolia. The firſt, a moſt beautiful ſhrub, riſes uſually to the height of five or ſix feet, and ſometimes twice that height in its native places. The ſtems of ſome are as big as the ſmall of a man's leg, though generally they are ſmaller, and covered with a brown rough bark. The wood is very cloſe grained, heavy, and hard like box. The limbs in general are crooked, and grow irregular; but are thick-clothed with ſtiff ſmooth leaves of a ſhining bright green. The flowers grow in bunches on the tops of the branches, to footſtalks of three inches long: they are white, ſtained with purpliſh red, conſiſting of one leaf in form of a cup divided at the verge into five ſections: in the middle is a ſtylus and 12 ſtamina; which, when the flower firſt opens, appear lying cloſe to the ſides of the cup at equal diſtances, their apices being lodged in ten little hollow cells, which being prominent on the outſide, appear as ſo many little tubercles. The flowers are ſucceeded by ſmall round capſulas; which when ripe open in five parts, and diſcharge its ſmall duſt like ſeeds. This plant is a native of Carolina, Virginia, and other parts of the northern continent of America; yet are not common, but are found only in particular places: they grow on rocks hanging over rivulets and running ſtreams, and on the ſides of barren hills. They bloſſom in May, and continue in flower the greateſt part of the ſummer. The noxious qualities of this elegant plant leſſen that eſteem which its beauty claims: for although deer feed on its green leaves with impunity, yet when cattle and ſheep, by ſevere winters deprived of better food, feed on the leaves of theſe plants, a great many of them die annually.

The kalmia anguſtifolia, riſes to the height of about 16 feet, producing evergreen leaves in ſhape like the lauro-ceraſus, but ſmall, and of a ſhining dark green. The flowers grow in cluſters, the buds of which appear in autumn wrapped up in a conic ſcaly perianthium, on which is lodged a viſcous matter, which protects them from the ſevere cold in winter. Theſe buds dilating in the following ſpring, break forth into twenty or more monopetalous flowers divided into five ſegments, and ſet ſingly on pedicles half an inch long. Theſe flowers, when blown, appear white; but on a near view are of a faint bluſh colour, which as the flower decays grow paler. One of the five petals is longer and more concave than the reſt, and is blended with purple, green, and yellow ſpecks, being a viſcous matter on the extremities of very fine hairs. The convex ſide of the ſame petal is alſo ſpeckled with yellowiſh green. The pointal riſes from the centre of the flower, and has its head adorned with ſcarlet, and ſurrounded by 10 ſtamina, whereof three are long and ſeven ſhort, whoſe farina iſſues out at a ſmall round hole at its top. This elegant tree adorns the weſtern and remote parts of Penſylvania, always growing in the moſt ſterile ſoil, or on the rocky declivities of hills and river-banks, in ſhady moiſt places.

KERATOPHYTUM, in natural hiſtory, a ſpecies of GORGONIA.—The keratophyta are called the *frutices carolloides*, or ſea-ſhrubs; and generally known among naturaliſts by the different appellations of *litophyta*, *lithoxyla*, and *keratophyta*; epithets tending to convey an idea of their compoſition, which at firſt view, ſeems to conſiſt partly of a woody or horny, partly of a ſtony or calcareous, ſubſtance, variouſly diſpoſed with re-

reſpect to each other. Their general form approaches to that of ſhrubs, having a root-like baſe, by which they adhere to ſome ſolid ſupport in the ocean; and a ſtem, or trunk, and branches differently diſpoſed; ſome riſing up in one or more different twigs, ſubdivided into ſmaller and ſeparate ramifications; while others have their ſmaller branches connected in ſuch a manner, as to form a curious net-like ſtructure: from this diverſity of figure, they borrow the names of *ſea-fans*, *ſea-feathers*, &c. The ſeeming fibres of the baſe are, in reality, ſmall tubes, of which the whole ſhrub conſiſts: theſe tubes run up longitudinally into the trunk, and are alſo circularly diſpoſed about the centre of the trunk: the woody part, as naturaliſts have called it, thus formed, affords, when burnt, a ſtrong ſmell like burning horn; whence ſome have called it *the horny part*. Upon this part is ſuperinduced a kind of ſtony or calcareous coat, which covers both trunk and branches to their extremities. In this coat may be diſcovered regular orders or pores of cells; and viewed by the microſcope, it always appears to be an organical body conſiſting of a regular congeries, like the cells in which animals have been formed or exiſted. Some of this kind of bodies have loſt their calcareous covering by the violence of the waves and other accidents. In ſome ſpecimens of an advanced growth, the calcareous tubes juſt mentioned, find out little cells of animals of the polype kind, with proper openings to them all: theſe cells are diffuſed along the branches in ſome regular order, much in the ſame manner as they are in the corallines. From the cells the animals have been diſcovered extending themſelves, as well to procure food as materials for the increaſe of this ſurpriſing ſtructure: and therefore there is no reaſon to doubt that they are animal productions.

A ſmall ſprig of the keratophyton ſtabelliforme, or warted ſea-fan, is repreſented in Plate CCCXVI. fig. 7. *c*. The outſide is covered with a cruſt full of little lumps like warts; which, when diſſolved in vinegar, diſcover the contracted bodies of polypes, like claws. C and C1 are two views of one of the warts magnified; C2, is the appearance of the polype when the cretaceous matter is diſſolved; C3, repreſents the particles that compoſe the incruſtation, magnified.—D, fig. 8. repreſents a ſea-willow, or keratophyton dichotomum. On both edges of the flat branches are regular rows of little riſing cells in the calcareous part, with ſmall holes for an entrance to each. See CORALLINES.

St KILDA, p. 4033. col. 1. line 8. For *having*, read *hanging*.

KINGSTON *upon* HULL, a town in the Eaſt Riding of Yorkſhire, ſeated on the north ſide of the river Humber. It is a handſome large place with two pariſh-churches. It is very well fortified, is one of the principal places in England for trade; a county of itſelf; ſends two members to parliament, and has the title of a duchy. W. Long. 0. 6. N. Lat. 53. 45.

KIRK-SESSIONS, the name of a petty eccleſiaſtical judicatory in Scotland. Each pariſh, according to its extent, is divided into ſeveral particular diſtricts; every one of which has its own elder and deacon to overſee it. A conſiſtory of the miniſters, elders, and deacons of a pariſh form a kirk-ſeſſion.

Theſe meet once a week, the miniſter being their moderator, but without a negative voice. It regulates matters relating to public worſhip, elections, catechiſing, viſitations, &c. It judges in matters of leſs ſcandal; but greater, as adultery, are left to the preſbytery; and in all caſes an appeal lies from it to the preſbytery.

KNOUT, is the name of a puniſhment inflicted in Ruſſia, with a kind of whip called *knout*, and made of a long ſtrap of leather prepared for this purpoſe. With this whip the executioners dexterouſly carry off a ſlip of ſkin from the neck to the bottom of the back laid bare to the waiſt, and repeating their blows, in a little while rend away all the ſkin off the back in parallel ſtrips. In the common knout, the criminal receives the laſhes ſuſpended on the back of one of the executioners: but in the great knout, which is generally uſed on the ſame occaſions as racking on the wheel in France, the criminal is raiſed into the air by means of a pulley fixed to the gallows, and a cord faſtened to the two wriſts tied together; a piece of wood is placed between his two legs, alſo tied together; and another of a crucial form under his breaſt. Sometimes his hands are tied behind over his back, and when he is pulled up in this poſition, his ſhoulders are diſlocated. The executioners can make this puniſhment more or leſs cruel: and, it is ſaid, are ſo dexterous, that when a criminal is condemned to die, they can make him expire at pleaſure, either by one or ſeveral laſhes.

L.

LAMPYRIS, the FIRE-FLY, a genus of inſects belonging to the coleoptera order; the characters of which are: The antennæ are filiform; the elytra are flexible; the thorax is flat, of a ſemiorbicular form, ſurrounding and concealing the head. The ſegments of the abdomen terminate in papillæ, which are turned up towards the elytra, and partly fold one over the other. The females in general are apterous.

There are 18 ſpecies; of which the moſt remarkable is the noctiluca. The male of this inſect is leſs than the female: its head is ſhaped exactly in the ſame manner, and covered likewiſe by the plate of the thorax, only it appears rather longer than that of the female. Both the head and antennæ are black. The thorax of the male, which is ſmaller and ſhorter than that of the female, has the folds and papillæ on its ſides much leſs remarkable: but the greateſt difference that is found between the two ſexes is, that the male is covered with brown elytra, ſhagreened and marked with two lines longitudinally. The elytra are longer than the abdomen, and under them lie the wings. The two laſt rings of the abdomen are not ſo bright as thoſe of the female, only there appear four luminous points, two upon each of the two laſt rings.

Barbut on Inſects.

The inſect called *glow-worm*, and which is frequently met with towards evening, in the month of June, in woods and meadows, is the female belonging to this ſpecies. By the ſhining light which it emits, it attracts the male; a wonderful inſtance of the divine providence. It is apparent that their ſhining light depends on a liquor placed at the lower extremity of the inſect, which when in motion, the light is more lively and ſhining, and of a finer green. This light the inſect withdraws at pleaſure, either by unfolding or contracting itſelf. As a proof that the light depends on a phoſphorous matter, you may cruſh the animal, which, though dead and bruiſed, leaves a luminous ſubſtance on the hand, that only loſes its luſtre when dried.

The perfect inſect flies about during the evening in autumn, and frequents the graſſy plantations of juniper trees.

Beauty of LANGUAGE, p. 4095. col. 2. l. 4. from bottom, for *Part II.* read *Part III.*

LARVA, in natural hiſtory, a name given by Linnæus to inſects in that ſtate called by other writers *eruca* or *caterpillar*.

LARVÆ, in antiquity, derived from the Hetruſcan word *lar* or *lars*, ſignifying *prince* or *lord*, denoted the ghoſts of the deceaſed, conſidered as wicked and miſchievous. Hence is formed the term *larvatus*, i. e. *larvâ indutus*, or *demoniac*. The ingenious Mr Farmer urges the etymology and uſe of this term to prove, that the heathen demons were human ghoſts.

LEASE, from the French *laiſer*, *demittere*, "to lett," in law, a demiſe, or letting of lands, tenements, or hereditaments, unto another for life, term of years, or at will, for a rent reſerved.

A leaſe is either written, called an *indenture*, *deed-poll*, or *leaſe* in writing; or by word of mouth, called *leaſe parole*.

All eſtates, intereſts of freehold, or terms for years in lands, &c. not put in writing and ſigned by the parties, ſhall have no greater effect than as eſtates at will; unleſs it be of leaſes not exceeding three years from the making; wherein the rent reſerved ſhall be two-thirds of the value of the things demiſed. Leaſes exceeding three years muſt be made in writing; and if the ſubſtance of a leaſe be put in writing, and ſigned by the parties, though it be not ſealed, it ſhall have the effect of a leaſe for years, &c.

An *aſſignment* differs from a leaſe only in this; that by a leaſe one grants an intereſt leſs than his own, reſerving to himſelf a reverſion; in aſſignments he parts with the whole property, and the aſſignee ſtands to all intents and purpoſes in the place of the aſſignor.

LEASE, in Scots law. See TACK, (*Encycl.*)

LEPAS, the ACORN, in zoology, a genus belonging to the order of vermes teſtacæa. The animal is the triton; the ſhell is multivalve, unequal, fixed by a ſtem or ſeſſile. There are ſeveral ſpecies, of which the moſt remarkable is the anatifera, conſiſting of five ſhells depreſſed, affixed to a pedicle and in cluſters. It adheres to the bottom of ſhips by its pedicles. The tentacula from its animal are feathered; and have given the old Engliſh hiſtorians and naturaliſts the idea of a bird. They aſcribed the origin of the barnacle gooſe to thoſe ſhells. See Plate CLIX. fig. 8.

LEUCOMA, in medicine and ſurgery. See ALBUGO in this APPENDIX.

LIBELLULA, (*Encycl.*) See Plate CCCXXII.

LIBERTY, p. 4206. col. 2. line 5. from the bottom, for PARLIAMENT read PREROGATIVE.

LIBERTY, phyſical, is that principle of ſpontaneity or ſelf-determination which conſtitutes us agents; or which gives us a command over our actions, rendering them properly ours, and not effects of the operation of any foreign cauſe. See METAPHYSICS, (*Encycl.*) n° 78—80. Without this liberty, or being under a neceſſity of always following ſome will different from his own, man would be a machine acted upon by mechanical ſprings, having no principle of motion in himſelf, or command over events; and therefore incapable of all merit or demerit.

Whether man is endued with this kind of liberty or ſelf-determining power, has been a ſubject of much controverſy: it was agitated at the beginning of this century between Leibnitz, Collins, &c. on one ſide, and Clarke, Jackſon, &c. on the other; and has been lately revived by Dr Prieſtley.

The principal arguments in favour of liberty, as it is popularly underſtood, and as it is defined above, are the following. This principle is neceſſary to conſtitute man an agent. For, as far as it is true of a being that he acts, ſo far he muſt himſelf be the cauſe of the action, and therefore not neceſſarily determined to act: but if he has no abſolute power over his own actions, *i. e.* if he be not a free agent, the actions which he performs cannot properly be ſaid to be his own, but muſt be aſcribed to ſome other power by which he is led on to perform them; as a good clock or watch performs the motions aſſigned to it by the artiſt. This argument is excellently illuſtrated by Dr Clarke. Man, ſays he, either has within himſelf a principle of action, properly ſpeaking, *i. e.* a ſelf-moving faculty, a principle or power of beginning motion; or he has not. If he has within himſelf ſuch a principle, then he is a free, and not a neceſſary agent: for every neceſſary agent is moved neceſſarily by ſomething elſe; and then that which moves it, not the thing itſelf which is moved, is the true and only cauſe of the action. That any other thing operating upon an agent ſhould efficiently and neceſſarily produce ſelf-motion in that agent, is a direct contradiction in terms. If man has not within himſelf a principle or power of ſelf-motion, then every motion and action of man is chiefly and properly produced by the efficiency of ſome extrinſic cauſe; which cauſe muſt be either what we uſually call the motive or reaſon upon which a man acts; or elſe it muſt be ſome inſenſible ſubtile matter, or ſome other being or ſubſtance making an impreſſion upon him. If the reaſons or motives upon which a man acts be the immediate and efficient cauſe of the action, then either abſtract notions, ſuch as all reaſons and motives are, have a real ſubſiſtence, that is, are themſelves ſubſtances; or elſe that which has itſelf no real ſubſiſtence can put a body into motion; either of which is manifeſtly abſurd. If inſenſible ſubtile matter, or any other being or ſubſtance, continually making impreſſion upon a man, be the immediate and efficient cauſe of his acting; then the motion of that ſubtile matter or ſubſtance muſt be cauſed by ſome other ſubſtance, and the motion of that by ſome other, till at laſt we arrive at a free agent; and then liberty is a poſſible thing, and man poſſibly may have liberty: and if he may poſſibly have it, then experience will prove that he probably, nay, that he certainly has it. If we never arrive at any free cauſe, then there is either *in infinitum* a progreſſion of motions without any mover, of effects without any cauſe, of things acted without any agent; which is a manifeſt contradiction, or elſe motion exiſts neceſſarily of itſelf. If motion exiſts neceſſarily of itſelf, it muſt be either with a determination every way, or one certain way: if with a determination every way, this is no motion at all; if with a determination one certain way, then that determination is either neceſſary, and conſequently all other determinations impoſſible, which is contrary to experience; or elſe there muſt be a particular reaſon of that determination, and ſo backwards *in infinitum*; which comes to the forementioned abſurdity, of effects exiſting without any cauſe.

Farther, liberty is the dictate of our own conſciouſneſs: we have really the ſame conſtant and neceſſary conſciouſneſs of liberty that we have that we think, chooſe, will, or even exiſt; and, whatever men may ſay to the contrary, it is impoſſible for them in earneſt to think they have no active ſelf-moving powers, and are not the cauſes of their own volitions, or not to aſcribe to themſelves what they muſt be conſcious they think and do. Mr Hume, though he denies the reality of liberty, grants that we have a feeling of it; that the divine plan required that we ſhould be ſo made, as to ſeem to ourſelves free; that the whole conſtitution of things is as if we were free; and that being under a neceſſity of approving and diſapproving actions and characters, we are ſo far under a neceſſity of believing ourſelves and others free. After theſe conceſſions, it can hardly be imagined that the conſtitution of nature ſhould be altogether impoſition and deceit.

Beſides, if man be not, in the ſtricteſt ſenſe of the word, a free agent, he can be no moral agent. It is hard to ſay what virtue and vice, commendation and blame, mean, if they do not ſuppoſe agency, voluntary motion, free choice, and an abſolute dominion over our reſolutions. Can we applaud or reproach ourſelves for what we were no more the cauſes of than of our own beings, and what it was no more poſſible for us to prevent than the returns of the ſeaſons, or the revolutions of the planets? On the ſyſtem of neceſſity, conſcience is an inexplicable principle: its cenſures or applauſe are equally futile and groundleſs: the approbation of mankind is an inſult with regard to thoſe on whom it is beſtowed, becauſe they can have no merit; and the reproach of men unjuſt and cruel, becauſe there can be no demerit and ground of blame. Whatever difficulties, therefore, may attend the nature of that influence which we aſcribe to motives, they cannot be the efficient neceſſitating cauſe of human actions: ſince, on this ſuppoſition, there could be but one agent in the univerſe; who muſt equally be the author of all the good and evil in the world, and on whom muſt ultimately be charged the ſin and miſery, as well as the virtue and happineſs, of his creatures.

Moreover, it has been urged by the advocates of liberty, that if mens determinations and actions flow neceſſarily from the previous ſtate of their minds and the motives or influences reſulting from a nature or condition impoſed upon them without their own conſent or choice, the idea of reſponſibility or accountableneſs muſt vaniſh, and there can be no propriety or uſe of rewards or puniſhments. God cannot reward without virtue, and there can be no virtue without a ſelf-determining power: he cannot puniſh without guilt, and there can be no guilt when men do what they cannot avoid doing, and when their actions ariſe from circumſtances in which their Creator placed them.

It is alſo equally unjuſt and uſeleſs to threaten puniſhment or inflict it on men, to prevent crimes, when they are neceſſarily determined in all their actions. And if men are neceſſary agents, though we cannot well admit this verbal contradiction, it can be of no uſe to reaſon with them, to admoniſh or intreat them; and God muſt be inſincere in his addreſſes and invitations, and cruel in his requirements and commands. But ſuch is the whole tenor of revelation; and therefore the concluſion is neceſſary, that man is a free agent, capable of good or evil, and of determining his purſuit of either, from the ſole power of his own judgment or will. See on this ſubject Collins's Inquiry concerning Human Liberty, firſt printed in 1717. Clarke's Remarks, 1717; and Collection of Papers which paſſed between Mr Leibnitz and Dr Clarke, in 1715 and 1716. Jackſon's Vindication and Defence of Human Liberty, 1730. Price's Review of the principal Queſtions, &c. in Morals, p. 315, &c. edit. 1758. Prieſtley's Doctrine of Philoſophical Neceſſity, 1777.—For the objections againſt liberty, and the arguments in ſupport of neceſſity, ſee NECESSITY.

LIEUTAUD (Dr Joſeph), counſellor of ſtate and firſt phyſician at the court of France, was born at Aix in Provence, and reſided principally there till he took the degree of doctor of medicine. After this he proſecuted his ſtudies for ſome years at Montpelier. He returned to Aix, where he ſoon acquired extenſive practice, and became eminent for literary abilities. He reſided there till the year 1750, when he was invited to act as phyſician to the royal infirmary at Verſailles. There he practiſed with ſuch reputation and ſucceſs, that he ſoon arrived at the head of his profeſſion; and in the year 1774, upon the death of M. Senac, he was appointed archiater. His extenſive engagements in practice did not prevent him from cultivating the ſcience of medicine in all its branches, and from freely communicating to others the reſult of his own ſtudies. He publiſhed many valuable works; among which the following may be accounted the moſt remarkable, 1. *Elementa Philologiæ*. 2. *Precis de la Medicine*. 3. *Pratique Precis de la Matiere Medicale*. 4. *Eſſais Anatomique*. 5. *Synopſis Univerſæ Praxeos Medicinæ*. 6. *Hiſtoria Anatomico-Medica*. He died at Verſailles Dec. 8. 1780. in the 78th year of his age.

LINARIA, TOAD-FLAX, in botany. See ANTIRRHINUM, (*Encycl.*)

LIPOTHYMIA, FAINTING; in medicine. See there, n° 207, 382, 383.

LITHOSTROTION, in natural hiſtory, the name of a ſpecies of foſſil coral, compoſed of a great number of long and ſlender columns, ſometimes round, ſometimes angular, jointed nicely to one another, and of a ſtarry or radiated ſurface at their tops. Theſe are found in conſiderable quantities in the northern and weſtern parts of this kingdom, ſometimes in ſingle, ſometimes in complex ſpecimens. See Plate CCCXVII.

LUNARIA, MOON-WORT, in botany. See OSMUNDA in this APPENDIX.

LYMINGTON, a town of Hampſhire in England ſituated on a hill near the ſea, in W. Long. 1.

45. N. Lat. 50.45. It ſends two members to parliament, and is remarkable for the great quantities of ſea-ſalt made in the neighbourhood. At theſe ſalt-works are prepared great quantities of ſal catharticus amarus, which being ſhot into large cryſtals is ſold for true Glauber's ſalt, under the name of *Lymington's ſalts*.

LYCANTHROPIA, a terrible kind of madneſs; ſuppoſed to be that which in Scripture is called poſſeſſion with a legion of devils. See MEDICINE, n° 86.

LYCOPERSICON, in botany; *love apple*, *wolf's peach*, or *tomatas*. See SOLANUM, (*Encycl.*)

M.

MACBRIDE (Dr David), an eminent phyſician and philoſopher, was deſcended from an ancient family in the county of Galloway in Scotland. His grandfather, a clergyman, had ſettled in Ireland about the end of the laſt century, as miniſter to a Preſbyterian congregation at Belfaſt; and his father, who followed the ſame line, was ſettled at Ballymony in the county of Antrum, where he married, and where our author was born in April 1726. After a proper ſchool-education, and having paſſed ſome time under the tuition of an eminent ſurgeon in his native place, he was ſent to the univerſity of Glaſgow. Having there completed the uſual courſe of academical ſtudies, he came to Edinburgh for the further proſecution of medical ſcience. After a ſhort ſtay here, a war then prevailing between France and Britain, he was induced to go on board the navy in the ſtation of a ſurgeon's mate. In the ſervice of his country he continued for ſeveral years; and after diſcharging for ſome time the duties of an aſſiſtant, he was raiſed to the rank of ſurgeon. In this ſituation, he firſt turned his thoughts towards the diſcovery of a remedy for the ſea-ſcurvy. It was not, however, at this period, that either chance or reaſoning ſuggeſted to him the employment of an article, which has ſince been attended with the moſt beneficial conſequences. Here he had an opportunity only of obſerving the ſymptoms, of ſtudying the nature, and of lamenting the conſequences of the diſeaſe.

The termination of the war by the peace of Aix-la-Chapelle, put a period to Dr Macbride's employment as a naval ſurgeon. He had now probably obtained much medical knowledge in the ſchool of experience; but he was ſenſible that he had ſtill much to acquire in that of ſcience. An ardent keenneſs to mingle in active life had led him from the ſchools of medicine at an earlier period than could have been wiſhed; and an earneſt deſire to found his future practice in the beſt eſtabliſhed principles led him back to them, when a judgment, matured by years, and informed from the obſervation of facts, rendered him capable of hearing teachers with greater advantage. He returned therefore to Edinburgh, and again entered on the career of academical purſuits, under the tuition of Dr Monro, and thoſe other teachers, whoſe abilities raiſed the fame of the medical ſchool at this place. But, not ſatisfied with the inſtructions to be had from any one ſet of profeſſors, the celebrity of the medical teachers in London led him alſo to viſit that capital. There he particularly became the pupil of thoſe diſtinguiſhed lecturers, Dr Hunter and Dr Smellie. And while from the former he laboured to acquire an accurate chirurgical knowledge, from the latter he endeavoured to obtain the true principles of midwifery conſidered as a ſcience. At the ſame time, he was no leſs induſtrious in improving himſelf in the ſucceſsful practice of both arts by attention at hoſpitals.

Thus prepared for the exerciſe of his profeſſion, about the end of the year 1749 he fixed his reſidence in Dublin in the character of ſurgeon and accoucheur. If amiable manners, and extenſive knowledge of his profeſſion, could alone have been ſufficient introductions to practice, he might in a ſhort time have looked for a competent ſhare of buſineſs in that capital; but while he had to combat that objection which very generally ariſes from youth, his progreſs was alſo not a little retarded by an uncommon degree of modeſty. Hence for ſeveral years he remained almoſt in a ſtate of obſcurity, and was employed by but few people either of rank or fortune. But, if it is to be regretted that for many years his time was not ſo fully employed in the lucrative part of his profeſſion as was due to his merit, it ought ſtill to be remembered, that this eſſentially promoted the cauſe of ſcience: for by this means his genius and induſtry were directed to medical reſearches; and were productive of diſcoveries which will with honour tranſmit his name to lateſt poſterity. Theſe, though ſome of them might have been ſucceſsfully turned to his own emolument, were fully communicated to the world in different publications; and he did not ſhow greater ingenuity in making diſcoveries, than liberality of ſentiment in publiſhing them for the advantage of others.—His firſt publication, intitled, "Experimental Eſſays on medical and philoſophical Subjects," made its appearance in the year 1764.—Theſe eſſays are five in number: 1. On the fermentation of alimentary mixture and the digeſtion of the food. 2. On the nature and properties of fixed air. 3. On the different kinds of antiſeptics. 4. Of the diſſolvent power of quicklime. 5. Of the ſea-ſcurvy. The merit of all theſe is ſufficiently known and acknowledged: but the laſt of them is unqueſtionably the moſt important; the method therein propoſed of both the prevention and cure of that dreadful diſeaſe the ſcurvy, having been confirmed by repeated and undeniable obſervation.

Having thus equally diſtinguiſhed himſelf as an ingenious philoſopher and able practitioner, the world were not now ſlow in beſtowing upon him the tribute of applauſe to which he was entitled. His name was enrolled with honour in the liſts of many learned ſocieties; and the univerſity where his ſtudies had firſt been commenced, were proud to confer upon him the degree of Doctor of Medicine.

The reputation, however, of being a diſtinguiſhed author, was to him but a ſecondary object; and his talents were not confined to the advancement of medicine alone. Having ſucceſsfully diſcovered a conſiderable improvement in the art of tanning, with that ſpirited generoſity which is ever the concomitant of real

Macbride,

real worth, he ſpeedily and freely communicated it to the public, by publiſhing, firſt, "An account of a new method of tanning;" and afterwards, "Inſtructions for carrying on the new method of tanning." As a mark of approbation for this liberal conduct, as well as a teſtimony of reſpect for his ingenuity, prize-medals were conferred upon him by the Societies of Arts both in London and Dublin. But his laſt and moſt extenſive publication was more immediately in the line of his own profeſſion: It is intitled, "A Methodical Introduction to the Theory and Practice of Medicine." In that valuable work he has given a conciſe and connected view of the principles and practice of the healing art, as beſt eſtabliſhed by ſound reaſoning, and confirmed by accurate obſervation. Moſt, if not all theſe publications, not only went thro' various editions, but were tranſlated into different languages.

After the merit of Dr Macbride came to be properly known, the public ſeemed to ſhow a deſire of making compenſation for having ſo long overlooked it. His employment increaſed ſo rapidly, that he had more buſineſs than he could tranſact either with eaſe or ſafety. This having kept him in perpetual agitation both of body and mind, at laſt induced an almoſt total incapacity of ſleeping. From this circumſtance his health could not fail to be impaired. In this ſituation, after accidental expoſure to cold, he was attacked with a fever, which put an end to his life on the 13th of December 1778, in the 53d year of his age.

Thoſe who were his moſt intimate acquaintance were inclined to believe that his death was not a little haſtened by domeſtic calamities. During his reſidence in Dublin he was twice married, and was as often ſubjected to that inexpreſſible diſtreſs which muſt reſult from a final ſeparation in this world from the moſt intimate and loving friends. By both of his wives he had ſeveral children; but none of them ſurvived their father. And on theſe calamitous events, although he was able to conceal his feelings from the world, yet they gave a ſevere ſhock to his conſtitution. After his death, ſeveral of the playful trinkets of his infants, with the ſignature of *dulces exuviæ*, were found in his repoſitories among papers on medical and other important ſubjects: an incontrovertible proof, that in him at leaſt, the great mind of the philoſopher was conjoined with the feeling heart of the affectionate father.

But if his abilities were remarkable as a philoſopher and phyſician, if his conduct was exemplary as an huſband and parent, his manners were no leſs amiable as a companion and friend. His polite and benevolent conduct, joined to his taſte for the fine arts, conciliated the affections and eſteem of all who knew him. His death was univerſally and ſincerely lamented in the city of Dublin.

MADREPORA, in natural hiſtory, the name of a genus of ſubmarine ſubſtances; the characters of which are, That they are almoſt of a ſtony hardneſs, reſembling the corals, and are uſually divided into branches, and pervious by many holes or cavities, which are frequently of a ſtellar figure.

In the Linnæan ſyſtem, this is a genus of lithophyta: The animal that inhabits it is the meduſa; it comprehends 39 ſpecies. According to Donati, the madrepora is like the coral as to its hardneſs, which is equal to bone or marble; the colour is white when poliſhed; its ſurface is lightly wrinkled, and the wrinkles run lengthwiſe of the branches; in the centre there is a ſort of cylinder, which is often pierced thro' its whole length by two or three holes. From this cylinder are detached about 17 laminæ, which run to the circumference in ſtraight lines; and are tranſverſely interſected by other laminæ, forming many irregular cavities; the cellules, which are compoſed of theſe laminæ ranged into a circle, are the habitations of little polypes, which are extremely tender animals, generally tranſparent, and variegated with beautiful colours. M. de Peyſſonel obſerves, that thoſe writers who only conſidered the figures of ſubmarine ſubſtances, denominated that claſs of them, which ſeemed pierced with holes, *pora;* and thoſe, the holes of which were large, they called *madrepora.* He defines them to be all thoſe marine bodies which are of a ſtony ſubſtance, without either bark or cruſt, and which have but one apparent opening at each extremity, furniſhed with rays that proceed from the centre to the circumference. He obſerves that the body of the animal of the madrepora, whoſe fleſh is ſo ſoft that it divides upon the gentleſt touch, fills the centre; the head is placed in the middle, and ſurrounded by ſeveral feet or claws, which fill the intervals of the partitions obſerved in this ſubſtance, and are at pleaſure brought to its head, and are furniſhed with yellow papillæ. He diſcovered that its head or centre was lifted up occaſionally above the ſurface, and often contracted and dilated itſelf like the pupil of the eye: he ſaw all its claws moved, as well as its head or centre. When the animals of the madrepora are deſtroyed, its extremities become white. In the madrepora, he ſays, the animal occupies the extremity; and the ſubſtance is of a ſtony but more looſe texture than the coral. This is formed, like other ſubſtances of the ſame nature, of a liquor which the animal diſcharges; and he farther adds, that there are ſome ſpecies of the polype of the madrepora, which are produced ſingly, and others in cluſters.

Madrepora
‖
Magnolia.

MALALEUCA, the CAYPUTI TREE; a genus of the polyandria order, belonging to the polyadelphia claſs of plants. There is but one ſpecies, viz. the leucodendra, a native of the Eaſt Indies and South-Sea iſlands. Mr Forſter relates that they were found in the iſland of New Caledonia. They were black at the root, but had a bark perfectly white and looſe, with long narrow leaves like our willows. The leaves are extremely fragrant and aromatic; and Rumphius tells us, that from them the natives of the Moluccas make the oil called *cayputi.* This oil is commended as a nervous medicine, and as being uſeful in ſome cardialgies. The doſe is four or five drops in ſome convenient liquor.

MAGNOLIA, (*Encycl.*) The glauca generally grows in a poor ſwampy ſoil, or on wet meadows. The Engliſh and Swedes in Penſylvania and New Jerſey call it *beaver-tree,* becauſe the root of this tree is the dainty of beavers, which are caught by its means. It drops its leaves early in autumn, though ſome of the young trees kept them all the winter. This tree is ſeldom found to the north of Penſylvania, where it begins to flower about the end of May. The ſcent of its bloſſoms is exquiſite: for by it you can diſcover, within three quarters of an Engliſh mile, whether theſe little trees ſtand in the neighbourhood, provided the wind be not againſt it; for the whole air is filled with this ſweet and pleaſant odour. It is beyond deſcription agreeable to travel in the woods about that time, eſpecially towards night. They retain their flowers for three weeks, and even longer, according to the quality of the ſoil on which the trees ſtand; and during the whole time of their being in bloſſom, they ſpread their odoriferous exhalations. The berries likewiſe look very fine when they are ripe; for they have a rich red colour, and hang in bunches on ſlender ſtalks. The cough and other pectoral diſeaſes are cured by putting the berries into rum or brandy, of which a draught every morning may be taken: the virtues of this remedy were univerſally extolled, and even praiſed, for their ſalutary effects in conſumptions. The bark being put into brandy, or boiled in any other liquor, is ſaid not only to eaſe pectoral diſeaſes, but likewiſe to be of ſome ſervice againſt all internal pains and heat; and it was thought that a decoction of it could ſtop the dyſentery. Perſons who had caught cold boiled the branches of the beaver-tree in water, and drank it to their great relief. *Kalm.*

MAN-OF-WAR BIRD, (*Pelecanus Aquilus*, Lin.) Its bill is more than a hand's-breadth long, and is narrow: the upper jaw is ſomewhat the longeſt, with a hook-ſhaped point: the cere, which is blue, covers the bill from the eyes to the hook-ſhaped point: the mandibles have no ſuch ſerrated inciſions (ſupplying the place of teeth) as are uſually found in ſea-birds: the head is covered with ſhort feathers as far as the eyes, which are pretty large: the tongue is large, almoſt trifid at the top; the corner at its bottom is ſplit: the temples are naked: the wings conſiſt of three parts, and are very long; of the 22 quill feathers, the firſt ten are of a conſiderable length; the two inner joints contain, beſides the coverts, 22 ſecondary feathers: the outward of the 12 tail-feathers are much longer than the middle ones, which make the tail look like a pair of ſciſſars. The bird is about the ſize of a gooſe, and is a yard long: the colour of the whole body, and of the toes, is black; but the head, breaſt, belly, and fore-part of the neck, are of a fine white. Its food is fiſhes, which it takes from others, becauſe it is not formed to catch them itſelf: the Engliſh for this reaſon call it *man of war*.

MARANTA, line 4. for *Galanea*, read *Galanga*.

MARBELLA, a town of Andaluſia in Spain, ſituated at the mouth of the Rio Verde, 30 miles north-eaſt of Gibraltar, and 28 ſouth-weſt of Malaga. W. Long. 5. 25. N. Lat. 30. 25.

MARINE REMAINS, a term uſed by many authors to expreſs the ſhells of ſea-fiſhes, and parts of cruſtaceous and other ſea-animals, found in digging at great depths in the earth, or on the tops of high mountains. Their being lodged in theſe places, is an evident and unqueſtionable proof of the ſea's having once been there, ſince it muſt have covered thoſe places where it has left its productions. It has been a favourite ſyſtem with many, and particularly with the late Dr Woodward, that all theſe marine bodies were brought to the places where they now lie, by the waters of the univerſal deluge; which, as we are informed by holy writ, covered the whole ſurface of the globe, and even the higheſt mountains. But though this is a very ready expedient to account for many of the natural phenomena, yet there are evident proofs that it cannot have been the cauſe of all that is attributed to it; and there muſt neceſſarily have been ſome other cauſe of many of theſe remains having been placed where we now find them. Neither does the opinion of ſome particular authors, that partial inundations of different places have left theſe marine bodies behind them at the receſs of the waters, ſeem ſufficient to account for the multitudes of theſe remains, many of which we find thrown upon places inacceſſible to ſuch floods.

Signior Moro has attempted to account for theſe phenomena on a new plan of reaſoning. He obſerves, that it is the beſt baſis of argument to begin from facts; and that if we can certainly find how ſome part of theſe animal remains come to be depoſited at ſuch great diſtances from their natural reſidence, we may very rationally conclude, that by the ſame means, be they what they will, all the reſt were alſo brought thither. He adds, that the earth, once the bottom o the ſea, or the level ſurface of a plain, may be, and frequently has been, in the memory of man, raiſed up into a mountain by ſubterranean fires, earthquakes, and volcanoes. He mentions the famous inſtance of the new iſland raiſed out of the bottom of the ſea near Santorini in the year 1707, which became of a circumference not leſs than ſix miles, and of the new mountain raiſed near Puzzoli in 1538.

Theſe, and many other like facts, prove that the origin of mountains and iſlands may have been ſuch, and that the matter they conſiſt of may have been the ſame with what was once the bottom of the ſea; and that the marine bodies found in theſe mountains were ſuch as were living, or remaining of living fiſh at the time when the iſlands or mountains were ſo raiſed above the ſurface of the water which before covered it.

This is no new opinion; but this author has ſet it in a new and much ſtronger light than it ever had appeared in before, by the inſtances and examples he has brought in proof of it. Some have been fond of believing that the bodies we call *marine remains*, were never indeed any parts of living animals, but that they are mere *luſi naturæ* formed in the places where they are found; but Fabius Columna proved this to be an error, ſhowing that the ſhark's teeth, or gloſſopetræ of the iſland of Malta, when calcined by a ſtrong fire, yielded aſhes the ſame with thoſe from animal-bodies, and by no means of the ſame nature with thoſe produced from calcined ſtones.

That changes of parts of the bottom of the ſea into dry land, have often been made, is proved not only from the late known inſtances, but from the teſtimonies of Strabo, Pliny, and other writers of credit: and nothing is more obvious to reaſon, than that in the ſudden riſe of ſuch parts of the bottom of the ſea, all its contents, all the ſhells, and other hard parts of fiſhes lying there, would be carried up with it.

As ſome mountains and ſome iſlands muſt have certainly been produced in this manner, it is not impoſſible but that all of them may have been ſo; and there is no more than this required to account clearly and evidently for all the vaſt profuſion of marine bodies at land as we find them, without having recourſe to the improbable means of the univerſal deluge, which for many plain reaſons cannot have been the cauſe; or to the

Marita-gium, ‖ Maſora.

the effects of particular inundations, which muſt have been wholly incapable of lodging many of them there. The lodgment of ſhells in the ſolid ſtrata of mountains, is better accounted for by this ſyſtem of Signior Moro than any other: and if it be aſked why ſome mountains afford them in great plenty, and others not at all, it will not be difficult to anſwer, by obſerving, that among the mountains of the more known parts of the world, ſome conſiſt of mere ſolid rock, and others of various ſtrata of earthy and other matter; that the firſt of theſe may be ſuppoſed primary or natural mountains, and the others ſecondary or accidental ones; and that theſe marine remains are always wanting in the former, and uſually are found in the latter, which is a fact greatly favourable to this ſyſtem.

There are many difficulties attending the accounts of all authors of the formation of the earth, and the lodging theſe bodies in it; nor is this laſt ſyſtem without difficulty. The cauſes here aſſigned as to the origin of mountains and iſlands, doubtleſs have been ſo in regard to ſome, but ſcarce to all; and the bodies here treated of are ſo numerous, in ſome particular places, that ſcarce any account can ſolve the difficulty of their being collected together in ſo ſtrange a manner.

MARITAGIUM, (*Encycl.*) In the feudal cuſtoms, *maritagium* (as contradiſtinguiſhed from *matrimonium*) ſignifies the power which the lord or guardian in chivalry had of diſpoſing of his infant ward in matrimony. For while the infant was in ward, the guardian had the power of tendering him or her a ſuitable match, without diſparagement or inequality: which if the infants refuſed, they forfeited the value of the marriage, *valorem maritagii*, to their guardian; that is, ſo much as a jury would aſſeſs, or any one would *bona fide* give to the guardian for ſuch an alliance: and if the infants married themſelves without the guardian's conſent, they forfeited double the value, *duplicem valorem maritagii*.

MASCULUS FLOS. See FLOS *Maſculus* in this APPENDIX.

MASORA, a term in the Jewiſh theology, ſignifying a work on the Bible, performed by ſeveral learned rabbins, to ſecure it from any alterations which might otherwiſe happen.

Their work regards merely the letter of the Hebrew text; in which they have, firſt, fixed the true reading by vowels and accents: they have, ſecondly, numbered not only the chapters and ſections, but the verſes, words, and letters of the text: and they find in the Pentateuch 5245 verſes, and in the whole Bible 23206. The maſora is called, by the Jews, the *hedge or fence of the law*, becauſe this enumeration of the verſes, &c. is a means of preſerving it from being corrupted and altered. They have, thirdly, marked whatever irregularities occur in any of the letters of the Hebrew text; ſuch as the different ſize of the letters, their various poſitions and inverſions, &c. and they have been fruitful in finding out reaſons for theſe irregularities and myſteries in them. They are, fourthly, ſuppoſed to be the authors of the Keri and Chetibh, or the marginal corrections of the text in our Hebrew Bibles.

The text of the ſacred books, it is to be obſerved, was originally written without any breaks or diviſions into chapters or verſes, or even into words; ſo that a whole book, in the ancient manner, was but one continued word; of this kind we have ſtill ſeveral ancient manuſcripts, both Greek and Latin. In regard, therefore, the ſacred writings had undergone an infinite number of alterations, whence various readings had ariſen, and the original was become much mangled and diſguiſed, the Jews had recourſe to a canon, which they judged infallible, to fix and aſcertain the reading of the Hebrew text; and this rule they call *maſora*, "tradition," from מסר, *tradidit*, as if this critique were nothing but a tradition which they had received from their forefathers. Accordingly they ſay, that when God gave the law to Moſes at mount Sinai, he taught him, firſt, the true reading of it; and, ſecondly, its true interpretation; and that both theſe were handed down by oral tradition, from generation to generation, till at length they were committed to writing. The former of theſe, viz. the true reading, is the ſubject of the maſora; the latter, or true interpretation, that of the miſhna and gemara.

Maſora, Maſque.

According to Elias Levita, they were the Jews of a famous ſchool at Tiberias, about 500 years after Chriſt, who compoſed, or at leaſt began, the maſora; whence they are called *maſorites*, and *maſoretic doctors*. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it; and which ſerve for vowels.

The age of the maſorites has been much diſputed. Archbiſhop Uſher places them before Jerom; Capel, at the end of the fifth century; father Morin, in the tenth century. Baſnage ſays, that they were not a ſociety, but a ſucceſſion of men; and that the maſora is the work of many grammarians, who, without aſſociating and communicating their notions, compoſed this collection of criticiſms on the Hebrew text. It is urged that there were maſorites from the time of Ezra and the men of the great ſynagogue, to about the year of Chriſt 1030; and that Ben Aſher and Ben Naphtali, who were the beſt of the profeſſion, and who, according to Baſnage, were the inventors of the maſora, flouriſhed at this time. Each of theſe publiſhed a copy of the whole Hebrew text, as correct, ſays Dr Prideaux, as they could make it. The eaſtern Jews have followed that of Ben Naphtali, and the weſtern that of Ben Aſher; and all that has been done ſince is to copy after them, without making any more corrections or maſoretical criticiſms.

The Arabs have done the ſame thing by their Koran that the maſorites have done by the Bible; nor do the Jews deny their having borrowed this expedient from the Arabs, who firſt put it in practice in the ſeventh century.

There is a great and little maſora printed at Venice and at Baſil, with the Hebrew text, in a different character. Buxtorf has written a maſoretic commentary, which he calls *Tiberias*.

MASQUE, or MASK, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preſerve their complexion from the weather, or out of modeſty, to prevent their being known.

Poppæa, wife of Nero, is ſaid to be the firſt inventor of the maſque; which ſhe did to guard her complexion from the ſun and weather, as being the moſt delicate woman, with regard to her perſon, that has been known.

Theatrical maſques were in common uſe both among the Greeks and Romans: Suidas and Athæneus aſcribe the invention of them to the poet Cherilus, a contemporary of Theſpis; Horace attributes them to Æſchylus; but Ariſtotle informs us, that the real inventor, and conſequently the time of their firſt introduction and uſe, were unknown. Brantome obſerves, that the common uſe of modern maſques was not introduced till towards the end of the 16th century.

MASQUERADE, or MASCARADE, an aſſembly of perſons maſqued or diſguiſed, meeting to dance and divert themſelves. This was much in uſe with us, and has been long a very common practice abroad, eſpecially in carnival time.

The word comes from the Italian *maſcarata*, and that from the Arabic *maſcara*, which ſignifies "raillery, buffoonery." Granacci, who died in 1543, is ſaid to have been the firſt inventor of maſquerades.

MEASURES, (*Encycl.*) It is neceſſary, for the convenience of commerce, that an uniformity ſhould be obſerved in weights and meaſures, and regulated by proper ſtandards. A foot-rule may be uſed as a ſtandard for meaſures of length, a buſhel for meaſures of capacity, and a pound for weights. There ſhould be only one authentic ſtandard of each kind, formed of the moſt durable materials, and kept with all poſſible care. A ſufficient number of copies, exactly correſponding to the principal ſtandard, may be diſtributed for adjuſting the weights and meaſures that are made for common uſe. There are ſeveral ſtandards of this kind both in England and Scotland. See the article WEIGHTS *and Meaſures*, (*Encycl.*)

If any one of the ſtandards above-mentioned be juſtly preſerved, it will ſerve as a foundation for the others, by which they may be corrected, if inaccurate, or reſtored, if entirely loſt. For inſtance, if we have a ſtandard foot, we can eaſily obtain an inch, and can make a box, which ſhall contain a cubical inch, and may ſerve as a ſtandard for meaſures of capacity. If it be known that a pint contains 100 cubical inches, we may make a veſſel five inches ſquare, and four inches deep, which will contain a pint. If the ſtandard be required in any other form, we may fill this veſſel with water, and regulate another to contain an equal quantity. Standards for weights may be obtained from the ſame foundation; for if we know how many inches of water it takes to weigh a pound, we have only to meaſure that quantity, and the weight which balances it may be aſſumed as the ſtandard of a pound.

Again, if the ſtandard of a pound be given, the meaſure of an inch may be obtained from it: for we may weigh a cubical inch of water, and pour it into a regular veſſel; and having noticed how far it is filled, we may make another veſſel of like capacity, in the form of a cube. The ſide of this veſſel may be aſſumed as the ſtandard for an inch; and ſtandards for a foot, a pint, or a buſhel, may be obtained from it. Water is the moſt proper ſubſtance for regulating ſtandards; for all other bodies differ in weight from others of the ſame kind; whereas it is found by experience that ſpring and river water, rain, and melted ſnow, and all other kinds, have the ſame weight; and this uniformly holds in all countries when the water is pure, alike warm, and free from ſalt and minerals.

Thus, any one ſtandard is ſufficient for reſtoring all the reſt. It may further be deſired to hit on ſome expedient, if poſſible, for reſtoring the ſtandards, in caſe that all of them ſhould ever fall into diſorder, or ſhould be forgotten, through the length of time, and the viciſſitudes of human affairs. This ſeems difficult, as no words can convey a preciſe idea of a foot-rule, or a pound weight. Meaſures, aſſumed from the dimenſions of the human body, as a foot, a handbreadth, or a pace, muſt nearly be the ſame in all ages, unleſs the ſize of the human race undergo ſome change; and therefore, if we know how many ſquare feet a Roman acre contained, we may form ſome judgment of the nature of the law which reſtricted the property of a Roman citizen to ſeven acres; and this is ſufficient to render hiſtory intelligible; but it is too inaccurate to regulate meaſures for commercial purpoſes. The ſame may be ſaid of ſtandards, deduced from the meaſure of a barley-corn, or the weight of a grain of wheat. If the diſtance of two mountains be accurately meaſured and recorded, the nature of the meaſure uſed will be preſerved in a more permanent manner than by any ſtandard; for if ever that meaſure fall into diſuſe, and another be ſubſtituted in its place, the diſtance may be meaſured again, and the proportion of the ſtandards may be aſcertained by comparing the new and ancient diſtances.

But the moſt accurate and unchangeable manner of eſtabliſhing ſtandards is, by comparing them with the length of pendulums. The longer a pendulum is, it vibrates the ſlower; and it muſt have one preciſe length in order to vibrate in a ſecond. The ſlighteſt difference in length will occaſion a difference in the time; which will become abundantly ſenſible after a number of vibrations, and will be eaſily obſerved if the pendulum be applied to regulate the motion of a clock. The length of a pendulum which vibrates ſeconds in London is about $39\frac{1}{8}$ inches, is conſtantly the ſame at the ſame place; but it varies a little with the latitude of the place, being ſhorter as the latitude is leſs. Therefore, though all ſtandards of weights and meaſures were loſt, the length of a ſecond pendulum might be found by repeated trials; and if the pendulum be properly divided, the juſt meaſure of an inch will be obtained; and from this all other ſtandards may be reſtored.

1. *Meaſures of length.* *Lineal* meaſure is regulated by the yard. The uſe of this meaſure was eſtabliſhed by Henry I. of England, and the ſtandard taken from the length of his own arm. It is divided into 36 inches, and each inch is ſuppoſed equal to 3 barley-corns. When uſed for meaſuring cloth, it is divided into 4 quarters, and each quarter ſubdivided into 4 nails. The Engliſh ell is equal to a yard and a quarter, or 45 inches, and is uſed in meaſuring linens imported from Germany and the Low-Countries.

The Scots *elwand* was eſtabliſhed by king David I. and divided into 37 inches. The ſtandard is kept in the council-chamber of Edinburgh, and being compared with the Engliſh yard, is found to meaſure $37\frac{1}{5}$ inches; and therefore the Scots inch and foot are larger than the Engliſh, in the proportion of 180 to 185; but this difference being ſo inconſiderable, is ſeldom attended to in practice. The Scots ell, though forbidden by law, is ſtill uſed for meaſuring ſome coarſe commodities, and is the foundation of the land-meaſure of Scotland.

A hand in horſemanſhip is 4 inches.

A ſpan 9 inches.

A geometrical pace 5 feet.

A fathom, chiefly uſed in meaſuring depth, 6 feet.

Itinerary meaſure is regulated by Table IX. (ſee Arithmetic, p. 655.) both in England and Scotland. The length of the chain is 4 poles, or 22 yards; 80 chains make a mile. The old Scots computed miles were generally about a mile and a half each.

The reel for yarn is 2½ yards, or 10 quarters, in circuit; 120 threads make a cut, 12 cuts make a haſp or hank, and 4 hanks make a ſpindle.

2. *Land meaſure.* This, in England, is regulated by Tab. VII. (ſee Arithmetic, p. 655.). Becauſe the length of a pole is 5 yards and a half, the ſquare of the ſame contains 30¼ ſquare yards. A ſquare mile contains 640 ſquare acres. In meaſuring fens and woodlands, 18 feet are generally allowed to the pole, and 21 feet in foreſt lands.

A hide of land, frequently mentioned in the earlier part of the Engliſh hiſtory, contained about 100 arable acres; and 5 hides were eſteemed a knight's fee. At the time of the Norman conqueſt, there were 243,600 hides in England.

Scots land-meaſure is founded on the Scots ell, and regulated by Tab. VIII. (See Arithmetic, p. 655.) The proportion between the Scots and Engliſh acre, ſuppoſing the feet in both meaſures alike, is as 1369 to 1089, or nearly as 5 to 4. If the difference of the feet be regarded, the proportion is as 10,000 to 7869. The length of the chain for meaſuring land in Scotland is 24 ells, or 74 feet.

A huſband-land contains 6 acres of ſock and ſcythe land, that is, of land that may be tilled with a plough or mown with a ſcythe: 13 acres of arable land make one ox-gang, and 4 ox-gangs make a pound-land of old extent.

3. *Liquid meaſure.* The Engliſh gallon was originally founded on the Troy weight. It was appointed that 8 lb. Troy of wheat, gathered from the middle of the ear, and well dried, ſhould make a gallon. When averdupois weight came into uſe, another gallon was formed from it in the ſame manner; which therefore is greater than the former, in the ſame proportion that the lb. averdupois exceeds the lb. Troy.

The wine-gallon is now appointed to contain 231 inches; and a cylindrical veſſel, 7 inches diameter and 6 inches deep, which anſwers almoſt exactly to that capacity, is alſo appointed to be a legal wine-gallon. This meaſure is uſed for wine, ſpirits, vinegar, oil, cyder, perry, and honey.

The ale-gallon is appointed to contain 282 inches; and is uſed in ſelling malt-liquors of all kinds, and in collecting the revenue of exciſe.

Table of Wine Meaſure.	*Table of Ale Meaſure.*
2 pints=1 quart	2 pints=1 quart
2 quarts=1 pottle	2 quarts=1 pottle
3 pottles=1 gallon	2 pottles=1 gallon
10 gallons=1 anker	8 gallons=1 firkin ale
18 gallons=1 runlet	9 gallons=1 firkin beer
31½ gallons=1 barrel	2 firkins=1 kilderken
42 gallons=1 tierce	4 firkins=1 barrel
2 bar. or 63 gallons=1 hogſhead	2 barrels=1 hd. 2 hds.=1 butt
84 gallons=1 puncheon	2 butts=1 ton
2 hds.=1 pipe or butt	
2 butts=1 ton	

The barrel for ale in London is 32 gallons, and the barrel for beer 36 gallons. In all other places of England, the barrel, both for ale and beer, is 36 gallons.

For the Scots meaſures, ſee Pint, (*Encycl.*)

4. *Dry meaſures.* The ſtandard for meaſuring corn, ſalt, coals, and other dry goods, in England, is the Wincheſter gallon, which contains 272¼ cubic inches. The buſhel contains 8 gallons, or 2178 inches. A cylindrical veſſel, 18½ inches diameter, and 8 inches deep, is appointed to be uſed as a buſhel in levying the malt-tax. A veſſel of theſe dimenſions is rather leſs than the Wincheſter buſhel of 8 gallons, for it contains only 2150 inches; though probably there was no difference intended.

The denominations of dry meaſure commonly uſed, are given in Tab. V. (ſee Arithmetic, p. 655.) Four quarters corn make a chaldron, 5 quarters make a wey or load, and 10 quarters make a ton. In meaſuring ſea-coal, 5 pecks make a buſhel, 9 buſhels make a quarter or vatt, 4 quarters make a chaldron, and 21 chaldrons make a ſcore.

There was formerly only one meaſure of capacity in Scotland; and ſome commodities were heaped, others *ſtraiked*, or meaſured exactly to the capacity of the ſtandard. The method of heaping was afterwards forbidden, as unequal, and a larger meaſure appointed for ſuch commodities as that cuſtom had been extended to.

The wheat-firlot, uſed alſo for rye, peaſe, beans, ſalt, and graſs-ſeeds, contains 21 pints 1 mutchkin, meaſured by the Stirling jug. The barley-firlot, uſed alſo for oats, fruit, and potatoes, contains 31 pints. A different method of regulating the firlot was appointed, from the dimenſions of a cylindrical veſſel. The diameter for both meaſures was fixed at 19⅙ inches, the depth 7⅓ inches for the wheat-firlot, and 10½ for the barley firlot. A ſtandard conſtructed by theſe meaſures is rather leſs than when regulated by the pint; and as it is difficult to make veſſels exactly cylindrical, the regulation by the pint has prevailed, and the other method gone into diſuſe.

If the Stirling jug contain 103½ inches, the wheat-firlot will contain 2109 inches; which is more than 2 *per cent.* larger than the legal malt-buſhel of England, and about 1 *per cent.* larger than the Wincheſter buſhel: and the barley-firlot will contain 3208 inches. The barley-boll is nearly equal to ſix legal malt buſhels.

In Stirlingſhire, 17 pecks are reckoned to the boll: in Inverneſsſhire, 18 pecks: in Ayrſhire, the boll is the ſame as the Engliſh quarter. And the firlots, in many places, are larger than the Linlithgow ſtandard.

40 feet hewn timber make a load.
50 feet unhewn timber make a load.
32 gallons make a herring barrel.
42 gallons make a ſalmon barrel.
1 cwt. gun-powder makes a barrel.
256 lb. ſoap make a barrel.
10 dozen candles make a barrel.
12 barrels make a laſt.

MEDICINE, n° 494. See further the article Serpent, in this Appendix.

MEDINE, an Egyptian piece of money, of iron ſilvered over, and about the ſize of a ſilver threepence.

MERCURY. Line 2. for 214, read 414.

MERCURIFICATION, in metallurgic chemiſtry, the obtaining the mercury from metallic minerals in its fluid form. For the effecting this, thoſe who have been engaged in theſe reſearches have propoſed three methods. The firſt is by means of a certain mercury, ſo prepared as to have a diſſolving power, by which it could take up the mercuries of metals in the ſame manner as water diſſolves ſalt from aſhes. The ſecond is by means of certain regenerating ſalts, ſuch as ſal ammoniac, which are to detain the more earthy parts of metals, and leave their mercuries ſeparate or ſeparable from them by ſublimation or otherwiſe; and the third method is by means of a large lens or burning-glaſs, in the focus whereof, if any metal be applied, its mercurial part is ſaid to ſeparate and go off in fume, which when collected and condenſed, appears to be running mercury.

The firſt of theſe methods would be very eaſy if the proper mercury were to be readily produced; the ſecond is extremely laborious, and requires much patience and reiteration. But the third ſeems eaſy enough, and practicable to advantage, when a glaſs of three or four feet in diameter is at hand, the ſky ſerene, and the ſun ſhines ſtrong.

For other proceſſes, the reader may conſult Junker's Conſpectus Chemiæ. But theſe mercurified metals, or their mercurial principle rendered ſenſible, are a kind of philoſophical mercury, which, although they reſemble ordinary mercury, are nevertheleſs ſaid by perſons exerciſed in ſuch ſtudies, to differ from it conſiderably, by having a greater ſpecific gravity, by more effectually penetrating and diſſolving metals, by a ſtronger adheſion to theſe, and by a leſs volatility.

MILLEPORA, in natural hiſtory, a name by which Linnæus diſtinguiſhes that genus of lithophytes, of a hard ſtructure and full of holes, which are not ſtellate or radiated, and whoſe animal is the hydra, in which it differs from the madrepora, and comprehending 14 different ſpecies.

In the millepora, the animal which forms and inhabits it occupies the ſubſtance; and it is obſerved that the milleporæ grow upon one another: their little animals produce their ſpawn; which attaching itſelf either to the extremity of the body already formed, or underneath it, gives a different form to this production. Hence the various ſhapes of the millepora, which is compoſed of an infinite number of the cells of thoſe little inſects, which all together exhibit different figures, though every particular cellula has its eſſential form, and the ſame dimenſions, according to its own ſpecies.

MINE, in the military art, (*Encycl.*) Mines are either dug within the body of the earth, as thoſe made by the beſieged to blow up the works of the beſiegers before they make a lodgment on the covered way; or in eminences and riſing grounds, as to make a breach in the ramparts, &c. or to blow up walls, or, laſtly, to tear up rocks.

Two ounces of powder have been found, by experiment, capable of raiſing two cubic feet of earth; conſequently 200 ounces, that is, 12 pound 8 ounces, will raiſe 200 cubic feet, which is only 16 feet ſhort of a cubic toiſe, becauſe 200 ounces joined together have proportionably a greater force than 2 ounces, as being an united force.

All the turnings a miner uſes to carry on his mines, and through which he conducts the ſauciſſe, ſhould be well filled with earth and dung; and the maſonry in proportion to the earth to be blown up, as 3 to 2. The entrance of the chamber of the mine ought to be firmly ſhut with thick planks, in the form of a St Andrew's croſs, ſo that the incloſure be ſecure, and the void ſpaces ſhut up with dung or tempered earth. If a gallery be made below or on the ſide of the chamber, it muſt abſolutely be filled up with the ſtrongeſt maſonry, half as long again as the height of the earth; for this gallery will not only burſt, but likewiſe obſtruct the effect of the mine. The powder ſhould always be kept in ſacks, which are opened when the mine is charged, and ſome of the powder ſtrewed about: the greater the quantity of earth to be raiſed is, the greater is the effect of the mine, ſuppoſing it to have the due proportion of powder. Powder has the ſame effect upon maſonry as upon earth, that is, it will proportionably raiſe either with the ſame velocity.

The branches which are carried into the ſolidity of walls do not exceed three feet in depth, and two feet ſix inches in width nearly: this ſort of mine is moſt excellent to blow up the ſtrongeſt walls.

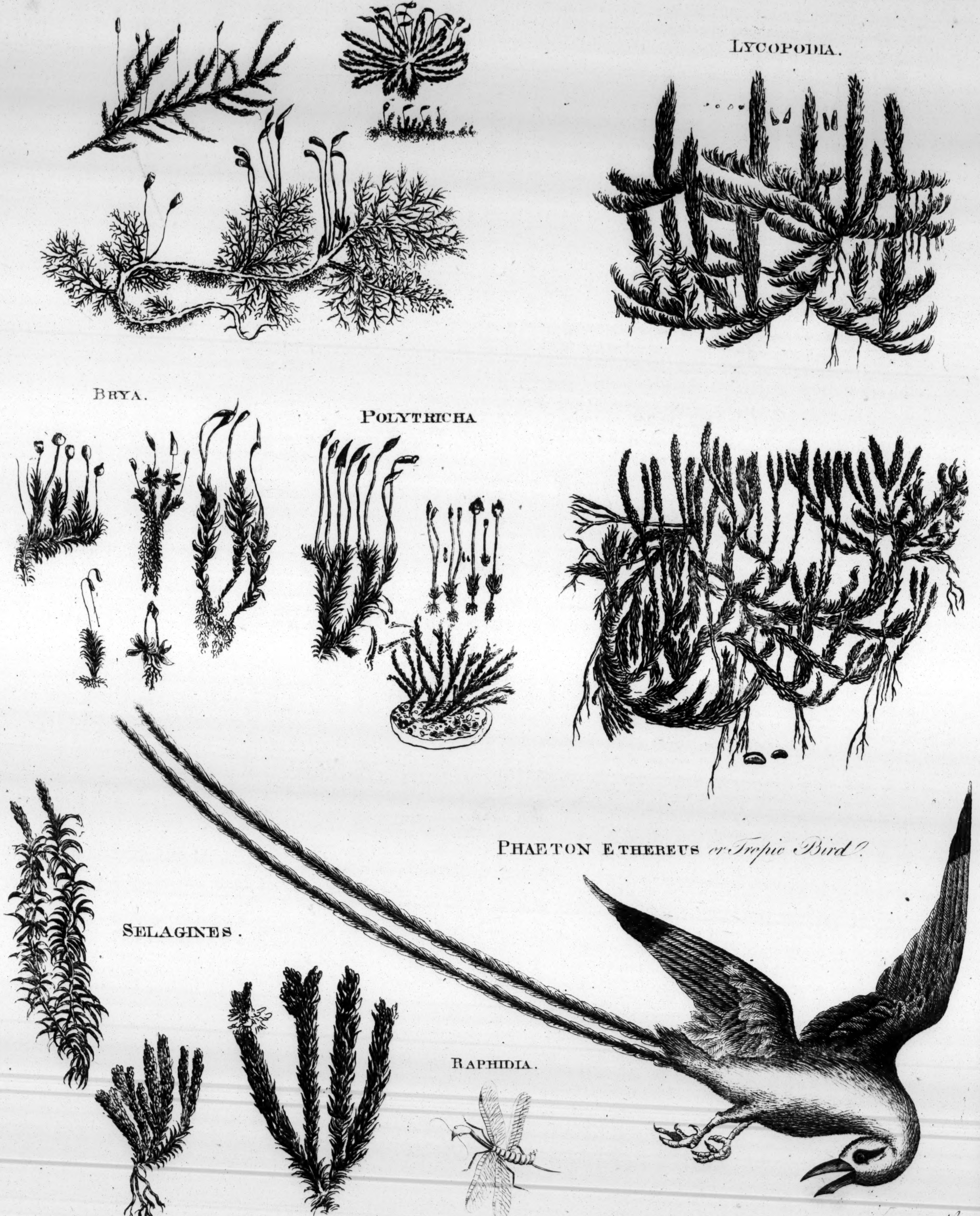
The weight of a cubic foot of powder ſhould be 80lb. 1 foot 1 inch cube will weigh 100lb. and 1 foot 2 inches and $\frac{11}{12}$, 150lb. and 200lb. of powder will be 1 foot 5 inches cube; however, there is a diverſity in this, according to the quantity of ſaltpetre in the gunpowder.

If, when the mines are made, water be found at the bottom of the chamber, planks are laid there, on which the powder is placed either in ſacks or barrels, of 100lb. each. The ſauciſſe muſt have a clear paſſage to the powder, and be laid in an auget or wooden trough, through all the branches. When the powder is placed in the chamber, the planks are laid to cover it, and others again acroſs theſe; then one is placed over the top of the chamber, which is ſhaped for that purpoſe: between that and thoſe which cover the powder, props are placed, which ſhore it up; ſome inclining towards the outſide, others to the inſide of the wall; all the void ſpaces being filled with earth, dung, brick, and rough ſtones. Afterwards planks are placed at the entrance of the chamber, with one acroſs the top, whereon they buttreſs three ſtrong props, whoſe other ends are likewiſe propped againſt another plank ſituated on the ſide of the earth in the branch; which props being well fixed between the planks with wedges, the branch ſhould then be filled up to its entrance with the forementioned materials. The ſauciſſes which paſs through the ſide-branches muſt be exactly the ſame length with that in the middle, to which they join: the part which reaches beyond the entrance of the mine is that which conveys the fire to the other three; the ſauciſſes being of equal length, will ſpring together. From a great number of experiments, it appears, 1. That the force of a mine is always towards the weakeſt ſide; ſo that the diſpoſition of the chamber

3 MA 53

MOSSES, &c.

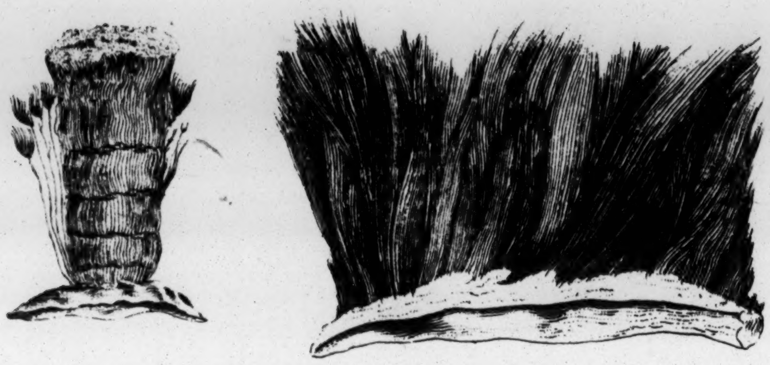
Plate CCCXXI


HYPNA.
LYCOPODIA.
BRYA.
POLYTRICHA
PHAETON ETHEREUS *or Tropic Bird.*
SELAGINES.
RAPHIDIA.
A Bell Sculpt.

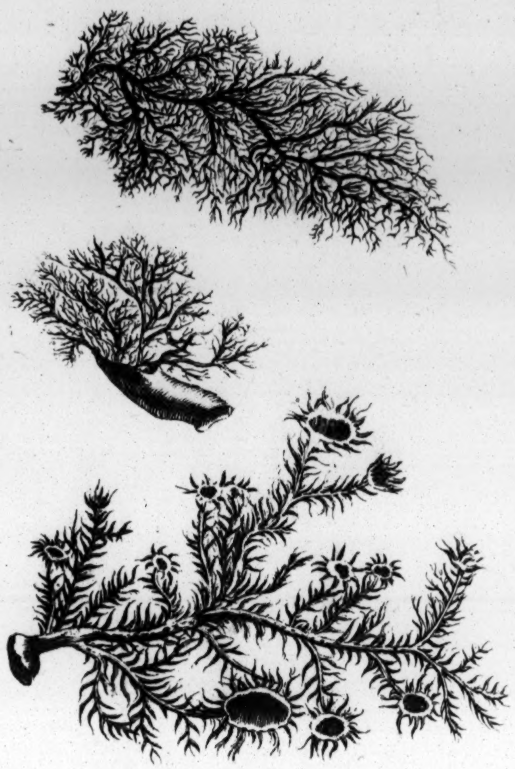
3 MA 53

MOSSES, &c.

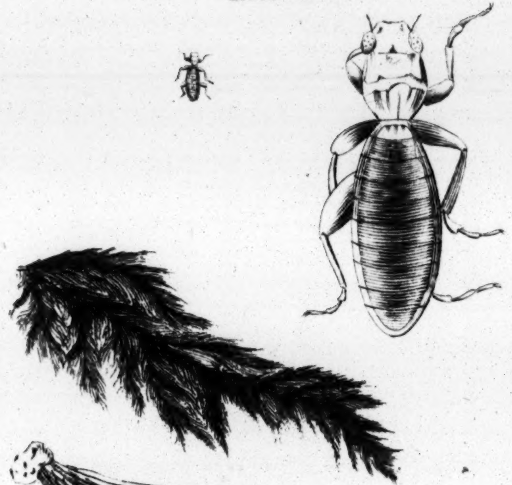
BYSSI.



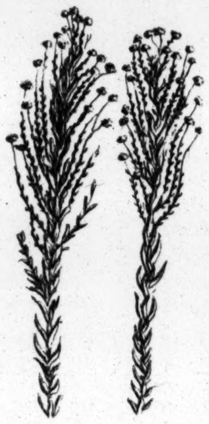
USNEÆ.



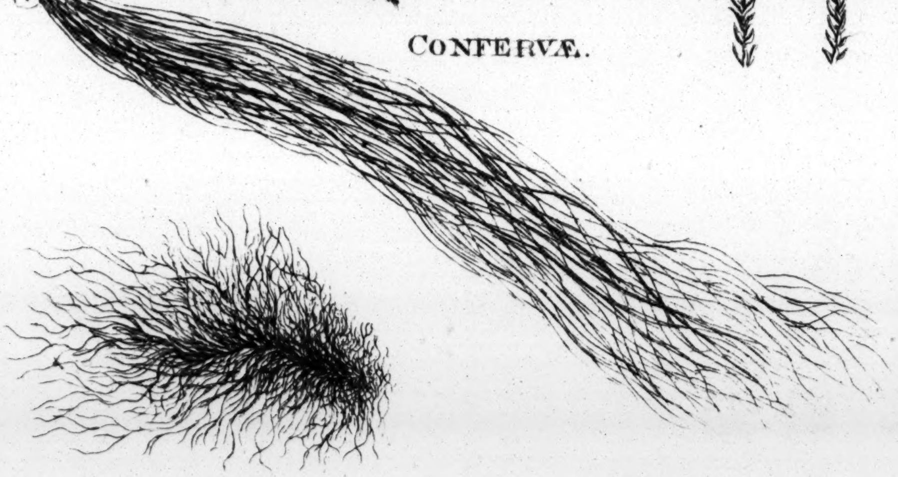
TERMES.



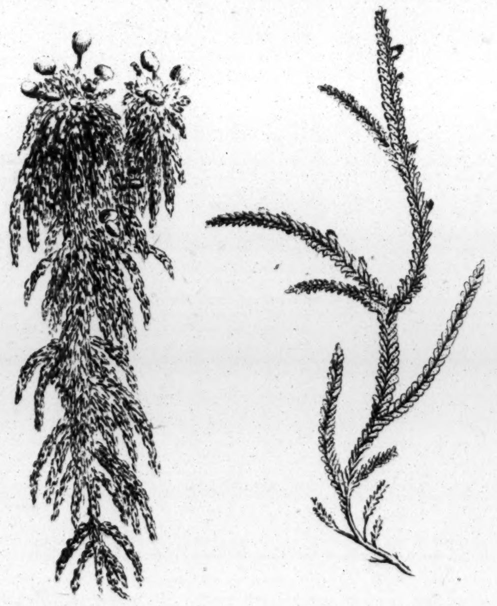
MNIUM.



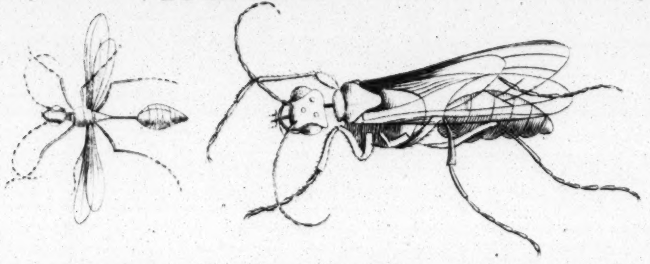
CONFERVÆ.



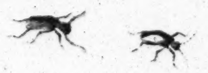
SPHAGNUM.



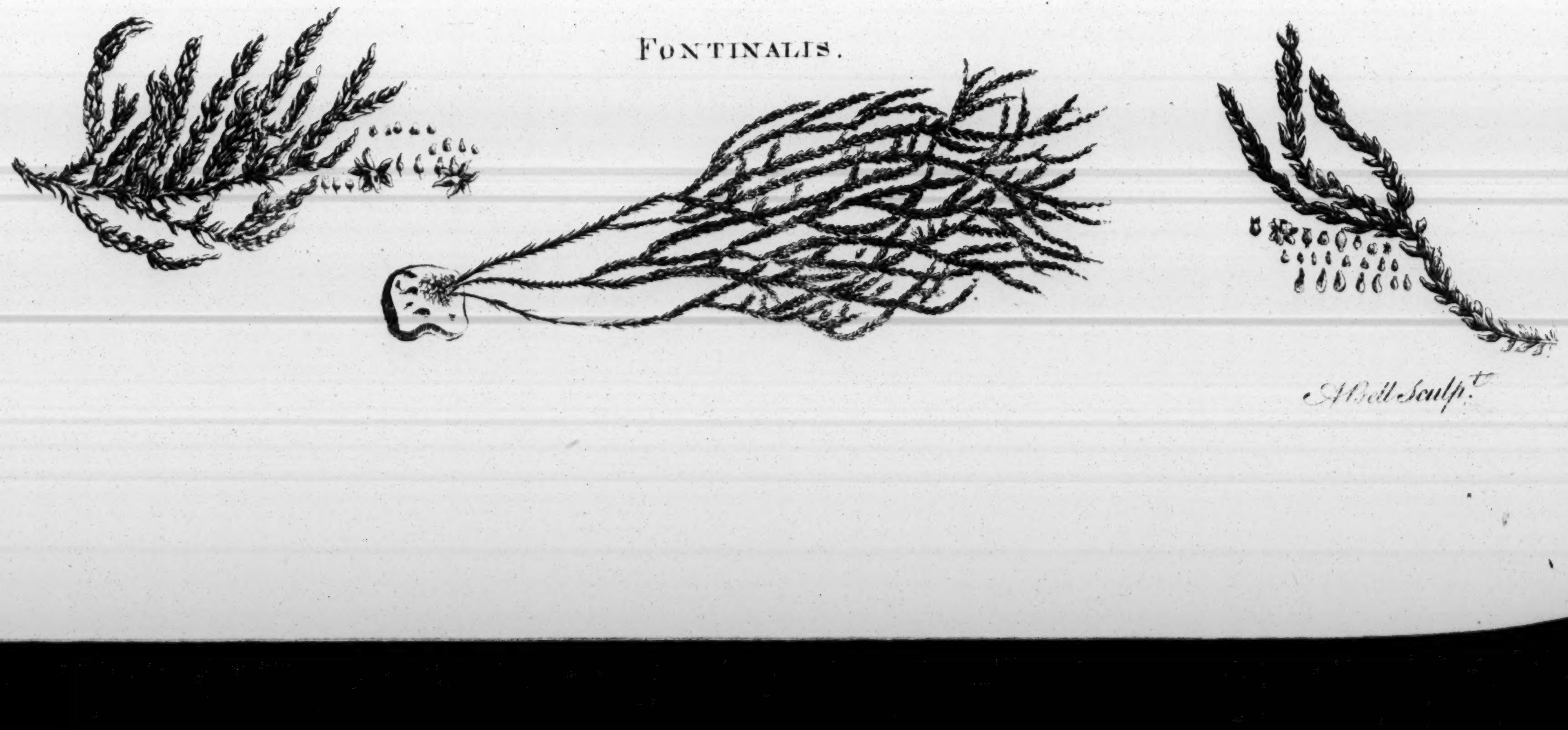
SPHEGES.



PTINI.



FONTINALIS.



A. Bell Sculpt.

ber of a mine does not at all contribute to determine this effect. 2. That the quantity of powder muſt be greater or leſs, in proportion to the greater or leſs weight of the bodies to be raiſed, and to their greater or leſs coheſion; ſo that you are to allow for each cubic fathom

Of looſe earth, - -	9 or 10lb.
Firm earth and ſtrong ſand, -	11 or 12
Fat clayey earth, - -	15 or 16
New maſonry, not ſtrongly bound,	15 or 20
Old maſonry, well bound, - -	25 or 30

3. That the aperture, or entonnoir of a mine, if rightly charged, is a cone, the diameter of whoſe baſe is double the height taken from the centre of the mine. 4. That when the mine has been overcharged, its entonnoir is nearly cylindrical, the diameter of the upper extreme not much exceeding that of the chamber. 5. That beſides the ſhock of the powder againſt the bodies it takes up, it likewiſe cruſhes all the earth that borders upon it, both underneath and ſidewiſe.

To charge a mine ſo as to have the moſt advantageous effect, the weight of the matter to be carried muſt be known; that is, the ſolidity of a right cone, whoſe baſe is double the height of the earth over the centre of the mine: thus, having found the ſolidity of the cone in cubic fathoms, multiply the number of fathoms by the number of pounds of powder neceſſary for raiſing the matter it contains; and if the cone contains matters of different weights, take a mean weight between them all, always having a regard to their degree of coheſion.

As to the diſpoſition of mines, there is but one general rule, which is, that the ſide towards which one would determine the effect be the weakeſt; but this varies according to occaſions and circumſtances.

The calculation of mines is generally built upon this hypotheſis, That the entonnoir of a mine is the fruſtum of an inverted cone, whoſe altitude is equal to the radius of the excavation of the mine, and the diameter of the whole leſſer baſe is equal to the line of leaſt reſiſtance; and though theſe ſuppoſitions are not quite exact, yet the calculations of mines deduced from them have proved ſucceſsful in practice; for which reaſon this calculation ſhould be followed, till a better and more ſimple be found out.

M. de Valliere found that the entonnoir of a mine was a parabaloid, which is a ſolid generated by the rotation of a ſemiparabola about its axis; but as the difference between theſe two is very inſignificant in practice, that of the fruſtum of a cone may be uſed.

MINERALOGY, (*Encycl.*) P. 5065. line 13. from the bottom, for *n m v*, mark *d e f;* and line 5. from the bottom, after *acids*, ſupply "mentioned, n° 68."

MORGO, anciently *Amorgos*, an iſland in the Archipelago, fertile in wine, oil, and corn. It is well cultivated, and the inhabitants are affable, and generally of the Greek-church. The beſt parts belong to a monaſtery. The greateſt inconvenience in this iſland is the want of wood. It is 30 miles in circumference. E. Long. 26. 15. N. Lat. 36. 30.

MOSSES, (*Encycl.*) Moſſes, by the inconſiderate mind, are generally deemed an uſeleſs or inſignificant part of the creation. That they are not, is evident from hence; that he who made them has made nothing in vain, but on the contrary has pronounced all his works to be very good. Many of their uſes we know; that they have many more which we know not, is unqueſtionable, ſince there is probably no one thing in the univerſe of which we dare to aſſert that we know all their uſes. Thus much we are certain of with reſpect to moſſes, that as they flouriſh moſt in winter, and at that time cover the ground with a beautiful green carpet, in many places which would be otherwiſe naked, and when little verdure is elſewhere to be ſeen; ſo at the ſame time they ſhelter and preſerve the ſeeds, roots, gems, and embryo plants of many vegetables, which would otherwiſe periſh; they furniſh materials for birds to build their neſts with; they afford a warm winter's retreat for ſome quadrupeds, ſuch as bears, dormice, and the like, and for numberleſs inſects, which are the food of birds and fiſhes, and theſe again the food or delight of men. Many of them grow on rocks and barren places, and rotting away afford the firſt principles of vegetation to other plants, which could never elſe have taken root there. Others grow in bogs and marſhes, and, by continual increaſe and decay, fill up and convert them either into fertile paſtures, or into peat-bogs the ſource of inexhauſtible fuel to the polar regions.—They are applicable alſo to many domeſtic purpoſes: the lycopodiums are ſome of them uſed in dyeing of yarn, and in medicine; the ſphagnum and polytrichum furniſh convenient beds for the Laplanders; the hypnums are uſed in tiling of houſes, ſtopping crevices in walls, packing up of brittle wares and the roots of plants for diſtant conveyance.—To which may be added, that all in general contribute entertainment and agreeable inſtruction to the contemplative mind of the naturaliſt, at a ſeaſon when few other plants offer themſelves to his view.

MOATAZALITES, or SEPARATISTS, a religious ſect among the Turks, who deny all forms and qualities in the Divine Being; or who diveſt God of his attributes.

There are two opinions among the Turkiſh divines concerning God. The firſt admits metaphyſical forms, or attributes; as, that God has wiſdom, by which he is wiſe; power, by which he is powerful; eternity, by which he is eternal, &c.

The ſecond allows God to be wiſe, powerful, eternal; but will not allow any form or quality in God, for fear of admitting a multiplicity.

Thoſe who follow this latter opinion are called *Moatazalites*: they who follow the former, *Sephalites*.

The Moatazalites alſo believed that the word of God was created *in ſubjecto*, as the ſchoolmen term it, and to conſiſt of letters and ſound; copies thereof being written in books to expreſs or imitate the original; they denied abſolute predeſtination, and affirmed that man is a free agent. This ſect is ſaid to have firſt invented the ſcholaſtic divinity, and is ſubdivided into no leſs than 20 inferior ſects, which mutually brand one another with infidelity.

MUNDA, (*Encycl.*) This city was anciently famous for a victory gained by Cæſar over the two ſons of Pompey, who had collected an army in Spain after the defeat of their father at Pharſalia. An account of the battle was referred from ROME, n° 218. to MUNDA, but omitted.

The Pompeys poſted their army advantageouſly on a riſing ground, whereof one ſide was defended by the city of Munda, and the other by a ſmall river which watered the plain, and by a marſh; ſo that the enemy could not attack them but in front. Cæſar likewiſe drew up his troops with great art, and having advanced a little way from his camp, ordered them to halt, expecting the enemy would abandon their advantageous poſt, and come to meet him. But as they did not ſtir, Cæſar made as if he intended to fortify himſelf in that poſt; which induced the young general, who looked upon this as a ſign of fear, to advance into the plain, and attack the enemy before they could ſecure themſelves with any works. Pompey's army was by far the moſt numerous; for it conſiſted of 13 legions, 6000 horſe, and an incredible number of auxiliaries, among whom were all the forces of Bocchus king of Mauritania, commanded by his two ſons, both youths of great valour and bravery. Cæſar had 80 cohorts, three legions, to wit, the third, the fifth, and the tenth, and a body of 8000 horſe. As the enemy drew near, Cæſar betrayed a great deal of uneaſineſs and concern, as if he were doubtful of the ſucceſs, knowing he was to engage men no way inferior in valour and experience to his own, and commanded by officers who had on many occaſions given ſignal proofs of their bravery and conduct. Cneius, the elder of the two brothers, was generally looked upon as an able commander; and Labienus, who had revolted, eſteemed ſcarce inferior to Cæſar himſelf.

However, the dictator, deſirous to put an end to the civil war, either by his own death, or that of his rivals, gave the ſignal for the battle, and fell upon the enemy with his uſual vigour and reſolution. At the firſt onſet, which was dreadful, the auxiliaries on both ſides betook themſelves to flight, leaving the Romans to decide their quarrel by themſelves. Then the legionaries engaged, with a fury hardly to be expreſſed; Cæſar's men being encouraged by the hopes of putting an end to all their labours by this battle, and thoſe of Pompey exerting themſelves out of neceſſity and deſpair, ſince moſt of them expected no quarter, as having been formerly pardoned. Never was victory more obſtinately diſputed. Cæſar's men, who had been always uſed to conquer, found themſelves ſo vigorouſly charged by the enemy's legionaries, that they began to give ground; and though they did not turn their backs, yet it was manifeſt that ſhame alone kept them in their poſts. All authors agree, that Cæſar had never been in ſo great danger; and he himſelf, when he came back to his camp, told his friends, that he had often fought for victory, but this was the firſt time he had ever fought for life. Thinking himſelf abandoned by fortune, which had hitherto favoured him, he had ſome thoughts of ſtabbing himſelf with his own ſword, and, by a voluntary death, preventing the diſgrace of a defeat: but returning ſoon to himſelf, and concluding it would be more to his reputation to fall by the enemy's hand at the head of his troops, than, in a fit of deſpair, by his own, he diſmounted from his horſe, and ſnatching a buckler from one of his legionaries, he threw himſelf, like a man in deſpair, into the midſt of the enemy; crying out to his men, *Are you not aſhamed to deliver your general into the hands of boys?* At theſe words, the ſoldiers of the tenth legion, animated by the example of their general, fell upon the enemy with freſh vigour, and made a dreadful havock of them. But, in ſpite of their utmoſt efforts, Pompey's men ſtill kept their ground, and, though greatly fatigued, returned to the charge with equal vigour. Then the Cæſarians began to deſpair of victory; and the dictator, running thro' the ranks of his diſheartened legionaries, had much ado to keep them together. The battle had already laſted from the riſing to the ſetting of the ſun, without any conſiderable advantage on either ſide.

At length a mere accident decided the diſpute in favour of the dictator. Bogud, a petty king of Mauritania, had joined Cæſar, ſoon after his arrival in Spain, with ſome ſquadrons of Numidian horſe; but, in the very beginning of the battle, being terrified at the ſhouting of the ſoldiers, intermingled with groans, and the claſhing of their arms, he had abandoned his poſt, and retired with the auxiliaries under his command to a riſing ground at a ſmall diſtance from the enemy's camp. There he continued the whole day an idle ſpectator of the battle that was fought in the plain. But towards the evening, partly out of ſhame, and partly out of compaſſion for his friend Cæſar, he reſolved to fall upon Pompey's camp; and accordingly flew thither with all the forces he had with him. Labienus, appriſed of his deſign, haſtened after him, to the defence of the camp; which Cæſar obſerving, cried to his legionaries, *Courage, fellow-ſoldiers! the victory at length is ours; Labienus flies.* This artifice had the deſired effect: Cæſar's men, believing that Labienus was truly fled, made a laſt effort, and charged the wing he commanded ſo briſkly, that after a moſt obſtinate diſpute they put them to flight.

Though the enemy's left wing was thus entirely defeated, the right wing, where the elder Pompey commanded, ſtill kept their ground for ſome time. Pompey diſmounting from his horſe, fought on foot like a private man in the firſt line, till moſt of his legionaries being killed, he was forced to ſave himſelf by flight from falling into the enemy's hands. Part of his troops fled back to their camp, and part took ſhelter in the city of Munda. The camp was immediately attacked, and taken ſword in hand; and as for the city, Cæſar, without loſs of time, drew a line of circumvallation round it. This victory was gained on the 16th of the calends of April, i. e. according to our way of counting, on the 17th day of March, when the Dionyſian feſtival, or the Liberalia, were celebrated at Rome; the very day, as Plutarch obſerves, in which Pompey the Great, four years before, had ſet out for the war. In this action Pompey loſt 30,000 men; among whom were the famous Labienus, Attius Varus, and 3000 Roman knights. Seventeen officers of diſtinction were taken, and all the enemy's eagles and enſigns, together with Pompey's faſces, which he had aſſumed as governor of Spain. On Cæſar's ſide only 1000 men were killed, and 500 wounded.

MULLEIN, VERBASCUM, (*Encycl.*) White mullein has received the name of *cow's lungwort*, from the great reputation it had formerly among the country people for inveterate coughs among the horned cattle. Parkinson tells us, that in his time it was uſed in ſuch caſes with great ſucceſs. It ſtill retains the ſame credit in ſeveral parts of Europe.

Muſca
||
Neceſſity.

Mycetites,
Neceſſity.

MUSCA, (*Encycl.*) Line 1. for *gnat*, read *fly*.

Flies form one of the moſt numerous claſſes of inſects. Variety runs through their forms, their ſtructure, their organization, their metamorphoſes, their manner of living, propagating their ſpecies, and providing for their poſterity. Every ſpecies is furniſhed with implements, adapted to its exigencies. What exquiſiteneſs, what proportion, in the ſeveral parts that compoſe the body of a fly! What preciſion, what mechaniſm in the ſprings and motion! Some are oviparous, others viviparous; which latter have but two young ones at a time, whereas the propagation of the former is by hundreds. Flies are laſcivious, troubleſome inſects, that put up with every kind of food. When ſtorms impend, they have moſt activity, and ſting with greateſt force. They multiply moſt in hot moiſt climates; and ſo great was formerly their numbers in Spain, that there were fly-hunters commiſſioned to give them chace. The vapour of ſulphur or arſenic deſtroys them; and their numbers may be reduced by taking them in phials of honeyed water, or between boards done over with honey.

MYA MARGARITIFERA, (*Encycl.*) Linnæus has made a remarkable diſcovery relating to the generation of pearls in this fiſh. This muſt not be confounded with what is called the *mother-of pearl ſhell*, as that belongs to another genus, is a ſea-ſhell, and an inhabitant of the warmer countries only. The ſhell-fiſh in queſtion is found in rivers in all the northern parts of the world; in Norway and Sweden it abounds; it is found in the rivers of the county of Tyrone in Ireland, and in thoſe of Donegal; in Scotland, the Don is ſaid to abound with it; and it is not unfrequent in the rivers of England. This fiſh will bear removal remarkably well; and it is ſaid, that in ſome places they form reſervoirs for the purpoſe of keeping it, and taking out the pearl, which, in a certain period of time, will be again renewed. From obſervations on the growth of theſe ſhells, and the number of their annular laminæ, or ſcales, it is ſuppoſed the fiſh will attain a very great age; 50 or 60 years are imagined to be a moderate computation. The diſcovery turned on a method which Linnæus found, of putting theſe muſcles into a ſtate of producing pearls at his pleaſure; though the final effect did not take place for ſeveral years: He ſays, that in five or ſix years after the operation the pearl would have acquired the ſize of a vetch. We are unacquainted with the means by which he accompliſhed this extraordinary operation; but it was probably publiſhed at the time, and conſidered as important, ſince it is certain that the author was rewarded with a munificent premium from the States of the kingdom on this account. We regret that we cannot ſpeak more fully on this head; but may obſerve, that it is probable, from a paper publiſhed many years afterwards in the Berlin Acts, that the method conſiſted in injuring the ſhell externally, perhaps by a perforation; as it has been obſerved, that theſe concretions in ſhell-fiſh are found on the inſide, exactly oppoſite to perforations and injuries made from without by ſerpulæ and other animals.

MYCETITES DISCOIDES, in natural hiſtory, a name given by Dr Woodward to thoſe kinds of foſſile coralloide bodies which the generality of writers had called, after Dr Plott, *porpitæ*. Theſe are uſually ſmall, and of a roundiſh, but flatted figure; they are hollowed on one ſide with a ſort of umbilicus, and ſtriated on the other; they are found on the ploughed lands in Oxfordſhire, and ſome other of our midland counties, and in other places, buried in the ſolid ſtrata of ſtone; they are ſometimes yellowiſh, ſometimes browniſh, and are from the breadth of an inch to a fourth part or leſs of that ſize; when broken, they are uſually found to conſiſt of a kind of ſpar, not unlike that of which the ſhelly coats of the echinitæ, or the lapides indici, and other ſpines of echini conſiſt in their foſſile ſtate; and in ſome of them the ridges and ſtriæ are thick ſet with little knobs and tubercles. The baſis in ſome of theſe is flat, as it is in others riſing in form of a circular elevation from the umbilicus, and others have a circular cavity in the ſame place.

N.

NARVA, a ſtrong town of the Ruſſian empire, in Livonia, with a caſtle, and a harbour. It was taken by the Muſcovites from the Danes in 1558, by the Swedes in 1581, and they defeated the Muſcovites near it in 1700; but it was retaken by the Ruſſians in 1704, by ſtorm, and the inhabitants ſent to Aſtrachan. It is ſeated on the river Narva, 95 miles S. W. of Wiburg, and 172 N. E. of Riga. E. Long. 29. 0. N. Lat. 59. 8.

NECESSITY, (*Encyl.*) Mr Hobbes, who is ſaid to have been the firſt who underſtood and maintained the proper doctrine of philoſophical neceſſity, gives the following account of it in his Leviathan, p. 108. Liberty and neceſſity are conſiſtent; as in the water, that hath not the liberty, but a neceſſity of deſcending in the channel: ſo likewiſe in the actions which men voluntarily do, which, becauſe they proceed from their will, proceed from liberty; and yet, becauſe every act of man's will, and every deſire and inclination, proceedeth from ſome cauſe, and that from another cauſe, in a continual chain (whoſe firſt link is in the hand of God, the firſt of all cauſes), proceed from neceſſity; ſo that to him who could ſee the connection of thoſe cauſes, the neceſſity of all men's voluntary actions would appear manifeſt: and therefore God that ſeeth and diſpoſeth all things, ſeeth alſo, that the liberty of man, in doing what he will, is accompanied with the neceſſity of doing that which God will, and no more or leſs: for though men may do many things, which God does not command, nor is, therefore, the author of them, yet they can have no paſſion, will, or appetite to any thing, of which appetite God's will is not the cauſe: and did not his will aſſure the neceſſity of man's will, and conſequently of all that on man's will dependeth, the liberty of men would be a contradiction and impediment to the omnipotence and liberty of God.

Mr Collins, one of the moſt admired writers on the ſubject of neceſſity, has ſtated the queſtion concerning human liberty in the following manner. Man, he ſays, is a neceſſary agent, if all his actions are ſo determined by the cauſes preceding each action, that not one paſt action could poſſibly not have come to paſs, or have been otherwiſe than it hath been; nor one future action can poſſibly not come to paſs, or be otherwiſe than it ſhall be. But he is a free agent, if he is able, at any time, under the circumſtances and cauſes he then is, to do different things; or, in other words, if he is not unavoidably determined, in every point of time, by the circumſtances he is in, and cauſes he is under, to do that one thing he does, and not poſſibly to do any other. According to this ſtate of the queſtion, he undertakes to prove, that man is a neceſſary agent; and that there neither is nor can be ſuch a thing as liberty.

1. He appeals to experience; alleging, that though the vulgar urge this in proof of liberty, it is not a proof of it: that many celebrated philoſophers and theologers, both ancient and modern, have given definitions of liberty, that are conſiſtent with fate or neceſſity: that ſome great patrons of liberty do, by their conceſſions in this matter, deſtroy all arguments from experience: that all the actions of men may be ranked under the four heads of perception, judging, willing, and and doing as we will; and that experience does not prove any of theſe to be free; and that experience not only does not prove liberty, but, on the contrary, men may ſee by experience, that they are neceſſary agents. It is, ſays he, matter of experience, that man is ever determined in his willing: we experience perfect neceſſity: and they, who think liberty a matter of experience, yet allow that the will follows the judgment of the underſtanding; and that, when two objects are preſented to a man's choice, one whereof appears better than the other, he cannot chuſe the worſt.

2. Man is a neceſſary agent, becauſe all his actions have a beginning; for whatever has a beginning muſt have a cauſe, and every cauſe is a neceſſary cauſe; and if any action whatſoever can be done without a cauſe, then effects and cauſes have no neceſſary relation; and, conſequently, we ſhould not be neceſſarily determined in any caſe at all.

3. Liberty would not be a perfection, but an imperfection; whereas, on the contrary, neceſſity is an advantage and a perfection.

4. Liberty is inconſiſtent withthe divine preſcience; for if God foreknows the exiſtence of any thing, as it depends on its own cauſes, that exiſtence is no leſs neceſſary than if it were the effect of his decree: for it no leſs implies a contradiction, that cauſes ſhould not produce their effects, than that an event ſhould not come to paſs which is decreed by God.

This laſt argument for neceſſity has been urged by a variety of writers; and the advocates for liberty have felt its force, and endeavoured to obviate it. Some have actually given up the divine preſcience: ſome have allowed the ſeeming contradiction implied in the foreknowledge of a contingent event, and have acknowledged themſelves incapable of removing it. Others have endeavoured to reconcile the foreknowledge of God and the liberty of man, by alleging, that there is a great difference between God's foreknowledge and his decrees, with regard to the neceſſity of future events; for God's preſcience has no influence at all on our actions: his infallible judgment, concerning contingent truths, does no more alter the nature of the things, and cauſe them to be neceſſary, than our judging right, at any time, concerning a contingent truth, makes it ceaſe to be contingent; or, than our ſenſe of a preſent truth is any cauſe of its being true or preſent.

In the argument, ſays Dr Clarke, drawn againſt liberty from the divine preſcience, it muſt not firſt be ſuppoſed that things are in their own nature neceſſary; but from the divine preſcience or power of judging infallibly (which power is as much more extenſive and infallible than in man, as the divine nature and underſtanding are ſuperior to our's) concerning free events, it muſt be proved, that things otherwiſe ſuppoſed free, will therefore unavoidably become neceſſary; which can no more be proved, than it can be proved that an action, ſuppoſed at this preſent time to be free, is yet (contrary to the ſuppoſition) at the ſame time neceſſary; becauſe, in all paſt time, whether foreknown or not foreknown, it could not, upon that very ſuppoſition of its being now freely done, but be future.

In another place, he acknowledges, that, though it is impoſſible for us to explain diſtinctly the manner how God can foreſee future events without a chain of neceſſary cauſes, yet we may form ſome general notion of it. For, as a man, who has no influence over another perſon's actions, and yet often perceives before hand what that other will do; and a wiſer and more experienced man will ſtill, with greater probability, foreſee what another, whoſe diſpoſition he is perfectly acquainted with, will in certain circumſtances do; and an angel, with ſtill much leſs degree of error, may have a farther proſpect into mens future actions: ſo it is very reaſonable to apprehend, that God, without influencing mens wills by his power, yet by his foreſight cannot but have as much more certain a knowledge of future free events than either men or angels can poſſibly have, as the perfection of his nature is greater than that of their's. The certainty of foreknowledge, ſays this excellent writer, does not cauſe the certainty of things, but is itſelf founded on the reality of their exiſtence; nor does it imply any other certainty than ſuch as would be equally in things, tho' there was no foreknowledge; nor again does this certainty of event, in any ſort, imply neceſſity. To the ſame purpoſe Origen has long ago obſerved, that preſcience is not the cauſe of things future, but their being future is the cauſe of God's preſcience that they will be.

It cannot reaſonably be diſputed, that there is an eſſential difference between the foreknowledge and permiſſion of events, and the preordination and production of them: and the ſcheme of neceſſity ſeems directly to charge God with being the efficient cauſe or author of thoſe vices and evils which ariſe from circumſtances and connections of his previous and abſolute appointment. Indeed, many of the advocates of this ſcheme will not admit the conſequence that ſeems to be fairly deducible from their opinion: however, Dr Prieſtley very candidly allows it. It certainly (ſays he) ſounds harſh to vulgar ears to ſay, that in all thoſe crimes that men charge themſelves with, and reproach themſelves for, God is the agent; and that, in ſuch caſes, they are in reality no more agents, than a ſword is an agent when employed to commit a murder. It does require ſtrength of mind not to ſtartle at ſuch a concluſion; but then it requires nothing but ſtrength of mind; i. e. ſuch a

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view of things as ſhall carry us beyond firſt and fallacious appearances.

5. Another argument in favour of neceſſity is the following: if man was not a neceſſary agent, determined by pleaſure and pain, there would be no foundation of rewards and puniſhments, which are the eſſential ſupports of ſociety. Theſe would be uſeleſs, becauſe if men were free or indifferent to pleaſure and pain, they could be no motives to a man to do or forbear any action.

6. Another argument of the ſame kind is deduced from the nature of morality: for if man was not a neceſſary agent, determined by pleaſure and pain, he would have no notion of morality, or motive to practiſe it; and if he were indifferent to pleaſure and pain, he would have no rule to go by, and might never judge, will, and practiſe right. Every act of the will, it is ſaid, is excited by ſome motive, which motive is the cauſe of that act: and if volitions are properly the effects of motives, then they are neceſſarily connected with their motives: whence it is inferred, that volition is neceſſary, and doth not proceed from any ſelf-determining power in the will. This argument has been illuſtrated and urged in all its force by many modern writers, from M. Leibnitz to Dr Prieſtley, the laſt and moſt zealous advocate for neceſſity: and it has often been anſwered by Dr Clarke and others, who have ſtrenuouſly maintained, that liberty is perfectly conſiſtent with mens acting from a regard to motives.

Suppoſing, ſays Dr Price, a power of ſelf-determination to exiſt, it is by no means neceſſary that it ſhould be exerted without a regard to any end or rule: on the contrary, it can never be exerted without ſome view or deſign. Whoever acts, means to do ſomewhat. The power of determining ourſelves, by the very nature of it, wants an end or rule to guide it; and no probability or certainty of its being exerted agreeably to a rule can have the leaſt tendency to infringe or diminiſh it. All that ſhould be avoided here is the intolerable abſurdity of making our reaſons and ends, in acting, the phyſical cauſes or efficients of action. This is the ſame with aſcribing the action of walking, not to the feet, or the power which moves the feet, but to the eye, which only ſees the way. The perception of a reaſon for acting, or the judgment of the underſtanding, is no more than ſeeing the way; it is the eye of the mind which informs and directs; and whatever certainty there may be that a particular determination will follow, ſuch determination will be the ſelf-determination of the mind; and not any change of its ſtate ſtamped upon it, over which it has no power, and in receiving which, inſtead of being an agent, it is merely a paſſive ſubject of agency. Although the views and ideas of beings may be the occaſions of their acting; yet it is a contradiction to make them the mechanical efficients of their actions: ſo neceſſary and important is the diſtinction inſiſted upon by Dr Clarke, between the operation of phyſical cauſes and the influence of moral reaſons.

Upon the whole, the queſtion concerning liberty is not, Whether the views or ideas of beings influence their actions; but, What is the nature of that influence. If we ſay, that it is ſome kind of mechanical or phyſical efficiency; or, with Dr Prieſtley, after Hobbes and Leibnitz, that man has no other liberty, in following motives, than water has in running down hill, or than the arms of a ſcale, preſſed by weights, have in riſing and falling; then it muſt follow, that man never acts, and it muſt be folly to applaud or reproach ourſelves for our conduct, and there is an end of all moral obligation and accountableneſs.

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However, the neceſſarians do not allow theſe conſequences; but, on the contrary, maintain, that the doctrine of the neceſſary influence of motives upon the mind of man, makes him the proper ſubject of diſcipline, reward, and puniſhment, praiſe and blame, both in the common and the philoſopbical uſe of the words; and that the doctrine of ſelf-determination, independently of the influence of motives, entirely diſqualifies a man from being the proper ſubject of them.

Mr Edwards, an acute writer on this ſubject, has endeavoured to prove, that liberty of indifference is not only not neceſſary to virtue, but utterly inconſiſtent with it; and that all habits and inclinations, whether virtuous or vicious, are inconſiſtent with the Arminian notions of liberty and moral agency. And Dr Prieſtley obſerves, that the ſenſe of ſelf-reproach and ſhame is excited by our finding that we have a diſpoſition of mind leading to vice, and on which motives to virtue, in particular caſes, have had no influence. If we aſk, whence proceeds that diſpoſition, and how it comes to paſs that motives to virtue had not a greater influence, we muſt ultimately aſcribe the inefficacy of the one, and the evil tendency of the other, to God, who made us what we are, and placed us in the ſituation which we occupy. Dr Prieſtley overcomes this difficulty by alleging, that the diſtinction between things natural and moral entirely ceaſes in the ſcheme of neceſſity; that the vices of men come under the claſs of common evils, producing miſery for a time, but, like all other evils, in the ſame great ſyſtem, ultimately ſubſervient to greater good. In this light, he ſays, every thing without diſtinction may be aſcribed to God. However, he acknowledges, that this is a view of moral evil, which, though innocent, and even uſeful, in ſpeculation, no wiſe man can or would chooſe to act upon himſelf, becauſe our underſtandings are too limited for the application of ſuch a means of good; though a Being of infinite knowledge may introduce it with the greateſt advantage. If there be any foundation for the doctrine of neceſſity, i. e. if all events ariſe from preceding ſituations, and the original ſituations of all things, together with the laws by which all changes of ſituation take place, were fixed by the Divine Being, there can be no difference whatever with reſpect to his cauſation of one thing more than another; and even whatever takes place in conſequence of his with-holding his ſpecial and extraordinary influence, is as much agreeable to his will as what comes to paſs in conſequence of the general laws of nature. But our ſuppoſing that God is the author of ſin, (as by the ſcheme of neceſſity he muſt in fact be the author of all things), by no means implies that he is a ſinful being; for it is the diſpoſition of mind and the deſign which conſtitute the ſinfulneſs of an action. If therefore his diſpoſition and deſign be good, what he does is morally good. To the ſame purpoſe he obſerves, that the proper foundation, or rather the ultimate object, of virtue, is general utility; ſince it conſiſts of ſuch conduct as tends to make intelligent creatures the moſt truly happy in the whole of their exiſtence; though, with reſpect to the agent, no action is denominated virtuous that is not voluntary, or that does not proceed from ſome good motive. And this reaſoning he applies to the Deity, who purſues the happineſs of his creatures by ſuch means as are beſt calculated to ſecure that end, and which are ſanctified by it. And he further adds, that the Deity may adopt ſome things which he would not have choſen on their own account, but for the ſake of other things with which they were neceſſarily connected.

The ſcriptures, according to this laſt writer, are favourable to the doctrine of neceſſity; though he does not think that the ſacred writers were, ſtrictly ſpeaking, neceſſarians, for they were not philoſophers: but their habitual devotion led them to refer all things to God, without reflecting on the rigorous meaning of their language: and very probably, had they been interrogated on the ſubject, they would have appeared not to be appriſed of the proper extent of the neceſſarian ſcheme, and would have anſwered in a manner unfavourable to it.

The reader, who is deſirous of being farther acquainted with the reaſoning of different writers on this ſubject, may conſult the collection of papers between Leibnitz and Clarke, 1717. Collins's Philoſophical Inquiry concerning Human Liberty, 1735, 3d Ed. with Clarke's Anſwer. Edwards on the Freedom of the Will, 8vo. 1775, 4th edit. Prieſtley's Doctrine of Philoſophical Neceſſity, 8vo, 1777. Correſpondence between Dr Price and Dr Prieſtley, 8vo, 1778. Hartley's Obſervations on Man, 8vo, 1749. See LIBERTY, (*Append.*)

NEREIS, (*Encycl*). The head of this inſect is roundiſh, flattened, with the roſtrum extending to a point; tentacula (feelers) two, very ſhort, ſubulate; eyes, two, prominent, on the ſides of the head; body conſiſting of 23 ſegments, diminiſhing toward the tail; the ſide of every ſegment has a conical apex cut ſhort at the vertex, and denticulated; from which ſprings a ſmall pencil of hairs, under each pencil a filament reſembling a foot, ſubulate, flexible, unarmed. Colour, glaſſy, pellucid. Length, two lines. Habitation, ſea-plants, as the fuci and algæ, which ſometimes it leaves, and wanders on the ſurface of the ſea.

This inſect is frequent in all ſeaſons of the year, but particularly in ſummer, and on the approach of a tempeſt, when it ſeems through inquietude to give a much greater quantity of light; its appearance alſo is very brilliant when the wind is in the eaſt and ſouth-eaſt points, and in winter-nights preceded by a warm day. If water containing theſe animacules be kept warm, they retain their light two whole days after they are dead; but in cold weather loſe it in eight hours: motion and warmth, which increaſe their vivacity and ſtrength, increaſe their light alſo.

NEWTON (Biſhop), late lord biſhop of Briſtol and dean of St Paul's, London, was born on the firſt of January 1704. His father, John Newton, was a conſiderable brandy and cyder merchant, who, by his induſtry and integrity, having acquired what he thought a competent fortune, left off trade ſeveral years before he died.

He received the firſt part of his education in the free ſchool of Litchfield; a ſchool which, the biſhop obſerves with ſome kind of exultation, had at all times ſent forth ſeveral perſons of note and eminence; from biſhop Smaldridge and Mr Wollaſton, to Dr Johnſon and Mr Garrick.

From Litchfield he was removed to Weſtminſter-ſchool, in 1717, under the care of Dr Freind and Dr Nicoll.

During the time he was at Weſtminſter, there were, he obſerves, more young men who made a diſtinguiſhed figure afterwards in the world, than perhaps at any other period, either before or ſince. He particularly mentions William Murray, the preſent earl of Mansfield, with whom he lived on terms of the higheſt friendſhip to the laſt.

He continued ſix years at Weſtminſter-ſchool, five of which he paſſed in college. He went to Cambridge, and entered at Trinity college. Here he conſtantly reſided eight months at leaſt in every year, till he had taken his Bachelor of Arts degree. Soon after he was choſen Fellow of Trinity college, he came to ſettle in London. As it had been his inclination from a child, and he was alſo deſigned for holy orders, he had ſufficient time to prepare himſelf, and compoſed ſome ſermons, that he might have a ſtock in hand when he entered on the miniſtry. His title for orders was his fellowſhip; and he was ordained deacon in December 1729, and prieſt in the February following, by biſhop Gibſon.

At his firſt ſetting out in the world, he officiated as curate at St George's, Hanover-ſquare; and continued for ſeveral years aſſiſtant-preacher to Dr Trebeck. His firſt preferment was that of reader and afternoon-preacher at Groſvenor chapel, in South-Audley ſtreet.

This introduced him to the family of lord Tyrconnel, to whoſe ſon he became tutor. He continued in this ſituation for many years, very much at his eaſe, and on terms of great intimacy and friendſhip with lord and lady Tyrconnel, "without ſo much (ſays he) as an unkind word or a cool look ever intervening."

In the ſpring of 1744, he was, through the intereſt of the earl of Bath (who was his great friend and patron, and whoſe friendſhip and patronage were returned by grateful acknowledgments and the warmeſt encomiums) preſented to the rectory of St Mary le Bow; ſo that he was 40 years old before he obtained any living.

At the commencement in 1745, he took his Doctor's degree. In the ſpring of 1747 he was choſen lecturer of St George's Hanover-ſquare, by a moſt reſpectable veſtry of noblemen and gentlemen of high diſtinction. In Auguſt following he married his firſt wife, the eldeſt daughter of Dr Trebeck, an unaffected, modeſt, decent young woman, with whom he lived very happy, in mutual love and harmony, near ſeven years.

In 1749 he publiſhed his edition of Milton's Paradiſe Loſt, which (ſays he, very modeſtly) it is hoped hath not been ill received by the public, having, in 1775, gone through eight editions. After the Paradiſe Loſt, it was judged (ſays he) proper that Dr Newton ſhould alſo publiſh the Paradiſe Regained, and other poems of Milton; but theſe things he thought detained him from other more material ſtudies, though he had the good fortune to gain by them more than

Milton did by all his works put together. But his greateſt gain (he ſays) was their firſt introducing him to the friendſhip and intimacy of two ſuch men as biſhop Warburton and Dr Jortin, whoſe works will ſpeak for them better than any private commendation.

In 1754 he loſt his father, at the age of 83; and within a few days his wife, at the age of 38. This was the ſevereſt trial he ever underwent, and almoſt overwhelmed him. At that time he was engaged in writing his Diſſertations on the Prophecies; and happy it was for him: for in any affliction he never found a better or more effectual remedy, than plunging deep into ſtudy, and fixing his thoughts as intenſely as he poſſibly could upon other ſubjects. The firſt volume was publiſhed the following winter; but the other did not appear till three years afterwards, as, for the encouragement of his work, he was appointed, in the mean time, to preach the Boyle's lecture. The biſhop informs us, that 1250 copies of the Diſſertations were taken at the firſt impreſſion, and 1000 at every other edition: and "though (ſays he) ſome things have been ſince publiſhed upon the ſame ſubjects, yet they ſtill hold up their head above water, and having gone through five editions, are ready prepared for another. Abroad, too, their reception hath not been unfavourable, if accounts from thence may be depended upon." They were tranſlated into the German and Daniſh languages; and received the warmeſt encomiums from perſons of learning and rank.

In the ſpring of 1757, he was made prebendary of Weſtminſter, in the room of Dr Green, and promoted to the deanery of Saliſbury. In October following, he was made ſub-almoner to his majeſty. This he owed to biſhop Gilbert. He married a ſecond wife in September 1761. She was the widow of the Rev. Mr Hand, and daughter of John lord viſcount Liſburne. In the ſame month he kiſſed his majeſty's hand for his biſhopric.

In the winter of 1764, Dr Stone, the primate of Ireland, died. Mr Grenville ſent for biſhop Newton, and in the moſt obliging manner deſired his acceptance of the primacy. Having maturely weighed the matter in his mind, he declined the offer.

In 1768 he was made dean of St Paul's. His ambition was now fully ſatisfied; and he firmly reſolved never to ſeek or aſk for any thing more.

From this time to his death, ill health was almoſt his conſtant companion. It was wonderful that ſuch a poor, and weak, and ſlender thread as the biſhop's life, ſhould be ſpun out to ſuch an amazing length. In the autumn of 1781 (uſually the moſt favourable part of the year to him) he laboured under repeated illneſſes; and on Saturday the 9th of February 1782, he began to find his breath much affected by the froſt. His complaints grew worſe and worſe till the Thurſday following. He got up at five o'clock, and was placed in a chair by the fire; complained to his wife how much he had ſuffered in bed, and repeated to himſelf that portion of the Pſalms, "O my God, I cry unto thee in the day-time," &c. &c. About ſix o'clock he was left by his apothecary in a quiet ſleep. Between ſeven and eight he awoke, and appeared rather more eaſy, and took a little refreſhment. He continued dozing till near nine, when he ordered his ſervant to come and dreſs him, and help him down ſtairs. As ſoon as he was dreſſed, he inquired the hour, and bid his ſervant open the ſhutter and look at the dial of St Paul's. The ſervant anſwered, it was upon the ſtroke of nine. The biſhop made an effort to take out his watch, with an intent to ſet it; but ſunk down in his chair, and expired without a ſigh, or the leaſt viſible emotion, his countenance ſtill retaining the ſame placid appearance which was ſo peculiar to him when alive.

NIDDUI, in the Jewiſh cuſtoms, is uſed to ſignify "ſeparated or excommunicated." This, according to ſome, was to be underſtood of the leſſer ſort of excommunication in uſe among the Hebrews. He that had incurred it was to withdraw himſelf from his relations, at leaſt to the diſtance of four cubits: it commonly continued a month. If it was not taken off in that time, it might be prolonged for 60 or even 90 days: but if, within this term, the excommunicated perſon did not give ſatisfaction, he fell into the cherem, which was a ſecond ſort of excommunication; and thence into the third ſort called *ſhammata*, or *ſhematta*, the moſt terrible of all. But Selden has proved that there were only two kinds of excommunication, viz. the greater and leſs; and that theſe three terms were uſed indifferently.

NILOMETER, a column built by the ſide of the river Nile in Egypt, on purpoſe to ſhow the increaſe and decreaſe of the waters of that river. See *Indicative* COLUMN, (*Encycl.*)

NOUN. See GRAMMAR, n° 6. (*Encycl.*)

O.

ODIN, in mythology, called alſo in the dialect of the Anglo-Saxons *Woden* or *Wodan*, a name given by the ancient Scythians to their ſupreme god, and aſſumed, about 70 years before the Chriſtian æra, by Sigge, a Scythian prince, who conquered the northern nations, made great changes in their government, manners, and religion, enjoyed great honours, and had even divine honours paid him. According to the account given of this conqueror by Snorro, the ancient hiſtorian of Norway, and his commentator Torfæus, Odin was a Scythian, who withdrew himſelf, with many others in his train, by flight, from the vengeance of the Romans, under the conduct of Pompey; and having officiated as prieſt in his own country, he aſſumed the direction of the religious worſhip, as well as the civil government, of the nations which he conquered. Having ſubdued Denmark, Sweden, and Norway, he retired to Sweden, where he died. There is nothing certain in this account; but it is probable, that the god, whoſe prophet or prieſt this Scythian pretended to be, was named *Odin*, and that the ignorance of ſucceeding ages confounded the Deity with his prieſt, compoſing out of the attributes of the one, and the hiſtory of the other, the character of the northern conqueror. He deluded the people by his enchantments and ſkill in magic: having cut off the head of one Mimer, who in his lifetime was in great reputation for wiſdom, he cauſed it to be embalmed, and perſuaded the Scandinavians that he had reſtored it to the uſe of ſpeech; and he cauſed it to pronounce whatever

ever oracles he wanted. The Icelandic chronicles repreſent Odin as the moſt eloquent and perſuaſive of men; they aſcribe to him the introduction of the art of poetry among the Scandinavians, and likewiſe the invention of the Runic characters. He had alſo the addreſs to perſuade his followers, that he could run over the world in the twinkling of an eye; that he had the direction of the air and tempeſts; that he could tranſform himſelf into all ſorts of ſhapes, could raiſe the dead, could foretel things to come, deprive his enemies, by enchantment, of health and vigour, and diſcover all the treaſures concealed in the earth. They add, that by his tender and melodious airs, he could make the plains and mountains open and expand with delight; and that the ghoſts, thus attracted, would leave their infernal caverns, and ſtand motionleſs about him. Nor was he leſs dreadful and furious in battle; changing himſelf into the ſhape of a bear, a wild bull, or a lion, and amidſt ranks of enemies committing the moſt horrible devaſtation, without receiving any wound himſelf.

ŒSTRUS, (*Enycl.*) See Plate CCCXXII.—This is one of the moſt curious genera of inſects. They are diſtinguiſhed into ſeveral ſpecies, by reaſon of the different places wherein they depoſite their eggs. Some, inſtructed by nature that their eggs cannot be hatched but under the ſkins of living creatures, ſuch as bulls, cows, rein-deer, ſtags and camels, fix upon them at the inſtant of laying their eggs. From the hinderpart of their body iſſues a whimble of wonderful ſtructure. It is a ſcaly cylinder, compoſed of four tubes, which draw out like the pieces of a ſpying-glaſs; the laſt is armed with three hooks, and is the gimblet with which the œſtri bore through the tough hides of horned cattle. The animal ſeems to experience no pain from the puncture, unleſs the inſect, plunging too deep, attacks ſome nervous fibre; in which caſe, the beaſt runs about, and becomes furious. The egg being hatched, the grub feeds on the matter of the wound. The place of its abode forms upon the body of the quadrupeds a bunch ſometimes above an inch high. When full-grown, the larva breaks through the tumor, and ſlides down to the ground; for doing which it takes the cool of the morning, that it may neither be overpowered by the heat of the day, nor chilled by the cold of the night: it then digs itſelf a burrow, into which it retires. Its ſkin grows hard, and turns to a very ſolid ſhell. There it is transformed to a chryſalis, and afterwards to a winged inſect. Nature has provided for every exigence: the ſhell wherein the œſtrus is incloſed, is of ſo ſtrong a texture that it could not make its way out, if at one of the ends there were not a ſmall valve, faſtened only by a very ſlight filament. The firſt puſh the œſtrus makes, the door gives way, the priſon opens. The inſect wings its way to woods and places frequented by cattle. See OESTRUS, and BOTTS, (*Encycl.*)

ONONIS, RESTHARROW; a genus of the decandria order, belonging to the diadelphia claſs of plants. There are a number of different ſpecies; but the moſt remarkable is the arvenſis or cammock, growing in barren paſtures in ſeveral parts of Scotland and England. The ſtalks recline towards the ground; are tough and branched, and have a red hairy bark. The flowers are red, and come out from the alæ of the branches. As the plant grows old, the branches are all terminated by a ſharp woody ſpine; in which ſtate ſeveral authors, among whom is Dr Withering, have deſcribed it as a diſtinct ſpecies. The ſmooth ſort is ſometimes pickled as ſamphire. The whole plant is diuretic, and has been recommended in caſes of jaundice and gravel. The plant abounds in Paleſtine; whence Mr Haſſelquiſt conjectures (very probably according to Mr Lightfoot) that it is the thorn mentioned in the Scripture which the ground produced after the curſe.

OPERA. For POETRY, *chap.* i. read POETRY, *Part II. chap.* ii.

OPORTO, or PORTO; a rich, handſome, and conſiderable town of Portugal, in the province of Entre Douro and Minho, with a biſhop's ſee. It is a place of great importance, and by nature almoſt impregnable It is noted for its ſtrong wines; and a large quantity is from thence exported into Britain, whence all red wines that come from Spain or Portugal are called *port-wines*. It is ſeated on the declivity of a mountain near the river Duero, which forms an excellent harbour. W. Long. 8. 1. N. Lat. 41. 0.

OPPENHEIM, a town of Germany, in the lower palatinate of the Rhine, and capital of a bailliwick of the ſame name; ſeated on the declivity of a hill near the Rhine. E. Long. 8. 20. N. Lat. 49. 48.

OPTION, the power or faculty of wiſhing or chooſing, or the choice a perſon makes of any thing.

When a new ſuffragan biſhop is conſecrated, the archbiſhop of the province, by a cuſtomary prerogative, claims the collation of the firſt vacant benefice or dignity in that ſee, according as he ſhall chooſe; which choice is called the *archbiſhop's option*.

But in caſe the biſhop dies, or is tranſlated before the preſent incumbent of the promotion choſen by the archbiſhop ſhall die or be removed, it is generally ſuppoſed that the option is void; inaſmuch as the greater, ſingly and by himſelf, could not convey any right or title beyond the term of his continuance in that ſee. And if the archbiſhop dies before the avoidance ſhall happen, the right of filling up the vacancy ſhall go to his executors or adminiſtrators.

OSMUNDA, MOONWORT, a genus of the order of filices, belonging to the cryptogamia claſs of plants. There are ſeveral ſpecies; the moſt remarkable of which is the regalis, oſmund-royal, or flowering-fern. This is a native of Britain, growing in putrid marſhes. Its leaf is doubly winged, bearing bunches of flowers at the ends. The root boiled in water is very ſlimy; and is uſed in the north to ſtiffen linen inſtead of ſtarch. Only ſome of the leaves bear flowers.

OTALGIA, (*Encycl.*) Inſtead of, "See there, n° 314. and p. 4869." read, *See* EAR-ACH, in APPENDIX.

P.

PAINTER's BALANCE. See PAINTING, n° 18.

PALMÆ, PALMS. Under this name Linnæus has arranged ſeveral genera, which, although capable of a place in ſeparate claſſes of his ſyſtem, he has choſen rather, on account of their ſingular ſtructure, to place apart, in an appendix to the work.—See ARECA, CHAMÆROPS, PHOENIX, COCOS, &c. (*Encycl.*); and CORYPHA, in this APPENDIX.

The ſame plants conſtitute one of the ſeven families or tribes into which all vegetables are diſtributed by Linnæus in his *Philoſophia Botanica*. They are deſined to be plants with ſimple ſtems, which at their ſummit bear leaves reſembling thoſe of the ferns, being a compoſition of a leaf and a branch; and whoſe flowers and fruit are produced on that particular receptacle or ſeat called a *ſpadix*, protruded from a common calix in form of a ſheath or ſcabbard, termed by Linnæus *ſpatha*.

Palmæ is likewiſe the name of the firſt order in Linnæus's Fragments of a Natural Method. See BOTANY, p. 1304.

PANAX, (*Encycl*) See Plate CCCXXII.

PARONYCHIA, the WHITLOW, in ſurgery, is an abſceſs at the end of the fingers. According as it is ſituated more or leſs deep, it is differently denominated, and divided into ſpecies.

It begins with a ſlow heavy pain, attended with a ſlight pulſation, without ſwelling, redneſs, or heat; but ſoon the pain, heat, and throbbing, are intolerable; the part grows large and red, the adjoining fingers and the whole hand ſwell up; in ſome caſes, a kind of red and inflated ſtreak may be obſerved, which beginning at the affected part, is continued almoſt to the elbow; nor is it unuſual for the patient to complain of a very ſharp pain under the ſhoulder, and ſometimes the whole arm is exceſſively inflamed and ſwelled; the patient cannot ſleep, the fever, &c. increaſing; and ſometimes delirium or convulſions follow.

1. When it is ſeated in the ſkin or fat, in the back or the fore part of the finger, or under or near the nail, the pain is ſevere, but ends well. 2. When the perioſteum is inflamed or corroded, the pain is tormenting. 3. When the nervous coats of the flexor tendons of the fingers or nerves near them are ſeized, the worſt ſymptoms attend. If the firſt kind ſuppurates, it muſt be opened, and treated as abſceſſes in general; but the beſt method of treating the other two ſpecies is, on the firſt, or at furtheſt the ſecond day, to cut the part where the pain is ſeated quite to the bone: if this operation is longer deferred, a ſuppuration will come on; in which caſe ſuppuration ſhould be ſpeedily promoted, and as early a diſcharge given to the matter as poſſible. As the pain is ſo conſiderable as to occaſion a fever, and ſometimes convulſions, the tinct. theb. may be added to the ſuppurating applications, and alſo given in a draught at bed-time. The ſecond ſpecies proves very troubleſome, and ſometimes ends in a caries of the ſubjacent bone. The third ſpecies is very tedious in the cure, and uſually the phalanx on which it is ſeated, is deſtroyed.

PARMESAN CHEESE, a ſort of cheeſe much eſteemed among the Italians; ſo named from the duchy of Parma where it is made, and whence it is conveyed to various parts of Europe.

The excellent paſture-grounds of this country are watered by the Po; and the cows from whoſe milk this cheeſe is made yield a great quantity of it. Of this cheeſe there are three ſorts; the *fromaggio di forma*, about two palms in diameter, and ſeven or eight inches thick; and the *fromaggio di ribiole* and *di ribolini*, which are not ſo large. This cheeſe is of a ſaffron-colour; and the beſt is kept three or four years.

PARRA, in ornithology, a genus of birds belonging to the order of grallæ; the characters of which are: The bill is tapering and a little obtuſe; the noſtrils are oval, and ſituated in the middle of the bill; the forehead is covered with fleſhy caruncles, which are lobated; the wings are ſmall, and ſpinous. There are five ſpecies; of which the moſt remarkable is the chavaria, which is about the ſize of the domeſtic cock. The Indians in the neighbourhood of Carthagena, who breed large flocks of poultry that ſtray in the woods, train up the chavaria to defend them againſt the numerous birds of prey, no one of which will dare to encounter it. It is never known to deſert the flock, and it returns every evening to rooſt.

PARTING, in chemiſtry, an operation by which gold and ſilver are ſeparated from each other. As theſe two metals reſiſt equally well the action of fire and of lead, they muſt therefore be ſeparated by other methods. This ſeparation could not be effected if they were not ſoluble by different menſtruums.

Nitrous acid, marine acid, and ſulphur, which cannot diſſolve gold, attack ſilver very eaſily; and therefore theſe three agents furniſh methods of ſeparating ſilver from gold, or of the operation called *parting*.

Parting by nitrous acid is the moſt convenient, and therefore moſt uſed, and even almoſt the only one employed by goldſmiths and coiners. Wherefore it is called ſimply *parting*. That made with the marine acid is only made by cementation, and is known by the name of *concentrated parting*. Laſtly, parting by ſulphur is made by fuſion, which the chemiſts call the *dry way*, and is therefore called *dry parting*.

PARTING *by Aquafortis*. Although parting by aquafortis be eaſy, as we have ſaid, it cannot however ſucceed or be very exact, unleſs we attend to ſome eſſential circumſtances.

1. The gold and ſilver muſt be in a proper proportion; for if the gold was in too great quantity, the ſilver would be covered and guarded by it from the action of the acid.

Therefore, when eſſayers do not know the proportion of theſe two metals in the maſs to be operated upon, they diſcover it by the following method.

They have a certain number of needles compoſed of gold and ſilver allayed together in graduated proportions, and the allay of each needle is known by a mark upon it. Theſe are called *proof-needles*.

When eſſayers want to know nearly the proportion of gold and ſilver in a maſs, they rub this maſs upon a touchſtone, ſo as to leave a mark upon it. They then make marks upon the touchſtone with ſome of the needles the colour of which they think comes neareſt to that of the maſs. By comparing the marks of theſe needles with the mark of the maſs, they diſcover nearly the proportion of the gold and ſilver in the maſs.

If this trial ſhows, that in any given maſs the ſilver is not to the gold as three to one, this maſs is improper for the operation of parting by aquafortis. In this caſe, the quantity of ſilver neceſſary to make an allay of that proportion muſt be added.

This operation is called *quartation*, probably becauſe it reduces the gold to a fourth part of the whole maſs.

2. That the parting may be exact, the nitrous acid or aquafortis employed muſt be very pure, and eſpecially free from mixture of vitriolic and marine acids. For if this was not attended to, a quantity of ſilver, proportionable to theſe two foreign acids would be ſeparated during the ſolution; and this portion of ſilver reduced by theſe acids to vitriol of ſilver and to luna cornea, would remain mingled with the gold, which conſequently would not be entirely purified by the operation.

When the metallic maſs is properly allayed, it is to be reduced to plates, rolled up ſpirally, called cornets; or to grains. Theſe are to be put into a matraſs, and upon them a quantity of aquafortis is to be poured, the weight of which is to that of the ſilver as three to two: and as the nitrous acid employed for this operation is rather weak, the ſolution is aſſiſted, eſpecially at firſt, by the heat of a ſand-bath, in which the matraſs is to be placed. When, notwithſtanding the heat, no further mark of ſolution appears, the aquafortis charged with ſilver is to be decanted. Freſh nitrous acid is to be poured into the matraſs, ſtronger than the former, and in leſs quantity, which muſt be boiled on the reſiduous maſs, and decanted as the former. Aquafortis muſt even be boiled a third time on the remaining gold, that all the ſilver may be certainly diſſolved. The gold is then to be waſhed with boiling water. This gold is very pure, if the operation has been performed with due attention. It is called *gold of parting*.

No addition of ſilver is required, if the quantity of ſilver of the maſs is evidently much more conſiderable than that of the gold: perſons who have not proof needles and other apparatus to determine the proportion of the allay, may add to the gold an indeterminate quantity of ſilver, obſerving that this quantity be rather too great than too ſmall, and ſo conſiderable as to render the maſs nearly as white as ſilver; for a large quantity of ſilver is rather favourable than hurtful to the operation: It has no other inconvenience than an uſeleſs expence, as the larger the quantity is of ſilver, the more aquafortis muſt be employed. We ought to attend to this fact, that the colour of gold is ſcarcely perceptible in a maſs two-thirds of which is ſilver and one-third is gold; this colour then muſt be much leſs perceptible when the gold is only one-fourth part, or leſs, of the whole maſs.

If the quantity of gold exceeds that of the ſilver, the maſs may be expoſed to the action of aquaregia, which would be a kind of inverſe parting, becauſe the gold is diſſolved in that menſtruum, and the ſilver is not, but rather reduced to a luna cornea, which remains in form of a precipitate after the operation. But this method is not much practiſed, for the following reaſons.

Firſt, the gold cannot be eaſily ſeparated from the aquaregia; for if the parting has been made with an aquaregia prepared with ſal ammoniac, or if the gold be precipitated by a volatile alkali, this gold has a fulminating quality, and its reduction requires particular operations. If the aquaregia has been made with ſpirit of ſalt, and the precipitation effected by a fixed alkali, the gold will not then be fulminating, but the precipitation will be very ſlow, and probably incomplete.

Secondly, in the parting by aquaregia, the ſilver is indeed precipitated into a luna cornea, and thus ſeparated; but this ſeparation is not perfect, as a ſmall quantity of luna cornea will always remain diſſolved by the acids, if this ſolution even could be only effected by the ſuperabundant water of theſe acids. Accordingly the ſilver is not ſo accurately ſeparated from the gold by aquaregia, as the gold is from the ſilver by aquafortis.

The gold, after the parting by aquafortis, is much more eaſily collected when it remains in ſmall maſſes, than when it is reduced to a powder.

When the maſs has been regularly quarted, that is, when it contains three parts of ſilver and one part of gold, we muſt employ, particularly for the firſt ſolution, an aquafortis ſo weakened that heat is required to aſſiſt the ſolution of the ſilver: by which means the ſolution is made gently; and the gold which remains, preſerves the form of the ſmall maſſes before the ſolution. If the aquafortis employed were ſtronger, the parts of the gold would be diſunited and reduced to the form of a powder, from the activity with which the ſolution would be made.

We may indeed part by aquafortis a maſs containing two parts of ſilver to one part of gold: but then the aquafortis muſt be ſtronger; and if the ſolution be not too much haſtened, the gold will more eaſily remain in maſſes after the operation. In both caſes, the gold will be found to be tarniſhed and blackened, probably from the phlogiſton of the nitrous acid. Its parts have no adheſion together, becauſe the ſilver diſſolved from it has left many interſtices; and the cornets or grains of this gold will be eaſily broken, unleſs they be handled very carefully. To give them more ſolidity, they are generally put into a teſt under a muffle and made red-hot, during which operation they contract conſiderably, and their parts are approximated. Theſe pieces of gold are then found to be rendered much more ſolid, ſo that they may be handled without being broken. By this operation alſo the gold reſumes its colour and luſtre; and as it generally has the figure of cornets, it is called *gold in cornets*, or *grain gold*. Eſſayers avoid melting it, as they chooſe to preſerve this form, which ſhows that it has been parted.

The gold and ſilver thus operated upon ought to have been previouſly refined by lead, and freed from all allay of other metallic matters, ſo that the gold which remains ſhould be as pure as is poſſible. However, as this is the only metal which reſiſts the action of aquafortis, it might be purified by parting from all other metallic ſubſtances; but this is not generally done, for ſeveral reaſons. Firſt, becauſe the refining by lead is more expeditious and convenient for the ſeparation of the gold from the imperfect metals; ſecondly, becauſe the ſilver, when afterwards ſeparated from the aquafortis, is pure; laſtly, becauſe moſt imperfect metals do not remain completely and entirely diſſolved in nitrous acid, from the portion of phlogiſton which this acid deprives them of, the gold would be found after the parting mixed with the part of theſe metals which is precipitated.

The gold remaining after the parting ought to be well waſhed, to cleanſe it from any of the ſolution of ſilver which might adhere to it; and for this purpoſe diſtilled

led water ought to be uſed, or at leaſt water the purity of which has been aſcertained by its not forming a precipitate with a ſolution of ſilver, becauſe ſuch a precipitate would alter the purity of the gold.

The ſilver diſſolved in the aquafortis may be ſeparated either by diſtillation, in which caſe all the aquafortis is recovered very pure, and fit for another parting; or it may be precipitated by ſome ſubſtance which has a greater affinity than this metal with nitrous acid. Copper is generally employed for this purpoſe at the mint.

The ſolution of ſilver is put into copper veſſels. The aquafortis diſſolves the copper, and the ſilver precipitates. When the ſilver is all precipitated, the new ſolution is decanted, which is then a ſolution of copper. The precipitate is to be well waſhed, and may be melted into an ingot. It is called *parted ſilver.* When this ſilver has been obtained from a maſs which had been refined by lead, and when it has been well waſhed from the ſolution of copper, it is very pure.

Mr Cramer obſerves juſtly in his Treatiſe on Eſſaying, that however accurately the operation of parting has been performed, a ſmall portion of ſilver always remains united with the gold, if the parting has been made by aquafortis; or a ſmall portion of the gold remains united with the ſilver, if the parting has been made by aquaregia: and he eſtimates this ſmall allay to be from a two hundredth to a hundredth and fiftieth part; which quantity may be conſidered as nothing for ordinary purpoſes, but may become ſenſible in accurate chemical experiments. *Chem. Dict.*

The maſs of gold and ſilver to be quarted, ought previouſly to be granulated; which may be done by melting it in a crucible, and pouring it into a large veſſel full of cold water, while at the ſame time a rapid circular motion is given to the water by quickly ſtirring it round with a ſtick or broom.

The veſſels generally uſed for this operation, called *parting-glaſſes*, have the form of truncated cones, the bottom being commonly about ſeven inches wide, the aperture about one or two inches wide, and the height about 12 inches. Theſe glaſs-veſſels ought to have been well annealed, and choſen free from flaws; as one of the chief inconveniences attending the operation is, that the glaſſes are apt to crack by expoſure to cold, and even when touched by the hand. Some operators ſecure their glaſſes by a coating. For this purpoſe they ſpread a mixture of quicklime ſlaked with beer and whites of eggs upon linen cloth, which they wrap round the lower part of the veſſel, leaving the upper part uncovered, that they may ſee the progreſs of the operation; and over this cloth they apply a compoſition of clay and hair. Schlutter adviſes to put the parting-glaſſes containing ſome water, and ſupported by trevets, with fire under them. When the heat communicated by the water is too great, it may be diminiſhed by adding cold water, which muſt be done very carefully by pouring againſt the ſides of the pan, to prevent too ſudden an application of cold to the parting-glaſs. The intention of this contrivance is, that the contents of the glaſſes, if theſe ſhould break, may be received by the copper veſſel. Into a glaſs 15 inches high, and 10 or 12 inches wide at bottom, placed in a copper-pan 12 inches wide at bottom, 15 inches wide at top, and 10 inches high, he uſually put about 80 ounces of metal, with twice as much aquafortis.

The aquafortis ought to be ſo ſtrong as to be capable of acting ſenſibly on ſilver when cold, but not ſo ſtrong as to act violently. If the aquafortis be very ſtrong, however pure, and if the veſſels be well cloſed, a ſmall quantity of the gold will be diſſolved along with the ſilver, which is to be guarded againſt.

Little heat ought to be applied at the beginning, the liquor being apt to ſwell and riſe over the veſſel; but when the acid is nearly ſaturated, the heat may be ſafely encreaſed.

When the ſolution ceaſes, which may be known by the diſcontinuance of the efferveſcence, or emiſſion of air-bubbles, the liquor is to be poured off. If any grains appear entire, more aquafortis muſt be added, that all the ſilver may be diſſolved. If the operation has been performed ſlowly, the remaining gold will have ſtill the form of diſtinct maſſes, which are to receive ſolidity and colour by fire, in the manner directed by the author of the Dictionary. If the operation has been performed haſtily, the gold will have the appearance of a black mud or powder, which after five or ſix waſhings with pure water muſt be melted.

The ſilver is uſually recovered by precipitating it from the aquafortis by means of copper-veſſels into which the liquor is poured, or of plates of copper which are thrown along with the liquor into glaſs-veſſels. A conſiderable heat is required to accelerate this precipitation. Dr Lewis ſays, he has obſerved that when the aquafortis was perfectly ſaturated with ſilver, no precipitation was occaſioned by plates of copper, till a drop or two of aquafortis was added to the liquor, and then the precipitation began and continued as uſual.

The precipitated ſilver muſt be well waſhed in boiling water, and fuſed with ſome nitre; the uſe of which is to ſcorify any cupreous particles, which may adhere to the ſilver.

From the ſolution of copper in aquafortis, a blue pigment, called *verditer*, is obtained by precipitation with whiting. *Notes to Chem. Dict.*

Concentrated PARTING, alſo called *Parting by Cementation*, becauſe it is actually performed by cementation, is uſed when the quantity of it is ſo great in proportion to the ſilver, that it cannot be ſeparated by aquafortis. This operation is done in the following manner.

A cement is firſt prepared, compoſed of four parts of bricks powdered and ſifted, of one part of green vitriol calcined till it becomes red, and of one part of common ſalt. The whole is very accurately mixed together, and a firm paſte is made of it by moiſtening it with a little water or urine. This cement is called *cement royal*, becauſe it is employed to purify gold, which is conſidered by chemiſts as the king of metals.

The gold to be cemented is to be reduced to plates as thin as ſmall pieces of money. At the bottom of the crucible or cementing-pot, a ſtratum of cement, of the thickneſs of a finger, is to be put, which is to be covered with plates of gold; upon theſe another ſtratum of cement is to be laid; and then more plates of gold, till the crucible or pot is filled with theſe alternate ſtrata of cement and of gold. The whole is then to be covered with a lid, which is to be luted with a mixture of clay and ſand. This pot is to be placed in a furnace, or oven, and heated by degrees till it is moderately red, which heat is to be continued during 24 hours. The heat muſt not be ſo great as to melt the gold. The pot or crucible is then left to cool, and the gold is to be carefully ſeparated from the cement, and boiled at different times in a large quantity of pure water. This gold is to be eſſayed upon a touchſtone or otherwiſe; and if it be found not ſufficiently purified, it is to be cemented a ſecond time in the ſame manner.

The vitriolic acid of the bricks and of the calcined vitriol diſengages the acid of the common ſalt during this cementation: and this latter acid diſſolves the ſilver allayed with the gold, and ſeparates it by that means.

This experiment proves, that although marine acid, while it is liquid, cannot attack ſilver, it is nevertheleſs a powerful ſolvent of that metal. But for this purpoſe it muſt be applied to the ſilver in the ſtate of vapours, extremely concentrated, and aſſiſted with a conſiderable heat. All theſe circumſtances are united in the concentrated parting.

This experiment proves alſo, that notwithſtanding all theſe circumſtances, which favour the action of the marine acid, it is incapable of diſſolving gold.

Laſtly, the marine acid in this ſtate more effectually diſſolves the ſilver than the nitrous acid does in the parting by aquafortis, ſince this operation ſucceeds well when the ſilver is in ſo ſmall a proportion as that it would be protected from the action of the nitrous acid in the ordinary parting.

Inſtead of ſea-ſalt, nitre may be uſed with equal ſucceſs; becauſe the nitrous acid is then put in a ſtate to attack the ſilver, notwithſtanding the quantity of gold which covers it.

Dry Parting. Dry-parting, or parting by fuſion, is performed by ſulphur, which has the property of uniting eaſily with ſilver, while it does not attack gold.

This method of ſeparating theſe two metals would be the cheapeſt, the moſt expeditious and convenient of any, if the ſulphur could diſſolve the ſilver, and ſeparate it from the gold as well and as eaſily as nitrous acid does: but, on the contrary, we are obliged to employ particular treatment, and a kind of concentration, to begin the union of the ſulphur allayed with gold. Then repeated and troubleſome fuſions muſt be made, in each of which we are obliged to add different intermediate ſubſtances, and particularly the metals which have the ſtrongeſt affinity with ſulphur, to aſſiſt the precipitation, which in that caſe does not give a regulus of pure gold, but a gold ſtill allayed with much ſilver, and even with a part of the precipitating metals; ſo that, to complete the operation, cupellation is neceſſary, and alſo parting by aquafortis.

From what we have ſaid concerning this operation, we may perceive, that it ought not to be made but when the quantity of ſilver with which the gold is allayed is ſo great, that the quantity of gold which might be obtained by the ordinary parting is not ſufficient to pay the expences; and that it is only proper for concentrating a larger quantity of gold in a ſmaller quantity of ſilver. As this dry parting is troubleſome, and even expenſive, it ought not to be undertaken but on a conſiderable quantity of ſilver allayed with gold. Accordingly Cramer, Schlutter, Schlinder, and all good chemiſts and artiſts who have given proceſſes for the dry parting, recommend its uſe only in the abovementioned caſes. We wiſh that this operation could be improved: it would be much more advantageous if it could be done by two or three fuſions; and if by theſe an exact ſeparation could be obtained of a ſmall quantity of gold mixed with a large quantity of ſilver. *Chem. Dict.*

As this operation for extracting a ſmall quantity of gold from a large quantity of ſilver is, notwithſtanding its inconveniences, approved by Schlutter, Scheffer, and other authors, and practiſed in Hartz, we ſhall add what Dr Lewis, in his excellent Hiſtory of Gold, has ſaid upon the ſubject.

The moſt advantageous method of ſeparating a ſmall portion of gold from a large one of ſilver, appears to be by means of ſulphur, which unites with and ſcorifies the ſilver without affecting the gold: but as ſulphurated ſilver does not flow thin enough to ſuffer the ſmall particles of gold diffuſed through it to reunite and ſettle at the bottom, ſome addition is neceſſary for collecting and carrying them down.

In order to the commixture with the ſulphur, 50 or 60 pounds of the mixed metal, or as much as a large crucible will receive, are melted at once, and reduced into grains, by lading out the fluid matter, with a ſmall crucible made red-hot, and pouring it into cold water ſtirred with a rapid circular motion. From an eighth to a fifth of the granulated metal, according as it is richer or poorer in gold, is reſerved, and the reſt well mingled with an eighth of powdered ſulphur. The grains enveloped with the ſulphur are again put into the crucible, and the fire kept gentle for ſome time, that the ſilver, before it melts, may be thoroughly penetrated by the ſulphur; if the fire was haſtily urged, great part of the ſulphur would be diſſipated, without acting upon the metal.

If to ſulphurated ſilver in fuſion pure ſilver be added, the latter falls to the bottom, and forms there a diſtinct fluid not miſcible with the other. The particles of gold, having no affinity with the ſulphurated ſilver, join themſelves to the pure ſilver, wherever they come in contact with it, and are thus transferred from the former into the latter, more or leſs perfectly according as the pure ſilver was more or leſs thoroughly diffuſed through the mixed. It is for this uſe that a part of the granulated metal was reſerved. The ſulphurated maſs being brought into perfect fuſion, and kept melted for near an hour in a cloſe covered crucible, one-third of the reſerved grains is thrown in; and as ſoon as this is melted, the whole is well ſtirred, that the freſh ſilver may be diſtributed through the mixed, to collect the gold from it. The ſtirring is performed with a wooden rod; an iron one would be corroded by the ſulphur, ſo as to deprive the mixed of its due quantity of ſulphur, and likewiſe render the ſubſequent purification of the ſilver more troubleſome. The fuſion being continued an hour longer, another third of the unſulphurated grains is added, and an hour after this the remainder; after which the fuſion is further continued for ſome time, the matter being ſtirred at leaſt every half hour from the beginning to the end, and the crucible kept cloſely covered in the intervals.

The ſulphurated ſilver appears in fuſion of a dark-brown colour: after it has been kept melted for a certain time, a part of the ſulphur having eſcaped from the top, the ſurface becomes white, and ſome bright drops of ſilver, about the ſize of peaſe, are perceived on it. When this happens, which is commonly in about three hours after the laſt addition of the reſerved grains, ſooner or later according as the crucible has been more or leſs cloſely covered, and the matter more or leſs ſtirred, the fire muſt be immediately diſcontinued; for otherwiſe more and more of the ſilver, thus loſing its ſulphur, would ſubſide and mingle with the part at the bottom in which the gold is collected. The whole is poured out into an iron mortar greaſed and duly heated; or if the quantity is too large to be ſafely lifted at once, a part is firſt laded out from the top with a ſmall crucible, and the reſt poured into the mortar. The gold, diffuſed at firſt through the whole maſs, is now found collected into a part of it at the bottom, amounting only to about as much as was reſerved unſulphurated. This part may be ſeparated from the ſulphurated ſilver above it by a chiſſel and hammer; or more perfectly, the ſurface of the lower maſs being generally rugged and unequal, by placing the whole maſs with its bottom upwards in a crucible: the ſulphurated part quickly melts, leaving unmelted that which contains the gold, which may thus be completely ſeparated from the other. The ſulphurated ſilver is eſſayed by keeping a portion of it in fuſion in an open crucible till the ſulphur is diſſipated, and then diſſolving it in aquafortis. If it ſhould ſtill be found to contain any gold, it is to be melted again; as much more unſulphurated ſilver is to be added as was employed in each of the former injections, and the fuſion continued about an hour and a half.

The gold thus collected into a part of the ſilver may be further concentrated into a ſmaller part, by granulating the maſs and repeating the whole proceſs. The operation may be again and again repeated, till ſo much of the ſilver is ſeparated, that the remainder may be parted by aquafortis without too much expence.

The foregoing proceſs, according to Mr Schlutter, is practiſed at Rammelſberg in the Lower Hartz. The prevailing metal in the ore of Rammelſberg is lead: the quantity of lead is at moſt 40 pounds on a quintal or 100 pounds of the ore. The lead worked off on a teſt or concave hearth yields about 110 grains of ſilver, and the ſilver contains only a 384th part of gold; yet this little quantity of gold, amounting ſcarcely to a third of a grain in a hundred weight of this ore, is thus collected with profit. The author abovementioned confines this method of ſeparation to ſuch ſilver as is poor in gold, and reckons parting with aquafortis more advantageous where the gold amounts to above a 64th of the ſilver: he adviſes alſo not to attempt concentrating the gold too far, as a portion of it will always be taken up again by the ſilver. Mr Scheffer, however, relates, (in the Swediſh Memoirs for the year 1752), that he has by this method brought the gold to perfect fineneſs; and that he has likewiſe collected all the gold which the ſilver contained; the ſilver of the laſt operations, which had taken up a portion of the gold, being reſerved to be worked over again with a freſh quantity of gold-holding ſilver. The ſulphurated ſilver is purified by continuing it in fuſion for ſome time with a large ſurface expoſed to the air; the ſulphur gradually exhales, and leaves the ſilver entire.

PASSIFLORA, or PASSION-FLOWER, a genus of the pentandria order, belonging to the gynandria claſs of plants. There are near 30 different ſpecies; all of them natives of warm foreign countries, only one of which is ſufficiently hardy to ſucceed well in the open ground here; all the others requiring the ſhelter of a green-houſe or ſtove, but chiefly the latter. The moſt remarkable are,

1. The cærulea, or blue-rayed common palmated paſſion-flower, hath long, ſlender, ſhrubby, purpliſh-green ſtalks, branchy, and aſcending upon ſupport by their claſpers thirty or forty feet high; with one large palmated leaf at each joint, and at the axillas large ſpreading flowers, with whitiſh-green petals, and a blue radiated nectarium; ſucceeded by a large, oval, yellowiſh fruit. It flowers from July until October; the flowers are very large, conſpicuous, and their compoſition is exceedingly curious and beautiful. The general ſtructure of the ſingular flowers of this plant is, they come out at the axillas on pedunculi about three inches long, which they terminate, each flower having juſt cloſe under the calix a three-lobed involucrum-like appendage; a five-lobed calix, and a five-petalous corolla, the ſize, figure, and colour of the calix, &c. the petals arranging alternately with the calicinal lobes; the whole, including the involucrum, calix, and corolla, make juſt 13 lobes and petals, all expanded flat: and within the corolla is the nectarium, compoſed of a multitude of thread-like fibres, of a blue and purple colour, diſpoſed in circular rays round the column of the fructification; the outer ray is the longeſt, flat, and ſpreading on the petals; the inner is ſhort, erect, and narrows towards the centre: in the middle is an erect cylindric club-ſhaped column, or pillar, crowned with the roundiſh germen, having at its baſe five horizontal ſpreading filaments, crowned with incumbent yellow antheræ, that move about every way; and from the ſide of the germen ariſe three ſlender ſpreading ſtyles, terminated by headed ſtigmas: the germen afterwards gradually becomes a large oval fleſhy fruit, ripening to a yellowiſh colour.—Theſe wonderful flowers are only of one day's duration, generally opening about 11 or 12 o'clock, and frequently in hot ſunny weather burſt open with elaſticity, and continue fully expanded all that day; and the next they gradually cloſe, aſſuming a decayed-like appearance, and never open any more; the evening puts a period to their exiſtence, but they are ſucceeded by new ones daily on the ſame plant.—This plant and flowers are held in great veneration in ſome foreign Catholic countries, where the religious make the leaves, tendrils, and different parts of the flower, to repreſent the inſtruments of our bleſſed Saviour's paſſion; hence the name *paſſiflora*.

2. The incarnata, incarnated, or fleſh-coloured Italian paſſion-flower, hath a ſtrong perennial root; ſlender, herbaceous ſtalks, riſing upon ſupport four or five feet high; leaves compoſed of three ſawed lobes, each leaf attended by a twining tendril; and at the axillas long ſlender pedunculi, terminated each by one whitiſh flower, having a greeniſh calix, and a reddiſh or purple radiated nectarium, ſurrounding the column of the

fructification, which ſucceed to a large, round, fleſhy fruit, ripening to a beautiful orange colour.—The flowers of this ſpecies are alſo very beautiful, though of ſhort duration, opening in the morning, and night puts a period to their beauty; but they are ſucceeded by a daily ſupply of new ones.—The fruit of this ſort is alſo very ornamental, as ripening to a fine reddiſh orange colour; but theſe rarely attain perfection here, unleſs the plants are placed in the ſtove; therefore when there is ſuch accommodation, it highly merits that indulgence, where it will exhibit both flowers and green and ripe fruit, all at the ſame time, in a beautiful manner.

3. The veſpertilio, or bat's-wing paſſion-flower, hath ſlender, ſtriated, branchy ſtalks; large, bilobate, or two-lobed leaves, the baſe roundiſh and glandular, the lobes acute, widely divaricated like a bat's wings, and dotted underneath; and axillary flowers, having white petals and rays. The leaves of this ſpecies have a ſingular appearance, the two lobes being expanded ſix or ſeven inches wide, reſembling the wings of a bat upon flight; hence the name *veſpertilio*.

As all the ſpecies are natives of warm climates, in this country they are moſtly of a tender quality, except the firſt ſort, which ſucceeds very well in the full ground, in a warm ſituation; only their young branches are ſometimes killed in very ſevere winters; but plenty of new ones generally riſe again in ſpring following; the others, denominated *ſtove* kinds, muſt always be retained in that repoſitory.

PAWN, a pledge or gage for ſurety of payment of money lent. It is ſaid to be derived *a pugno, quia res quæ pignori dantur, pugno vel manu traduntur.* The party that pawns goods hath a general property in them; they cannot be forfeited by the party that hath them in pawn for any offence of his, nor be taken in execution for his debt; neither may they otherwiſe be put in execution till the debt for which they are pawned is ſatisfied.

If the pawn is laid up, and the pawnee robbed, he is not anſwerable; though if the pawnee uſe the thing, as a jewel, watch, &c. that will not be the worſe for wearing, which he may do, it is at his peril; and if he is robbed, he is anſwerable to the owner, as the uſing occaſioned the loſs, &c.

If the pawn is of ſuch a nature that the keeping is a charge to the pawnee, as a cow, or a horſe, &c. he may milk the one, and ride the other, and this ſhall go in recompence for his keeping.

Things which will grow the worſe by uſing, as apparel, &c. he may not uſe.

PAVING, the conſtruction of ground-floors, ſtreets, or high-ways, in ſuch a manner that they may be conveniently walked upon. In Britain, the pavement of the grand ſtreets, &c. are uſually of flint, or rubble-ſtone; courts, ſtables, kitchens, halls, churches, &c. are paved with tiles, bricks, flags, or fire-ſtone; ſometimes with a kind of free-ſtone, and rag-ſtone.

In ſome ſtreets, *e. gr.* of Venice, the pavement is of brick; churches ſometimes are paved with marble, and ſometimes with moſaic work, as the church of St Mark at Venice. In France, the public roads, ſtreets, courts, &c. are all paved with gres or gritt, a kind of free-ſtone.

In Amſterdam and the chief cities of Holland, they call their brick pavement the *burgher-maſters pavement*, to diſtinguiſh it from the ſtone or flint pavement, which uſually takes up the middle of the ſtreet, and which ſerves for carriages; the brick which borders it being deſtined for the paſſage of people on foot.

Pavements of free-ſtone, flint, and flags, in ſtreets, &c. are laid dry, *i. e.* in a bed of ſand; thoſe of courts, ſtables, ground rooms, &c. are laid in a mortar of lime and ſand; or in lime and cement, eſpecially if there be vaults or cellars underneath. Some maſons, after laying a floor dry, eſpecially of brick, ſpread a thin mortar over it; ſweeping it backwards and forwards to fill up the joints. The ſeveral kinds of pavement are as various as the materials of which they are compoſed, and whence they derive the name by which they are diſtinguiſhed; as,

1. *Pebble-paving*, which is done with ſtones collected from the ſea-beach, moſtly brought from the iſlands of Guernſey and Jerſey; they are very durable, indeed the moſt ſo of any ſtone uſed for this purpoſe. They are uſed of various ſizes, but thoſe which are from ſix to nine inches deep, are eſteemed the moſt ſerviceable. When they are about three inches deep, they are denominated *bolders*, or *bowlers*; theſe are uſed for paving court-yards, and other places not accuſtomed to receive carriages with heavy weights; when laid in geometrical figures, they have a very pleaſing appearance.

2. *Rag-paving* was much uſed in London, but is very inferior to the pebbles; it is dug in the vicinity of Maidſtone, in Kent, from which it has the name of *Kentiſh rag-ſtone;* there are ſquared ſtones of this material for paving coach-tracks and foot-ways.

3. *Purbeck pitchens;* ſquare ſtones uſed in footways; they are brought from the iſland of Purbeck, and alſo frequently uſed in court-yards; they are in general from ſix to ten inches ſquare, and about five inches deep.

4. *Squared paving*, for diſtinction by ſome called *Scotch paving*, becauſe the firſt of the kind paved in the manner that has been and continues to be paved, came from Scotland; the firſt was a clear cloſe ſtone, called *blue whynn*, which is now diſuſed, becauſe it has been found inferior to others ſince introduced in the order they are hereafter placed.

5. *Granite*, a hard material, brought alſo from Scotland, of a reddiſh colour, very ſuperior to the blue whynn quarry.

6. *Guernſey*, which is the beſt, and now almoſt the only ſtone in uſe; it is the ſame ſtone with the pebble before ſpoken of, but broken with iron hammers, and ſquared to any dimenſions required of a priſmoidical figure, ſet with its ſmalleſt baſe downwards. The whole of the foregoing paving ſhould be bedded and paved in ſmall gravel.

7. *Purbeck-paving*, for footways, is in general got in large ſurfaces about 2½ inches thick; the blue ſort is the hardeſt and the beſt of this kind of paving.

8. *Yorkſhire paving*, is an exceeding good material for the ſame purpoſe, and is got of almoſt any dimenſions of the ſame thickneſs as the Purbeck. This ſtone will not admit the wet to paſs through it, nor is it affected by the froſt.

9. *Ryegate*, or *fire-ſtone paving*, is uſed for hearths, ſtoves, ovens, and ſuch places as are liable to great heat, which does not affect this ſtone if kept dry.

10. *Newcaſtle flags*, are ſtones about two feet ſquare, and 1½ or two inches thick; they anſwer very well for paving out-offices; they are ſomewhat like the Yorkſhire.

11. *Portland paving*, with ſtone from the iſland of Portland; this is ſometimes ornamented with black marble dots.

12. *Swedland paving*, is a black ſlate dug in Leiceſterſhire, and looks well for paving halls, or in party-coloured paving.

13. *Marble paving*, is moſtly variegated with different marbles, ſometimes inlaid in moſaic.

14. *Flat brick paving*, done with brick laid in ſand, mortar, or groute, as when liquid lime is poured into the joints.

15. *Brick-on-edge paving*, done with brick laid edgewiſe in the ſame manner.

16. Bricks are alſo laid flat or edgewiſe in herring-bone.

17. Bricks are alſo ſometimes ſet endwiſe in ſand, mortar, or groute.

18. Paving is alſo performed with paving bricks.

19. With ten inch tiles.

20. With foot tiles.

21. With clinkers for ſtables and outer offices.

22. With the bones of animals, for gardens, &c.

And, 23. We have knob-paving, with large gravel-ſtones, for porticoes, garden-ſeats, &c.

Pavements of churches, &c. frequently conſiſt of ſtones of ſeveral colours; chiefly black and white, and of ſeveral forms, but chiefly ſquares and lozenges, artfully diſpoſed. Indeed, there needs no great variety of colours to make a ſurpriſing diverſity of figures and arrangements. M. Truchet, in the Memoirs of the French Academy, has ſhown by the rules of combination, that two ſquare-ſtones, divided diagonally into two colours, may be joined together chequerwiſe 64 different ways: which appears ſurpriſing enough; ſince two letters, or figures, can only be combined two ways.

The reaſon is, that letters only change their ſituation with regard to the firſt and ſecond, the top and bottom remaining the ſame; but in the arrangement of theſe ſtones, each admits of four ſeveral ſituations, in each whereof the other ſquare may be changed 16 times, which gives 64 combinations.

Indeed, from a farther examination of theſe 64 combinations, he found there were only 32 different figures, each figure being repeated twice in the ſame ſituation, though in a different combination; ſo that the two only differed from each other by the tranſpoſition of the dark and light parts.

PERIAGUA, a ſort of large canoe made uſe of in the Leeward iſlands, South America, and the gulf of Mexico. It is compoſed of the trunks of two trees hollowed and united together; and thus differs from the CANOE which is formed of one tree.

PERSIMON (Dioſpyros Virginiana, *Linn.*) a tree pretty common in North America; the fruit of which, when ripe, is ſweet and glutinous, with a little aſtringency. From the perſimon is made a very palatable liquor, in the following manner. As ſoon as the fruit is ripe, a ſufficient quantity is gathered, which is very eaſy, as each tree is well ſtocked with them. Theſe perſimon apples are put into a dough of wheat or other flour, formed into cakes, and put into an oven, in which they continue till they are quite baked and ſufficiently dry, when they are taken out again: then, in order to brew the liquor, a pot full of water is put on the fire, and ſome of the cakes are put in: theſe become ſoft by degrees as the water grows warm, and crumble in pieces at laſt; the pot is then taken from the fire, and the water in it well ſtirred about, that the cakes may mix with it: this is then poured into another veſſel, and they continue to ſteep and break as many cakes as are neceſſary for a brewing: the malt is then infuſed, and they proceed as uſual with the brewing. Beer thus prepared is reckoned much preferable to other beer. They likewiſe make brandy of this fruit in the following manner: having collected a ſufficient quantity of perſimons in autumn, they are all together put into a veſſel, where they lie for a week till they are quite ſoft: then they pour water on them, and in that ſtate they are left to ferment of themſelves, without promoting the fermentation by any addition. The brandy is then made in the common way, and is ſaid to be very good, eſpecially if grapes (in particular of the ſweet ſort) which are wild in the woods, be mixed with the perſimon fruit. Some perſimons are ripe at the end of September, but moſt of them later, and ſome not before November and December, when the cold firſt overcomes their acrimony. The wood of this tree is very good for joiners inſtruments, ſuch as planes, handles to chiſels, &c. but if after being cut down it lies expoſed to ſunſhine and rain, it is the firſt wood which rots, and in a year's time there is nothing left but what is uſeleſs. When the perſimon trees get once into a field, they are not eaſily got out of it again, as they ſpread ſo much.

PEZIZA, CUP-MUSHROOM, in botany, a genus of the claſs of cryptogamia, and order of fungi. This muſhroom is bell-ſhaped and ſeſſile. Linnæus enumerates eight ſpecies.

PHAETON, in ornithology, a genus of birds belonging to the order of anſeres; the characters of which are: The bill is ſharp, ſtraight, and pointed; the noſtrils are oblong, and the hinder toe is turned foreward. There are two ſpecies, viz.

1. The demerſus, or penguin, has a thick, arched, red bill; the head, hind-part of the neck, and the back, of a duſky purpliſh hue, and breaſt and belly white; brown wings, with the tips of the feathers white; inſtead of a tail, a few black briſtles; and red legs. It is found on Pinguin iſle, near the Cape of Good Hope.

2. The ethereus, or tropic bird, is about the ſize of a partridge, and has very long wings. The bill is red, with an angle under the lower mandible. The eyes are encompaſſed with black, which ends in a point towards the back of the head. Three or four of the larger quill-feathers, towards their ends, are black, tipped with white; all the reſt of the bird is white, except the back, which is variegated with curved lines of black. The legs and feet are of a vermilion red. The toes are webbed. The tail conſiſts of two long ſtraight narrow feathers, almoſt of equal breadth from their quills to their points. See Plate CCCXXI. Theſe birds are rarely ſeen but between the tropics, at the remoteſt diſtance from land. Their name ſeems to imply the limits of their abode; and although they are ſeldom ſeen but a few degrees north or ſouth of either tropic, yet one of their breeding-places is almoſt nine degrees from the northern tropic, viz. at Bermudas. They breed alſo in great numbers on ſome little iſlands at the eaſt end of Porto Rico.

PHARMACY, (*Encycl.*) n° 288. Correct thus: "Let the iron-filings be put below a lawn or gauze ſieve, and the magnet applied above; it will attract them through the pores of the ſieve, and thus free them more effectually from heterogeneous matter."

PHASCUM, in botany, a genus of the claſs of cryptogamia, and order of muſci or moſſes. Its characters are, that the anthera is covered, and guarded at the margin by parallel briſtles; and that the calyptra, or veil, is ſmall. There are four ſpecies.

PHORMIUM, *New Zealand* FLAX-PLANT. See FLAX-*Plant*, (*Append.*)

PHOSPHORUS. P. 6168, col. 1. line 35, for *quickſilver* read *quicklime*.

PHRENETIC, a term uſed to denote thoſe who, without being abſolutely mad, are ſubject to ſuch ſtrong ſallies of imagination as in ſome meaſure pervert their judgment, and cauſe them act in a way different from the more rational part of mankind.

PILEUS, in Roman antiquity, was the ordinary cap or hat worn at public ſhows and ſacrifices, and by the freedmen. It was one of the common rewards aſſigned to ſuch gladiators as were ſlaves, in token of their obtaining freedom.

PINANG, the Chineſe name of the areca catechu, *Lin.* See ARECA, (*Encycl.*)

PINCHBECK. See SIMILOR and ZINC, (*Encycl.*)

PINGUICULA VULGARIS, *Butterwort*, or *Yorkſhire ſanicle*. The Laplanders receive the milk of the rein-deer upon the freſh leaves of this plant, which they immediately ſtrain off and ſet aſide till it becomes ſomewhat aceſcent; and the whole acquires in a day or two the conſiſtence of cream without ſeparating the ſerum, and thus becomes an agreeable food. When thus prepared, a ſmall quantity of the ſame has the property of rennet in producing the like change on freſh milk.

PIUS II. (Pope), before called *Æneas Sylvius Bar. Piccolomini*, was born at Corſignano of Sienna in 1405. He was, at the age of 26, ſecretary to Dominico Capranico at the council of Bale, and had the provoſtſhip of St Laurence's church in Milan. Afterwards Frederic III. honoured him with the poetical crown, and employed him in divers embaſſies to Rome, Milan, Naples, Bohemia, &c. He managed ſeveral employments with ſucceſs, eſpecially in the diet which he called for the forming of a league againſt the Turks at Ratiſbon and Francfort, where he delivered himſelf with wonderful eloquence. Calixtus III. made him cardinal in 1456; and that pope dying, he was advanced to his place, and took the name of *Pius* II. In 1458 he ſummoned the Chriſtian princes againſt the Turks; and would have led ſome troops himſelf, but died at Ancona, whither he was coming in order to embark, in 1464, having ſat five years, &c. His works were publiſhed at Bale in 1571. He was a perſon of true courage, ſingular prudence, the beſt and moſt learned pope that wore the tiara for many ages before.

PLANTS, FOSSILE. Many ſpecies of tender and herbaceous plants are found at this day, in great abundance, buried at conſiderable depths in the earth, and converted, as it were, into the nature of the matter they lie among; foſſile wood is often found very little altered, and often impregnated with ſubſtances of almoſt all the different foſſile kinds, and lodged in all the ſeveral ſtrata, ſometimes firmly imbedded in hard matter; ſometimes looſe: but this is by no means the caſe with the tenderer and more delicate ſubjects of the vegetable world. Theſe are uſually immerſed either in a blackiſh ſlaty ſubſtance, found lying over the ſtrata of coal, elſe in looſe nodules of ferruginous matter of a pebble-like form, and they are always altered into the nature of the ſubſtance they lie among: what we meet with of theſe are principally of the fern kind; and what is very ſingular, though a very certain truth, is, that theſe are principally the ferns of American growth, not thoſe of our own climate. The moſt frequent foſſile plants are the polypody, ſpleen-wort, oſmund, trichomanes, and the ſeveral larger and ſmaller ferns; but beſide theſe there are alſo found pieces of the equiſetum or horſetail, and joints of the ſtellated plants, as the clivers, madder, and the like; and theſe have been too often miſtaken for flowers; ſometimes there are alſo found complete graſſes, or parts of them, as alſo reeds, and other watery plants; ſometimes the ears of corn, and not unfrequently the twigs or bark, and impreſſions of the bark, and fruit of the pine or fir kind, which have been, from their ſcaly appearance, miſtaken for the ſkins of fiſhes; and ſometimes, but that very rarely, we meet with moſſes and ſea-plants.

Many of the ferns not unfrequently found, are of very ſingular kinds, and ſome ſpecies yet unknown to to us; and the leaves of ſome appear ſet at regular diſtances, with round protuberances and cavities. The ſtones which contain theſe plants ſplit readily, and are often found to contain, on one ſide, the impreſſion of the plant; and on the other the prominent plant itſelf: and, beſide all that have been mentioned, there have have been frequently ſuppoſed to have been found with us ears of common wheat, and of the maiz or Indian corn; the firſt being in reality no other than the common endmoſt branches of the firs, and the other the thicker boughs of various ſpecies of that and of the pine kind, with their leaves fallen off; ſuch branches in ſuch a ſtate cannot but afford many irregular tubercles and papillæ, and, in ſome ſpecies, ſuch as are more regularly diſpoſed.

Theſe are the kinds moſt obvious in England; and theſe are either immerſed in the ſlaty ſtone which conſtitutes whole ſtrata, or in flatted nodules, uſually of about three inches broad, which readily ſplit into two pieces on being ſtruck.

They are moſt common in Kent, on coal-pits near Newcaſtle, and the foreſt of Dean in Glouceſterſhire; but are more or leſs found about almoſt all our coal-pits, and many of our iron mines. Though theſe ſeem the only ſpecies of plants found with us, yet in Germany there are many others, and thoſe found in different ſubſtances. A whitiſh ſtone, a little harder than chalk, frequently contains them: they are found alſo often in a grey ſlaty ſtone of a firmer texture, not unfrequently in a blackiſh one, and at times in many others. Nor are the bodies themſelves leſs various here than the matter in which they are contained: the leaves of trees are found in great abundance, among which thoſe of the willow, poplar, whitethorn, and pear trees, are the moſt common; ſmall branches of box, leaves of the olive-tree, and ſtalks of garden thyme, are alſo found there; and ſometimes ears of the various ſpecies of corn, and the larger as well as the ſmaller moſſes in great abundance.

Theſe ſeem the tender vegetables, or herbaceous plants, certainly found thus immerſed in hard ſtone, and buried at great depths in the earth: others of many kinds there are alſo named by authors; but, as in bodies ſo imperfect, errors are eaſily fallen into, theſe ſeem all that can be aſcertained beyond mere conjecture.

PLANTS, *Method of* PRESERVING *them in their original Shape and Colour.* Waſh a ſufficient quantity of fine ſand, ſo as perfectly to ſeparate it from all other ſubſtances; dry it; paſs it through a ſieve to clear it from any groſs particles which would not riſe in the waſhing: take an earthen veſſel of a proper ſize and form, for every plant and flower which you intend to preſerve; gather your plants and flowers when they are in a ſtate of perfection, and in dry weather, and always with a convenient portion of the ſtalk: heat a little of the dry ſand prepared as above, and lay it in the bottom of the veſſel, ſo as equally to cover it; lay the plant or flower upon it, ſo as that no part of it may touch the ſides of the veſſel: ſift or ſhake in more of the ſame ſand by little upon it, ſo that the leaves may be extended by degrees, and without injury, till the plant or flower is covered about two inches thick: put the veſſel into a ſtove, or hot-houſe, heated by little and little to the 50th degree; let it ſtand there a day or two, or perhaps more, according to the thickneſs and ſucculence of the flower or plant; then gently ſhake the ſand out upon a ſheet of paper, and take out the plant, which you will find in all its beauty, the ſhape as elegant, and the colour as vivid as when it grew.

Some flowers require certain little operations to preſerve the adherence of their petals, particularly the tulip; with reſpect to which it is neceſſary, before it is buried in the ſand, to cut the triangular fruit which riſes in the middle of the flower; for the petals will then remain more firmly attached to the ſtalk.

A hortus ſiccus prepared in this manner would be one of the moſt beautiful and uſeful curioſities that can be.

PLAY, in poetry, &c. See DRAMA, TRAGEDY, COMEDY, &c. (*Encycl.*)

PLAY-*Houſe*. The moſt ancient Engliſh play-houſes were the Curtain in Shoreditch, and the Theatre. In the time of Shakeſpeare, who commenced a dramatic writer about the year 1592, there were no leſs than ten theatres open, four private houſes, and ſix that were called public theatres. Moſt, if not all, of Shakeſpeare's plays were performed either at the Globe, which was an hexagonal building, partly open to the weather and partly covered with reeds, on the ſouthern ſide of the river Thames, called the *Bank-ſide*, and a public theatre, where they always acted by day-light; or at the theatre in Blackfriars, which was a private play-houſe, and where plays were uſually repreſented by candle-light. Both theſe belonged to the ſame company of comedians, viz. his majeſty's ſervants; which title they aſſumed after a licence had been granted to them by king James in 1603, having before this time been called the ſervants of the lord chamberlain. The exhibitions at the Globe ſeem to have been calculated chiefly for the lower claſs of people, and thoſe at Blackfriars for a more ſelect and judicious audience. The former was a ſummer, and the latter a winter theatre. Many of our ancient dramatic pieces were performed in the yards of carrier's inns; in which, in the beginning of queen Elizabeth's reign, the comedians, who then firſt united themſelves in companies, erected an occaſional ſtage. The form of theſe temporary play-houſes ſeems to be preſerved in our modern theatre. Many circumſtances concur to render it probable, that our ancient theatres, in general, were only furniſhed with curtains, which opened in the middle, and a ſingle ſcene compoſed of tapeſtry, ſometimes ornamented with pictures. In the year 1605, Inigo Jones exhibited an entertainment at Oxford, in which moveable ſcenes were uſed; but they were not then uſed in the public theatres. When Sir William Davenant firſt opened, by virtue of his patent, the duke of York's theatre in Lincoln's-Inn fields, in the ſpring of the year 1662, with one of his own plays, the ſiege of Rhodes, then ſcenes made their firſt appearance upon the Engliſh ſtage; and about the ſame time actreſſes were alſo introduced, probably by him, in imitation of the foreign theatres; and Mrs Betterton is ſaid to have been the firſt woman that appeared on the Engliſh ſtage. Before this time female characters were repreſented by boys or young men. In the time of Shakeſpeare plays began at one o'clock in the afternoon, and the exhibition was uſually finiſhed in two hours; and ſo late as 1667, they commenced at three o'clock. See *Malone's Supplemental Obſervations to Steevens's edition of Shakeſpeare.*

If any perſons ſhall, in plays, &c. jeſtingly or profanely uſe the name of God, they ſhall forfeit 10l. Stat. 1. Jac. I. cap. 21. And players ſpeaking any thing in derogation of religion, &c. are liable to forfeitures and impriſonments. 1. Eliz. Alſo acting plays or interludes on a Sunday is ſubject to penalties, by 1 Car. I. cap. 1. No perſon ſhall act any new play, or addition to an old one, &c. unleſs a true copy thereof, ſigned by the maſter of the play-houſe, be ſent to the lord chamberlain 14 days before it be acted, who may prohibit the repreſenting any ſtage-play; and perſons acting contrary to ſuch prohibitions ſhall forfeit 50l. and their licences, &c. Stat. 10. Geo. II. cap. 28. And by this ſtatute, no licence is to be given to act plays, but in the city and liberties of Weſtminſter, or places of his majeſty's reſidence.

PLEASURE, (*Encycl.*) Pleaſure and pain are no other than engines in nature's hand, whereby we are directed to conſult our own preſervation, and avoid our ruin. To things that may contribute to the one, as food, venery, &c. ſhe has annexed pleaſure; and to thoſe that may conduce to the other, as hunger, diſeaſes, &c. pain. She durſt not leave it to our diſcretion, whether we would preſerve and propagate the ſpecies or not; but, as it were, conſtrains us to both. Were there no pleaſure in eating, nor pain in hunger, what numbers would be ſtarved through negligence, forgetfulneſs, or ſloth? What is it induces people to the office of generation, but pleaſure? Without this the world had ſcarce ſubſiſted to this time.

Among the multiplicity of things to be done, and to be avoided, for the preſervation of animal life, &c. how ſhould we have diſtinguiſhed between the one and the other, but for the ſenſation of pleaſure and pain? Theſe are not only ſpurs to urge us on, but alſo guides to direct us whither we are to go. Wherever nature has fixed a pleaſure, we may take it for granted ſhe there enjoins a duty; and ſomething is to be there done, either for the individual, or for the ſpecies.

Hence it is, that our pleaſures vary at different ſtages of life; the pleaſures, *e. g.* of a child, a youth, a grown man, an old man, &c. all tending to thoſe particular things required by nature in that particular ſtate of life, either for the preſervation ſimply, or jointly for that and propagation, &c.

Hence, from the different conſtitutions of the body, at different ages, it were very eaſy to account for all the particular taſtes and pleaſures thereof: not by deducing the pleaſures mechanically from the diſpoſition of the organs in that ſtate, but by conſidering what is neceſſary for the perfection and well-being of the individual in that ſtate, and what is to contribute to that of the ſpecies. In a child, *e. g.* mere preſervation in the preſent ſtate is not enough; it muſt likewiſe grow: to bring this to paſs, nature has made the returns of hunger, &c. more frequent, as well as more acute, and the pleaſures of feeding more exquiſite. And that the exceſs of aliment, in proportion to the bulk of the body, may be diſpenſed with, ſhe has made one of the great pleaſures of this ſtate to conſiſt in a ſeries of ſportive exerciſes; by means whereof the parts of the body come to be opened and expanded, and arrive at maturity. This done, the pleaſures that conduced thereto diſappear; and others, ſuited to the new ſtate, ſucceed.

PLUMBAGO, LEAD-WORT; a genus of the monogynia order, belonging to the pentandria claſs of plants. There are four ſpecies; the moſt remarkable of which are the Europæa and Zeylonica. The firſt grows naturally in the ſouthern parts of Europe, and has a perennial root ſtriking deep in the ground. There are many ſlender channelled ſtalks, about three feet high, terminated by tufts of ſmall funnel-ſhaped flowers, of a blue or white colour. The ſecond grows naturally in both the Indies. The upper part of the ſtalk and empalement are covered with a glutinous juice, which catches the ſmall flies that light upon it. The former ſpecies is propagated by parting the roots, and by ſeeds; but the latter is too tender to thrive in the open air in this country.

POE-BIRD, in ornithology, is an inhabitant of ſome of the South Sea iſlands, where it is held in great eſteem and veneration by the natives. It goes by the name of *Kogo* in New Zealand; but is better known by that of *Poë-bird*. It is ſomewhat leſs than our blackbird. The feathers are of a fine mazarine blue, except thoſe of its neck, which are of a moſt beautiful ſilver grey, and two or three ſhort white ones which are on the pinion-joint of the wing. Under its throat hang two little tufts of curled ſnow-white feathers, called its *poies*, (the Otaheitian word for ear-rings); which occaſioned the name of *poë bird* being given to it. It is remarkable for the ſweetneſs of its note, as well as the beauty of its plumage. Its fleſh is alſo delicate food. See Plate CCXLIV.

POINT-BLANK, in gunnery, denotes the ſhot of a gun levelled horizontally, without either mounting or ſinking the muzzle of the piece.—In ſhooting point-blank, the ſhot or bullet is ſuppoſed to go directly forward, in a ſtraight line, to the mark; and not to move in a curve, as bombs and highly elevated random-ſhots do.—When a piece ſtands upon a level plane, and is laid level, the diſtance between the piece and the point where the ſhot touches the ground firſt, is called the *point-blank* range of that piece; but as the ſame piece ranges more or leſs, according to a greater or leſs charge, the point-blank range is taken from that of a piece loaded with ſuch a charge as is uſed commonly in action. It is, therefore, neceſſary that theſe ranges of all pieces ſhould be known, ſince the gunner judges from thence what elevation he is to give to his pieces when he is either farther from or nearer to the object to be fired at; and this he can do pretty nearly by ſight, after conſiderable practice.

POLYGALA. At the end of the paragraph, dele the remark which follows the word *rattleſnake*.

POLYGAMY, (*Encycl.*) Dr Percival, Phil. Tranſ. vol. lxvi. part i. p. 163. has very juſtly obſerved, that the practice is brutal, deſtructive to friendſhip and moral ſentiment, inconſiſtent with one great end of marriage the education of children, and ſubverſive of the natural rights of more than half of the ſpecies. Beſides, it is injurious to population, and therefore can never be countenanced or allowed in a well-regulated ſtate: for, though the number of females in the world may conſiderably exceed the number of males, yet there are more men capable of propagating their ſpecies than women capable of bearing children; and it is a well-known fact, that Armenia, in which a plurality of wives is not allowed, abounds more with inhabitants than any other province of the Turkiſh empire.

Yet Selden has proved, in his Uxor Hebraica, that plurality of wives was allowed of, not only among the Hebrews, but alſo among all other nations, and in all ages. It is true, the ancient Romans were more ſevere in their morals, and never practiſed it, though it was not forbid among them: and Mark Anthony is mentioned as the firſt who took the liberty of having two wives.

From that time it became pretty frequent in the empire, till the reigns of Theodoſius, Honorius, and Arcadius, who firſt prohibited it by expreſs law in 393. After this the emperor Valentinian, by an edict, permitted all the ſubjects of the empire, if they pleaſed, to marry ſeveral wives: nor does it appear, from the eccleſiaſtical hiſtory of thoſe times, that the biſhops made any oppoſition to this introduction of polygamy. In effect, there are ſome even among the Chriſtian caſuiſts, who do not look on polygamy as in itſelf criminal. Jurieu obſerves, that the prohibition of polygamy is a poſitive law; but from which a man may be exempted by ſovereign neceſſity. Baillet adds, that the example of the patriarchs is a very powerful argument in favour of polygamy.

It has been much diſputed among the doctors of the civil law, whether polygamy be adultery. In the Roman law it is called *ſtuprum*, and puniſhed as ſuch, that is, in ſome caſes, capitally. But a ſmaller puniſhment is more conſiſtent with the Jewiſh law, wherein the prohibition of adultery is perpetual, but that of polygamy temporary only.

In Germany, Holland, and Spain, this offence is diſ-differently puniſhed. By a conſtitution of Charles V. it was a capital crime. By the laws of ancient and modern Sweden, it is puniſhed with death. In Scotland it is puniſhed as perjury.

In England it is enacted by ſtatute 1 Jac. I. cap. 11. that if any perſon, being married, do afterwards marry again, the former huſband or wife being alive, it is felony, but within the benefit of clergy. The firſt wife in this caſe ſhall not be admitted as an evidence againſt her huſband, becauſe ſhe is the true wife; but the ſecond may, for ſhe is indeed no wife at all; and ſo *vice verſa*, of a ſecond huſband. This act makes an exception to five caſes, in which ſuch ſecond marriage, tho' in the three firſt it is void, is, however, no felony. 1. Where either party hath been continually abroad for ſeven years, whether the party in England had notice of the other's being living or no. 2. Where either of the parties hath been abſent from the other ſeven years, within this kingdom, and the remaining party hath had no notice of the other's being alive within that time. 3. Where there is a divorce or ſeparation *a menſa et thoro* by ſentence in the eccleſiaſtical court. 4. Where the firſt marriage is declared abſolutely void by any ſuch ſentence, and the parties looſed *a vinculo*. Or, 5. Where either of the parties was under the age of conſent at the time of the firſt marriage; for in ſuch caſe the firſt marriage was voidable by the diſagreement of either party, which this ſecond marriage very clearly amounts to. But if at the age of conſent the parties had agreed to the marriage, which completes the contract, and is indeed the real marriage, and afterwards one of them ſhould marry again, judge Blackſtone apprehends that ſuch ſecond marriage would be within the reaſon and penalties of the act.

Bernardus Ochinus, general of the order of Capuchins, and afterwards a Proteſtant, publiſhed, about the middle of the 16th century, Dialogues in favour of Polygamy, which were anſwered by Theodore Beza. And about the concluſion of the laſt century we had at London an artful treatiſe publiſhed in behalf of a plurality of wives, under the title of *Polygamia Triumphatrix:* the author whereof aſſumes the name of *Theophilus Aletheus;* but his true name was *Lyſerus:* he was a native of Saxony. It has been anſwered by ſeveral.

In the year 1780, the rev. Mr Madan publiſhed a treatiſe, artfully vindicating and ſtrongly recommending polygamy, under the title of *Thelyphthora;* or, *A Treatiſe on Female Ruin, in its Cauſes, Effects, Conſequences, Prevention, and Remedy*, &c. Marriage, according to this writer, ſimply and wholly conſiſts in the act of perſonal union, or *actus coitus*. Adultery, he ſays, is never uſed in the ſacred writings but to denote the defilement of a betrothed or married woman, and to this ſenſe he reſtricts the uſe of the term; ſo that a married man, in his opinion, is no adulterer, if his commerce with the ſex be confined to ſingle women, who are under no obligations by eſpouſals or marriage to other men: but, on the other hand, the woman who ſhould dare to have even but once an intrigue with any other man beſides her huſband, (let him have as many wives as Solomon), would, *ipſo facto*, be an adultereſs, and ought, together with her gallant, to be puniſhed with immediate death. This, he boldly ſays, is the law of God: and on this foundation he limits the privilege of polygamy to the man; in ſupport of which he refers to the polygamous connections of the patriarchs and ſaints of the Old Teſtament, and infers the lawfulneſs of their practice from the bleſſings which attended it, and the laws which were inſtituted to regulate and ſuperintend it. He contends for the lawfulneſs of Chriſtians having, like the ancient Jews, more wives than one; and labours much to reconcile the genius of the evangelical diſpenſation to an arrangement of this ſort. With this view he aſſerts, that there is not one text in the New Teſtament that even hints at the criminality of a polygamous connection; and he would infer from St Paul's direction that biſhops and deacons ſhould have but one wife, that it was lawful for laymen to have more. Chriſt, he ſays, was not the giver of a new law; but the buſineſs of marriage, polygamy, &c. had been ſettled before his appearance in the world, by an authority which could not be revoked. Beſides, this writer not only thinks polygamy lawful in a religious, but advantageous in a civil light, and highly politic in a domeſtic view.

In defence of his notion of marriage, which, according to his account of it, conſiſts in the union of man and woman as one body, the effects of which in the ſight of God no outward forms or ceremonies of man's invention can add to or detract from, he grounds his principal argument on the Hebrew words made uſe of in Gen. ii. 24. to expreſs the primitive inſtitution of marriage, viz. דבק באשתו, rendered by the LXX. προσκολληθησεται προς την γυναικα αυτȣ, which tranſlation is adopted by the evangeliſt (Mat. xix. 5.) with the omiſſion only of the ſuperfluous propoſition (προς) after the verb. Our tranſlation, "ſhall cleave to his wife," doth not, he ſays, convey the idea of the Hebrew, which is literally, as Montanus renders the words, "ſhall be joined or cemented *in* his woman, and they ſhall become (*i. e.* by this union) one fleſh." But on this criticiſm it is well remarked, that both the Hebrew and Greek terms mean ſimply and literally attachment or adherence; and are evidently made uſe of in the ſacred writings to expreſs the whole ſcope of conjugal fidelity and duty, though he would reſtrain them to the groſſer part of it.

With reſpect to the Moſaic law, for which Mr Madan is a warm advocate, it was certainly a local and temporary inſtitution, adapted to the ends for which it was appointed, and admirably calculated, in its relation to marriage, to maintain and perpetuate the ſeparation of the Jewiſh people from the Gentiles. In attempting to depreciate the outward forms of marriage, this writer would make his readers believe, that becauſe none are explicitly deſcribed, therefore none exiſted; and conſequently that they are the ſuperfluous ordinances of human policy. But it is evident, from comparing Ruth iv. 10, 13. with Tobit. vii. 13, 14. and from the caſe of Dinah, related Gen. xxxiv. that ſome forms were deemed eſſential to an honourable alliance by the patriarchs and ſaints under the Old Teſtament, excluſive of the carnal knowledge of each other's perſons. It is alſo evident in the caſe of the woman of Samaria, whoſe connection with a man not her huſband, is mentioned in John iv. that ſomething beſides cohabitation is neceſſary to conſtitute marriage in the ſight of God.

Having ſtated his notion of marriage, he urges, in defence of polygamy, that, notwithſtanding the ſeventh commandment, it was allowed by God himſelf, who made laws for the regulation of it, wrought miracles in ſupport of it by making the barren woman fruitful, and declared the iſſue legitimate to all intents and purpoſes. God's allowance of polygamy is argued from Exod. xxi. 10. and particularly from Deut. xxi. 15. which, he ſays, amounts to a demonſtration. This paſſage, however, at the utmoſt, only preſuppoſes that the practice might have exiſtence among ſo hard-hearted and fickle a people as the Jews; and therefore wiſely provides againſt ſome of its more unjuſt and pernicious conſequences, ſuch as tended to affect the rights and privileges of heirſhip. Laws enacted to regulate it cannot be fairly urged in proof of its lawfulneſs on the author's own hypotheſis; becauſe laws were alſo made to regulate divorce, which Mr Madan condemns as abſolutely unlawful, except in caſes of adultery. Beſides, it is more probable that the "hated wife" had been diſmiſſed by a bill of divorcement, than that ſhe was retained by her huſband: and moreover, it is not certain that the two wives, ſo far from living with the ſame huſband at the ſame time, might not be dead; for the words may be rendered thus, "if there *ſhould have been* to a man two wives, &c." The words expreſſing the original inſtitution of marriage, Gen. ii. 24. compared with Mat. xix. 4, 5, 8. afford inſuperable objections againſt Mr Madan's doctrine of polygamy.

If we appeal on this ſubject, from the authority of ſcripture to the writings of the earlieſt fathers in the Chriſtian church, there is not to be found the fainteſt trace of any thing reſembling a teſtimony to the lawfulneſs of polygamy; on the contrary, many paſſages occur, in which the practice of it is ſtrongly and explicitly condemned.

Monthly Review, vol. 63. p. 338.

We ſhall cloſe this article with the words of an excellent anonymous writer, to whoſe critique on Mr Madan's work we are indebted for the above remarks: "In a word, when we reflect, that the primitive inſtitution of marriage limited it to one man and one woman; that this inſtitution was adhered to by Noah and his ſons, amidſt the degeneracy of the age in which they lived, and in ſpite of the examples of polygamy which the accurſed race of Cain had introduced; when we conſider how very few (comparatively ſpeaking) the examples of this practice were among the faithful; how much it brought its own puniſhment with it; and how dubious and equivocal thoſe paſſages are in which it appears to have the ſanction of divine approbation; when to theſe reflections we add another, reſpecting the limited views and temporary nature of the more ancient diſpenſations and inſtitutions of religion—how often the imperfections and even vices of the patriarchs and people of God, in old time, are recorded, without any expreſs notification of their criminality—how much is ſaid to be commanded, which our reverence for the holineſs of God and his law, will only ſuffer us to ſuppoſe, were, for wiſe ends, permitted—how frequently the meſſengers of God adapted themſelves to the genius of the people to whom they were ſent, and the circumſtances of the times in which they lived;—above all, when we conſider the purity, equity, and benevolence of the Chriſtian law; the explicit declarations of our Lord, and his apoſtle St Paul, reſpecting the inſtitution of marriage, its deſign and limitation;—when we reflect too, on the teſtimony of the moſt ancient fathers, who could not poſſibly be ignorant of the general and common practice of the apoſtolic church; and, finally, when to theſe conſiderations we add thoſe which are founded on juſtice to the female ſex, and all the regulations of domeſtic œconomy and national policy, we muſt wholly condemn the revival of polygamy; and thus bear our honeſt teſtimony againſt the leading deſign of this dangerous and ill-adviſed publication."

POLYPE, or **Polypus**, in zoology, a ſmall freſh-water inſect, belonging to the genus of hydra, in the claſs of worms, and order of zoophytes, in the Linnæan ſyſtem; which, when cut into a number of ſeparate pieces, becomes in a day or two ſo many diſtinct and ſeparate animals; each piece having the ſurpriſing property of producing a head and tail, and the other organs neceſſary for life, and all the animal-functions.

The firſt diſcovery of this animal was owing to M. Leuwenhoek, who, in the year 1703, preſented to the Royal Society of London a deſcription of it, and an account of its uncommon way of producing its young: but the diſcovery of its amazing property of reproducing the ſeveral organs from its various pieces was not made till the year 1740, by M. Trembley, at the Hague.

The production of its young is indeed different from the common courſe of nature in other animals: for the young one iſſues from the ſides of its parent in form of a ſmall pimple or protuberance, which, lengthening and enlarging every hour, becomes in about two days a perfect animal, and drops from off its parent to ſhift for itſelf: but before it does this, it has often another growing from its ſide; and ſometimes a third from it, even before the firſt is ſeparated from its parent.

M. Trembley obſerves, that there is no diſtinguiſhed place in the body of the polypus by which the young are brought forth. He has ſeen ſome of them that have produced young ones from all the exterior parts of their bodies.

They breed quicker in hot than in cold weather; and what is very extraordinary is, that there never has yet been diſcovered among them any diſtinction of ſex or appearance of copulation; every individual of the whole ſpecies being prolific, and that as much if kept ſeparate, as if ſuffered to live among others.

If the method of this little animal's producing its young be very amazing, its reproduction of the ſeveral parts, when cut off, is much more ſo. The diſcovery of this was perfectly accidental; for M. Trembley, who had often met with the creature in the water, and from its fixed reſidence in one place, and ſome other obſervations, not being able to determine whether it was an animal or a vegetable, made the trial by cutting it aſunder; when, to his amazement, he found, that in a few days each of thoſe pieces was become a perfect animal, the head part having ſhot forth a tail, and the tail a head.

A thouſand other trials, by cutting the animal in different manners, firſt by M. Trembley, and afterwards, at his requeſt, by Monſ. Reaumur and Bernard de Juſſieu at Paris, and Mr Folkes, Mr Baker, and the other naturaliſts in England, were the reſult of this; and all ſucceeded in the ſame manner by thoſe who repeated them.

It is not eaſy to ſay what is the ſize of this creature; for it can contract or extend its body at pleaſure from the length of an inch or more, and the thickneſs of a hog's briſtle, to the ſhortneſs of a ſingle line, with a proportionable increaſe of thickneſs. Its body is round and tubular; at one end of which is the head, ſurrounded with ſix, eight, ten, or more arms, with which it catches its prey; and at the other, the anus and tail, by which it fixes itſelf to any thing it pleaſes.

There have been many different ſpecies of it diſcovered; the moſt elegant of which, the *polype a panache*, or plumed polype of M. Trembley, ſeems much to reſemble the wheel-animal † (ſo called from having the appearance of two wheels in its head) which Mr Leuwenhoek diſcovered, living in a ſheath or caſe, and affixed to the roots of duckweed.

† See *Animalcule*, (Encycl.) N° 16.

All the ſpecies are found in clear and ſlowly-running waters, adhering by the tail to ſticks, ſtones, and water plants; and live on ſmall inſects. They are eaſily kept alive a long time in glaſſes, often changing the water, keeping the glaſſes clean, and feeding them with a ſmall red worm common in the mud of the Thames, or with other ſmall inſects.

The creature has its name from the Greek πολυς "many," and πους a "foot," ſignifying an animal with many feet; but a more appoſite one might eaſily have been invented, ſince it has in reality no feet at all. What were originally taken for feet, are what have ſince been called its horns, and of late, more properly, its arms, their office being to catch its prey.

This animal is firſt of a worm-ſhaped figure, and of the ſame kind of tender ſubſtance with the horns of a common ſnail: it adheres by one end, like a ſucker, to water-plants and other ſubſtances; the other end, which is the head, is ſurrounded by many arms or feeders, placed like rays round a centre: this centre is its mouth; and with theſe tender arms, which are capable of great extenſion, it ſeizes minute worms, and various kinds of water-inſects, and brings them to its mouth; and often ſwallows bodies larger than itſelf, having a ſurpriſing property of extending its mouth wider in proportion than any other animal. After its food is digeſted in its ſtomach, it returns the remains of the animals upon which it feeds through its mouth again, having no other obſervable emunctory. In a few days there appear ſmall knobs or papillæ on its ſides: as theſe increaſe in length, little fibres are ſeen riſing out of the circumference of their heads, as in the parent animal; which fibres they ſoon begin to uſe for the purpoſe of procuring nouriſhment, &c. When theſe are arrived at mature ſize, they ſend out other young ones on their ſides in the ſame manner; ſo that the animal branches out into a numerous offspring, united together, and growing out of one common parent. Each of theſe provides nouriſhment not only for itſelf, but for the whole ſociety; an increaſe of the bulk of one polype, by its feeding, tending to an increaſe in the reſt. Thus a polype of the freſh-water kind becomes like a plant branched out, or compoſed of many bodies; each of which has this ſingular characteriſtic, that if one of them be cut in two in the middle, the ſeparated part becomes a complete animal, and ſoon adhering to ſome fixed baſe, like the parent from which it was ſeparated, produces a circle of arms: a mouth is formed in the centre; it increaſes in bulk, emits a numerous progeny, and is in every reſpect as perfect an animal as that from which it was ſevered.

The ſeveral ſtrange properties recorded of this animal, though very ſurpriſing, are, however, none of them peculiar to it alone. The Surinam toad is well known to produce its young, not in the ordinary way, but in cells upon its back. Mr Sherwood has very lately diſcovered the ſmall eels in four paſte to be without exception full of living young ones. And as to the moſt amazing of all its properties, the reproduction of its parts, we know the crab and lobſter, if a leg be broken off, always produce a new one: and M. Bonet, M. Lyonet, Monſ. de Reaumur, and Mr Folkes, have all found, on experiment, that ſeveral earth and water worms have the ſame property, ſome of them even when cut into thirty pieces. The urtica marina, or ſea-nettle, has been alſo found to have the ſame; and the ſea ſtar-fiſh, of which the polype is truly a ſpecies, though it had long eſcaped the ſearches of the naturaliſts, was always well known by the fiſhermen to have it alſo.

Polype, marine, is different in form from the freſh-water polype already deſcribed; but is nouriſhed, increaſes, and may be propagated after the ſame manner; Mr Ellis having often found, in his inquiries, that ſmall pieces cut off from the living parent, in order to view the ſeveral parts more accurately, ſoon gave indications that they contained not only the principles of life, but likewiſe the faculty of increaſing and multiplying into a numerous iſſue. It has been lately diſcovered and ſufficiently proved by Peyſſonel, Ellis, Juſſieu, Reaumur, Donati, &c. that many of thoſe ſubſtances, which had formerly been conſidered by naturaliſts as marine vegetables or ſea-plants, are in reality animal-productions; and that they are formed by polypes of different ſhapes and ſizes, for their habitation, defence, and propagation. To this claſs may be referred the corals, corallines, keratophyta, eſchara, ſponges, and alcyonium: nor is it improbable that the more compact bodies, known by the common appellations of *ſtar-ſtones*, *brain-ſtones*, *petrified fungi*, and the like, brought from various parts of the Eaſt and Weſt Indies, are of the ſame origin. To this purpoſe Mr Ellis obſerves, that the ocean, in all the warmer latitudes near the ſhore, and wherever it is poſſible to obſerve, abounds ſo much with animal-life, that no inanimate body can long remain unoccupied by ſome ſpecies. In thoſe regions, the ſhips bottoms are ſoon covered with the habitations of thouſands of animals: rocks, ſtones, and every thing lifeleſs, are covered with them inſtantly; and even the branches of living vegetables that hang into the water, are immediately loaded with the ſpawn of different animals, ſhell-fiſh of various kinds: and ſhell-fiſh themſelves, when they become impotent and old, are the baſis of new colonies of animals, from whoſe attacks they can no longer defend themſelves. For a farther account of this ſyſtem, ſee Coral and Corallines.

POLYTRICHUM, (*Encycl.*) See Plate CCCXXI.

POPERY, in Eccleſiaſtical Hiſtory, comprehends the religious doctrines and practices adopted and maintained by the church of Rome. The following ſummary, extracted chiefly from the decrees of the council of Trent, continued under Paul III. Julius III. and Pius IV. from the year 1545 to 1563, by ſucceſſive ſeſſions, and the creed of pope Pius IV. ſubjoined to it, and bearing date November 1564, may not be unacceptable to the reader. One of the fundamental tenets, ſtrenuouſly maintained by popiſh writers, is the infallibility of the church of Rome; though they are not agreed, whether this privilege belongs to the pope, or a general council, or to both united; but they pretend that an infallible living judge is abſolutely neceſſary to determine controverſies, and to ſecure peace in the Chriſtian church. However, Proteſtants allege, that the claim of infallibility in any church is not juſtified by the authority of Scripture; much leſs does it pertain to the church of Rome; and that it is inconſiſtent with the nature of religion, and the perſonal obligations of its profeſſors; and that it has proved ineffectual to the end for which it is ſuppoſed to be granted, ſince popes and councils have diſagreed in matters of importance, and they have been incapable, with the advantage of this pretended infallibility, of maintaining union and peace.

Another eſſential article of the popiſh creed is the ſupremacy of the pope, or his ſovereign power over the univerſal church. On this ſubject it is maintained, that every Chriſtian, under pain of damnation, is bound to be ſubject to the pope; that no appeals may be made from him; and that he alone is the ſupreme judge of all perſons, in all eccleſiaſtical cauſes, but that he himſelf can be judged by no man. To this purpoſe they aſſert, that the church of Rome is the catholic church; the mother and miſtreſs of all churches; that the pope is the vicar of Chriſt, ſucceſſor of St Peter, and the ſupreme paſtor over all the world. And they likewiſe aſſert his dominion over temporal princes; pretending that he may over-rule what they command; excommunicate and depoſe them, if they contradict his commands; and abſolve their ſubjects from allegiance, and exempt the clergy from their juriſdiction.

This exorbitant power hath been challenged by the pope for many ſucceſſive ages, and in ſeveral inſtances actually exerciſed. Thus Gregory VII. excommunicated the emperor Henry IV. and gave away his kingdoms to Rudolphus duke of Sweden. Gregory IX. excommunicated the emperor Frederick II. and abſolved his ſubjects from their oath of allegiance. Pope Paul III. excommunicated and depoſed Henry VIII. king of England, and commanded all his ſubjects, under a curſe, to withdraw their obedience from him. Pope Pius V. and Gregory XIII. damned and depoſed queen Elizabeth, and abſolved her ſubjects from their allegiance. And this practice has been warranted by the decrees of the third Lateran council under pope Alexander III. and by the fourth Lateran council under pope Innocent III. though it is contrary to the expreſs language of Scripture, to the doctrine and conduct of the apoſtles and primitive fathers, and to the confeſſions and practice of the ancient biſhops of Rome, and altogether inconſiſtent with the rights of government and the welfare of ſociety.

Farther, the doctrine of the ſeven ſacraments is a peculiar and diſtinguiſhing doctrine of the church of Rome: theſe are baptiſm, confirmation, the euchariſt, penance, extreme unction, orders, and matrimony.

The council of Trent (ſeſſ. 7. can. 1.) pronounces an anathema on thoſe who ſay, that the ſacraments are more or fewer than ſeven, or that any one of the above number is not truly and properly a ſacrament. And yet it does not appear that they amounted to this number before the 12th century, when Hugo de St Victore and Peter Lombard, about the year 1144, taught that there were ſeven ſacraments. The council of Florence, held in 1438, was the firſt council that determined this number. Theſe ſacraments confer grace, according to the decree of the council of Trent (ſeſſ. 7. can. 8.) *ex opere operato*, by the mere adminiſtration of them: three of them, viz. baptiſm, confirmation, and orders, are ſaid (can. 9.) to impreſs an indelible character, ſo that they cannot be repeated without ſacrilege; and the efficacy of every ſacrament depends on the intention of the prieſt by whom it is adminiſtered (can. 11.) Pope Pius expreſsly enjoins, that all theſe ſacraments ſhould be adminiſtered according to the received and approved rites of the catholic church. With regard to the euchariſt in particular, we may here obſerve, that the church of Rome holds the doctrine of tranſubſtantiation; the neceſſity of paying divine worſhip to the conſecrated bread, or hoſt; the propitiatory ſacrifice of the maſs, according to their ideas of which Chriſt is truly and properly put to death as a ſacrifice as often as the prieſt ſays maſs; and ſolitary maſs, in which the prieſt alone, who conſecrates, communicates, and allows communion only in one kind, viz. the bread, to the laity. Seſſ. 14.

The doctrine of merits is another diſtinguiſhing tenet of popery; with regard to which the council of Trent has expreſsly decreed (ſeſſ. 6. can. 32.) that the good works of juſtified perſons are truly meritorious; deſerving not only an increaſe of grace, but eternal life, and an increaſe of glory; and it has anathematized all who deny this doctrine. Of the ſame kind is the doctrine of ſatisfactions; which ſuppoſes that penitents may truly ſatisfy, by the afflictions they endure under the diſpenſations of Providence, or by voluntary penances to which they ſubmit, for the temporal penalties of ſin, to which they are ſubject, even after the remiſſion of their eternal puniſhment. Seſſ. 6. can. 30. and ſeſſ. 14. can. 8. and 9. In this connection we may mention the popiſh diſtinction of venial and mortal ſins: the greateſt evils ariſing from the former are the temporary pains of purgatory; but no man, it is ſaid, can obtain the pardon of the latter without confeſſion to a prieſt, and performing the penances which he impoſes.

The council of Trent (ſeſſ. 14. can. 1.) has expreſsly decreed, that every one is accurſed, who ſhall affirm that penance is not truly and properly a ſacrament inſtituted by Chriſt in the univerſal church, for reconciling thoſe Chriſtians to the divine majeſty, who have fallen into ſin after baptiſm: and this ſacrament, it is declared, conſiſts of two parts, the matter and the form; the matter is the act of the penitent, including contrition, confeſſion, and ſatisfaction; the form of it is the act of abſolution on the part of the prieſt. Accordingly it is enjoined, that it is the duty of every man, who hath fallen after baptiſm, to confeſs his ſins once a year, at leaſt, to a prieſt: that this confeſſion is to be ſecret; for public confeſſion is neither commanded nor expedient: and that it muſt be exact and particular, including every kind and act of ſin, with all the circumſtances attending it. When the penitent has ſo done, the prieſt pronounces an abſolution; which is not conditional or declarative only, but abſolute and judicial. This ſecret, or auricular confeſſion, was firſt decreed and eſtabliſhed in the fourth council of Lateran, under Innocent III. in 1215, (cap. 21.) And the decree of this council was afterwards confirmed and enlarged in the council of Florence, and in that of Trent, which ordains, that confeſſion was inſtituted by Chriſt, that by the law of God it is neceſſary to ſalvation, and that it has been always practiſed in the Chriſtian church. As for the penances impoſed on the penitent by way of ſatisfaction, they have been commonly the repetition of certain forms of devotion, as pater-noſters, or ave-marias, the payment of ſtipulated ſums, pilgrimages, faſts, or various ſpecies of corporal diſcipline. But the moſt formidable penance in the eſtimation of many, who have belonged to the Romiſh communion, has been the temporary pains of purgatory. But under all the penalties which are inflicted or threatened in the Romiſh church, it has provided relief by its indulgences, and by its prayers or maſſes for the dead, performed profeſſedly for relieving and reſcuing the ſouls that are detained in purgatory.

Another article that has been long authoritatively enjoined and obſerved in the church of Rome, is the celibacy of her clergy. This was firſt enjoined at Rome by Gregory VII. about the year 1074, and eſtabliſhed in England by Anſelm archbiſhop of Canterbury about the year 1175; though his predeceſſor Lanfranc had impoſed it upon the prebendaries and clergy that lived in towns. And though the council of Trent was repeatedly petitioned by ſeveral princes and ſtates to aboliſh this reſtraint, the obligation of celibacy was rather eſtabliſhed than relaxed by this council; for they decreed, that marriage contracted after a vow of continence is neither lawful nor valid; and thus deprived the church of the poſſibility of ever reſtoring marriage to the clergy. For if marriage, after a vow, be in itſelf unlawful, the greateſt authority upon earth cannot diſpenſe with it, nor permit marriage to the clergy, who have already vowed continence.

To the doctrines and practices above recited may be farther added the worſhip of images; to juſtify which, the Papiſts often leave the ſecond commandment out of their catechiſms: the invocation of ſaints and angels, with reſpect to which the council of Trent decreed, that all biſhops and paſtors, who have the cure of ſouls, do diligently inſtruct their flocks, that it is good and profitable humbly to pray unto the ſaints, and to have recourſe to their prayers, help, and aid; for which practice no ſcripture command or example, nor any teſtimony within the firſt 300 years after Chriſt, can be pleaded: the worſhip of ſacred relics, by which they underſtand not only the bodies and parts of the bodies of the ſaints, but any of thoſe things that appertained to them, and which they touched: and the celebration of divine ſervice in an unknown tongue; to which purpoſe the council of Trent hath denounced an anathema on any one who ſhall ſay that maſs ought to be celebrated only in the vulgar tongue, ſeſſ. 25, and ſeſſ. 22, can. 9. Though the council of Lateran under Innocent III. in 1215 (can. 9.) had expreſsly decreed, that, becauſe in many parts within the ſame city and dioceſe, there are many people of different manners and rites mixed together, but of one faith, the biſhops of ſuch cities or dioceſes ſhould provide fit men for celebrating divine offices, according to the diverſity of tongues and rites, and for adminiſtering the ſacraments.

We ſhall only add, that the church of Rome maintains, that unwritten traditions ought to be added to the holy Scriptures, in order to ſupply their defect, and regarded as of equal authority; that the books of the Apocrypha are canonical ſcripture; that the vulgate edition of the Bible is to be deemed as authentic; and that the Scriptures are to be received and interpreted according to that ſenſe which the holy mother church, to whom it belongs to judge of the true ſenſe, hath held, and doth hold, and according to the unanimous conſent of the fathers.

Such are the principal and diſtinguiſhing doctrines of Popery, moſt of which have received the ſanction of the council of Trent; and that of the creed of pope Pius IV. which is received, profeſſed, and ſworn to by every one who enters into holy orders in the church of Rome; and at the cloſe of this creed, we are told, that the faith contained in it is ſo abſolutely and indiſpenſably neceſſary, that no man can be ſaved without it.

Many of the doctrines of Popery were relaxed, and very favourably interpreted by M. de Meaux, biſhop of Condom, in his Expoſition of the Doctrine of the Catholic Church, firſt printed in the year 1671: but this edition, which was charged with perverting, in endeavouring to palliate, the doctrine of the church, was cenſured by the doctors of the Sorbonne, and actually ſuppreſſed; nor does it appear that they ever teſtified their approbation in the uſual form of ſubſequent and altered editions.

PORELLA, in botany, the name of a genus of moſſes, the characters of which are theſe: The capſules contain a powder like thoſe of the other moſſes; and they have neither operculum, calyptra, nor pedicle; and their manner of ſhedding their powder is not by ſeparating into two parts, like thoſe of the ſelago and lycopodium, but by opening into ſeveral holes on all ſides.

Of this genus of moſſes there is only one known ſpecies; this is called by Dillenius the *bluntly pinnated porella*, and grows in wet places in Virginia, Penſylvania, Maryland, and other parts of North America.

PORPITES, the HAIR-BUTTON STONE, in Natural Hiſtory, a name given by authors to a ſmall ſpecies of foſſil coral; which is uſually of a rounded figure conſiderably flatted, and ſtriated from the centre every way to the circumference. Theſe are of different ſizes, and of different colours, as greyiſh, whitiſh, browniſh, or bluiſh, and are uſually found immerſed in ſtone. See Plate CCCXVII.

POTSDAM, or POSTDAM, a town of Germany in the circle of Upper Saxony, with a palace, belonging to the king of Pruſſia. It is ſeated in an iſland ten miles in circumference, formed by the rivers Sprae and

Havel. The palace is very curious, and finely built upon a delightful ſpot 12 miles weſt of Berlin. E. Long. 13. 42. N. Lat. 52. 34.

PREDESTINARIAN, a perſon who adheres to the doctrine of abſolute predeſtination. See PREDESTINATION, (*Encycl.*)

St Auguſtin is looked on as the founder of the ſect of Predeſtinarians, he being the firſt of the fathers that ſeems to have aſſerted the doctrine in ſuch expreſs terms; though the Janſeniſts and Jeſuits are ſtill greatly divided about the real doctrine of St Auguſtin in this article, each interpreting him conſiſtently with their own ſcheme.

Father Sirmond contends for an ancient ſect of Predeſtinarians, or Predeſtinatians, *Prædeſtinatiani*, contemporary with St Auguſtin himſelf, and who had their riſe in Africa, in the monaſtery of Adrumetum, from a miſunderſtanding of St Auguſtin's doctrine. Hence they were led into a notion, that God not only predeſtinated the wicked to eternal puniſhment, but alſo to the guilt and tranſgreſſion for which they are puniſhed; and that thus both the good and bad actions of all men were determined from eternity by a divine decree, and fixed by an inevitable neceſſity.

It is added, that the opinion ſpread thence throughout the Gauls; where one of them, a prieſt, named *Lucidus*, was condemned by Fauſtus biſhop of Rheggio, and his ſentence was confirmed by two councils.

However, the exiſtence of this Predeſtinarian ſect has been denied by many learned men, particularly the preſident Mauguin, and conſidered as an invention of the Semi-pelagians, deſigned to decry the followers of Auguſtin, by attributing to him unjuſtly this dangerous and pernicious error. Nor does it appear, though there might have been perſons who embraced the Predeſtinarian opinions, that the abettors of them ever formed themſelves into a ſect.

The doctrine was again broached in the ninth century by Godeſchalcus, a Benedictine; who, as Hincmar, in a letter to pope Nicolas, ſays, maintained with the ancient Predeſtinarians, who had been already anathematized, that God predeſtinated ſome to eternal life, and others to eternal death; that God did not will all people to be ſaved; that Jeſus Chriſt did not die for all, but only the elect, or thoſe that are ſaved, &c.

This doctrine was again condemned in a ſynod held at Mentz, A. D. 848, and by a council at Quiercy, A.D. 849; in conſequence of which Godeſchalcus was treated with the utmoſt barbarity, and compelled to burn with his own hands the juſtification of his opinion, which he had preſentd to the council at Mentz. He was then caſt into priſon, where he died in the year 868 or 869, maintaining with his laſt breath the doctrine for which he had ſuffered.

The decrees of the former council were confirmed in a new council which met at Quiercy, A. D. 853, but they were declared null by a council aſſembled at Valence, A.D. 855; and the decrees of this council were confirmed by the council of Langres in the year 859, and in 860 by the council of Touſi.

This controverſy was revived in the 16th century by Calvin, who maintained, that the everlaſting condition of mankind in a future world was determined from all eternity; and that God, in predeſtinating from all eternity one part of mankind to everlaſting happineſs, and another to endleſs miſery, was led to make this diſtinction by no other motive than his own good pleaſure and free will. This opinion was, in a very ſhort time, propagated through all the reformed churches, by the writings of Calvin, and by the miniſtry of his diſciples; and in ſome places was inſerted in the national creeds and confeſſions, and thus made a public article of faith.

The unhappy controverſy, which took its riſe from this doctrine, was opened at Straſburg, in the year 1560, by Jerome Zanchius, an Italian eccleſiaſtic, who was particularly attached to the ſentiments of Calvin, and carried on in a manner that contributed very much to exaſperate the paſſions and foment the diſcord of the contending parties.

The Predeſtinarian opinions have been maintained by conſiderable numbers, both in Popiſh and Proteſtant countries; and in our own country in particular, they have had many zealous advocates.

We ſhall here obſerve, that they have undergone a kind of relaxation by thoſe who have been denominated *Baxterians*, from the famous nonconformiſt miniſter, Mr Richard Baxter, of the laſt century. The Baxterians have endeavoured to ſtrike into a middle path between Calviniſm and Arminianiſm, and to unite both theſe ſchemes. They profeſs to believe in the doctrines of election, effectual calling, and other tenets of Calviniſm; and, conſequently ſuppoſe, that a certain number, determined upon in the divine counſels, will infallibly be ſaved. This they think neceſſary to ſecure the ends of Chriſt's interpoſition. But then, on the other hand, they reject the doctrine of reprobation, and admit, that our bleſſed Lord, in a certain ſenſe, died for all; and that ſuch a portion of grace is allotted to every man, as renders it his own fault if he doth not attain to eternal happineſs. If he improves the common grace given to all mankind, this will be followed by that ſpecial grace which will end in his final acceptance and ſalvation. Whether the Baxterians are of opinion, that any, beſides the elect, will actually make ſuch a right uſe of common grace as to obtain the other and at length come to heaven, we cannot aſſuredly ſay. There may poſſibly be a difference of ſentiment upon the ſubject, according as they approach nearer to Calviniſm or Arminianiſm.

PREDETERMINATION, in philoſophy and theology. The ſchoolmen call that concurrence of God, which makes men act, and determines them in all their actions both good and evil, *phyſical predetermination*, or *premotion*.

Divines hold, that God hath no part in ſin, inaſmuch as he only affords his concurrence to the phyſical part of human actions, not to the moral part.

Phyſical predetermination, or premotion, if there be any ſuch thing, is that action of God, whereby he excites a ſecond cauſe to act: or by which, antecedently to all operations of the creature, or before it could operate in conſequence either of the order of nature or reaſon, he really and effectually moves and occaſions it to produce all its actions: that is, whatever the creature does or acts, is really done and acted by the agency of God on the creature, who is all the time paſſive. So that, without ſuch predetermination of God, all creatures muſt remain in an eternal ſtate of inactivity; and, with ſuch predetermination, it is impoſſible but that they ſhould do what they are thus put upon doing.

Preſbytery, Pringle.

It is ſtrongly controverted, whether or no ſuch a phyſical predetermination be neceſſary to the action of natural cauſes: the Scotiſts maintain the negative; urging, that all natural cauſes are of their own nature determined to a certain action; whence it ſhould ſeem needleſs to call in a new predetermination of God, *e. gr.* to fire, to make it warm the hand. For if an object be, by the courſe of divine providence, applied to fire; what need a ſecond application of the fire, to make it warm the object applied thereto; ſince beings are not to be multiplied unneceſſarily.

And ſuch predetermination ſome philoſophers hold ſtill leſs requiſite to produce the acts of the will: at leaſt, ſay they, the human mind muſt be allowed the common power and privilege of a ſecond cauſe, and therefore be intitled to produce its own acts, as well as other ſtrictly natural agents.

The Thomiſts, on the other hand, ſtand up ſtrenuouſly for the phyſical predetermination: one of their principal arguments is drawn from the ſubordination of ſecond cauſes to the firſt. Where there are ſeveral ſubordinate agents, ſay they, the lower agents do not act, unleſs firſt moved and determined thereto by the firſt; this being the very eſſence of ſubordination.

Again, the like they argue from the dominion of God over all his creatures: It is of the eſſence of dominion, ſay they, to apply and direct things ſubject thereto, to its own operations; and this, if the dominion be only moral, morally; but if it be alſo phyſical, phyſically. And that this is the caſe in reſpect of God and his creatures, is confeſſed.

PRESBYTERY, an aſſembly of the order of preſbyters, or prieſts, with lay-elders, for the exerciſe of church-diſcipline.

The kirk, or church, of Scotland, is divided into 69 preſbyteries, each conſiſting of a number of pariſhes, not exceeding 24, nor leſs than 12. The miniſters of theſe pariſhes, with one ruling elder choſen half-yearly out of every kirk-ſeſſion, conſtitute a preſbytery; who, meeting in their chief town, whence the preſbytery is denominated, chooſe a moderator, or, more properly, a prolocutor, who muſt be a miniſter, half-yearly.—They determine all appeals from kirk-ſeſſions, *i. e.* from the ſeveral parochial aſſemblies; but can try nothing at the firſt inſtance cognizable before a kirk-ſeſſion.—They compoſe all differences between miniſters and people; for which end, they hold preſbyterial viſitations in each pariſh, where they examine the regiſters of the kirk-ſeſſions, &c.—They inquire into repairs of churches; ſee that the glebe, &c. ſuffer no dilapidations; appoint ſchools in the pariſhes; and ſee that the funds be not miſapplied. They alone can exclude from the communion; licenſe probationers; ſuſpend, depoſe, and, in effect, determine all eccleſiaſtical matters within their diſtrict. From the preſbytery there lies an appeal, in all caſes, to provincial ſynods.

PRINGLE (Sir John), an eminent phyſician and philoſopher, was a younger ſon of Sir John Pringle of Stitchel, in the ſhire of Roxburgh, baronet; took the degree of M. D. at Leyden, 1730; and publiſhed there "Diſſertatio Inauguralis de Marcore Senili," 4to. After having been ſome years profeſſor of moral philoſophy at Edinburgh, he was in June 1745 appointed phyſician to the duke of Cumberland, and phyſician-general to the hoſpital of the forces in Flanders, where the earl of Stair appears to have been his patron. In February 1746, Dr Pringle, Dr Armſtrong, and Dr Barker, were nominated phyſicians to the hoſpital for lame, maimed, and ſick ſoldiers, behind Buckingham-houſe; and in April 1749, Dr Pringle was appointed phyſician in ordinary to the king. In 1750 he publiſhed "Obſervations on the Nature and Cure of Hoſpital and Goal Fevers, in a Letter to Dr Mead," 8vo (reprinted in 1755); and in 1752 he favoured the public with the reſult of his long experience in an admirable treatiſe under the title of "Obſervations on the Diſorders of the Army in Camp and Garriſon," 8vo. On the 14th of April 1752, he married Charlotte, ſecond daughter of Dr Oliver, an eminent phyſician at Bath. In 1756 he was appointed jointly with Dr Wintringham (now Sir Clifton Wintringham, bart.) phyſician to the hoſpital for the ſervice of the forces of Great Britain. After the acceſſion of his preſent majeſty, Dr Pringle was appointed phyſician to the queen's houſhold, 1761; phyſician in ordinary to the queen in 1763, in which year he was admitted of the college of phyſicians in London; and on the 5th of June 1766, he was advanced to the dignity of a baronet of Great Britain. In 1772 he was elected preſident of the Royal Society, where his ſpeeches for five ſucceſſive years, on delivering the prize-medal of Sir Godfrey Copley, gave the greateſt ſatisfaction. Sir John Pringle in 1777 was appointed phyſician-extraordinary to the king. He was alſo a fellow of the College of Phyſicians at Edinburgh, and of the Royal Medical Society at Paris; member of the Royal Academies at Paris, Stockholm, Goettingen, and of the Philoſophical Societies at Edinburgh and Haerlem; and continued preſident of the Royal Society till November 1778; after which period he gradually withdrew from the world, and in 1781 quitted his elegant houſe in Pall Mall (where he had long diſtinguiſhed himſelf as the warm friend and patron of literary men of every nation and profeſſion), and made an excurſion to his native country. He returned to London in the latter end of that year; died greatly beloved and reſpected Jan. 18, 1782; and having no children, was ſucceeded in eſtate and alſo (agreeably to the limitation of the patent) in title, by his nephew, now Sir James Pringle, bart. Among this worthy phyſician's communications to the Royal Society, the following are the principal: 1. "Some Experiments on Subſtances reſiſting Putrefaction," Phil. Tranſ. N° 495, p. 580; and N° 496, p. 525, 550; reprinted, with additions, in Martin's Abridgment, vol. xi. p. 1365. 2. "Account of ſome Perſons ſeized with the Goal Fever by working in Newgate, and of the manner by which the Infection was communicated to one entire Family," vol. xlviii. p. 42. At the requeſt of Dr Hales, a copy of this uſeful paper was inſerted in the Gentleman's Magazine, 1753, p. 71, before its appearance in the Tranſactions. 3. "A remarkable Caſe of Fragility, Flexibility, and Diſſolution of the Bones," Ib. p. 297. 4. "Account of the Earthquakes felt at Bruſſels," vol. xlix. p. 546. 5. "Account of ſinking of a River near Pontypool, in Monmouthſhire," Ib. p. 547. 6. "Account of an Earthquake felt Feb. 18, 1756, along the coaſt of England, between Margate and Dover," ib. p. 579. 7. "Account of the Earthquake felt at Glaſgow and Dumbarton; alſo of a Shower of

Pringle.

Duſt falling on a Ship between Shetland and Iceland," ib. p. 509. 8. "Several Accounts of the Fiery Meteor which appeared on Sunday, Nov. 26, 1758, between eight and nine at night," Vol. L. p. 218. 9. "Account of the Virtues of Soap in diſſolving the Stone, in the Caſe of the Rev. Mr Matthew Simſon," ib. p. 221. 10. "Account of the Effects of Electricity in Paralytic Caſes," ib. p. 481. And ſee a letter to him on that ſubject from Profeſſor Winthorp. "Some Account of the Succeſs of the Vitrum Ceratum Antimonii" was printed in the "Edinburgh Medical Eſſays," Vol. V.

PROCELLARIA, (*Encycl*) See alſo Plate CCXLIII.

PROPHECY, a prediction made by divine inſpiration.

One of the ſtrongeſt evidences for the truth of revealed religion is that ſeries of prophecies which is preſerved in the Old and New Teſtaments; and a greater ſervice, ſays an excellent writer, could not be done to Chriſtianity than to lay together the ſeveral predictions of ſcripture with their completions, to ſhow how particularly things have been foretold, and how exactly fulfilled. A work of this kind was deſired by the lord Bacon, and he intitles it the "Hiſtory of Prophecy;" in which he propoſes, that every prophecy of the ſcripture be ſorted with the event fulfilling the ſame throughout the ages of the world, both for the better confirmation of faith, and for the better illumination of the church touching thoſe parts of prophecies which are yet unfulfilled; allowing, nevertheleſs, that latitude which is agreeable and familiar unto divine prophecies, being of the nature of the Author, with whom a thouſand years are but as one day; and therefore they are not fulfilled punctually at once, but have ſpringing and germinant accompliſhment throughout many ages, though the height or fulneſs of them may refer to ſome one age. A work of this kind has been actually executed by the learned biſhop Newton, in his Diſſertation on the Prophecies.

With regard to the credibility of prophecy, it may be obſerved in general, that it is not at all incredible that God ſhould upon ſpecial occaſions foretell future events; and, if he affords an extraordinary revelation of his will to mankind, that he ſhould atteſt its divine original by this kind of evidence; an evidence which, if the prophecies point to the events, and the events correſpond with the prophecies, is in the higheſt degree concluſive and convincing. No previous conjecture nor accidental coincidence are ſufficient to counteract and invalidate this kind of evidence.

As to moſt of the ſcripture-prophecies, they comprehend ſuch a variety of particulars; they ſo minutely deſcribe diſtant events, to be accompliſhed in circumſtances which no human ſagacity could foreſee or conceive likely to occur; and they accord ſo exactly with the facts to which they refer; that there is no way of evading the concluſion, but by either denying the premiſſes, that ſuch prophecies were ever delivered and recorded, againſt which fact and hiſtory militate; or by pretending, that what we call predictions are only hiſtories written after the events had happened, in a prophetic ſtyle and manner. But it is alleged in anſwer to this abſurd plea, that there are all the proofs and authorities which can be had in caſes of this nature, that the prophets propheſied in one age, and that the events happened in another and ſubſequent age: and we have as much reaſon to believe theſe, as we have to believe any ancient matters of fact whatever; and by the ſame rule which leads us to deny theſe, we may as well controvert and contradict the credibility of all ancient hiſtory. But, beſides, Chriſtian writers undertake to prove the truth of prophecy, and conſequently the truth of revelation, not by an induction of particulars long ago foretold and long ago fulfilled, the predictions of which may be ſuppoſed to have been written after the hiſtories, but by inſtances of things which have confeſſedly many ages ago been foretold, and have in theſe later ages been fulfilled, or are fulfilling at this very time: ſo that there is no pretence for aſſerting ſuch prophecies to have been written after the events; but it muſt be acknowledged, that the events many ages after, correſpond exactly with the predictions many ages before. The evidence, therefore, which prophecy furniſhes in favour of the truth of religion, is a growing evidence; and the more prophecies are fulfilled, the more teſtimonies there are and confirmations of the truth and certainty of divine revelation.

One of the greateſt difficulties in Chriſtianity turns upon the manner of completion of the ſcripture-prophecies. In the prophets of the Old Teſtament are frequent predictions of the Meſſiah, which the writers of the New frequently urge to the Jews and Heathens as fulfilled in Jeſus Chriſt; and on this principle evince the truth of his miſſion. But theſe texts, thus urged from the Old, in the New Teſtament, are ſometimes not to be now found in the Old; and at other times are not urged in the New in the literal and obvious ſenſe which they ſeem to bear in the Old: whence moſt of the Chriſtian commentators, divines, and critics, ancient and modern, judge them to be applied in a ſecondary, typical, allegorical, or myſtical ſenſe. Thus, *e. gr.* St Matthew, after an account of the conception of the Virgin and the birth of Jeſus, ſays, "All this was done, that it might be fulfilled which was ſpoken by the prophet, ſaying, Behold, a virgin ſhall be with child, and ſhall bring forth a ſon, and they ſhall call his name Emmanuel." But the words, as they ſtand in Iſaiah, whence they are ſuppoſed to be taken, do, in their obvious and literal ſenſe, relate to a young woman who was to bring forth a child in the days of Ahaz; as appears from the context, and is owned by Grotius, Huetius, Caſtalio, Curcellæus, Epiſcopius, Hammond, Simon, Le Clerc, Lamy, &c.

This prophecy, then, not being fulfilled in Jeſus in the primary, literal, or obvious ſenſe of the words, is ſuppoſed, like the other prophecies cited by the apoſtles, to be fulfilled in a ſecondary, typical, or allegorical ſenſe: *i. e.* this prophecy, which was firſt literally fulfilled by the birth of the prophet's ſon in the time of Ahaz, was again fulfilled by the birth of Jeſus, as being an event of the ſame kind, and intended to be ſignified either by the prophet, or by God who directed the prophet's ſpeech. Grotius obſerves this to be the caſe in moſt, if not all, the prophecies and citations quoted from the Old in the New Teſtament: and Dodwell, with Sir John Marſham, refer even the famous prophecy in Daniel, about the ſeventy weeks, to the time of Antiochus Epiphanes; ſhowing, that the expreſſions taken thence by Chriſt, and urged by him as predicting the deſtruction of Jeruſalem by the Romans, have only, in a ſecondary ſenſe, a reſpect to that deſtruction.

And even that famous prophecy in the Pentateuch, "A prophet will the Lord God raiſe up unto thee, like unto me; to him ſhall ye hearken;" which St Luke refers to as ſpoken of Jeſus Chriſt, is by Simon, Grotius, Stillingfleet, &c. underſtood to ſignify, in its immediate ſenſe, a promiſe of a ſucceſſion of prophets.

It is allowed, then, the apoſtles applied the prophecies which they quote from the Old Teſtament, in a typical ſenſe; but, unhappily, the rules whereby they quoted them are loſt. Dr Stanhope laments the loſs of the Jewiſh traditions or rules for interpreting ſcripture received among the rabbins, and followed by the apoſtles. But this loſs Surenhuſius, Hebrew profeſſor at Amſterdam, thinks he has retrieved from the Jewiſh Talmud and the ancient Jewiſh commentaries; and has accordingly publiſhed to the world the rules whereby the apoſtles quoted the Old Teſtament. But the truth is, theſe rules are too precarious, ſtrained, and unnatural, to gain much credit.

Mr Whiſton condemns all allegorical explanation of the prophecies of the Old Teſtament cited in the New, as weak, enthuſiaſtic, &c. and adds, that if a double ſenſe of the prophecies be allowed, and there be no other method of ſhowing their completion than by applying them ſecondarily and typically to our Lord, after having been in the firſt and primary intention long ago fulfilled in the times of the Old Teſtament, we loſe all the real advantages of the ancient prophecies as to the proofs of Chriſtianity.

He therefore ſets up a new ſcheme in oppoſition thereto: he owns, that taking the preſent text in the Old Teſtament for genuine, it is impoſſible to expound the apoſtles citations of the prophecies of the Old Teſtament on any other than the allegorical foundation; and therefore, to ſolve the difficulty, he is forced to have recourſe to a ſuppoſition contrary to the ſenſe of all Chriſtian writers before him, viz. that the text of the Old Teſtament has been greatly corrupted ſince the apoſtolic age by the Jews. His hypotheſis is, that the apoſtles made their quotations out of the Old Teſtament rightly and truly from the Septuagint verſion, which in their time was in vulgar uſe, and exactly agreed with the Hebrew original; and that as they made exact quotations, ſo they argued juſtly and logically from the obvious and literal ſenſe of the ſaid quotations, as they then ſtood in the Old Teſtament; but that, ſince their times, both the Hebrew and Septuagint copies of the Old Teſtament have been ſo greatly corrupted, and ſo many apparent diſorders and diſlocations introduced therein, as to occaſion many remarkable differences and inconſiſtencies between the Old and New Teſtament in reſpect to the words and ſenſe of thoſe quotations.

As to the manner wherein theſe corruptions were introduced, he ſays, the Jews, in the ſecond century, greatly corrupted and altered both the Hebrew and Septuagint, eſpecially in the prophecies cited by the apoſtles, to make their reaſoning appear inconcluſive: that, in the third century, they put into Origen's hand one of theſe corrupted copies of the Septuagint; which Origen miſtaking for genuine, inſerted in his Hexapla, and thus brought into the church a corrupted copy of the Septuagint; and that, in the end of the fourth century, the Jews put into the hands of the Chriſtians, who till then had been almoſt univerſally ignorant of the Hebrew, a corrupted copy of the Hebrew Old Teſtament.

The diſagreement, then, between the Old and New Teſtament, in reſpect to the ſaid quotations, he contends, has no place between the genuine text of the Old Teſtament (now nowhere exiſting), but only between the preſent corrupted text of the Old and New Teſtament: and therefore, to juſtify the reaſonings of the apoſtles, he propoſes to reſtore the text of the Old Teſtament, as it ſtood before the days of Origen, and as it ſtood in the days of the apoſtles; from which text, thus reſtored, he doubts not, it will evidently appear, that the apoſtles cited exactly, and argued juſtly and logically, from the Old Teſtament. But this ſcheme of accompliſhing prophecies labours under difficulties at leaſt as great as the allegorical ſcheme. Its foundation is incredible, and its ſuperſtructure, from firſt to laſt, precarious. In effect, it is inconceivable that the Old Teſtament ſhould be ſo corrupted; and it may even be made appear, that the Hebrew and Septuagint diſagreed in the times of the apoſtles: add to this, that the means whereby he propoſes to reſtore the true text will never anſwer that end; nor has he himſelf, from all the means he is yet poſſeſſed of, been able to reſtore one prophetical citation, ſo as to make that ſeem literally which before only ſeemed allegorically applied.

Upon this head it may be obſerved, that the double ſenſe of prophecies, for which ſome have zealouſly contended, and which others have as ſtrenuouſly oppoſed, ought not to be underſtood as if a prophecy equally and indifferently referred to many perſons or events; or as if, literally referring to a lower perſon, it was only figuratively and allegorically to be interpreted of the Meſſiah, (for a paſſage only capable of being accommodated to him is not by any means a prediction of him): but it is to be ſo explained, as that it may appear the Meſſiah was principally intended, and the prophecy literally referred to him, though it might in part be applied to ſome other perſon; and might have been underſtood as referring to that inferior perſon alone, if farther light had not been thrown upon it by comparing other prophecies, or by the teſtimony of thoſe whom on other accounts we have reaſon to regard as authentic interpreters. Nevertheleſs it muſt be acknowledged, that though the tracing of the Meſſiah in ſuch prophecies as theſe may ſerve to illuſtrate the unity of deſign, which is a conſiderable additional proof of the truth of a revelation; yet the main ſtreſs is to be laid upon ſuch prophecies as evidently and ſolely relate to the Meſſiah and his kingdom, rather than on thoſe which are capable of reference to other perſons or events.

PROVENCAL POETS, in the Hiſtory of Literature, a name given to certain profeſſions of men who ſprang up in Provence about the end of the 10th century, comprehending thoſe that were called *Troubadours*, or *Trouverres*, *Jongleurs*, *Cantadours*, *Violars*, and *Muſars*, in whom the faculties both of muſic and poetry ſeemed to be united. The firſt of theſe were ſo denominated from the art which they profeſſed of inventing or finding out as well ſubjects and ſentiments as rhymes, conſtituting what at that time was deemed poetry. The jongleurs are ſuppoſed to have taken their name from ſome muſical inſtrument on which they played, probably of a name reſembling in its ſound that by which their profeſſion was diſtinguiſhed: whence ſpring the juglers, *quaſi joculatores*, as Menage conjectures, who went about ſinging their verſes in courts and the houſes of noblemen, with a viol or harp, or other inſtrument, and were dreſſed in a peculiar habit, for the ſake of entertaining, in a burleſque manner, their protectors and patrons. The cantadours, called alſo *chanterres*, were ſingers of ſongs and ballads, as were alſo the muſari; and the violars were players on the viol.

All theſe arts were comprehended, in the French language, under the general denomination of *meneſtruadie*, *meneſtraudiſe*, and *jongleire*.

The Provençal poets were not only the inventors and compoſers of metrical romances, ſongs, ballads and rhymes, to ſo great a number, and of ſuch a kind, as to raiſe an emulation in moſt countries of Europe to imitate them; but, if we may credit the Italian writers, the beſt poets of Italy, namely Petrarch and Dante, owed much of their excellence to their imitation of the Provençals; and it is alſo ſaid that the greater part of the novels of Boccace are taken from Provençal or ancient French romances. The learned Dr Percy, in his Eſſay on the Ancient Engliſh Minſtrels, has given a very curious and ſatisfactory account of theſe fathers of modern poetry and muſic; and although he agrees that the ſeveral profeſſions above enumerated were included under the general name of *minſtrel*, he has in the notes to that eſſay, p. 42. with great accuracy aſſigned to each its diſtinct and peculiar office. Of the ancient writers of romance, a hiſtory is extant in the lives of the Provençal poets, written in French by J. Noſtradamus, compiled and publiſhed at Lyons in 1575; but a much more ſatisfactory account of them is contained in the tranſlation of this work into Italian, with many additions, by Gio. Mario de Creſcimbeni, and publiſhed, in 1710, under the title of *Commentari Intorno all Iſtoria della Volgare Poeſia*.

PRUDENCE, in ethics, may be defined an ability of judging what is beſt, in the choice both of ends and means. According to the definition of the Roman moraliſt, *De Officiis*, *lib.* i. *cap.* 43. prudence is the knowledge of what is to be deſired or avoided. Accordingly he makes *prudentia* (De Legibus, lib. i.) to be a contraction of *providentia*, or foreſight. Plato (*De Legibus*, *lib.* iii.) calls this the leading virtue; and Juvenal, Sat. x. obſerves,

Nullum numen abeſt ſi ſit prudentia.

The idea of prudence includes ευβυλια, or due conſultation, that is, concerning ſuch things as demand conſultation, in a right manner, and for a competent time, that the reſolution taken up may be neither too precipitate nor too ſlow; and συνεσις, or a faculty of diſcerning proper means when they occur: and to the perfection of prudence, theſe three things are farther required, viz. δεινοτης, or a natural ſagacity; αγχινοα, preſence of mind, or a ready turn of thought; and εμπειρια, or experience. The extremes of prudence are craft or cunning on the one hand, which is the purſuit of an ill end by direct and proper, though not honeſt means; and folly on the other, which is either a miſtake, both as to the end and means, or proſecuting a good end by foreign and improper means.

PULEX, the FLEA, (*Encycl.*) This bloodthirſty inſect, which fattens at the expence of the human ſpecies, prefers the more delicate ſkin of women; but preys neither upon epileptic perſons, nor upon the dead or dying. It loves to neſtle in the fur of dogs, cats, and rats. The neſts of river-ſwallows are ſometimes plentifully ſtored with them.

Fleas are apterous; walk but little, but leap to a height equal to 200 times that of their own body. This amazing motion is performed by means of the elaſticity of their feet, the articulations of which are ſo many ſprings. Thus it eludes, with ſurpriſing agility, the purſuit of the perſon on whom it riots.—Through the microſcope its form appears monſtrous; and from obſervations made on the generation of fleas, we know them to be oviparous. The eggs, which are exceeding ſmooth and ſlippery, are depoſited at the baſe of the hairs of animals, and on blankets, &c. In four or five days time, the egg, being hatched, produces a little nimble larva that feeds on greaſy down. When touched, it rolls itſelf up into a ball. After it has crept for ſome time with great ſwiftneſs, it ſpins a ſmall downy cod, which it is careful to keep in concealment. A fortnight after, it iſſues from its tomb, but leaping, and under the form of a flea. Among the memorabilia of fleas, one, they ſay, has been ſeen to draw a ſmall ſilver piece of ordnance to which it was faſtened, the firing of the gun nowiſe daunting its intrepidity. The owner carried it about in a little box lined with velvet, every now and then placing it on her arm to let it feed; but winter put an end to the being of this martial flea. Another flea that became ſlave to an Engliſhman, had, for its daily and eaſy taſk, to drag its golden chain and padlock, of the weight of one grain. A third flea ſerved as a thill-horſe to an Engliſh artiſt, who had made an ivory coach and ſix, that carried a coachman with his dog between his legs, a poſtillion, two footmen, and four inſide riders.—Mercurial ointment, brimſtone, a fumigation with the leaves of penny-royal, or freſh-gathered leaves of that plant ſewed up in a bag, and laid in the bed, are remedies pointed out as deſtructive of fleas.

PTINUS, a genus of inſects belonging to the order of coleoptera. The antennæ are filiform: The laſt or exterior articulations are longer than the others: The thorax is nearly round, without a margin into which the head is drawn back or received: The feet are made for leaping. The moſt remarkable ſpecies are,

1. The pectinicornis. This is produced from a worm that lodges in wood and the trunks of trees, ſuch as the willow, where it makes deep round holes, turns to a winged inſect, takes flight, and rooſts upon flowers. It is diſtinguiſhed by its antennæ pectinated on one ſide, whence it has the name of *feathered*. The elytra and thorax are of a deep clay-coloured brown, the antennæ and legs are of a pale brown.

2. The pertinax. The form of this inſect reſembles the preceding one, ſaving that its antennæ are filiform.

It is all over of a deep blackiſh brown colour reſembling ſoot. It attacks houſehold-furniture, clothes, furs, and eſpecially animals dried and preſerved in collections of natural hiſtory, where it makes great havock. When caught, this inſect bends its legs, draws back its head, and lies as if it was dead till it thinks itſelf out of danger. It cannot be forced out of this ſtate of inaction either by pricking or tearing; nothing but a ſtrong degree of heat can oblige it to reſume its motion and run away. There are many beautiful varieties of this genus; but they in general eſcape our attention by their minuteneſs, and living among hay, dried leaves, and divers other duſty matters, where they undergo their metamorphoſes. The larvæ of ſome are found in trunks of decayed trees, in old tables, chairs, &c. See Plate CCCXX.

PYRAMIDS, (*Encycl.*) Dr Bryant has lately maintained, with conſiderable force of argument, this opinion, that the pyramids were deſigned for high altars and temples, and were conſtructed in honour of the Deity. If the chief pyramid was deſigned for a place of burial, what occaſion, ſays he, was there for a well, and for paſſages of communication which led to other buildings? The apartments near the pyramids he ſuppoſes to be deſigned for the reception of prieſts, and to be appendages, not to a tomb, but to a temple of the Deity. The ſtone coffin, he apprehends, was a trough or reſervoir for water, which by means of the well they drew from the Nile. The prieſts of Egypt delighted in obſcurity, and they probably came by the ſubterraneous paſſages of the building to the dark chambers within; where they peformed their luſtrations, and other nocturnal rites. Many, he adds, of the ancient temples in this country were caverns in the rock, enlarged by art, and cut out into numberleſs dreary apartments; for no nation upon the earth was ſo addicted to gloom and melancholy as the Egyptians. From the top of the pyramids they obſerved the heavens, and marked the conſtellations; and upon the ſame eminence it is probable that they offered up vows and oblations.

PYROMETER, (*Encycl.*) Muſchenbroek, who was the original inventor of this machine, has given a table of the expanſion of the different metals, in the ſame degree of heat. Having prepared cylindric rods of iron, ſteel, copper, braſs, tin, and lead, he expoſed them firſt to a pyrometer with one flame in the middle; then with two flames; and ſucceſſively to one with three, four, and five flames. But previous to this trial, he took care to cool them equally, by expoſing them ſome time upon the ſame ſtone, when it began to freeze, and Fahrenheit's thermometer was at 32 degrees. The effects of which experiment are digeſted in the following table, where the degrees of expanſion are marked in parts equal to the $\frac{1}{12500}$ part of an inch.

Expanſion of	Iron	Steel	Copper	Braſs	Tin	Lead
By one flame	80	85	89	110	153	155
By two flames placed cloſe together.	117	123	115	220		274
By two flames 2½ inches diſtant.	109	94	92	141	219	263
By three flames placed cloſe together.	142	168	193	275		
By four flames placed cloſe together.	211	270	270	361		
By five flames	230	310	310	377		

It is to be obſerved of tin, that it will eaſily melt when heated by two flames placed together. Lead commonly melts with three flames placed together, eſpecially if they burn long.

From theſe experiments, it appears at firſt view, that iron is the leaſt rarefied of any of theſe metals, whether it be heated by one more flames; and therefore is moſt proper for making machines or inſtruments which we would have free from any alterations by heat or cold, as the rods of pendulums for clocks, &c. So likewiſe the meaſures of yards or feet ſhould be made of iron, that their length may be as nearly as poſſible the ſame, ſummer and winter.

The expanſion of lead and tin, by only one flame, is nearly the ſame; that is, almoſt double of the expanſion of iron. It is likewiſe obſervable, that the flames placed together, cauſe a greater rarefaction than when they have a ſenſible interval between them; iron, in the former caſe, being expanded 117 degrees, and only 109 in the latter; the reaſon of which difference is obvious.

By comparing the expanſions of the ſame metal, produced by one, two, three, or more flames, it appears, that two flames do not cauſe double the expanſion of one; nor three flames three times that expanſion, but always leſs; and theſe expanſions differ ſo much the more from the ratio of the number of flames as there are more flames acting at the ſame time.

It is alſo obſervable, that metals are not expanded equally at the time of their melting, but ſome more, ſome leſs. Thus tin began to run, when rarefied 219 degrees; whereas braſs was expanded 377 degrees, and yet was far from melting.

Mr Ellicot found, upon a medium, that the expanſion of bars of different metals, as nearly of the ſame dimenſions as poſſible, by the ſame degree of heat, were as follow:

Gold,	Silver,	Braſs,	Copper,	Iron,	Steel,	Lead,
73	103	95	89	60	56	149

The great difference between the expanſions of iron and braſs has been applied with good ſucceſs to remedy the irregularities in pendulums ariſing from heat.

Mr Graham uſed to meaſure the minute alterations, in length, of metal bars, by advancing the point of a micrometer-ſcrew, till it ſenſibly ſtopped againſt the end of the bar to be meaſured. This ſcrew, being ſmall and very lightly hung, was capable of agreement within the three or four-thouſandth part of an inch. On this general principle Mr Smeaton contrived his pyrometer, in which the meaſures are determined by the contact of a piece of metal with the point of a micrometer-ſcrew.

The following table ſhows how much a foot in length of each metal grows longer by an increaſe of heat correſponding to 180° of Fahrenheit's thermometer, or to the difference between freezing and boiling water, expreſſed in ſuch parts of which the unit is equal to the 10000th part of an inch.

1.	White-glaſs barometer-tube, -	100
2.	Martial regulus of antimony, -	130
3.	Bliſtered ſteel, - -	138
4.	Hard ſteel, - - -	147
5.	Iron, - - -	151
6.	Biſmuth, - - -	167
7.	Copper hammered, -	204
8.	Copper eight parts, mixed with tin one,	218
9.	Caſt braſs, - - -	225
10.	Braſs ſixteen parts, with tin one, -	229
11.	Braſs wire, - - -	232
12.	Speculum metal, - -	232
13.	Spelter ſolder, viz. braſs two parts, zinc one,	247
14.	Fine pewter, - - -	274
15.	Grain tin, - - -	298
16.	Soft ſolder, viz. lead two, tin one, -	301
17.	Zinc eight parts, with tin one, a little hammered, - - -	323
18.	Lead, - - -	344
19.	Zinc or ſpelter, - -	353
20.	Zinc hammered half an inch per foot,	373

We ſhall cloſe this article with a brief deſcription of a pyrometer lately invented by M. De Luc, in conſequence of a hint ſuggeſted to him by Mr Ramſden. The baſis of this inſtrument is a rectangular piece of deal board two feet and a half long, 15 inches broad, and one inch and a half thick, and to this all the other parts are fixed. This is mounted in the manner of a table, with four deal legs, each a foot long and an inch and a half ſquare, well fitted near its four angles, and kept together at the other ends by four firm croſs-pieces. This ſmall table is ſuſpended by a hook to a ſtand; the board being in a vertical ſituation in the direction of its grain, and bearing its legs forward in ſuch a manner as that the croſs pieces which join them may form a frame, placed vertically facing the obſerver. This frame ſuſtains a microſcope, which is firmly fixed in another frame that moves in the former by means of grooves, but with a very conſiderable degree of tightneſs; the friction of which may be increaſed by the preſſure of four ſcrews. The inner ſliding frame, which is likewiſe of deal, keeps the tube of the microſcope in a horizontal poſition, and in great part without the frame, inſomuch, that the end which carries the lens is but little within the ſpace between the frame and the board. This microſcope is conſtructed in ſuch a manner as that the object obſerved may be an inch diſtant from the lens; and it has a wire which is ſituated in the focus of the glaſſes, in which the objects appear reverſed. At the top of the apparatus there is a piece of deal, an inch and a half thick, and two inches broad, laid in a horizontal direction from the board to the top of the frame. To this piece the rods of the different ſubſtances, whoſe expanſion by heat is to be meaſured, are ſuſpended: one end of it ſlides into a ſocket, which is cut in the thickneſs of the board; and the other end, which reſts upon the frame, meets there with a ſcrew, which makes the piece move backwards and forwards, to bring the objects to the focus of the microſcope. There is a cork very ſtrongly driven through a hole bored vertically through this piece; and in another vertical hole made through the cork, the rods are fixed at the top; ſo that they hang only, and their dilatation is not counteracted by any preſſure. In order to heat the rods, a cylindrical bottle of thin glaſs, about 21 inches high, and four inches in diameter, is placed in the inſide of the machine, upon a ſtand independent of the reſt of the apparatus. In this bottle the rods are ſuſpended at a little leſs than an inch diſtance from one of the ſides, in order to have them near the microſcope. Into this bottle is poured water of different degrees of heat, which muſt be ſtirred about, by moving upwards and downwards, at one of the ſides of the bottle, a little piece of wood, faſtened horizontally at the end of a ſtick: in this water is hung a thermometer, the ball of which reaches to the middle of the height of the rods. During theſe operations the water riſes to the cork, which thus determines the length of the heated part; the bottle is covered, to prevent the water from cooling to rapidly at the ſurface; and a thin caſe of braſs prevents the vapour from fixing upon the pierce of deal to which the rods are fixed.

PYROPHORUS, (*Encycl.*) Mr Bewly prepares his pyrophorus in the following manner. "I fill, (ſays he) half or three-fourths of the bowl of a tobacco-pipe with a mixture, conſiſting of two parts of alum, previouſly calcined in a red-heat, and of powdered charcoal and ſalt of tartar each one part; preſſing the matter down ſlightly, and filling the remainder of the bowl with fine ſand. As ſoon as the powder becomes hot, the ſand lying over it is put into a ſtate of ebullition, which generally continues ſeveral minutes. This appearance ſeems to proceed partly from the vitriolic acid in the alum leaving its earth, and expelling fixed air from the alkali; while another part of it is poſſibly converted into vitriolic acid air. This phenomenon is ſucceeded by the appearance of a blue ſulphureous flame, proceeding from the combination of the ſame acid with the phlogiſton of the coal, and which continues about ten minutes or a quarter of an hour. After it ceaſes, no other remarkable appearance preſents itſelf. The matter is now to be kept in a red-heat 20 minutes or half an hour; or it may continue there two hours longer, if the operator pleaſes, without any injury to the pyrophorus. The pipe being taken out of the fire, the matter is knocked out of it as ſoon as it becomes cool, and generally pretty ſoon afterwards takes fire ſpontaneouſly."[1]

In another experiment, having added ſucceſſively various and encreaſing quantities of fixed alkali to the ſalt heated as above, till the vitriolic acid contained in the mixture might be conſidered merely as an evaneſcent quantity, a pyrophorus was ſtill produced on calcining it with charcoal as before. He alſo mixed equal parts of ſalt of tartar and vegetable or animal coal, or ſometimes three parts of the former with two of the latter, and calcined them in the uſual manner: and this compoſition, on being expoſed to the air, ge-

Pyrophorus, Quartz.

Pyrophorus, Quartz.

nerally kindled in half a minute or a minute; though, as it contained no ſulphur, it did not burn with ſo much vivacity as the vitriolic pyrophori. This, which Mr Bewly calls the *alkaline pyrophorus*, differs in no circumſtance from M. De Suvigny's neutral pyrophori, except in its not containing that principle to which he aſcribes their accenſion. However, leſt it might be ſuſpected that the ſalt of tartar which he employed might accidentally contain vitriolated tartar, or vitriolic acid, he repeated the experiment with tartar calcined by himſelf, as well as with nitre fixed or alkaliſed by deflagration with charcoal, and with iron filings; and in all theſe caſes with the ſame reſult. By diverſifying in a like manner M. De Suvigny's experiments on the metallic pyrophori, Mr Bewly found that none of the three vitriols, heated with charcoal alone, in his uſual method, could produce a pyrophorus. And thus he found that the addition of an alkaline ſalt to the compoſition, which was a part of M. De Suvigny's proceſs, was eſſential to its ſucceſs.

Treating in the uſual manner equal parts of calcined green vitriol and charcoal, the powder, which contained no ſulphur nor hepar ſulphuris, did not acquire any of the properties of a pyrophorus. The vitriolic acid ſeemed to have been entirely diſſipated; having no baſe to detain it, when diſlodged from the metallic earth. The charcoal and calx of iron left in this proceſs were calcined again, together with ſome ſalt of tartar; and a pyrophorus was produced, which exhibited indications of its containing a ſcarce perceptible portion of hepar ſulphuris. Thirty grains of crocus martis aſtringens were calcined with 15 grains of charcoal, and the ſame quantity of ſalt of tartar; and the mixture burnt ſpontaneouſly, though it contained no hepar ſulphuris or vitriolic acid. Having by theſe experiments evinced that metallic pyrophori may be prepared without vitriolic acid, Mr Bewly proceeded to form an aluminous pyrophorus of the ſame kind. For this purpoſe, he procured the earth of alum by a long and violent calcination; and examining a part of it, he found, by the uſual teſts, that it neither contained any ſulphur, hepar ſulphuris, nor alum undecompounded. This he conſidered as perfectly pure, though he afterwards found that it contained a ſmall quantity of vitriolated tartar; and yet it repeatedly furniſhed a pyrophorus, as active as when alum itſelf is employed. From theſe and ſimilar experiments, he infers, that the ſeveral kinds of pyrophori are not kindled by moiſture, attracted by the vitriolic acid, as M. De Suvigny has maintained: and his concluſion is farther confirmed by ſome experiments of Dr Prieſtley, from which it appears, that they are kindled in dry nitrous and dephlogiſticated air.

M. Prouſt, cited by Mr Bewly, deſcribes a variety of new pyrophori, which neither contain vitriolic acid, nor ſeem likely to owe their accenſion to the attraction of humidity from the air. Theſe principally conſiſt of a coaly matter ſimply divided by metallic or other earths; ſuch are the ſediment left on the filter in preparing Goulard's extract, various combinations of tartar, or its acid, or the acetous acid, with metals, calcareous earth, &c.

Mr Bewly, having evinced the inſufficiency of M. De Suvigny's theory, and diſcovered that the pyrophori are not kindled by moiſture, attracted (merely) by the vitriolic acid, directed his attention to the nitrous acid, which Dr Prieſtley has ſhown to be a conſtituent part of atmoſpherical air, as the probable agent in the production of this phenomenon. The ſtrong affinity which this acid has with phlogiſton, and the heat, and even flame, which it is known to produce with certain inflammable matters, manifeſted that it was equal to the effect; and having excluded the vitriolic acid from having any eſſential concern in this operation, he ſuggeſts, either that the pyrophorus is kindled by moiſture attracted by ſome of the other ingredients which compoſe it; or that it has the power of decompounding atmoſpherical air, by ſuddenly attracting its nitrous acid, and thereby generating a heat ſufficient to kindle the phlogiſtic matter contained in it. This idea appeared plauſible, when he farther conſidered that Dr Prieſtley produced the pureſt reſpirable air with this ſame acid combined with other principles; and that this as well as common air is diminiſhed, and probably in part decompounded, in a variety of phlogiſtic proceſſes. This ingenious writer concludes, upon the whole, from the experiments he hath made, that the pyrophorus ſeems to owe its ſingular property to its being a combination of earth or alkali with phlogiſton; the vitriolic acid, when preſent, only occaſionally increaſing or diminiſhing the effect, according to circumſtances. In the proceſs of calcination, the earth or alkaline principle is not merely mixed, but actually, though looſely, combined with the phlogiſtic principle of the coal; ſo that the pyrophorus, conſidering it in its moſt ſimple ſtate, is only a perfectly dry phlogiſticated alkali or earth. On theſe data, the phenomena may be explained in the two following methods; with reſpect particularly to the influence of moiſture and heat upon the pyrophorus. Suppoſing either the alkaline or earthy principle to have a greater affinity to water than to the phlogiſton with which either of them is united, they may, on being expoſed to a moiſt atmoſphere, attract the humidity, and thereby ſet the phlogiſtic principle at liberty; which may, in its turn, attract, and be ignited by, the ſuppoſed aerial acid, its ſtrong affinity to which is well known:—or, if this hypotheſis be rejected, the inflammable matter may be kindled, merely in conſequence of the heat produced by the combination of the alkali, &c. with moiſture.

Q.

QUARTZ, is a hard vitrifiable ſtone, ſomething intermediate betwixt rock-cryſtals and flints, or opake vitrifiable ſtones. Quartz is a ſtone well known by metallurgiſts, mineralogiſts, and miners, as it is frequently and abundantly found with ores, of which it often forms the matrix. It is alſo frequently found where no ores are.—The moſt common quartz is more or leſs of a milky-white colour, and conſequently ſemi-tranſparent. Some of them have various colours. This ſtone, which is very hard and very compact, is nevertheleſs cracked throughout its ſubſtance; to which alſo the rock-cryſtal is very liable, but much leſs ſo than quartz. The fragments of quaitz are always angular, and its internal ſurface has but little gloſs. Quartz is a little waved, and has a greaſy appearance. It is found not only of various colours, but alſo of various forms. It is frequently found cryſtallized in caverns and ſlits of rocks. Its cryſtallization is the ſame as that of rock-cryſtal. Quartz may be employed in vitrification, as all other vitrifiable ſtones are.

QUASIA, in botany, a genus of the monogynia order, belonging to the decandria claſs of plants. There is but one ſpecies, viz. the amara, or bitter-aſh, as it is called in the Weſt Indies. It has of late come into great repute as a medicine, and the root is the part made uſe of. Its virtues were firſt revealed by a negro at Surinam, whoſe name was *Quaſſi*. This root appears to be the moſt pure and intenſe of all the bitters. At Surinam it has acquired a high character in curing intermittents, even in caſes where the Peruvian bark has failed. It may be given in any form; but the moſt uſual is an aqueous infuſion, in the proportion of one drachm to a pint, the doſe of which is one ounce.

R.

RAGUSA, a city of Dalmatia, and capital of Raguſan. It is about two miles in circumference, and is pretty well built. It is ſtrong by ſituation, having an inacceſſible mountain on the land-ſide, and on the ſide of the ſea a ſtrong fort. It has an archbiſhop's ſee and a republic; and has a doge like that of Venice, but he continues only a month in office. It carries on a conſiderable trade with the Turks. E. Long. 18. 25. N. Lat. 42. 30.

RAPHIDIA, in zoology, a genus of inſects, of the neuroptera order; the characters of which are theſe: The head is of a horny ſubſtance, and depreſſed or flattened: the mouth is armed with two teeth, and furniſhed with four palpi: the ſtemmata are three in number: the wings are deflected: the antennæ are filiform, as long as the thorax; the anterior part of which is lengthened out, and of a cylindrical form: the tail of the female is terminated by an appendix, reſembling a flexible crooked briſtle.—There are three ſpecies. The moſt remarkable is the ophiopſis; which for its ſhape is one of the moſt ſingular that can be ſeen ‡. It has an oblong head, ſhaped like a heart, with its point joined to the thorax, and the broad part before. It is ſmooth, black, flattened, continually ſhaking, with ſhort antennæ, yellowiſh maxillæ, and four palpi. Towards the middle of the upper part of the head, between the eyes, are the three ſtemmata, placed in a triangle. The thorax, to which this head is faſtened, is narrow, long, and cylindrical. The abdomen, broader, is black like the reſt of the body, with the ſegments margined yellow. The feet are of a yellowiſh caſt. The wings, which are faſtigiated, are white, diaphanous, veined, and as it were covered with a very fine net-work of black. This inſect, for the figure of its head, reſembles a ſnake. It is found but ſeldom, and in woods only. Its larva, chryſalis, and habitation, are abſolutely unknown.

‡ See Plate CCCXXI.

RED-BREAST, in ornithology, a ſpecies of MOTACILLA, under which article it was omitted. The bill is duſky; the forehead, chin, throat, and breaſt, are of a deep orange-colour; the head, hind part of the neck, the back, and tail, are of a deep aſh-colour tinged with green; the wings rather darker, the edges inclining to yellow; the legs and feet duſky. This bird, though ſo very petulant as to be at conſtant war with its own tribe, yet is remarkably ſociable with mankind: in the winter it frequently makes one of the family, and takes refuge from the inclemency of the ſeaſon even by our fire-ſides. Thomſon has prettily deſcribed the annual viſits of this gueſt; vide his *Winter*, l. 246. In the ſpring this bird retires to breed in the thickeſt coverts, or the moſt concealed holes of walls and other buildings. The eggs are of a dull white, ſprinkled with reddiſh ſpots. Its ſong is remarkably fine and ſoft; and the more to be valued, as we enjoy it the greateſt part of the winter and early in the ſpring, and even through great part of the ſummer; but its notes are part of that time drowned in the general warble of the ſeaſon. Many of the autumnal ſongſters ſeem to be the young cock red-breaſts of that year.

RED-*Start*, (*Motacilla phœnicurus*), in ornithology, was omitted to be deſcribed under the article MOTACILLA, of which it is a ſpecies. This bird appears among us only in the ſpring and ſummer, and is obſerved to come over nearly at the ſame time with the nightingale. It makes its neſt in hollow trees, and holes in walls and other buildings; which it forms with moſs on the outſide, and lines with hair and feathers. It lays four or five eggs, very like thoſe of the hedge-ſparrow, but rather paler, and more taper at the leſs end. This bird is ſo remarkably ſhy, that it will forſake its neſt if the eggs are only touched. It has a very fine ſoft note; but, being a ſullen bird, is with difficulty kept alive in confinement. It is remarkable in ſhaking its tail; it moves it horizontally, as a dog does when fawning.—The bill and legs of the male are black; the forehead white; the crown of the head, hind part of the neck, and the back, are of a deep blue-grey; the cheeks and throat black; the breaſt, rump, and ſides are red; the two middle feathers of the tail brown, the others red; the wings brown. In the female, the top of the head and back are of a deep aſh-colour; the rump and tail of a duller red than thoſe of the male; the chin white; the lower ſide of the neck cinereous; the breaſt of a paler red.

REPRODUCTION, (*Encycl.*) By reproduction is uſually underſtood the reſtoration of a thing before exiſting, and ſince deſtroyed. It is very well known that trees and plants may be raiſed from ſlips and cuttings; and ſome late obſervations have ſhown, that there are ſome animals which have the ſame property. The polype was the firſt inſtance we had of this; but we had ſcarce time to wonder at the diſcovery Mr Trembley had made, when Mr Bonett diſcovered the ſame property in a ſpecies of water-worm. Amongſt the plants which may be raiſed from cuttings, there are ſome which ſeem to poſſeſs this quality in ſo eminent a degree, that the ſmalleſt portion of them will become a complete tree again.

It deſerves inquiry, whether or not the great Author of nature, when he ordained that certain inſects, as theſe polypes and worms, ſhould reſemble thoſe plants in that particular, allowed them this power of being reproduced in the ſame degree; or, which is the ſame thing, whether this reproduction will or will not take place in whatever part the worm is cut. In order to try this, Mr Bonett entered on a courſe of many experiments on the water-worms which have this property. Theſe are, at their common growth, from two or three inches long, and of a browniſh colour, with a caſt of reddiſh. From one of theſe worms he cut off the head and tail, taking from each extremity only a ſmall piece of a twelfth of an inch in length; but neither of theſe pieces were able to reproduce what was wanting. They both periſhed in about 24 hours; the tail firſt, and afterwards the head. As to the body of the worm from which theſe pieces were ſeparated, it lived as well as before, and ſeemed indeed to ſuffer nothing by the loſs, the head-part being immediately uſed as if the head was thereon, boring the creature's way into the mud. There are, beſides this, two other points in which the reproduction will not take place; the one of theſe is about the fifth or ſixth ring from the head, and the other at the ſame diſtance from the tail; and in all probability the condition of the great artery in theſe parts is the cauſe of this.

What is ſaid of the want of the reproductive power of theſe parts relates only to the head and tail ends; for as to the body, it feels very little inconvenience from the loſs of what is taken off, and very ſpeedily reproduces thoſe parts. Where, then, does the principle of life reſide in ſuch worms, which, after having their heads cut off, will have not only the ſame motions, but even the inclinations, that they had before? and yet this difficulty is very ſmall, compared to ſeveral others which at the ſame time offer themſelves to our reaſon. Is this wonderful reproduction of parts only a natural conſequence of the laws of motion? or is there lodged in the body of the creature a chain of minute buds or ſhoots, a ſort of little embryos, already formed and placed in ſuch parts where the reproductions are to begin? Are theſe worms only mere machines? or are they, like more perfect animals, a ſort of compound, the ſprings of whoſe motions are actuated or regulated by a ſort of ſoul? And if they have themſelves ſuch a principle, how is it that this principle is multiplied, and is found in every ſeparate piece? Is it to be granted, that there are in theſe worms, not a ſingle ſoul (if it is to be ſo called) in each, but that each contains as many ſouls as there are pieces capable of reproducing perfect animals? Are we to believe with Malpighi, that theſe ſorts of worms are all heart and brain from one end to the other! This may be; but yet if we knew that it was ſo, we ſhould know in reality but very little the more for knowing it: and it ſeems, after all, that in caſes of this kind we are only to admire the works of the great Creator, and ſit down in ſilence.

The nice ſenſe of feeling in ſpiders has been much talked of by naturaliſts; but it appears that theſe worms have yet ſomewhat more ſurpriſing in them in regard to this particular. If a piece of ſtick, or any other ſubſtance, be brought near them, they do not ſtay for its touching them, but begin to leap and friſk about as ſoon as it comes towards them. There want, however, ſome farther experiments to aſcertain whether this be really owing to feeling or to ſight; for though we can diſcover no diſtinct organs of ſight in theſe creatures, yet they ſeem affected by the light of the ſun or a candle, and always friſk about it in the ſame manner at the approach of either; nay, even the moon-light has ſome effect upon them.

A twig of willow, poplar, or many other trees, being planted in the earth, takes root, and becomes a tree, every piece of which will in the ſame manner produce other trees. The caſe is the ſame with theſe worms: they are cut to pieces, and theſe ſeveral pieces become perfect animals; and each of theſe may be again cut into a number of pieces, each of which will in the ſame manner produce an animal. It had been ſuppoſed by ſome that theſe worms were oviparous: but Mr Bonett, on cutting one of them to pieces, having obſerved a ſlender ſubſtance, reſembling a ſmall filament, to move at the end of one of the pieces, ſeparated it; and on examining it with glaſſes, found it to be a perfect worm, of the ſame form with its parent, which lived and grew larger in a veſſel of water into which he put it. Theſe ſmall bodies are eaſily divided, and very readily complete themſelves again, a day uſually ſerving for the production of a head to the part that wants one; and, in general, the ſmaller and ſlenderer the worms are, the ſooner they complete themſelves after this operation. When the bodies of the large worms are examined by the microſcope, it is very eaſy to ſee the appearance of the young worms alive, and moving about within them: but it requires great preciſion and exactneſs to be certain of this; ſince the ramifications of the great artery have very much the appearance of young worms, and they are kept in a ſort of continual motion by the ſyſtoles and diaſtoles of the ſeveral portions of the artery, which ſerve as ſo many hearts. It is very certain, that what we force in regard to theſe animals by our operations, is done alſo naturally every day in the brooks and ditches where they live. A curious obſerver will find in theſe places many of them without heads or tails, and ſome without either; as alſo other fragments of various kinds, all which are then in the act of completing themſelves: but whether accidents have reduced them to this ſtate, or they thus purpoſely throw off parts of their own body for the reproduction of more animals, is not eaſy to determine. They are plainly liable to many accidents, by which they loſe the ſeveral parts of their body, and muſt periſh very early if they had not a power of reproducing what was loſt: they often are broken into two pieces, by the reſiſtance of ſome hard piece of mud, which they enter; and they are ſubject to a diſeaſe, a kind of gangrene, rotting off the ſeveral parts of their bodies, and muſt inevitably periſh by it, had they not this ſurpriſing property.

This worm was a ſecond inſtance, after the polype, of the ſurpriſing power in an animal of recovering its moſt eſſential parts when loſt. But nature does not ſeem to have limited her beneficence in this reſpect to theſe two creatures. Mr Bonett tried the ſame experiments on another ſpecies of water-worm, differing from the former in being much thicker. This kind of worm, when divided in the ſummer-ſeaſon, very often ſhows the ſame property: for if it be cut into three or four pieces, the pieces will lie like dead for a long time, but afterwards will move about again; and will be found in this ſtate of reſt to have recovered a head, or a tail, or both. After recovering their parts, they move very little; and, according to this gentleman's experiments, ſeldom live more than a month.

It ſhould ſeem, that the more difficult ſucceſs of this laſt kind of worm, after cutting, and the long time it takes to recover the loſt parts, if it do recover them at all, is owing to its thickneſs; ſince we always find in that ſpecies of worms which ſucceeds beſt of all, that thoſe which are thinneſt always recover their parts much ſooner than the others.

The water-inſects alſo are not the only creatures which have this power of recovering their loſt parts. The earth affords us ſome already diſcovered to grow in this manner from their cuttings, and theſe not leſs deſerving our admiration than thoſe of the water: the common earth-worms are of this kind. Some of theſe worms have been divided into two, others into three or four pieces; and ſome of theſe pieces, after having paſſed two or three months without any appearance of life or motion, have then begun to reproduce a head or tail, or both. The reproduction of the anus, after ſuch a ſtate of reſt, is no long work; a few days do it: but it is otherwiſe with the head, that does not ſeem to perform its functions in the divided pieces till about ſeven months after the ſeparation. It is to be obſerved, that in all theſe operations both on earth and water-worms, that the hinder part ſuffers greatly more than the fore part in the cutting; for it always twiſts itſelf about a long time, as if actuated by ſtrong convulſions; whereas the head uſually crawls away without the appearance of any great uneaſineſs.

The reproduction of ſeveral parts of lobſters, crabs, &c. makes alſo one of the great curioſities in natural hiſtory. That, in lieu of an organical part of an animal broken off, another ſhall riſe perfectly like it, may ſeem inconſiſtent with the modern ſyſtem of generation, where the animal is ſuppoſed to be wholly formed in the egg. Yet has the matter of fact been well atteſted by the fiſhermen, and even by ſeveral virtuoſos who have taken the point into examination, particularly M. de Reaumur and M. Perrault, whoſe ſkill and exactneſs in things of this nature will hardly be queſtioned. The legs of lobſters, &c. conſiſt each of five articulations: now, when any of the legs happen to break by any accident, as in walking, &c. which frequently happens, the fracture is always found to be in a part near the fourth articulation; and what they thus loſe is preciſely reproduced in ſome time afterwards; that is, a part of a leg ſhoots out, conſiſting of four articulations, the firſt whereof has two claws as before; ſo that the loſs is entirely repaired.

If a lobſter's leg be broken off by deſign at the fourth or fifth articulation, what is thus broken off always comes again; but it is not ſo if the fracture be made in the firſt, ſecond, or third articulation. In thoſe caſes, the reproduction is very rare if things continue as they are. But what is exceedingly ſurpriſing is, that they do not; for, upon viſiting the lobſter maimed in theſe barren and unhappy articulations, at the end of two or three days, all the other articulations are found broken off to the fourth; and it is ſuſpected they have performed the operation on themſelves, to make the reproduction of a leg certain.

The part reproduced is not only perfectly like that retrenched, but alſo, in a certain ſpace of time, grows equal to it. Hence it is that we frequently ſee lobſters, which have their two big legs unequal, and that in all proportions. This ſhows the ſmaller leg to be a new one.

A part thus reproduced being broken, there is a ſecond reproduction. The ſummer, which is the only ſeaſon of the year when the lobſters eat, is the moſt favourable time for the reproduction. It is then performed in four or five weeks; whereas it takes up eight or nine months in any other ſeaſon.

The ſmall legs are ſometimes reproduced, but more rarely, as well as more ſlowly, than the great ones: the horns do the ſame. The experiment is moſt eaſily tried on the common crab.

REST-HARROW, or Cammock, the *Ononis Arvenſis*. A decoction of this plant has been much recommended to horſes labouring under a ſtoppage of urine. It is the peſt of ſome corn-fields; but in its younger ſtate, before the plant has aquired its thorns, it is a moſt acceptable food to ſheep.

ROSYCRUCIANS, Rosicrucians, or *Brothers of the Roſy Croſs*, a name aſſumed by a ſect or cabal of hermetical philoſophers, who appeared, or at leaſt were firſt taken notice of, in Germany, in the beginning of the 16th century. They pretended to be maſters of all ſciences, and to have many important ſecrets, particularly that of the philoſopher's ſtone.—Their ſociety is frequently denoted by the abbreviatures F. R. C.

ROUSSEAU (John James), a celebrated philoſopher, was the ſon of a watchmaker at Geneva, and was born in 1712. In the early part of his life he embraced the Roman Catholic religion, and travelled into Italy. Some time after, he went into France; and was ſecretary to M. de Montaign ambaſſador at Venice in 1743. Till he was 40 years of age he remained entirely unknown in the literary world. His Diſcourſe againſt the Sciences, which in 1750 was honoured with the prize by the academy of Dijon, firſt drew him from this obſcurity. Though the ſubject had formerly been treated by the famous Henry Cornelius Agrippa, Rouſſeau gave his ſubject all the charms of novelty; diſplaying the moſt uncommon reſources of genius and knowledge. A variety of writers attacked his opinion; diſpute on diſpute enſued, and he found himſelf engaged in the moſt formidable liſts of literary controverſy. His diſcourſe on the Inequality among Men and of the Origin of Society, tho' it ſupports a falſe ſyſtem, is yet done with admirable art; and this performance, eſpecially its dedication to the Republic of Geneva, are among thoſe maſter-pieces of eloquence, of which the ancients alone have given us any idea. His Letter to M. d'Alembert on the Project of eſtabliſhing a Theatre at Geneva, publiſhed in 1757, contains, amidſt many paradoxes, ſome of the moſt important truths. This letter, in which he decries the ſtage, was the ſource of an irreconcileable enmity between him and the celebrated Voltaire. However, it is remarkable, that even Rouſſeau, this enemy of plays, wrote a comedy, and preſented a Paſtoral to the theatre; the poetry and muſic of which he compoſed with the moſt pleaſing attention to the ſimplicity of rural ſentiment and manners. The author, who had an excellent talent for muſic, had cultivated it from his infancy with equal taſte; and his Dictionary of Muſic is one of the beſt works of the kind. His Epiſtolary Romance, to which the Engliſh tranſlator had given the name of *Eloiſa*, is univerſally known; but of all the works of this celebrated writer, his Emilius, or Treatiſe on Education, made the greateſt noiſe. The moſt exceptionable part of this work is the third volume; which is almoſt full of objections to Chriſtianity. This proved fatal to his repoſe. He had lived from the year 1754 in a country houſe near Montmorenci; a retreat which he owed to the generoſity of a farmer-general of the revenues. The parliament of Paris condemned the laſt-mentioned work in 1762, and commenced a criminal proceſs againſt the author, which obliged him to fly from that city. Being proſcribed alſo in his native place, he at length found an aſylum in Switzerland in the ſovereignty of Neufchatel. His firſt care was to defend his Emilius againſt the anathemas of the archbiſhop of Paris. His "Letters from the Mountains" were publiſhed ſoon after; but this book, leſs eloquent than his "Letter to the archbiſhop of Paris," and filled with unintereſting invectives againſt the magiſtrates and eccleſiaſtics of Geneva, irritated the Proteſtant miniſters without reconciling him to the Romiſh clergy.

In the year 1753, Rouſſeau had ſolemnly abandoned the Romiſh religion; and, what is remarkable, at the very time that he had determined to reſide in a Catholic country. This converſion, however, could not regain the eſteem of the Proteſtant teachers; nor could the protection of the king of Pruſſia ſecure him againſt the vengeance of the miniſter of the village where he reſided. He therefore took the reſolution of viſiting England; but here he ſoon embroiled himſelf with the celebrated Mr Hume, by whoſe means he had been placed in an agreeable retreat in Derbyſhire, and who had obtained for him a penſion from the king. He again returned to France, where his patrons obtained leave for him to reſide in Paris, but on condition that he ſhould not write any thing on the ſubjects of religion or government. He obeyed this injunction inviolably, and wrote nothing on any ſubject, but contented himſelf with the peaceful life of a philoſopher. In May 1776 he accepted the invitation of the marquis and marchioneſs de Girardin, who had prepared a neat little houſe for him at a ſmall diſtance from their delightful caſtle of Ermenonville, about 30 miles from Paris. This retreat was perfectly conformable to the wiſhes of Rouſſeau. Every day he amuſed himſelf in a neighbouring wood in collecting plants for his herbal. The marquis, who was himſelf a philoſopher, indulged his paſſion for rural life, and was enamoured with the writings of the ſingular Rouſſeau. They had muſical parties frequently, at which he aſſiſted; and he compoſed ſeveral airs in all that ſimple ſtyle of nature for which he had ever been remarked. Among others he ſet ſeveral paſſages of our Shakeſpeare to muſic, and played them himſelf on the forte piano in the moſt enchanting manner.—In this ſweet retirement he lived two years in the moſt agreeable manner; and died on the 2d of July 1778, in the 66th year of his age. The marquis has ſince erected a ſepulchral monument, to cover the remains of his departed friend. This mauſoleum is conſtructed of white marble, with the buſt of the deceaſed by Houdon; and its decorations are in the beſt taſte. One of its ſides exhibits two doves, for Eloiſa; another, a mother ſucking her child, for Emilius; a third, children ſacrificing on the altar of nature; and the fourth, a lyre, with other ſymbols of poetry and muſic. The inſcription on the monument is long; and contains a pompous encomium on the genius, ſentiments, and moral character of Mr Rouſſeau.

We ſhall conclude the life of this ſingular man with the character of himſelf and of his writings, as delivered by the maſterly pen of Dr Beattie. "I conſider Rouſſeau," ſays the Doctor, "as a moral writer of true genius. Senſibility of heart; a talent for extenſive and accurate obſervation; livelineſs and ardour of fancy; and a ſtyle, copious, nervous, and elegant, beyond that of any other French writer; are his diſtinguiſhing characteriſtics. In argument he is not always equally ſucceſsful; for he often miſtakes declamation for proof, and hypotheſis for fact: but his eloquence, when addreſſed to the heart, overpowers with force irreſiſtible. A greater number of important facts relating to the human mind are recorded in his works, than in all the books of all the ſceptical philoſophers ancient and modern. And he appears in general to be a friend to virtue, to mankind, to natural religion, and ſometimes to Chriſtianity. Yet none even of his beſt works are free from abſurdity. His reaſonings, on the effects of the ſciences, and on the origin and progreſs of human ſociety, are diffuſe, inaccurate, and often weak; much perverted by theories of his own, as well as by too implicit an admittance of the vague aſſertions of travellers, and of the ſyſtems and doctrines of ſome favourite French philoſophers. And he ſeems, in theſe, and frequently too in his own writings, to conſider animal pleaſure, and bodily accompliſhments, as the happineſs and perfection of man. His plan of education, though admirable in many parts, is in ſome injudicious and dangerous, and impracticable as a whole. The character of Julia's lover is drawn with a maſterly hand indeed, and well conducted throughout; but the lady has two characters, and thoſe incompatible. The wife of Wolmar is quite a different perſon from the miſtreſs of St Prieux. Wolmar himſelf is an impoſſible character; deſtitute of principle, yet of rigid virtue; deſtitute of feeling, yet capable of tenderneſs and attachment; delicate in his notions of honour, yet not aſhamed to marry a woman whom he knew to be to all intents and purpoſes devoted to another. Some of this author's remarks on the ſpirit of Chriſtianity, and on the character of its Divine Founder, are not only excellent, but tranſcendently ſo; and I believe no Chriſtian can read them without feeling his heart warmed, and his faith confirmed. But what he ſays of the abſurdities which he fancies to be contained in the Sacred Hiſtory, of the impropriety of the evidence of miracles, of the analogy between thoſe of Jeſus Chriſt and the tricks of jugglers, of the inſignificancy and impertinence of prayer, of the ſufficiency of human reaſon for diſcovering a complete and comfortable ſcheme of natural religion, of the diſcouraging nature of the terms of ſalvation offered in the Goſpel, of the meaſure of evidence that ought to accompany Divine Revelation (which, as he ſtates it, would be incompatible with man's free agency and moral probation); what he ſays of theſe, and ſeveral other theological points of great importance, betrays a degree of ignorance and prejudice, of which, as a philoſopher, as a ſcholar, and as a man, he ſhould have been utterly aſhamed. He appears to be diſtreſſed with his doubts; and yet, without having ever examined whether they be well or ill founded, ſcruples not to exert all his eloquence on purpoſe to infuſe them into others: a conduct which I muſt ever condemn as illiberal, unjuſt, and cruel. Had Rouſſeau ſtudied the Scripture, and the writings of rational divines, with as much care as he ſeems to have employed in reading the books, and liſtening to the converſation of French infidels, and in attending to the unchriſtian practices and doctrines warranted by ſome eccleſiaſtical eſtabliſhments; I may venture to aſſure him, that his mind would have been much more at eaſe, his works much more valuable, and his memory much dearer to all good men. Rouſſeau is, in my opinion, a great philoſophical genius, but wild, irregular, and often ſelf-contradictory; diſpoſed, from the faſhion of the times, and from his deſire of being reputed a bold ſpeaker and free-thinker, to adopt the doctrines of infidelity; but of a heart too tender, and an imagination too lively, to permit him to become a thorough-paced infidel. Had he lived in an age leſs addicted to hypotheſis, he might have diſtinguiſhed himſelf as a moral philoſopher of the firſt rank.—To conclude, the writings of this author, with all their imperfections, may be read by the philoſopher with advantage, as they often direct to the right obſervation and interpretation of nature; and by the Chriſtian, without detriment, as the cavils they contain againſt religion are too ſlight and too paradoxical to weaken the faith of any one who is tolerably inſtructed in the principles and evidences of Chriſtianity. To the man of taſte they can never fail to recommend themſelves, by the irreſiſtible charms of the compoſition."

S.

SAINTS, (*Encycl.*) Cardinal Bellarmine, and other Popiſh writers, have pleaded, that by praying to the ſaints, they only intend to expreſs a deſire of their interceſſion, and that their invocation of the ſaints terminates ultimately in God. Accordingly they have diſtinguiſhed two ſorts of worſhip; one called *latria*, appropriate to God; and another *dulia*, which, being of an inferior nature, is paid to angels and ſaints. However, many of their own writers have exploded this diſtinction, and others have owned that it is unſcriptural. There is another ſort of worſhip, which is of a higher degree than that paid to ſaints in common, and which is peculiar to the Virgin Mary: this they call *hyperdulia*.

After all, thoſe who read their books of devotion, their Hours, their Offices, their Roſaries, their Breviaries, and their Miſſals, will find many direct addreſſes to the ſaints, which are very different from thoſe prayers whoſe object is merely to ſupplicate their interceſſion. Beſides, the council of Trent, ſeſſ. 25. directs to apply to the ſaints for their help and aſſiſtance, as well as their prayers; and condemns all who think that it is not good and profitable to offer prayers to ſaints, as chargeable with impious ſentiments. And the creed of pope Pius IV. expreſsly inſiſts upon it as an article of faith, that the ſaints reigning together with Chriſt are to be invocated. As to the antiquity of this practice, the council of Trent, ſeſſ. 25. ſpeaks of it as the uſage of the apoſtolic and catholic church from the beginning of Chriſtianity. As to the doctrine of the interceſſion of ſaints and angels, there is not the leaſt intimation of it in the writings of the two firſt centuries; though it muſt be allowed to have been introduced in the next century, and that Origen and Cyprian expreſsly favour this ſuperſtition. The worſhip of ſaints and angels is of a much later date, eſpecially as a ſtanding generally-received doctrine of the church. For though Athanaſius was for worſhipping the ſaints, yet Cyril, who lived in the next century, ſays, We neither call the holy martyrs gods, nor are we uſed to worſhip them. St Auſtin affirms, that neither ſaints nor angels will be worſhipped. Archbiſhop Uſher ſays, that as to the firſt 400 years after Chriſt, for nine parts of that time, not one true teſtimony can be produced out of any father in favour of this doctrine; and cardinal Perron, Richlieu, and other learned writers among the Romaniſts, own, that the invocation of ſaints was not practiſed for the three firſt centuries. The firſt ſymptoms of this worſhip did not appear till towards the end of the fourth century, and it ſeems to have ſprung out of the regard which the Chriſtians at that time manifeſted to the memory of the martyrs. They frequented their tombs, and erected altars there, praying to God, and engaging themſelves to a ſtrict imitation of the virtues and piety of the departed martyrs: by degrees this veneration degenerated into praiſes and eulogiums of the ſaints themſelves, in which they uſed ſome apoſtrophes and rhetorical addreſſes; whence proceeded a ſuperſtitious regard to them, and at length a direct invocation and worſhip of them. Nor does it appear, that any public prayers to ſaints were eſtabliſhed till A. D. 788, by the ſecond council of Nice; and this council was condemned by another held at Francfort, A. D. 794; and the invocation of ſaints was likewiſe condemned by a former council held at Conſtantinople, A. D. 755, conſiſting of 388 biſhops. In the ſeventh century, Gregory expreſsly ſays, that angels refuſed to be worſhipped ſince the appearance of Chriſt.

In order to convey ſome idea of the extravagance to which veneration for reputed ſaints hath arrived in the Romiſh church, we ſhall only mention one inſtance out of many that might be alleged. It is well known that there were three altars in the cathedral church of Canterbury, one erected to the honour of Chriſt, another to the Virgin Mary, and a third to St Thomas à Becket; and the offerings at his ſhrine amounted to 1000 l. when thoſe to the Virgin did not amount to 5 l. and thoſe to Chriſt were nothing; and Rapin informs us, that in one year, viz. A. D. 1420, there were no leſs than 50,000 foreigners who came in pilgrimages to pay their homage at this tomb.

SALT, (*Encycl.*) See alſo ACIDS and ALKALIES in this APPENDIX.—Acids and alkalies, and combinations of both, when in a concrete form, are ſalts, and of the pureſt ſort. The bodies, therefore, to which the name of *ſalts* more properly belongs, are the concretions of thoſe ſubſtances; which are accordingly called *acid ſalts*, *alkaline ſalts*, and *neutral ſalts*. Theſe laſt are combinations of acid and alkaline ſalts, in ſuch propor-

Salt.

proportion as to render the compounds neither ſour nor alkaline to the taſte. This proportionate combination is called *ſaturation:* thus the common kitchen-ſalt is a neutral ſalt, compoſed of marine acid and mineral alkali combined together to the point of ſaturation. The appellation of *neutral ſalts* is alſo extended to denote all thoſe combinations of acids, and any other ſubſtance with which they can unite, ſo as to loſe, wholly or in great meaſure, their acid properties.

Notwithſtanding that the general definition of ſalts given above is commonly received, yet there are many writers, eſpecially mineralogiſts, who confine the denomination of *ſalts* to thoſe ſubſtances only which, beſides the general properties of ſalts, have the power of cryſtallizing, that is, of arranging their particles ſo as to form regularly-ſhaped bodies, called *cryſtals;* when the water ſuperfluous to their concrete exiſtence has been evaporated.

Salts of various ſorts are found already formed in nature, but a great many others are made by art, and even ſeveral of the natural ones may be imitated. We ſhall only conſider thoſe ſalts, either natural or artificial, which are moſtly uſed.

The vitriolic acid, when combined with other ſubſtances, forms vitriolic ſalts, which vary both in ſpecific names and properties, according to the various ſubſtances with which the acid is combined. Thus the vitriolic acid, combined with mineral alkali, forms the ſalt called *Glauber's ſalt*, or *ſal mirabile*. When it is combined with calcareous earths, it forms vitriolic ſalts with baſes of calcareous earth, which are commonly called *ſelenites*. When combined with argillaceous earths, it forms alum. When combined with metals, it forms vitriolic ſalts with metallic baſes, to which the general name *vitriols* is given; and in commerce are commonly called *copperas*. The vitriols principally uſed are, 1. The martial vitriol; called alſo *Engliſh vitriol, green vitriol*, or *green copperas*, which is a combination of vitriolic acid with iron. 2. The vitriol of copper, called alſo *blue vitriol, Cyprian vitriol*, or *blue copperas;* which is a combination of vitriolic acid and copper. 3. The vitriol of zinc, called alſo *white copperas*, and *Goſlar vitriol;* which is a combination of the ſame acid with a ſemi-metal called *zinc*. It is a property peculiar to the vitriolic acid, that all the combinations of it, with thoſe ſubſtances with which it can form neutral ſalts, are ſuſceptible of cryſtallization.

The nitrous acid, combined with all the ſubſtances with which it can mix, forms ſaline ſubſtances, in general called *nitrous ſalts;* ſpecifying each particular ſalt by the name of the ſubſtance united to the acid. Thus nitrous acid, with fixed vegetable alkali, forms a ſaline ſubſtance called *nitre*, or *ſaltpetre*. With mineral alkali, forms cubic or quadrangular nitre. When mixed with metallic ſubſtances, forms metallic nitres, which are ſpecified *nitre of gold; nitre of ſilver*, or *lunar nitre, lunar cryſtals*, and *cryſtals of ſilver, nitrous cryſtals of mercury; nitre of copper*, &c.

The marine acid, combined with various matters, forms marine ſalts, or ſimply ſalts, ſpecified by the names of their particular baſes. The ſea-ſalt, or kitchen ſalt, and ſal gem, are combinations of marine acid and mineral alkali. When this acid is combined with volatile alkali, it forms ſal ammoniac (A). With metals it forms metallic ſalts, called *ſalt of gold, ſalt of copper*, &c. according to the various metals combined with the acid. The ſalt of ſilver is alſo called *luna cornea;* the ſalt of lead is often called *plumbum corneum;* and the ſalts of antimony, and of arſenic, are known by the names of *butter of antimony*, and *butter of arſenic*.

The acid of tartar (the pureſt part of which, or that ſaline ſubſtance which firſt cryſtallizes, by evaporation, in the veſſels in which it is purified, is called *cream of tartar*), and alſo all other concrete vegetable acids analogous to it, when mixed with various other ſubſtances, form compounds, generally called *tartareous ſalts*, or *ſoluble tartars*, becauſe they are diſſolved by water more eaſily than the acid of tartar itſelf.

Acetous ſalts, that is, all ſalts containing the acid of vinegar, are alſo combined with various baſes, and form ſaline ſubſtances of different names; the principal of which are, the acetous ſalt of copper, called *cryſtals of Venus, or of verdigriſe*, by the chemiſts, and *diſtilled* or *cryſtallized verdigriſe* in commerce; the acetous ſalt of lead, commonly called *ſalt* or *ſugar of lead;* and the acetous mercurial ſalts.

Sugar is an eſſential vegetable ſalt, of a pleaſant ſweet taſte, containing a vegetable acid combined with earth and oil.

Potaſh is a fixed vegetable alkali, extracted from the aſhes of wood. Concrete volatile alkalies are generally called *volatile ſalts;* although this name is ſometimes alſo given to the volatile ſalt of amber, which is not an alkaline, but an acid ſalt.

Borax is a neutral ſaline matter, whoſe origin, whether animal or vegetable, is as yet unknown, its components being not ſufficiently examined. It is ſoluble in water, and very nearly as cryſtallizable as alum. When borax is expoſed to the fire, it firſt bubbles and foams very much, but afterwards it melts into a clear glaſs. When acids are combined with the alkaline part of borax, a ſubſtance of a ſingular nature is ſeparated from it, commonly called *ſedative ſalt*. Altho' this ſubſtance acts as an acid in borax, by ſaturating its alkali, yet it has no acid taſte, nor doth it turn the tincture of heliotropium to a red, as other acids do. It is the property of borax to facilitate conſiderably the fuſion of metals, of earths, and other minerals. Some ſpecies of ſtones and earths cannot be vitrified at all, except they are mixed with borax. For this property borax is commonly uſed as a flux (that is, a ſubſtance which facilitates the fuſion of other bodies) in various manufactories; but eſpecially in ſoldering metals, and in aſſaying ores.

Phoſphoric ſalts are combinations of alkaline, earthy, and metallic ſubſtances with the acid obtained from the phoſphorus of urine.

Beſides the above-mentioned ſalts, there are ſeveral others to be met with in the writings of the chemical and medical authors; but, as they are of little conſequence, we ſhall omit any account of them.

Sandemanians.

SANDEMANIANS, in eccleſiaſtical hiſtory, a modern ſect that originated in Scotland about the year 1728; where it is at this time diſtinguiſhed by the name of *Glaſſites*, after its founder Mr John Glaſs, who was a miniſter of the eſtabliſhed church in that

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(A) Ammoniacal ſalts is alſo a general name given to all neutral ſalts compoſed of an acid ſaturated with a volatile alkali.

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kingdom ; but being charged with a deſign of ſubverting the national covenant, and ſapping the foundation of all national eſtabliſhments by the kirk judicatory, was expelled by the ſynod from the church of Scotland. His ſentiments are fully explained in a tract publiſhed at that time, intitled, "The Teſtimony of the King of Martyrs," and preſerved in the firſt volume of his works. In conſequence of Mr Glaſs's expulſion, his adherents formed themſelves into churches conformable in their inſtitution and diſcipline to what they apprehended to be the plan of the firſt churches recorded in the New Teſtament. Soon after the year 1755, Mr Robert Sandeman, an elder in one of theſe churches in Scotland, publiſhed a ſeries of letters addreſſed to Mr Hervey, occaſioned by his Theron and Aſpaſio; in which he endeavours to ſhow, that his notion of faith is contradictory to the ſcripture account of it, and could only ſerve to lead men, profeſſedly holding the doctrines commonly called *Calviniſtic*, to eſtabliſh their own righteouſneſs upon their frames, inward feelings, and various acts of faith. In theſe letters Mr Sandeman attempts to prove, that faith is neither more nor leſs than a ſimple aſſent to the divine teſtimony concerning Jeſus Chriſt, recorded in the New Teſtament ; and he maintains, that the word *faith*, or *belief*, is conſtantly uſed by the apoſtles to ſignify what is denoted by it in common diſcourſe, viz. a perſuaſion of the truth of any propoſition, and that there is no difference between believing any common teſtimony, and believing the apoſtolic teſtimony, except that which reſults from the nature of the teſtimony itſelf. This led the way to a controverſy, among thoſe who were called *Calviniſts*, concerning the nature of juſtifying faith ; and thoſe who adopted Mr Sandeman's notion of it, and who took the denomination of *Sandemanians*, formed themſelves into church order, in ſtrict fellowſhip with the churches in Scotland, but holding no kind of communion with other churches. The chief opinions and practices in which this ſect differs from other Chriſtians, are, their weekly adminiſtration of the Lord's Supper ; their love-feaſts, of which every member is not only allowed but required to partake, and which conſiſt of their dining together at each other's houſes in the interval between the morning and afternoon ſervice ; their kiſs of charity uſed on this occaſion, at the admiſſion of a new member, and at other times, when they deem it to be neceſſary or proper ; their weekly collection before the Lord's Supper, for the ſupport of the poor, and defraying other expences ; mutual exhortation ; abſtinence from blood and things ſtrangled ; waſhing each other's feet, the precept concerning which, as well as other precepts, they underſtand literally ; community of goods, ſo far as that every one is to conſider all that he has in his poſſeſſion and power as liable to the calls of the poor and church, and the unlawfulneſs of laying up treaſures on earth, by ſetting them apart for any diſtant, future, and uncertain uſe. They allow of public and private diverſions, ſo far as they are not connected with circumſtances really ſinful ; but apprehending a lot to be ſacred, diſapprove of playing at cards, dice, &c. They maintain a plurality of elders, paſtors, or biſhops, in each church ; and the neceſſity of the preſence of two elders in every act of diſcipline, and at the adminiſtration of the Lord's Supper. In the choice of theſe elders, want of learning, and engagements in trade, &c. are no ſufficient objection ; but ſecond marriages diſqualify for the office ; and they are ordained by prayer and faſting, impoſition of hands, and giving the right hand of fellowſhip. In their diſcipline they are ſtrict and ſevere ; and think themſelves obliged to ſeparate from the communion and worſhip of all ſuch religious ſocieties as appear to them not to profeſs the ſimple truth for their only ground of hope, and who do not walk in obedience to it. We ſhall only add, that in every church tranſaction, they eſteem unanimity to be abſolutely neceſſary. From this abſtract of the account which they have publiſhed of their tenets and practices, it does not ſeem to be probable that their number ſhould be very conſiderable.

Sapota ‖ Saſſafras.

SAPOTA, in botany. See ACHRAS in this APPENDIX.

SARPLAR *of* WOOL, a quantity of wool, otherwiſe called a *pocket*, or *half-ſack* ; a ſack containing 80 tod ; a tod two ſtone ; and a ſtone 14 pounds. —In Scotland it is called *ſarpliath*, and contains 80 ſtone.

SASSAFRAS, a ſpecies of LAURUS ; ſee LAURUS, (*Encycl.*). In Penſylvania and other parts of North America, it grows in a dry looſe ground, of a pale brick colour, which conſiſts for the moſt part of ſand mixed with clay. This tree ſpreads its roots very much, and new ſhoots come up from them in ſome places ; but theſe ſhoots are not good for tranſplanting, becauſe they have ſo few fibres beſides the root which connects them to the main ſtem, that they cannot well ſtrike into the ground. If, therefore, any one would plant ſaſſafras trees, he muſt endeavour to get their berries ; which, however, is difficult, ſince the birds eat them before they are half ripe. The cows are very greedy after the tender new ſhoots, and look for them every where.

The bark of this tree is uſed by the women here in dying worſted a fine laſting orange-colour, which does not fade in the ſun. They uſe urine inſtead of alum in dying ; and boil the dye in a braſs boiler, becauſe in an iron veſſel it does not yield ſo fine a colour.

The wood is made uſe of for poſts belonging to the encloſures, for it is ſaid to laſt a long time in the ground : but it is likewiſe ſaid, that there is hardly any kind of wood which is more attacked by worms than this, when it is expoſed to the air without cover ; and that in a ſhort time it is quite worm-eaten through and through. On cutting ſome part of the ſaſſafras tree, or its ſhoots, and holding it to the noſe, it has a ſtrong but pleaſant ſmell. Some people peel the root, and boil the peel with the beer which they are brewing, becauſe they believe it wholeſome. For the ſame reaſon, the peel is put into brandy, either whilſt it is diſtilling, or after it is made. Profeſſor Kalm informs us, that a decoction of the root of ſaſſafras in water, drank every morning, is uſed with ſucceſs in the dropſy.

Kalm's Travels in America.

When part of a wood is deſtined for cultivation, the ſaſſafras trees are commonly left upon it, becauſe they have a very thick foliage, and afford a cool ſhade to the cattle during the great heats. Some people get their bed-poſts made of ſaſſafras wood, in order to expel the bugs; for its ſtrong ſcent, it is ſaid, prevents thoſe vermin from ſettling in them. For two or three years together this has the deſired effect; or about as long as the wood keeps its ſtrong aromatic ſmell; but after that time it has been obſerved to loſe its effect. In Penſylvania ſome people put chips of ſaſſafras into their cheſts, where they keep all ſorts of woollen ſtuffs, in order to expel the moths (or larvæ or caterpillars of moths or tinies) which commonly ſettle in them in ſummer. The root keeps its ſmell for a long while: our author ſaw one which had lain five or ſix years in the drawer of a table, and ſtill preſerved the ſtrength of its ſcent. The people here alſo gather its flowers, and uſe it as tea.

The ſaſſafras-tree generally ſtands ſingle in the woods, and along the fences round the fields. It flowers in May before the leaves come out; and being entirely covered with them, it is diſtinguiſhed at a great diſtance by their beautiful yellow colour.

SCALDS, in the hiſtory of literature, a name given by the ancient inhabitants of the northern countries to their poets; in whoſe writings their hiſtory is recorded.

SCARBOROUGH, (*Encycl.*) The waters of Scarborough are chalybeate and purging. Of theſe there are two wells, both impregnated with the ſame principles, in different proportions; though the purging well is the moſt celebrated, and the water of this is uſually called the *Scarborough water*. When theſe waters are poured out of one glaſs into another, they throw up a number of air-bubbles; and if they are ſhook for ſome time in a phial cloſe ſtopped, and the phial be ſuddenly opened before the commotion ceaſes, they diſplode an elaſtic vapour, with an audible noiſe, which ſhows that they abound in fixed air. At the fountain they have a briſk, pungent, chalybeate taſte; but the purging water taſtes bitteriſh, which is not uſually the caſe with the chalybeate one. They loſe their chalybeate virtues by expoſure and by keeping; but the purging water the ſooneſt. They both putrefy by keeping; but in time recover their ſweetneſs. Four or five half pints of the purging water drank within an hour, give two or three eaſy motions, and raiſe the ſpirits. The like quantity of the chalybeate purges leſs, but exhilarates more, and paſſes off chiefly by urine. Theſe waters have been found beneficial in hectic fevers, weakneſſes of the ſtomach, and indigeſtion; in relaxations of the ſyſtem; in nervous, hyſteric, and hypochondriacal diſorders; in the green ſickneſs, ſcurvy, rheumatiſm, and aſthmatic complaints; in gleets, the fluor albus, and other preternatural evacuations; and in habitual coſtiveneſs

SCHOONER, in ſea-language, a ſmall veſſel with two maſts, whoſe main-ſail and fore-ſail are ſuſpended from gaffs, reaching from the maſt towards the ſtern, and ſtretched out below by booms, whoſe foremoſt ends are hooked to an iron, which claſps the maſt, ſo as to turn therein as upon an axis, when the after-ends are ſwung from one ſide of the veſſel to the other.

SENSE, MORAL, is a determination of the mind to be pleaſed with the contemplation of thoſe affections, actions, or characters, of rational agents, which we call *good* or *virtuous*.

This moral ſenſe of beauty in actions and affections, may appear ſtrange at firſt view: ſome of our moraliſts themſelves are offended at it in lord Shafteſbury, as being accuſtomed to deduce every approbation, or averſion, from rational views of intereſt. Our gentlemen of good taſte can tell us of a great many ſenſes, taſtes, and reliſhes, for beauty, harmony, imitation in painting and poetry; and may we not find too, in mankind, a reliſh for a beauty in characters, in manners? The truth is, human nature does not ſeem to have been left quite indifferent in the affair of virtue, to form to itſelf obſervations concerning the advantage or diſadvantage of actions, and accordingly to regulate its conduct. The weakneſs of our reaſon, and the avocations ariſing from the infirmities and neceſſities of our nature, are ſo great, that very few of mankind could have framed thoſe long deductions of reaſon, which may ſhow ſome actions to be, in the whole, advantageous, and their contraries pernicious. The Author of Nature has much better furniſhed us for a virtuous conduct than our moraliſts ſeems to imagine, by almoſt as quick and powerful inſtructions as we have for the preſervation of our bodies: he has made virtue a lovely form, to excite our purſuit of it; and has given us ſtrong affections, to be the ſprings of each virtuous action. See MORAL *Philoſophy*, (*Encycl.*)

SENSE, *Public*, is defined to be our determination to be pleaſed with the happineſs of others, and to be uneaſy at their miſery. This, he ſays, is found in ſome degree in all men, and was ſometimes called κοινονοημοσυνη, or *ſenſus communis*, by ſome of the ancients.

SENSE, *Common*, is a term that has been variouſly uſed both by ancient and modern writers. With ſome it has been ſynonymous with public ſenſe; with others it has denoted prudence: in certain inſtances, it has been confounded with ſome of the powers of taſte; and, accordingly, thoſe who commit egregious blunders with regard to decorum, ſaying and doing what is offenſive to their company, and inconſiſtent with their own character, have been charged with a defect in common ſenſe. Some men are diſtinguiſhed by an uncommon acuteneſs in diſcovering the characters of others; and this talent has been ſometimes called *common ſenſe*: ſimilar to which is that uſe of the term, which makes it to ſignify that experience and knowledge of life which is acquired by living in ſociety. To this meaning Quintilian refers, ſpeaking of the advantages of a public education: *Senſum ipſum qui communis dicitur, ubi diſcet, cum ſe a congreſſu, qui non hominibus ſolum, ſed mutis quoque animalibus naturalis eſt, ſegregarit?* Lib. i. cap. 2.

But the term *common ſenſe* hath in modern times been uſed to ſignify that power of the mind which perceives truth, or commands belief, not by progreſſive argumentation, but by an inſtantaneous, inſtinctive, and irreſiſtible impulſe; derived neither from education nor from habit, but from nature; acting independently of our will, whenever its object is preſented, according to an eſtabliſhed law, and therefore called *ſenſe*; and acting in a ſimilar manner upon all, or at leaſt upon a great majority of mankind, and therefore called *common ſenſe*. The firſt among the moderns, who took notice of this principle as one of the ſprings of our knowledge, was Buffier, a French philoſopher of the preſent century, in a book entitled *Traité des premières verites*; and this doctrine hath lately, in

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our own country, been illuſtrated and maintained by Drs Reid, Beattie, Oſwald, and Campbell.

In order to evince, that there is a real and eſſential difference between this faculty and that of reaſon, it is obſerved, that we are conſcious, from internal feeling, that the energy of underſtanding, which perceives intuitive truth, is different from that other energy which unites a concluſion with a firſt principle, by a gradual chain of intermediate relations: that we cannot diſcern any neceſſary connection between reaſon and common ſenſe: that the one is more in our power than the other; the faculty of reaſoning being improveable by culture; whereas common ſenſe, like other inſtincts, arrives at maturity with almoſt no care of ours, and it is impoſſible to teach common ſenſe to one who wants it; though this, like other inſtincts, may languiſh for want of exerciſe: and that a diſtinction, ſimilar to that which is here maintained, is acknowledged by the vulgar, who ſpeak of mother-wit, as ſomething different from the deductions of reaſon, and the refinements of ſcience. All ſound reaſoning, it is ſaid, muſt ultimately reſt on the principles of common ſenſe; that is, on principles intuitively certain, or intuitively probable; and, conſequently, common ſenſe it the ultimate judge of truth, to which reaſon muſt continually act in ſubordination. Thus the advocates for this faculty, as an original and diſtinct power of the human mind, aſſign to it a very extenſive empire, and an authority that is ſupreme and abſolute. And they have proceeded ſo far, as to ſubſtitute in the room of Mr Locke's *abſtraction*, this faculty, as the characteriſtic of rationality. To this they refer the evidence of mathematical truth, of external and internal ſenſe, of memory, of reaſoning from the effect to the cauſe, of probable or experimental reaſoning, of analogical reaſoning, of faith in teſtimony, and, indeed, of all primary truths. To common ſenſe, therefore, all truth muſt be conformable; this, they ſay, is its fixed and invariable ſtandard. And whatever contradicts common ſenſe, or is inconſiſtent with that ſtandard, though ſupported by arguments that are deemed unanſwerable, and by names that are celebrated by all the critics, academies, and potentates on earth, is not truth, but falſehood. In a word, the dictates of common ſenſe are, in reſpect to human knowledge, in general, what the axioms of geometry are in reſpect to mathematics: on the ſuppoſition that theſe axioms are falſe or dubious, all mathematical reaſoning falls to the ground; and on the ſuppoſition that the dictates of common ſenſe are erroneous or deceitful, all truth, virtue, and ſcience, are vain. And hence it appears, that according to this ſyſtem, common ſenſe is not only the teſt of truth, but the ſtandard of moral obligation. See Reid's Enquiry into the Human Mind, on the Principles of *Common Senſe*, 8vo, ed. 2. 1765. Beatties Eſſay on the Nature and Immutability of Truth, 8vo, ed. 2. 1771. Oſwald's Appeal to *Common Senſe* in behalf of Religion, 8vo, ed. 2 1768 Campbell's Philoſophy of Rhetoric, 8vo, 1776, vol. i. p. 109, &c.

This ſyſtem has been attacked by Dr Prieſtley; who has again been replied to (by Dr Blacklock, if we are not miſinformed) in a late periodical publication at Edinburgh. See Prieſtley's Examination of Reid, Beattie, and Oſwald; alſo Edinburgh Magazine and Review for the year 1775.

Serpents.

SERPENTS, (*Encycl.*) Serpents ſtrike mankind, and other animals, with ſuch terror upon account of their poiſon and ſome ſingular properties which elude all the diſtinction of our judgment, that their unexpected approach alarms even the moſt determined courage. Among the amphibia ſerpentes we find ſome genera endued with a very ſingular quality, whereby they differ from all others: the greater part of them live indifferently by land or water, many of them for one half the year ſleep in their winter-quarters to all appearance dead: their reſpiration differs very much from that of birds and the Mammalia; they draw in air without any reciprocal expiration, at leaſt a ſenſible one: their bodies are of a very rigid nature, abounding with blood, which poſſeſſes a very ſmall degree of heat: the organs of generation in the male are double; a ſingularity occurring in no other animal, unleſs perhaps a few inſects: their natural ſounds are hoarſe, their aſpects ugly, their ſmell fetid. Some of them are oviparous, others viviparous; and by their having cartilaginous bones, every ſpring they ſhake off their old age in the manner of the crab; ſo that there is no definitive bound to their increaſe and magnitude. Their ſingular mode of taking their prey alſo deſerves to be mentioned: being deſtitute of feet, and conſequently not able to purſue it, they lie hidden under the cover of large ſtones and the roots of trees, and darting forward with a ſudden ſpring upon any animal which paſſes by, ſeize and devour it. Travellers into India inform us, that the Boa *conſtrictor*, the greateſt of all ſerpents, lies in ambuſh among ſhrubs, and ſeizing hares, ſtags, and other animals, ſuffocates them by rolling himſelf round them, and then covering them with his ſaliva, ſwallows them. Theſe animals, as they very ſeldom happen of capture, and beſide are not furniſhed with real and proper grinding teeth, have not their jawbones jointed with the ſame articulation as other animals, but only connected at the baſe with a ligament; ſo that by expanding them they are able to devour the body of an animal of twice their thickneſs, or even more: Thus Cleijer relates, that the boa of Java will devour a whole buffalo, and other travellers affirm that he is able to ſwallow a ſtag. Our own vipers are frequently ſeen with their bellies greatly ſwelled out; and being diſſected, they will be found to contain a frog or a mouſe. A writer in the Amœnitates Academicæ, informs us, that he once diſcovered ſeven young birds in the ſtomach of a viper.

The American rattleſnake is the moſt indolent of all the ſerpents: As he lies under the ſhade of a tree, opening his jaws a little, he fixes his eyes, which glitter very brightly upon any bird or ſquirrel which is in it: they are endued with a wonderful power of faſcination; the ſquirrel utters a mournful and feeble cry, and, as if foreſeeing his fate, leaps from bough to bough on every ſide, ſeemingly to attempt a ſudden eſcape; but ſtruck with an unknown ſpecies of faſcination, he comes down from the tree, and flings himſelf with a ſpring into the very jaws of his enemy. A mouſe, having been ſhut up with one of theſe faſcinating rattle-ſnakes in an iron box, the mouſe ſat in one corner, and the rattle-ſnake was oppoſite to it; and fixing

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his eyes continually upon it, by his look alone it was at laſt forced to fling itſelf into the mouth of the ſerpent. The ſame experiment was repeated in Italy with a pregnant female viper with the ſame ſucceſs; and do we not ſee in the ſummer a parallel inſtance at home in the toad, a moſt indolent animal, into whoſe mouth, as it lies in the ſhade or under a ſhrub, butterflies and other inſects fly?

Weapons. No ſubject has excited more philoſophical controverſy than the poiſon of ſerpents, with regard to its nature and mode of operating. Antiquity has not been ſparing in conjecture and fiction upon this ſubject, and its errors have been retained with the moſt reverential obſtinacy by the vulgar: among theſe we are to reckon the fictitious ſting fixed in the tail of the ſerpent, as the painters ſometimes have groundleſsly enough repreſented it; ſome have invented a ſimilar fiction of a black forked tongue, which the ſerpent vibrates on both ſides, and have aſcribed its power of producing ſuch noxious effect to this; while others, affecting an air of ſuperior diſcernment, have, upon equally good reaſons, aſcribed it to the teeth in general: theſe are all errors of a magnitude that the moſt deſultory attention to the ſubject would have been ſufficient to have removed. There is a very ſmall bone cloſely fixed to the upper jaw, in the inſide of the lip of a poiſonous ſerpent, which has a power of moving backward or forward; to this two or three fangs are annexed larger than the teeth, which the ſerpent, by its aſſiſtance, when enraged, darts forward, or withdraws and conceals at his pleaſure, in a ſimilar manner to the claws of a cat: theſe fangs, which the common people name the large teeth of the ſerpent, are excellently deſcribed by Tyſon, in the anatomy of the rattleſnake, which he has given in the Philoſophical Tranſactions. "In theſe (the fangs) we obſerved a conſiderable cavity near the baſe; and near the point a very diſcernible fiſſure of ſome length like the ſlit of a pen: the part of the tooth from the fiſſure to the root was manifeſtly channelled, which we firſt diſcovered by lightly preſſing the gums; we then ſaw the poiſon aſcend through the cavity of the fang and flow out of the fiſſure; and as theſe fangs are ſo very acute, ſo firm and ſolid toward the point (the fiſſure being on the external and convex, not the internal ſide), nothing could be conceived more convenient either for inflicting a wound, or to inſure the infuſion of the poiſon." Each of the fangs is ſurrounded with a veſicle furniſhed with glands ſecreting a certain fluid; which, upon the veſicle being preſſed, ſeems to flow out of the point of the fang. The ſerpent when incenſed, raiſing his head, extends the ſmall bone armed with the fangs mentioned above; and attacking his enemy with a force combined of the weight of his body and the action of the muſcles, he wounds him with the expanded fangs, and the veſicle being compreſſed the poiſon immediately flows into the wound: this is clear from the experience of thoſe who, having broken off their fangs with a pair of forceps, handled the ſerpent thus diſarmed without any hurt. And as the North Americans, after carefully extracting theſe venomous fangs, ſuffer the rattleſnake to bite and gnaw them with his teeth till the blood flows freely, with total impunity; it is certain thoſe people are deceived who attribute the fatal effects of his bite to thoſe hurtleſs weapons.

Serpents.

Poiſon. Antiquity amuſed itſelf with a fable deſtitute of all appearance of truth, that anger was excited by black bile: they applied this fiction without heſitation to the preſent ſubject, and founded an hypotheſis upon it to account for the effects of the bite of an incenſed ſerpent; pretending to have diſcovered an ideal canal which conducted the bile from its veſicle to the mouth of the ſerpent, whence it flowed into the part bitten, and produced the moſt fatal ſymptoms. But toward the end of the laſt century, this ſubject was greatly illuſtrated under the auſpices of Ferdinand the Second, Great Duke of Tuſcany: This prince, deſirous of inquiring into that myſterious queſtion, the nature of ſerpents, invited Steno, Rhedi, and ſome other philoſophers of the firſt eminence, to his court; and a multitude of the moſt poiſonous ſerpents being collected, Rhedi made ſeveral experiments upon them, which diſcovered to him a number of particulars before unknown; of which the following ſeem to have the beſt claim to our attention. When he either cauſed a living viper to bite a dog, or wounded him with the teeth of one newly dead (the poiſonous veſicle remaining unbroken), the event was the ſame. If the bite was repeated, its effect became weaker, and at laſt was loſt, the poiſon contained in the veſicle being totally exhauſted. That the teeth of ſerpents, when extended to bite, were moiſtened over with a certain liquor; and when the veſicle at the baſe was preſſed, a drop of poiſon flowed to the point of the fang. When the poiſon thus flowing from the veſicle was received in ſoft bread or a ſpunge, an animal bitten by the ſerpent received no more harm from the wound than from being pricked by a needle, till after a few days, when the venom was reſtored afreſh: but when an animal was wounded with the point of a needle dipped in the poiſon, it was tormented with the ſame pains as if it had been bitten by the viper itſelf. Preſerving ſome of this poiſon in a glaſs, and totally evaporating the moiſture in the ſun, when the reſiduum was diluted again with water, and the point of a needle dipped in the ſolution, Rhedi found to his great ſurpriſe that it had the ſame effect as when recent. But the boldneſs of Tozzi, one who charmed vipers, flung all theſe men who were deeply verſed in natural philoſophy into the utmoſt aſtoniſhment; they happening to fall into diſcourſe (while the prince was preſent) upon the certain death which would attend any perſon's ſwallowing this poiſon of the viper by miſtake, inſtead of ſpirit of wine or water; Tozzi, confiding in his art, drank a conſiderable portion of it without heſitation: they were all aſtoniſhed at his apparent raſhneſs, and predicted inſtant death to the man; however, he eſcaped as ſafely as if he had drunk only ſo much water. This event, which ſtruck the prince and his illuſtrious aſſociates in theſe philoſophical inquiries by its novelty, was well known to the ancients. Lucan, in the 9th book of the Pharſalia, ſpeaking of the ſerpent, ſays,

Noxia ſerpentum eſt admiſto ſanguine peſtis
Morſu virus habent, et fatum dente minantur,
Pocula morte carent. Phar. l. 9, v. 614.

Mixed with the blood that venom ſlays alone,
His bite is poiſon, death is in his fang;
Yet is the draught innoxious.

Nor muſt we omit obſerving, that barbarous nations are perfectly acquainted with the property of the poiſon of ſerpents by which it retains its deadly power after it has been long kept: they have been poſſeſſed of this fatal ſecret for ages paſt; it being their cuſtom to tinge the points of their arrows with the juice of ſpurge, putrid fleſh, or oil of tobacco, but more particularly with the poiſon of vipers. Some modern Indians continue the practice to this day; and we have the teſtimony of Pliny, in his Natural Hiſtory, that the Scythians had long ago the ſame cuſtom: "The Scythians (ſays that author) dip their arrows in the poiſon of vipers and human blood; a horrid practice, as the ſlighteſt wound inflicted by one of them defies all the art of medicine."

While Rhedi and his aſſociates were thus buſied in Tuſcany in tracing the footſteps of nature cloſely and and ſucceſsfully under the guidance of experiment, the philoſophers of other countries amuſed themſelves with forming new conjectures and fictions. In France, Moſes Charas, firſt ſurgeon to the king, a man of conſiderable reputation, writing upon the theory of ſerpents, endeavoured with all his weight to prove their poiſon "to conſiſt in heated animal-ſpirits, and therefore that it is impoſſible for a viper to give a deadly wound unleſs it had been before incenſed." We ſhall not go about to deny, that the mental affections can generate ſomething ſimilar to a poiſon. The face of a man in anger, changed to a ſublivid colour, indicates ſomething like it: men ſtruck with a ſudden terror frequently turn pale, and the humours lodged in the inteſtinal canal are evacuated by a diarrhœa. But this is evidently diſcovered in nurſes, whoſe milk becomes poiſonous when they are greatly irritated; and if it be then taken by a child, provokes a diarrhœa, which frequently terminates fatally. But however this may be, the hypotheſis of Charas can receive but little ſupport from it; as that vague doctrine of animal ſpirits and their irritation, however it might afford a commodious and decent retreat to ignorance formerly, is now ſuffered to ſubſide in a very undiſturbed oblivion.

Bite. The ſymptoms that attend the bite of the viper are a ſmarting in the part wounded, as if it were continually pricked with needles; ſwelling, paleneſs, ſnapping of the eyes, tears, horror with coldneſs; a weak pulſe, afterwards becoming unequal; thirſt, cold ſweat, pain in the reins, diarrhœa with griping and vomiting, difficulty of breathing, drowſineſs, and convulſions which terminate in death.

We are ignorant of what ſpecies the hemorrhois was, which is deſcribed by Lucan as cauſing by its bite a flux of blood from every part of the body. But the bite of an American ſerpent named *de la crux* kills in the ſame manner.

The dipſaſas is at preſent likewiſe unknown. Lucan informs us, that the perſon wounded by it was attacked by an unquenchable thirſt. This is finely painted by him; where A. Tuſcus, ſtandard-bearer of Cato, is deſcribed as bitten by that ſerpent:

Non decus imperii, non mœſti jura Catonis
Ardentem tenuere virum, quin ſpargere ſigna
Auderet, totiſque furens exquireret agris
Quas poſcebat aquas ſitiens in corde venenum.
Pharſal. l. 9.

His wild impatience, not his honoured ſtate,
Nor ſorrowing Cato's high command, reſtrain;
Furious, diſhonoured in the duſt, he flings
His ſacred eagle, and o'er all the fields
Rapid he burſts to ſeek the cooling ſtream,
To quench the thirſty poiſon in his breaſt.

And a few verſes after:

Scrutatur venas penitus ſqualentis arenæ
Nunc redit ad Syrtes, et fluctus accipit ore,
Aquoreaſque placet, ſed non ſibi ſufficit humor,
Nec ſentit fatique genus, mortemque veneni,
Sed putat eſſe ſitim; ferroque aperire tumentes
Suſtinuit venas, atque os implere cruore.

Now tearing up the ſands, ſome latent vein
Fruſtrate he ſeeks; now to the Syrtes ſhore
Return'd, he ſwallows down the briny flood
Mixed with its rolling ſands; nor knows his fate
And the ſad poiſon's death, but calls it thirſt;
Then with his ſword opens his ſpouting veins,
And drinks the burſting blood.——

In the monuments of antiquity we find three ſpecies of aſps.

1. The phytas, with a callous caruncle on its forehead: its colour is cinereous, with a ſhining green.

2. The cherſea, is very long, cinereous, inclining to green; its eyes red.

3. The chelidonia is black, with a white belly: its bite is ſaid to produce two or three hiccoughs, change of colour, ſtupor, cold, and ſleep with palpitation. Upon a compariſon of what theſe authors have written upon theſe aſps, it ſeems probable that the phytas, which kills by bringing on a lethargic ſleepineſs, is the ſame ſerpent which obtained the ſpecific name of the *aſpis* among the ancients, and that it is the nintipolonga Zeylanica of Bellonius and Ray, and the Amodytes of Linnæus. The phytas ſeems to have been the ſerpent made uſe of by Cleopatra to deſtroy herſelf. This woman, to terminate a diſſipated life with an eaſy death, ordered her phyſicians to prepare a poiſon for her which might beſt effect this purpoſe. They having tried a number of different experiments upon condemned criminals, at laſt diſcovered this ſpecies of aſp, which brings on death without any previous appearance of diſtemper or hiccough: the face ſeems in a ſlight perſpiration, an eaſy inſenſibility and lethargy creeps upon the whole frame, and the perſon bitten ſeems almoſt totally ignorant of his approaching diſſolution. Having acquainted the queen with their diſcovery, ſhe applied the aſp either to her boſom or her arms; or, according to ſome authors, dipping the point of a needle in the poiſon, and pricking herſelf with it, ſhe expired in an eaſy ſleep. Moſt of the COLUBRI are poiſonous, and perhaps all the CROTALI: among theſe are reckoned

Vipera,
Berus,
Lebetinus,
Naja,
Dipſas,
Atropos,
Cherſea,
Severus,
Atrox,
Mycterizans,
Leberis,
Preſter, or black viper,
Stolatus,
Niveus,
Amodytes,
Aſpis,
Lacteus,
Corallinus.

The bite of the naja is ſo fatal, that a man dies by it in the ſpace of an hour, his fleſh entirely falling off his bones in a ſemi-diſſolved putrid ſtate: this makes it probable that it is the ſame ſerpent which the ancients named the *ſepe*. It is not neceſſary to enumerate

rate any more, though a number of different ſpecies might be mentioned whoſe poiſons all produced different effects: yet with this diverſity, according to Rhedi, they all agree in one particular circumſtance, that their venom is not fatal unleſs introduced into the blood externally.

The experiments of Rhedi have not, however, in the opinion of ſome celebrated philoſophers, ſo far cleared the theory of the operation of the poiſon of the viper, as to leave nothing further to be deſired upon that ſubject. Fontana and Carminati have endeavoured to inveſtigate its operations more clearly. Carminati, from eleven experiments, deduces the following concluſions. 1. That if poiſon be inſtilled into a nerve, the animal wounded dies almoſt inſtantly; and the whole nervous ſyſtem, to which it is rapidly conveyed, is deprived of its quality called *ſenſibility*. 2. If a muſcle be wounded, it is deprived of its irritability. This is confirmed by the experiments of Fontana. 3. The poiſon injected into a wounded muſcle or tendon is conſiderably longer in killing an animal than that introduced into a nerve. 4. The ſymptoms which precede the death of the animal bitten are, a ſtupor, lethargy, tremors, convulſions, paralyſis of the legs (part wounded), entire diſſolution of the limbs. The blood is not always coagulated, nor its craſis diſſolved. Marks of inflammation are ſometimes diſcovered in certain parts of the animal after death, ſometimes not: theſe are the effects of ſpaſms and convulſions, not of the poiſon. 5. Not the leaſt ſign of the jaundice was diſcoverable in the eyes of any of the animals upon which Carminati made his experiments. 6. The ſtomach in every one of them was very much inflated; a ſymptom remarked only by Fallopius and Albertini. 7. A ligature applied inſtantly above the part bitten, if it be ſo placed as to admit one, was found by ſome experiments a good preventative againſt the diffuſion of the poiſon: its compreſſion ſhould be conſiderable, but not exceſſive.

Cure. It would be endleſs to attempt to relate all thoſe antidotes which men, compelled by ſo fatal a neceſſity, have employed againſt the bite of ſerpents. We ſhall confine ourſelves only to ſuch as are recommended by the probability of uſe. The firſt in point of antiquity, and which recommends itſelf alſo to us by its certainty, is to draw the venom out of the wounded part as quickly as poſſible. This has been attempted by different methods. The moſt ancient is ſucking it out by the mouth; yet the utmoſt precaution is neceſſary in the perſon who performs this operation, that his mouth be perfectly free from the ſcurvy, and that the ſkin of the fauces be entirely unbroken; leſt he ſhould incur an equal hazard, or perhaps a greater, as the poiſon muſt attack a nobler part. Therefore, as the operation is nauſeous and full of danger, it will be better to ſcarify the part with the knife, that the infected blood may have a freer exit from the opened mouths of the veſſels, and to apply a large cupping-glaſs, by means of which the remaining venom may be extracted; then to foment the part with warm emollient applications, joined with ſome ſpirit, as the ſpirit of ſal ammoniac or theriacum; if theſe be not at hand, apply ſoap and vinegar to the wound: the patient may take ſudorific and exciting medicines internally, by which is meant emetics or ipecacuanha; and the ſtronger ſudorifics are exhibited with great ſucceſs. But the preſent age has added antidotes of three different ſpecies to counteract the moſt vehement effects of this poiſon, of which *Europe*, *America*, and *Aſia*, has each furniſhed us with one.

1. Among the *Europeans*, there has been a ſtrong predilection in favour of the oil of olives, or any other expreſſed oil: this is directed to be drunk plentifully by the patient, to the quantity of half a pound or more, while the wounded part is copiouſly bathed by it. Very full accounts of the happy effects of this treatment are inſerted in the Philoſophical Tranſactions of London, and the Memoirs of the Academy of Paris. We are ſo far from detracting from the merits of this medicine, that we think it ſpecific againſt the bite of the common and black viper; yet we muſt add, that the nature of this antidote is not yet thoroughly inveſtigated and underſtood, and that we dare not pronounce ſentence upon its efficacy and uſe in every ſingle and particular caſe. Linnæus, being in Scania, was applied to by a woman who was bitten by the cherſea; and notwithſtanding he cauſed her to drink this oil according to the preſcribed forms, ſhe nevertheleſs expired in the greateſt agonies. May not this oil fail when applied againſt the bite of ſome of the European ſpecies of ſerpents? or is there not ſome neceſſary obſervations omitted in the formula delivered, either reſpecting the medicine or the patient? This we leave and ſtrongly recommend to the experience of others to determine.

Amœnitates Academicæ, vol. vi.

2. Let us now proceed to the *American* antidotes; of which the powder of the ſenega root deſervedly claims the firſt place. The uſe of this root has been known to the natives of the woods of North America for many ages paſt. Its effects againſt the bite of the rattleſnake almoſt exceed all belief; but the invidious prejudices of thoſe barbarians preſerved this ſecret with ſo obſtinate a ſilence, that no bribe could purchaſe it from them, until Tennent happily diſcovered and publiſhed it for the benefit of mankind. He tells us, that the root of the polygala ſenega never fails of ſucceſs unleſs where ſome large veſſel is wounded, when the medicine has not time to counteract the rapid progreſs of the violence of the poiſon. Upon this ſubject the reader may conſult the Diſſertation upon this plant in the ſecond volume of the Amœnitates Academicæ. A maid-ſervant at Upſal was bitten by a ſerpent upon a very dangerous place. The moſt dreadful ſymptoms followed the bite, and ſuch as demanded the application of the moſt deciſive remedies. Two doſes of the powder of this root was attended with ſo good an effect, that in two days ſhe was almoſt completely recovered. Beſide this root, the Americans have many other plants which they apply upon the ſame occaſion; as the eryngium fœtidum, or American fetid eryngo; aquaticum, or Virginian aquatic ditto; veratrum luteum, or Virginian yellow-flowered veratrum; aletris farinoſa, or floridan aletris; uvularia perfoliata, or Virginian perfoliate uvula; ſanicula canadenſis, or Canadian ſanicle; and the ariſtolochia ſerpentaria, or Virginian ſnake-root: but we ſhall diſmiſs theſe, with a long catalogue of others whoſe virtues are not yet well known to us.

3. We come now to another antidote of equal celebrity, that made uſe of by the *Aſiatics*, which is of

the greateſt antiquity among the Indians, the ophiorrhiza mungos, or Indian ophiorrhiza. Kæmpfer has given us the hiſtory of this plant and its unequalled virtues againſt the bite of the coluber najas, or cobra di capello. We ſhall only hint, that as the efficacy of this medicine is ſo great, it would be much ſafer to introduce that, or the true lignum colubrinum, inſtead of the ſtrychnos colubrina, or Indian ſtrychnos, into general practice, whoſe uſe, if it have any, is extremely ambiguous.

The ſnake-ſtone, called the *pedra de cobras di capello* (as if it were a ſtone extracted from the head of the coluber naja) is very famous throughout all India, and is extolled by Garzia, Kircher, and others, as a ſpecific againſt the bite of ſerpents. It is pretended, that if it be applied to a poiſoned wound, and ſuffered to remain upon it until it fall off of itſelf, that it will extract all the venom. But its uſe has been ſuſpected by many; nor did it ſucceed with Rhedi, who tried a variety of experiments with it. Many have been of opinion that the ſtone is artificial, and nothing more than the calcined horn of a hart. See PSYLLI, (*Encycl.*)

SHAKE, (*Encycl.*) See TRILL, below.

SHELLS, POLISHING OF. This is an art of no long ſtanding in the world in its preſent perfection; and as the love of ſea-ſhells is become ſo common among us, it may not be diſagreeable to the reader to find ſome inſtructions in executing ſo pleaſing a method of adding to their natural beauty, the rules for which are at preſent ſo little known, though the effect of them be ſo much eſteemed.

Among the immenſe variety of ſhells which we are acquainted with, ſome are taken up out of the ſea, or found on its ſhores in all their perfection and beauty; their colours being all ſpread by nature upon the ſurface, and their natural poliſh ſuperior to any thing that art could give. Where nature is in herſelf thus perfect, it were madneſs to attempt to add any thing to her charms: but in others, where the beauties are latent and covered with a coarſer outer ſkin, art is to be called in; and the outer veil being taken off, all the internal beauties appear.

Among the ſhells which are found naturally poliſhed are, the porcelains, or cowries; the caſſanders; the dolia, or conchæ globoſæ, or tuns; ſome buccina, the volutes, and the cylinders, or olives, or, as they are generally though improperly called, the *rhombi;* excepting only two or three, as the tiara, the plumb, and the butter-tub rhombus, where there is an unpromiſing film on the ſurface, hiding a very great ſhare of beauty within. Though the generality of the ſhells of theſe genera are taken out of the ſea in all their beauty, and in their utmoſt natural poliſh, there are ſeveral other genera, in which all or moſt of the ſpecies are taken up naturally rough and foul, and covered with an epidermis, or coarſe outer ſkin, which is in many rough and downy or hairy. The tellinæ, the muſcles, the cochleæ, and many others, are of this kind. The more nice collectors, as naturaliſts, inſiſt upon having all their ſhells in their native and genuine appearance, as they are found when living at ſea; but the ladies, who make collections, hate the diſagreeable outſides, and will have all ſuch poliſhed. It would be very adviſeable, however, for both kinds of collectors to have the ſame ſhells in different ſpecimens both rough and poliſhed: the naturaliſt would by this means, beſides knowing the outſide of the ſhell, be better acquainted with its internal characters than he otherwiſe could be, and the lady would have a pleaſure in comparing the beauties of the ſhell, in its wrought ſtate, to its coarſe appearance as nature gives it. How many elegancies in this part of the creation muſt be wholly loſt to us, if it were not for the aſſiſtance of an art of this kind! Many ſhells in their native ſtate are like rough diamonds, and we can form no juſt idea of their beauties till they have been poliſhed and wrought into form.

Though the art of poliſhing ſhells is a very valuable one, yet it is very dangerous to the ſhells; for without the utmoſt care, the means uſed to poliſh and beautify a ſhell often wholly deſtroy it. When a ſhell is to be poliſhed, the firſt thing to be examined is whether it have naturally a ſmooth ſurface, or be covered with tubercles or prominences.

A ſhell which has a ſmooth ſurface, and a natural dull poliſh, need only be rubbed with the hand, or with a piece of chamoy leather, with ſome tripoli, or fine rotten ſtone, and will become of a perfectly bright and fine poliſh. Emery is not to be uſed on this occaſion, becauſe it wears away too much of the ſhell. This operation requires the hand of an experienced perſon, that knows how ſuperficial the work muſt be, and where he is to ſtop; for in many of theſe ſhells the lines are only on the ſurface, and the wearing away ever ſo little of the ſhell defaces them. A ſhell that is rough, foul, and cruſty, or covered with a tartareous coat, muſt be left a whole day ſteeping in hot water: when it has imbibed a large quantity of this, it is to be rubbed with rough emery on a ſtick, or with the blade of a knife, in order to get off the coat. After this, it may be dipped in diluted aquafortis, ſpirit of ſalt, or any other acid; and after remaining a few moments in it, be again plunged into common water. This will add greatly to the ſpeed of the work. After this it is to be well rubbed with linen cloths, impregnated with common ſoap; and when by theſe ſeveral means it is made perfectly clean, the poliſhing is to be finiſhed with fine emery and a hair-bruſh. If after this the ſhell when dry appears not to have ſo good a poliſh as was deſired, it muſt be rubbed over with a ſolution of gum arabic; and this will add greatly to its gloſs, without doing it any ſort of injury. The gum-water muſt not be too thick, and then it gives no ſenſible coat, only heightening the colours. The white of an egg anſwers this purpoſe alſo very well; but it is ſubject to turn yellow. If the ſhell has an epidermis, which will by no means admit the poliſhing of it, it is to be dipped ſeveral times in diluted aquafortis, that this may be eaten off; and then the ſhell is to be poliſhed in the uſual way with putty, fine emery, or tripoli, on the hair of a fine bruſh. When it is only a pellicle that hides the colours, the ſhells muſt be ſteeped in hot water, and after that the ſkin worked off by degrees with an old file. This is the caſe with ſeveral of the cylinders, which have not the natural poliſh of the reſt.

When a ſhell is covered with a thick and fatty epidermis, as is the caſe with ſeveral of the muſcles and tellinæ; in this caſe aquafortis will do no ſervice, as it will not touch the ſkin: then a rough bruſh and coarſe emery are to be uſed; and if this does not ſucceed, ſeal-ſkin, or, as the workmen call it, *fiſh-ſkin* and *pumice-ſtone*, are to be employed.

When a ſhell has a thick cruſt, which will not give way to any of theſe means, the only way left is to plunge it ſeveral times into ſtrong aquafortis, till the ſtubborn cruſt is wholly eroded. The limpets, auris marina, the helmet-ſhells, and ſeveral other ſpecies of this kind, muſt have this ſort of management; but as the deſign is to ſhow the hidden beauties under the cruſt, and not to deſtroy the natural beauty and poliſh of the inſide of the ſhell, the method of uſing the aquafortis muſt be this: A long piece of wax muſt be provided, and one end of it made perfectly to cover the whole mouth of the ſhell; the other end will then ſerve as a handle, and the mouth being ſtopped by the wax, the liquor cannot get in to the inſide to ſpoil it; then there muſt be placed on a table a veſſel full of aquafortis, and another full of common water.

The ſhell is to be plunged into the aquafortis; and after remaining a few minutes in it, is to be taken out, and plunged into the common water. The progreſs the aquafortis makes in eroding the ſurface is thus to be carefully obſerved every time it is taken out: the point of the ſhell, and any other tender parts, are to be covered with wax, to prevent the aquafortis from eating them away; and if there be any worm-holes, they alſo muſt be ſtopped up with wax, otherwiſe the aquafortis would ſoon eat through in thoſe places. When the repeated dippings into the aquafortis ſhow that the coat is ſufficiently eaten away, then the ſhell is to be wrought carefully with fine emery and a bruſh; and when it is poliſhed as high as can be by this means, it muſt he wiped clean, and rubbed over with gum-water or the white of an egg. In this ſort of work the operator muſt always have the caution to wear gloves; otherwiſe the leaſt touch of the aquafortis will burn the fingers, and turn them yellow; and often, if it be not regarded, will eat off the ſkin and the nails.

Theſe are the methods to be uſed with ſhells which require but a moderate quantity of the ſurface to be taken off; but there are others which require to have a larger quantity taken off, and to be uncovered deeper: this is called entirely ſcaling a ſhell. This is done by means of an horizontal wheel of lead or tin, impregnated with rough emery; and the ſhell is wrought down in the ſame manner in which ſtones are wrought by the lapidary. Nothing is more difficult, however, than the performing this work with nicety: very often ſhells are cut down too far by it, and wholly ſpoiled; and to avoid this, a coarſe vein muſt be often left ſtanding in ſome place, and taken down afterwards with the file, when the cutting it down at the wheel would have ſpoiled the adjacent parts.

After the ſhell is thus cut down to a proper degree, it is to be poliſhed with fine emery, tripoli, or rotten ſtone, with a wooden wheel turned by the ſame machine as the leaden one, or by the common method of working with the hand with the ſame ingredients. When a ſhell is full of tubercles, or protuberances, which muſt be preſerved, it is then impoſſible to uſe the wheel; and if the common way of dipping into aquafortis be attempted, the tubercles being harder than the reſt of the ſhell, will be eat through before the reſt is ſufficiently ſcaled, and the ſhell will be ſpoiled: in this caſe induſtry and patience are the only means of effecting a poliſh. A camel's-hair pencil muſt be dipped in aquafortis; and with this the intermediate parts of the ſhell muſt be wetted, leaving the protuberances dry: this is to be often repeated; and after a few moments the ſhell is always to be plunged into water to ſtop the eroſion of the acid, which would otherwiſe eat too deep, and deſtroy the beauty of the ſhell. When this has ſufficiently taken off the foulneſs of the ſhell, it is to be poliſhed with emery of the fineſt kind, or with tripoli, by means of a ſmall ſtick, or the common poliſhing ſtone uſed by the goldſmiths may be uſed.

This is a very tedious and troubleſome thing, eſpecially when the echinated oyſters and murices, and ſome other ſuch ſhells, are to be wrought: and what is worſt of all is, that when all this labour has been employed, the buſineſs is not well done; for there ſtill remains ſeveral places which could not be reached by any inſtrument, ſo that the ſhell muſt neceſſarily be rubbed over with gum-water or the white of an egg afterwards in order to bring out the colours and give a gloſs; in ſome caſes it is even neceſſary to give a coat of varniſh.

Theſe are the means uſed by artiſts to brighten the colours, and add to the beauty of ſhells; and the changes produced by poliſhing in this manner are ſo great, that the ſhell is often not to be known afterwards for the ſame it was; and hence we hear of new ſhells in the cabinets of collectors, which have no real exiſtence as ſeparate ſpecies, but are the poliſhed appearance of others well known. To caution the reader againſt errors of this kind, it may be proper to add the moſt remarkable ſpecies thus uſually altered.

The onyx-ſhell or volute, called by us the *purple* or *violet-tip*, which in its natural ſtate is of a ſimple pale brown, when it is wrought ſlightly, or poliſhed with juſt the ſuperficies taken off, is of a fine bright yellow; and when it is eat away deeper, it appears of a fine milk-white, with the lower part bluiſh: it is in this ſtate that it is called the *onyx-ſhell*; and it is preſerved in many cabinets in its rough ſtate, and in its yellow appearance, as different ſpecies of ſhells.

The violet ſhells, ſo common among the curious, is a ſpecies of porcelain, or common cowry, which does not appear in that elegance till it has been poliſhed; and the common auris marina ſhows itſelf in two or three different forms, as it is more or leſs deeply wrought. In its rough ſtate it is duſky and coarſe, of a pale brown on the outſide, and pearly within; when it is eaten down a little way below the ſurface, it ſhows variegations of black and green; and when ſtill farther eroded, it appears of a fine pearly hue within and without.

The nautilus, when it is poliſhed down, appears all over of a fine pearly colour; but when it is eaten away but to a ſmall depth, it appears of a fine yellowiſh colour with duſky hairs. The burgau, when entirely cleared of its coat, is of the moſt beautiful pearl-colour: but when once ſlightly eroded, it appears of a variegated mixture of green and red; whence it has been called the *parroquet ſhell*. The common helmet-ſhell, when wrought, is of the colour of the fineſt agate;

Shells.

gate ; and the muſcles, in general, though very plain ſhells in their common appearance, become very beautiful when poliſhed, and ſhow large veins of the moſt elegant colours. The Perſian ſhell, in its natural ſtate, is all over white, and covered with tubercles; but when it has been ground down on a wheel, and poliſhed, it appears of a grey colour, with ſpots and veins of a very bright and highly poliſhed white. The limpets in general become very different when poliſhed, moſt of them ſhowing very elegant colours; among theſe the tortoiſe-ſhell limpet is the principal; it does not appear at all of that colour or tranſparence till it has been wrought.

That elegant ſpecies of ſhell called the *junquil-chama*, which has deceived ſo many judges of theſe things into an opinion of its being a new ſpecies, is only a white chama with a reticulated ſurface; but when this is poliſhed, it loſes at once its reticular work and its colour, and becomes perfectly ſmooth, and of a fine bright yellow; and the violet-coloured chama of New England, when worked down and poliſhed, is of a fine milk-white, with a great number of blue veins, diſpoſed like the variegations in agates.

The aſſes-ear ſhell, when poliſhed after working it down with the file, becomes extremely gloſſy, and obtains a fine roſe-colour all about the mouth. Theſe are ſome of the moſt frequent among an endleſs variety of changes wrought on ſhells by poliſhing; and we find there are many of the very greateſt beauties of this part of the creation, which muſt have been loſt but for this method of ſearching deep in the ſubſtance of the ſhell for them.

The Dutch are very fond of ſhells, and are very nice in their manner of working them: they are under no reſtraint, however, in their works; but uſe the moſt violent methods, ſo as often to deſtroy all the beauty of the ſhell. They file them down on all ſides, and often take them to the wheel, when it muſt deſtroy the very characters of the ſpecies. Nor do they ſtop at this; but, determined to have beauty at any rate, they are for improving upon nature, and frequently add ſome lines and colours with a pencil, afterwards covering them with a fine coat of varniſh; ſo that they ſeem the natural lineations of the ſhell: the Dutch cabinets are by this means made very beautiful, but they are by no means to be regarded as inſtructors in natural hiſtory. There are ſome artificers of this nation who have a way of covering ſhells all over with a different tinge from that which nature gives them; and the curious are often deceived by theſe tricks into the purchaſing them as new ſpecies.

There is another kind of work beſtowed on certain ſpecies of ſhells, particularly the nautilus; namely, the engraving on it lines and circles, and figures of ſtars, and other things: this is too obvious a work of art to ſuffer any one to ſuppoſe it natural. Buonani has figured ſeveral of theſe wrought ſhells at the end of his work; but it is miſerably throwing away labour to do them; the ſhells are ſpoiled as objects of natural hiſtory by it, and the engraving is ſeldom worth any thing. They are principally done in the Eaſt Indies.

Shells are ſubject to ſeveral imperfections; ſome of which are natural, and others accidental. The natural ones are the effect of age, or ſickneſs in the fiſh. The greateſt miſchief happens to ſhells by the fiſh dying in them. The curious in theſe things pretend to be always able to diſtinguiſh a ſhell taken up with the fiſh alive, from one found on the ſhores: they call the firſt a *living*, the ſecond a *dead* ſhell; and ſay that the colours are always much the fainteſt in the dead ſhells. When the ſhells have lain long dead on the ſhores, they are ſubject to many injuries, of which the being eaten by ſea worms is not the leaſt: age renders the fineſt ſhells livid or dead in their colours.

The fineſt ſhells are thoſe which are fiſhed up at ſea, not found on the ſhores. The other natural defects of ſhells are their having morbid cavities, or protuberances, in parts where there ſhould be none. When the ſhell is valuable, theſe faults may be hid, and much added to the beauty of the ſpecimen, without at all injuring it as an object of natural hiſtory, which ſhould always be the great end of collecting theſe things. The cavities may be filled up with maſtic, diſſolved in ſpirit of wine, or with iſinglaſs: theſe ſubſtances muſt be either coloured to the tinge of the ſhell, or elſe a pencil dipped in water-colours muſt finiſh them up to the reſemblance of the reſt; and then the whole ſhell being rubbed over with gum-water, or with the white of an egg, ſcarce any eye can perceive the artifice: the ſame ſubſtances may alſo be uſed to repair the battered edge of a ſhell, provided the pieces chipped off be not too large. And when the excreſcences of a ſhell are faulty, they are to be taken down with a fine file. If the lip of a ſhell be ſo battered that it will not admit of repairing by any cement, the whole muſt be filed down to an evenneſs, or ground on the wheel.

Sheridan, Sidus.

SHERIDAN (Mrs Frances), wife to Thomas Sheridan, M. A. was born in Ireland about the year 1724, but deſcended from a good Engliſh family which had removed thither. Her maiden name was Chamberlaine, and ſhe was grand-daughter of Sir Oliver Chamberlaine. The firſt literary performance by which ſhe diſtinguiſhed herſelf was a little pamphlet at the time of a violent party-diſpute relative to the theatre, in which Mr Sheridan had newly embarked his fortune. So well-timed a work exciting the attention of Mr Sheridan, he by an accident diſcovered his fair patroneſs, to whom he was ſoon afterwards married. She was a perſon of the moſt amiable character in every relation of life, with the moſt engaging manners. After lingering ſome years in a very weak ſtate of health, ſhe died at Blois, in the ſouth of France, in the year 1767. Her "Sydney Biddulph" may be ranked with the firſt productions of that claſs in ours or in any other language. She alſo wrote a little romance in one volume, called *Nourjahad*, in which there is a great deal of imagination productive of an admirable moral. And ſhe was the authoreſs of two comedies, "The Diſcovery" and "The Dupe."

SIDUS, Georgium, in aſtronomy, a new primary planet, diſcovered by William Herſchel, Eſq; of Bath, in the year 1781, for which he obtained from the Royal Society the honorary recompence of Sir Godfrey Copley's medal; and ſo called in honour of his majeſty king George III. who has taken Mr Herſchel under his patronage, and granted to him an annual ſalary. "From many calculations of our beſt a-aſtronomers and mathematicians, ſays Mr Herſchel, I have collected the following particulars, as moſt to be depended upon.

Place of the node	$2^s\ 11^d\ 49'\ 30''$
Inclination of the orbit	$43'\ 35''$
Place of the perihelion	$172^d\ 13'\ 17''$
Time of the perihelion paſſage	Sep. 7, 1799
Eccentricity of the orbit	,82034
Half the greater axis	19,07904
Revolution	83,3364 ſiderial years.

From my own obſervations on this planet's apparent diameter, which I have found cannot well be leſs than 4″, nor indeed much greater, we infer that its real diameter is to that of the earth as 4,454 to 1; and hence it appears to be of very conſiderable bulk, and, except Saturn and Jupiter, by far the largeſt of the remaining planets. Its light is of a bluiſh-white colour, and in brilliancy between that of the Moon and of Venus With a teleſcope which magnifies about 300 times, it appears to have a very well defined viſible diſk; but with inſtruments of a ſmall power, it can hardly be diſtinguiſhed from a fixed ſtar of between the ſixth and ſeventh magnitude. In a very fine clear night, when the moon is abſent, it may alſo be ſeen by the naked eye."

SIGHING, an effort of nature, by which the lungs are put into greater motion, and more dilated, ſo that the blood paſſes more freely, and in greater quantity, to the left auricle, and thence to the ventricle. Hence we learn, ſays Dr Hales, how ſighing increaſes the force of the blood, and conſequently proportionably cheers and relieves nature, when oppreſſed by its too ſlow motion, which is the caſe of thoſe who are dejected and ſad.

SILK, sericum, a very ſoft, fine, bright, delicate thread; the work of an inſect, called *bombyx* or the *ſilk-worm*. See Silk, (*Encycl.*)

The ancients were but little acquainted with the uſe and manufacture of ſilk; they took it for the work of a ſort of ſpider, or beetle, who ſpun it out of its entrails, and wound it with its feet about the little branches of trees. This inſect they called *ſer*, from Seres, a people in Scythia, whom we now call the *Chineſe*, who, as they thought, bred it; whence the ſilk itſelf they called *ſericum*. But this ſer of theirs has very little affinity with our ſilk-worm, bombyx; the former living five years; but the latter dying annually, enveloped in a yellowiſh bag, or ball, which, wound out into little threads, makes what we call *ſilk*.

It was in the iſle of Cos that the art of manufacturing ſilk was firſt invented; and Pamphila, daughter of Platis, is honoured as the inventreſs. The diſcovery was not long unknown to the Romans. Silk was brought them from Serica, where the worm was a native. But ſo far were they from profiting by the diſcovery, that they could not be induced to believe ſo fine a thread ſhould be the work of a worm, and thereupon formed a thouſand chimerical conjectures of their own.

Silk was a very ſcarce commodity among them for many ages; it was even ſold weight for weight with gold, inſomuch that Vopiſcus tells us, the emperor Aurelian, who died A. D 275, refuſed the empreſs, his wife a ſuit of ſilk, which ſhe ſolicited of him with much earneſtneſs, merely on account of its dearneſs.

Others, however, with greater probability, aſſert that it was known at Rome ſo early as the reign of Tiberius, about A. D. 17.

Galen, who lived about the year of our Lord 173, ſpeaks of the rarity of ſilk; being nowhere but at Rome, and only among the rich.

Heliogabalus, the emperor, who died A. D. 220, is ſaid by ſome to be the firſt perſon who wore a holoſericum, i. e. a garment of all ſilk.

The Greeks of Alexander the Great's army are ſaid to have been the firſt who brought wrought ſilk from Perſia into Greece, about 323 years before Chriſt; but the manufacture of it was confined to Berytus and Tyre, in Phœnicia, whence it was diſperſed over the Weſt.

At length, two monks, coming from the Indies to Conſtantinople, in 555, under the encouragement of the emperor Juſtinian, brought with them great quantities of ſilk-worms, with inſtructions for the hatching of their eggs, rearing and feeding the worms, and drawing out the ſilk, and ſpinning and working it. Upon this, manufactures were ſet up at Athens, Thebes, and Corinth. The Venetians, ſoon after this time, commencing a commerce with the Greek empire, ſupplied all the weſtern parts of Europe with ſilks for many centuries; though ſundry kinds of modern ſilk manufactures were unknown in thoſe times, ſuch as damaſks, velvets, ſattins, &c.—About 1130, Roger II. king of Sicily eſtabliſhed a ſilk-manufactory at Palermo, and another in Calabria; managed by workmen, who were a part of the plunder brought from Athens, Corinth, &c. whereof that prince made a conqueſt in his expedition to the Holy Land. By degrees, Mezeray adds, the reſt of Italy and Spain learned, from the Sicilians and Calabrians, the management of the ſilk-worms, and the working of ſilk: and at length the French got it by right of neighbourhood, a little before the reign of Francis I. and began to imitate them. Thuanus, indeed, in contradiction to moſt other writers, makes this manufacture of ſilk to be introduced into Sicily 200 years later, by Robert the Wiſe, king of Sicily, and count of Provence.

It appears, by 33 Henry VI. cap. 5. that there was a company of ſilk-women in England ſo early as the year 1455. But theſe were probably employed in needle-works of ſilk and thread; and we find that various ſorts of ſmall haberdaſhery of ſilk were manufactured here in 1482: but Italy ſupplied England, and all other parts, with the broad manufacture, till the year 1489. In Spain, indeed, the culture and manufacture of ſilk ſeem to have been introduced in an early period by the Moors, particularly in Murcia, Cordova, and Granada. The ſilk manufactures of this laſt town were very flouriſhing, when it was taken by Ferdinand, &c. at the cloſe of the 15th century.

In 1521, the French, being ſupplied with workmen from Milan, commenced a ſilk manufacture; but it was long after this time before they could obtain raw ſilk from the worms: and, even in the year 1547, ſilk was ſcarce and dear in France; and Henry II. is ſaid to have been the firſt who wore a pair of ſilk knit ſtockings, though the firſt invention originally came from Spain, whence ſilk ſtockings were brought over to Henry VIII. and Edward VI. After the civil wars in France, the plantations of mulberry-trees were greatly encouraged by Henry IV. and his ſucceſſors; and the produce of ſilk is at this day very conſiderable.

The great advantage which the new manufacture afforded, made our king James I. very earneſt for its being introduced into England: accordingly, it was recommended ſeveral times from the throne, and in the moſt earneſt terms, particularly in the year 1608, to plant mulberry-trees, &c. for the propagation of ſilk-worms, but unhappily without effect; though, from the various experiments we meet with in the Philoſophical Tranſactions, and other places, it appears that the ſilk-worm thrives and works as well, in all reſpects, in England as in any other part of Europe.

However, towards the latter end of this king's reign, i. e. about the year 1620, the broad-ſilk manufacture was introduced into this country, and proſecuted with great vigour and advantage. In 1629, the ſilk manufacture was become ſo conſiderable in London, that the ſilk-throwſters of the city and parts adjacent were incorporated under the name of *maſter, wardens,* &c. *of the ſilk-throwſters;* and in 1661, this company of ſilk-throwſters employed about 40,000 perſons. The revocation of the edict of Nantes, in 1685, contributed in a great degree to promote the ſilk manufacture in this kingdom; as did alſo the invention of the ſilk-throwing machine at Derby, in 1719.—So high in reputation was the Engliſh ſilk manufacture, that even in Italy, as Keyſler informs us, in 1730, the Engliſh ſilks bore a higher price than the Italian.

Silk, *Raw,* is that taken from the ball, without fire, and wound without any coction: ſuch as is moſt, if not all, that is brought into England from the Levant; i. e. from Perſia by the way of Turkey, from Bengal in India, and from China. The raw ſilk is commonly worked up into two ſorts, called *organzine* and *tram.* The former is made by giving a throw or twiſt to each thread of raw ſilk ſingly, and then doubling two of theſe twiſted threads together, and twiſting them ſmartly together: this forms the length or warp of a piece when manufactured. The tram, or ſhoot, which makes the breadth of the piece, is formed by twiſting two or more threads of raw ſilk ſlack. The waſted ſilk, or refuſe in reeling, &c. is collected, carded, and ſpun, and called *floſs ſilk;* this is doubled and thrown, and often made into a cheap ſort of ſilk ſtockings, which are very ſtrong and durable.

In the French ſilk-works, the greateſt part of this raw ſilk paſſes for little better than a kind of fine floretta; yet, when ſpun, it makes a bright thread, and ſerves for the manufacture of ſtuffs of moderate value and luſtre. But the raw ſilks of the Levant, whence moſt of ours come, are exceeding fine and beautiful. The difference ariſes hence, that, in France, the beſt balls are ſpun and wound in boiling water, and only the refuſe made into raw ſilk; whereas, in the Levant, there is no ſuch thing as ſpinning or winding on the fire, but the ſilks are all ſent in bales, or packs, as they are drawn from off the balls; ſo that they are only diſtinguiſhed by their quality of fine, middling, and coarſe.

Silk, *Boiled,* is that which has been boiled in water, to facilitate the ſpinning and winding. This is the fineſt of all the ſorts of ſilk manufactured in France, and is ſeldom uſed but in the richeſt ſtuffs, as velvets, taffaties, damaſks, brocades, &c.

There is alſo another kind of boiled ſilk, which is prepared by boiling, to be milled, and which cannot receive that preparation without being firſt paſſed through hot water. By the laws of France, it is prohibited to mix raw with boiled ſilk; both as ſuch a practice ſpoils the dyeing, and as the raw ſilk corrupts and cuts the boiled.

Silks, *Throwed* or *Twiſted,* are ſuch as, beſide their ſpinning and winding, have received their milling or throwing.

This they receive in a different degree, as they are paſſed oftener or ſeldomer over the mill; properly, however, throwed ſilks are thoſe wherein the threads are pretty thick throwed, and twiſted ſeveral times.

The thrown ſilk comes to us chiefly from Leghorn, Genoa, Naples, and Meſſina.

Silks, *Slack,* are ſuch as are not twiſted, but are prepared, and dyed, for tapeſtry, and other works with the needle.

Silk, *Eaſtern* or *Eaſt Indian.* That popularly thus called is not the work of the ſilk-worms, but comes from a plant that produces it, in pods, much like thoſe of the cotton-tree. The matter this pod contains is extremely white, fine, and moderately gloſſy: it ſpins eaſily, and is made into a kind of ſilk that enters the manufacture of ſeveral Indian and Chineſe ſtuffs.

Silks, *French.* It is only in the moſt ſouthern provinces of France that ſilk is cultivated, mulberry-trees planted, and worms bred. The principal places are Languedoc, Dauphiné, Provence, Avignon, Savoy, and Lyons. This laſt place, indeed, furniſhes very few ſilks of its own growth; but it is the great ſtaple whence the merchants of Paris, and the other cities, are to fetch them. At leaſt, they are obliged to have them paſs through Lyons, if they bring them from other places, either by land or ſea. There have been computed to enter Lyons, *communibus annis,* 6000 bales, the bale valued at 160 pounds weight; of which 6000 bales there are 1400 from the Levant, 1600 from Sicily, 1500 from Italy, 300 from Spain, and 1200 from Languedoc, Provence, and Dauphiné.

At the time when the manufactures of Lyons were in their proſperity, there were reckoned to be 18000 looms employed in the ſilk manufacture; but in 1698 there were not reckoned 4000. However, this manufacture has revived of late, and a great part of Europe has been ſupplied from thence with brocade and rich ſilks. The decay has not been leſs notable at Tours: they had formerly there 800 mills for winding and preparing the ſilks, 8000 looms to weave them, and 40,000 perſons employed in the preparation and manufacturing thereof; but theſe have been reduced to 70 mills, 1200 looms, and about 4000 perſons.

Silks, *Sicilian.* The commerce of the ſilks of Sicily is very conſiderable: and the Florentines, Genoeſe, and Lucceſe, are the people who chiefly make it. Great quantities are yearly brought thence, eſpecially from Meſſina: part whereof they uſe in their own manufactures, and ſell the reſt to their neighbours, the French, &c. with profit. The Italians have this advantage, eſpecially the Genoeſe, over other people that, having larger eſtabliſhments in the iſland, they are reputed as natives, and pay no duty for the export.

Part of the Sicilian ſilks are raw, the reſt are ſpun and milled; of which laſt kind, thoſe of St Lucia and Meſſina are the moſt valued. The raw unwrought ſilks are always ſold for ready money: the others, ſometimes, in exchange for other goods.

Silks, *Italian*. The ſilks brought from Italy are partly wrought, and partly raw and unwrought. Milan, Parma, Lucca, and Modena, furniſh none but the latter kind; Genoa moſt of the former; Bologna affords both kinds. The fineſt Italian wrought ſilk comes from Piedmont, Novi, Bergamo, and Bologna: and is imported into England from the ports of Nice, Genoa, and Leghorn.

The ſilk we have from Italy is generally thrown, and ſerves for warp for our manufactures: and the greater part we import from Piedmont, at an annual expence of no leſs than 200,000 l. and in general at the price of 20 s. for every pound. And the king of Sardinia, it is ſaid, hath prohibited the exportation of raw ſilk out of his dominions; though the markets are open in other parts of Italy.

Silks, *Spaniſh*, are all raw; and are ſpun, milled, &c. in England, according to the ſeveral works they are to be uſed in.

Silks, *Turkey*, are all raw. One advantage we have in the commerce of the Levant, in ſilks, wanting in thoſe of Sicily, is, that the latter are confined to a particular ſeaſon of the year; whereas the former are bought at all times. They are brought from Aleppo, Tripoli, Sayda, and from the iſle of Cyprus, Candia, &c. But the principal place of commerce, eſpecially for the ſilks of Perſia, is Smyrna. The ſilks are brought hither in caravans, from the month of January to September. The caravans in January are loaden with the fineſt ſilks; thoſe of February and March bring indifferent ones; the reſt, the coarſeſt. They all come from the ſeveral provinces of Perſia, chiefly thoſe of Ghilan and Shirvan, and the city of Schamachia, ſituate near the edge of the Caſpian ſea; from which three places, a Dutch author aſſures us, there have not come leſs than 30,000 bales of ſilk in a year. Ghilan produces the beſt and greateſt quantities of ſilk; next to this comes Shirvan and Erivan, then Mazanderan, and laſtly Aſtrabad; but the latter is much inferior, ſerving only for a manufacture mixed with cotton; that of Mazanderan and Aſtrabad is ſeldom or never exported.

Ardeuil, or Ardebil, another city of Perſia, not far diſtant from theſe ſilk countries, is the place where ſilks are laid up, and whence the caravans ſet out for Smyrna, Aleppo, Scanderoon, and Conſtantinople; and it is this city, with Schamachia, that have always been eſteemed the centre of the ſilk trade; which has been ſeveral times attempted to be removed from Smyrna and the Mediterranean, in favour of Archangel, and the White-ſea, by carrying them acroſs Muſcovy, by the Volga and Dwina, two rivers that traverſe the principal provinces of that vaſt empire.

This new courſe of the Perſian ſilks into Europe was firſt propoſed by Paolo Centurio, a Genoeſe, to the czar Baſil, under the pontificate of Leo X. The French had the ſame deſign in 1628. The duke of Holſtein, in 1633, ſent ambaſſadors to the court of Perſia, purely with the ſame view: and, in 1668, the czar Alexis Michael attempted the thing himſelf; but he was diſappointed by the rebellion of the Coſſacks, and the ſurpriſe of Aſtracan.

In 1688, the commerce of Perſian ſilks had like to have been removed from Smyrna, by an earthquake, which almoſt overturned the whole city; and doubtleſs, the removal had been effected, but for the vigorous means uſed by the Turks to prevent it. Smyrna, however, ſtill remains in her ancient poſſeſſion; and the ſeveral nations of Europe continue every year to ſend their fleets to fetch away the ſilks; and matters are like to remain ſo, unleſs the conqueſts made by the late czar, along the Caſpian ſea, enable his ſucceſſors, as it is certain he himſelf had ſuch a thing in view, to put this trade into another channel.

Silks, *China, Japan, and Indian*. Several provinces of China are ſo fertile in mulberry-trees, and their climate is ſo agreeable to the nature of ſilkworms, that the quantity of ſilk there produced is incredible: the ſingle province of Tchehiang might ſupply all China, and even a great part of Europe, with this commodity. The ſilks of this province are the moſt eſteemed, though thoſe of Nankin and Canton be excellent.

The ſilk trade is the principal in China, and that which employs the moſt hands: but the European merchants, who deal in it, eſpecially in wrought ſilks, are to be careful of the ſpinning, &c. the waſte being uſually very great, as the French Eaſt India company have found to their coſt.

In the year 1750, an act of parliament was paſſed for repealing the duties payable on China raw ſilk, imported into this kingdom by the Eaſt India Company, and intitling ſuch ſilk, upon exportation, to the ſame drawbacks and allowances with the raw ſilk of the produce of Italy. And another act was paſſed in 1753, for the farther encouragement of the Britiſh ſilk manufacture. Japan would not afford fewer ſilks than China; but that the Japaneſe, a barbarous and diſtruſtful people, have interdicted all commerce with ſtrangers, eſpecially with Europeans, excepting with the Dutch; who are ſaid to be admitted on certain impious terms, related by Tavernier, but which we muſt own we cannot credit. The Dutch have endeavoured to vindicate themſelves from theſe by the pens of ſeveral famous writers.

The ſilks of the ſtates of the Great Mogul are brought in great quantities from Caſſem-bazaar, a midland place, whence they are conveyed by a canal of 15 leagues into the Ganges, by which they are forwarded 15 leagues farther, to the mouth of the famous river of Indoſtan. The ſilk of Caſſem-bazaar is yellowiſh; as are alſo thoſe of Perſia and Sicily; there being none, that we know of, naturally white, but that of Paleſtine. The Indians, however, whiten this with a ley, made of the aſhes of a tree called *Adam's fig-tree;* but as this tree is pretty ſcarce, and they have not yet found any other that will ſerve in its place, the Europeans are forced to take the greateſt part of their ſilks in their native yellow. Caſſem-bazaar alone is computed to furniſh every year 22,000 bales of ſilk, each bale weighing 100 pounds; of which the Dutch are ſaid to export 7000 bales annually.

Great quantities of both raw and wrought ſilk are furniſhed by other parts of Bengal, and by ſeveral provinces of Indoſtan, which partly ſupply the natives, and afford a very conſiderable exportation to Europe. Several thouſand bales of raw ſilk are annually imported from Bengal and China; ſome of which is, in this ſtate, uſed for making princeſs-ſtuffs, but the greater part is prepared for the manufacturers by the ſilk-throwſters. The duty on thrown ſilk imported is 5s. 1d $\frac{12}{20}$; and the duty on raw ſilk, whether of the growth of Italy, Turkey, or India, is 1s. 4d. $\frac{1}{2}$ per pound.

The quantity of Bengal and China raw ſilk imported in 1783, was 3636 Bengal bales, each bale weighing about 150 great pounds, and 1390 China bales, at about 145 ſmall pounds per bale.

SKATING, an exerciſe on ice, both graceful and healthy. Although the ancients were remarkable for their dexterity in moſt of the athletic ſports, yet ſkating ſeems to have been unknown to them. It may be looked on, therefore, as a modern invention; and probably it derived its origin in Holland, where it naturally became habitual and neceſſary, not only as a graceful and elegant amuſement, but as an expeditious mode of travelling when the lakes and canals were frozen up during winter. In Holland long journeys are made upon ſkates with eaſe and expedition; but in general leſs attention is there paid to graceful and elegant movements, than to the expedition and celerity of what is called *journey ſkating*. It is in thoſe countries alone where it is conſidered as an amuſement, that graceful attitudes and movements can be found; and there is no exerciſe whatever better calculated to ſet off the human figure to advantage. The acquirement of moſt exerciſes may be attained at an advanced period of life; but to become an expert ſkater, it is neceſſary to begin the practice of the art at a very early age. It is difficult to reduce the art of ſkating to a ſyſtem. It is principally by the imitation of a good ſkater, that a young practitioner can form his own practice. The Engliſh, though often remarkable for feats of agility upon ſkates, are very deficient in the article of grace; which is partly owing to the conſtruction of the ſkates, which are too much curved in the ſurface which embraces the ice, conſequently they involuntarily bring the uſers of them round on the outſide upon a quick and ſmall circle; whereas the ſkater, by uſing ſkates of a different conſtruction, leſs curved, has the command of his ſtroke, and can enlarge or diminiſh the circle according to his own wiſh and deſire. The metropolis of Scotland has produced more inſtances of elegant ſkaters, than perhaps any other country whatever; and the inſtitution of a Skating Club about 40 years ago, has contributed not a little to the improvement of this elegant amuſement. We are are indebted for this article to a gentleman of that Club, who has made the practice and improvement of ſkating his particular ſtudy; and as the nature of our work will not permit the inſertion of a full treatiſe on ſkating, we ſhall give a few inſtructions which may be of uſe towards the attainment of the art.—Thoſe who wiſh to be proficients ſhould begin at an early period of life; and ſhould firſt endeavour to throw off the fear which always attends the commencement of an apparently hazardous amuſement. They will ſoon acquire a facility of moving on the inſide: and when they do ſo, they muſt endeavour to acquire the movement on the outſide of the ſkates; which is nothing more than throwing themſelves upon the outer edge of the ſkate, and making the balance of their body tend towards that ſide, which will neceſſarily enable them to form a ſemicircle. In this, much aſſiſtance may be derived from placing a bag of lead-ſhot in the pocket next to the foot employed in making the outſide ſtroke, which will produce an artificial poiſe of the body, which afterwards will become natural by practice. At the commencement of the outſide ſtroke, the knee of the employed limb ſhould be a little bended, and gradually brought to a rectilineal poſition when the ſtroke is completed. When the practitioner becomes expert in forming the ſemicircle with both feet, he is then to join them together and proceed progreſſively and alternately with both feet, which will carry him foreward with a graceful movement. Care ſhould be taken to uſe very little muſcular exertion, but that the impelling motion ſhould proceed from the mechanical impulſe of the body thrown into ſuch a poſition as to regulate the ſtroke. At taking the outſide ſtroke, the body ought to be eaſily thrown foreward, the unemployed limb kept in a direct line with the body, and the face and eyes directly looking foreward: the unemployed foot ought to be ſtretched towards the ice, with the toes in a direct line with the leg. In the time of making the curve, the body muſt be gradually, and almoſt imperceptibly, raiſed, and the unemployed limb brought in the ſame manner foreward; ſo that, at finiſhing the curve, the body will bend a ſmall degree backward, and the unemployed foot will be about two inches before the other, ready to embrace the ice and form a correſpondent curve. The muſcular movement of the whole body muſt correſpond with the movement of the ſkate, and ſhould be regulated ſo as to be almoſt imperceptible to the ſpectators. Particular attention ſhould be paid in carrying round the head and eyes with a regular and imperceptible motion; for nothing ſo much diminiſhes the grace and elegance of ſkating as ſudden jerks and exertions, which are too frequently uſed by the generality of ſkaters. The management of the arms likewiſe deſerves attention. There is no mode of diſpoſing of them more gracefully in ſkating outſide, than folding the hands into each other, or uſing a muff.

There are various feats of activity and manœuvres uſed upon ſkates; but they are ſo various as to render their inſertion too tedious. Moving on the outſide is the primary object for a ſkater to attain; and when he becomes an adept in that, he will eaſily acquire a facility in executing other branches of the art. There are few exerciſes but will afford him hints of elegant and graceful attitudes. For example, nothing can be more beautiful than the attitude of drawing the bow and arrow whilſt the ſkater is making a large circle on the outſide: the manual exerciſe and military ſalutes have likewiſe a pretty effect when uſed by an expert ſkater.

SOLANDER (Dr Daniel-Charles), was a native of Sweden, and educated at the univerſity of Upſal, where he obtained the degree of Doctor of Medicine. That of Doctor of Laws was afterwards conferred upon him by the univerſity of Oxford. Dr Solander's ſtrong propenſity for the purſuit of natural knowledge was probably not a little increaſed by the patronage and encouragement of his preceptor the celebrated Sir Charles Linnæus; while the zeal which he ſhowed for theſe branches of literature, particularly for botany, conciliated the eſteem and affection of that eminent profeſſor. When Dr Solander went from Upſal to London in the proſecution of his ſtudies, Linnæus furniſhed him with introductory letters to thoſe learned men who were his principal correſpondents in the metropolis of Britain. In theſe letters, among other ſtrong expreſſions of regard, he is ſaid to have employed the following ſentence: *Omnium diſcipulorum, quos unquam habui, dilectiſſimus.* The footing thus obtained, Dr Solander ſoon improved by agreeable manners and extenſive knowledge. In no long time he contracted intimacies with the moſt eminent philoſophers in London, particularly with Sir Joſeph Banks, the preſident of the Royal Society and one of the firſt literary characters in Europe. He was the companion of Sir Joſeph in thoſe different voyages which he made for the ſole purpoſe of extending natural knowledge, and which will do immortal honour to the memory of both. When he was not thus engaged, his time was principally ſpent in the Britiſh Muſeum, where he had obtained an appointment in every reſpect ſuited to his philoſophical diſpoſition: and in diſcharging that part of the duties of his office which led him to ſhow that moſt valuable collection to different viſitors, it was hardly poſſible to conceive a more agreeable union of the manners of the gentleman with the knowledge of the philoſopher. While he was engaged in converſation with his uſual cheerfulneſs at the houſe of his friend Sir Joſeph Banks, he was ſuddenly attacked with a fit of apoplexy, which in a few days, notwithſtanding the beſt medical aſſiſtance, terminated in his death; an event ſincerely regretted by all who had the honour of his acquaintance, and by which the literature and philoſophy of London ſuſtained a real loſs.

SPHEX, the ICHNEUMON WASP or SAVAGE; a genus of inſects belonging to the order of hymenoptera. The mouth is armed with jaws, but without any tongue. The wings of both ſexes are extended without folds, and laid horizontally on the back. The ſting is ſharp, and concealed within the abdomen. The genus is divided into two families. 1. Thoſe in which the abdomen is petiolated, or joined to the thorax by a ſtalk. 2. Thoſe in which the abdomen is ſubſeſſile, or nearly of an equal ſize through its whole length. The manner of living is different in the various ſpecies, and ſo is the general form of the body and their haunts: but though the method of life be utterly different, yet the ſame manners appear innate and inherent in all. They agree in being the fierceſt of all flies: they will attack inſects much larger than themſelves, and this whether they be defenceleſs or armed, as they are provided with a ſting. The ſtrength in all this ſavage kind is great; their jaws are hard and ſharp, and in their ſting lies a poiſon ſuddenly fatal to the creatures with whom they engage. The ſavage ſeizes hardily on the animal he attacks, and gives a ſtroke of amazing force; after which he falls down, as if himſelf were killed, but it is to reſt from his fatigue and enjoy his victory. He keeps a ſteady eye on the creature he has ſtruck till it dies, which happens in a few minutes, and then drags it to the neſt to feed the young. The number of other inſects they deſtroy is ſcarce to be conceived; the mouth of their cave is like that of a giant in the days of yore, ſtrawed with the remains of prey. The eyes, the filament that ſerves as a brain, and a ſmall part of the contents of the body, are all the ſavage eats, and will kill fifty for a meal.

Plate CCCXX.

SPHINX, in zoology, a genus of inſects belonging to the order of lepidoptera. There are ſeven ſpecies, all of them commonly called *moths* of different kinds. The name of *ſphinx* is given them on account of the ſingular attitude of their caterpillars, who apply the hinder part of their body to a branch of a tree, holding the reſt of it erect, like the fabulous ſphinx. Moſt of them ſpin their cod under ground, making them up with ſmall parcels of earth and grains of corn interwoven with threads. The ſphinges fly either early in the morning or after ſunſet in the evening. They fly heavily and ſluggiſhly, often emitting a kind of ſound. One ſpecies, the atropos, or jeſſamine hawkmoth, has the thorax marked ſomewhat like a death's head. It has a ſhrill voice, more diſmal than the ſqueaking of a mouſe. All the ſpecies ſuck the nectar of flowers, though they ſeldom ſettle upon them.

SPIRIT OF WINE, the ſame with rectified ſpirit or alcohol. See DISTILLATION.

SPLACHNUM, in botany, a genus of the cryptogamia muſci. There are two ſpecies.

1. The ampullaceum, or crewet ſplachnum, is found in bogs and marſhes, and often upon cow-dung. It grows in thick tufts, and is about two inches high. The leaves are oval-lanceolate, terminated with a long point or beard. The top of the filament or peduncle ſwells into the form of an inverted cone, which Linnæus terms an *apophyſis* or *umbraculum;* upon the top of which is placed a cylindrical anthera, like the neck of a crewet. The calyptra is conical, and reſembles a ſmall extinguiſher.

2. The vaſculoſum, or acorn-ſhaped ſplachnum, is found upon bogs and cow-dung, and upon the points of rocks on the tops of the Highland mountains, as on Ben-Lomond, and in the Iſle of Sky, and elſewhere. This differs little from the preceding, and perhaps is no more than a variety. The filaments are about an inch high. The leaves oval-acute, not ſo lanceolate and bearded as the other. The apophyſis, and the anthera at the top of it, form together nearly an oval figure, not unlike an acorn in its cup, the apophyſis being tranſverſely ſemioval and of a blood-red colour, the anthera ſhort and conical. The calyptra is the ſame as that of the other. The operculum is ſhort and obtuſe, and the rim of the anthera has eight large horizontal cilia. The anthera of the other is alſo ciliated, but not ſo diſtinctly. It is an elegant moſs, and very diſtinguiſhable on account of its orange-coloured filaments and dark-red capſules.

SQUATT, among miners, a ſmall bed of ore, leſs valuable than a vein or load, as reaching only a little way.

STANHOPE (Dr George), an eminent divine, was born at Hertiſhorn in Derbyſhire, in the year 1660. His father was rector of that place, vicar of St Margaret's church in Leiceſter, and chaplain to the earls of Cheſterfield and Clare. His grandfather Dr George Stanhope was chaplain to James I. and

Stanhope.

Charles I.; had the chancellorſhip of York, where he was alſo a canon-reſidentiary, held a prebend, and was rector of Weldrake in that county. He was for his loyalty driven to doors with eleven children; and died in 1644. Our author was ſent to ſchool, firſt at Uppingham in Rutland, then at Leiceſter; afterwards removed to Eaton; and thence choſen to King's college in Cambridge, in the place of W. Cleaver. He took the degree of B. A. in 1681; M. A. 1685; was elected one of the ſyndics for the univerſity of Cambridge, in the buſineſs of Alban Francis, 1687; miniſter of Quoi near Cambridge, and vice-proctor 1688; was that year preferred to the rectory of Tring in Hertfordſhire, which after ſome time he quitted. He was in 1689 preſented to the vicarage of Lewiſham in Kent by lord Dartmouth, to whom he had been chaplain, and tutor to his ſon. He was alſo appointed chaplain to king William and queen Mary, and continued to enjoy that honour under queen Anne. He commenced D. D. July 5. 1697, performing all the offices required to that degree publicly and with great applauſe. He was made vicar of Deptford in 1703; ſucceeded Dr Hooper as dean of Canterbury the ſame year; and was thrice choſen prolocutor of the lower houſe of convocation. His uncommon diligence and induſtry, aſſiſted by his excellent parts, enriched him with a large ſtock of polite, ſolid, and moſt uſeful learning. His diſcourſes from the pulpit were equally pleaſing and profitable; a beautiful intermixture of the cleareſt reaſoning with the pureſt diction, attended with all the graces of a juſt elocution. The good Chriſtian, the ſolid divine, and the fine gentleman, in him were happily united. His converſation was polite and delicate, grave without preciſeneſs, facetious without levity. His piety was real and rational, his charity great and univerſal, fruitful in acts of mercy, and in all good works. He died March 18. 1728, aged 68 years; and was buried in the chancel of the church at Lewiſham. The dean was twice married: 1. to Olivia Cotton, by whom he had one ſon and four daughters. His ſecond lady, who was ſiſter to Sir Charles Wager, ſurvived him, dying October 1. 1730, aged about 54. One of the dean's daughters was married to a ſon of biſhop Burnet. Biſhop Moore of Ely died the day before queen Anne; who, it has been ſaid, deſigned our dean for that ſee when it ſhould ſo have become vacant. Dr Felton ſays, “The late dean of Canterbury is excellent in the whole. His thoughts and reaſoning are bright and ſolid. His ſtyle is juſt, both for the purity of the language, and for the ſtrength and beauty of expreſſion; but the periods are formed in ſo peculiar an order of the words, that it was an obſervation, nobody could pronounce them with the ſame grace and advantage as himſelf.” His writings, which are an ineſtimable treaſure of piety and devotion are, “A Paraphraſe and Comment upon the Epiſtles and Goſpels,” 4 vols, 1705, 8vo. “Sermons at Boyle's Lectures,” 1706, 4to. “Fifteen Sermons,” 1700, 8vo. “Twelve Sermons on ſeveral occaſions,” 1727, 8vo. “Thomas à Kempis,” 1696, 8vo. “Epictetus's Morals, with Simplicius's Comment, and the Life of Epictetus,” 1700, 8vo. “Parſon's Chriſtian Directory,” 1716, 8vo. “Rochefoucault's Maxims,” 1706, 8vo. “A Funeral Sermon on Mr Richard Sare Bookſeller,” 1724; two editions 4to. “Twenty Sermons,” publiſhed ſingly between the years 1692 and 1724. “Private Prayers for every Day in the Week, and for the ſeveral Parts of each Day: tranſlated from the Greek Devotions of Biſhop Andrews, with Additions, 1730.” In his tranſlations, it is well known, Dr Stanhope did not confine himſelf to a ſtrict and literal verſion: he took the liberty of paraphraſing, explaining, and improving upon his author; as will evidently appear (not to mention any other work) by the ſlighteſt peruſal of St Auguſtine's Meditations, and the Devotions of Biſhop Andrews.

Stephens
‖
Sulcer,

STEPHENS's MEDICINES *for the* **STONE**, were only a more imperfect method of uſing ſoap-ley in that diſtemper. See CHITTRICK.

STERNWAY, is when a ſhip, inſtead of advancing, retreats in the water, either through the violence of a current or any other means.

STONE-CHATTERER, (*Motacilla Rubicola*), in ornithology, a ſpecies omitted to be deſcribed under MOTACILLA. It is common among us during ſummer in gorſy grounds. In the winter they diſperſe into marſhes and other places, but do not quit the iſland. It is a reſtleſs and noiſy bird, and perches frequently on ſome buſh, chattering inceſſantly. The head, neck, and throat, are black; but on both ſides of the latter is a white bar, ſo that it appears on firſt ſight to be encircled with white: the feathers on the back are black, edged with tawny; the lower part of the back juſt above the rump is white: the end and exterior ſide of the two outmoſt feathers of the tail are of a pale ruſt-colour, the reſt are black: the breaſt is of a deep reddiſh yellow; the belly of a lighter hue: the quill-feathers are duſky edged with dull red; thoſe next the body are marked with a white ſpot near their bottoms; the coverts of the wings are adorned with another. The head of the female is ferruginous ſpotted with black; and the colours in general are leſs vivid. In both ſexes the legs are black.

SULZER (M.), a celebrated philoſopher, was born at Winterthun, in the canton of Zurich, October 16. 1720. He was the youngeſt of 25 children. His early education did not promiſe much, though it was by no means neglected. He had little inclination for what is called in the ſchools the ſtudy of humanity, and made but a ſmall progreſs in the learned languages, which were to prepare him for the ſtudy of theology, for which profeſſion his parents deſigned him. At the age of 16, when he went to the academical ſchool of Zurich, he had not the ſmalleſt notion of the ſciences, or of elegant literature, and conſequently no taſte for ſtudy. The firſt incident that developed a hidden germ of philoſophical genius, was his meeting with Wolfe's metaphyſics: this was the birth of his taſte for ſcience; but he wanted a guide. The clergyman with whom he lodged was an ignorant man; and the academical prelections were, as yet, above the reach of his comprehenſion. On the other hand, a ſedentary life was not the thing he liked, nor to which he had been accuſtomed; and, moreover, a ſociable turn of mind led him often into company, where he loſt much time in frivolous amuſements, yet without corrupting his morals. Who, that obſerved him at this period, ſays Mr Formey in his *Eulogium*, would have thought that Sulzer would one day be numbered among the moſt knowing and wiſeſt men of his time? The learned

Geſner was the inſtrument of Providence that rendered Sulzer's inclination to ſtudy triumphant over his paſſion for amuſement and company. Animated by the counſels and example of this worthy and learned man, he applied himſelf to philoſophy and mathematics with great ardour, and reſumed the purſuit of Grecian literature and the Oriental languages. The contemplation of nature became his noble and favourite paſſion. An eccleſiaſtical ſettlement in a rural ſcene, that exhibited happy objects and occaſions for this delightful ſtudy, began to render his days happy and uſeful; and he publiſhed, in 1741, *Moral Contemplations of the works of Nature*; and, the year following, an *Account* of a voyage he had made through the Alps; which ſhowed, at the ſame time, his knowledge of natural hiſtory, and the taſte and ſenſibility with which he ſurveyed the beauties of nature, and the grandeur and goodneſs of its author. He afterwards became private tutor to a young gentleman at Magdeburg. This procured him the acquaintance of Meſſrs Maupertuis, Euler, and Sack, which opened to his merit the path of preferment, and advanced him ſucceſſively to the place of mathematical profeſſor in the King's College at Berlin in 1747, and to that of member of the Royal Academy in 1750.

In this laſt quality he diſtinguiſhed himſelf in a very eminent manner, enriched the claſs of ſpeculative philoſophy with a great number of excellent memoirs, and was juſtly conſidered as one of the firſt-rate metaphyſicians in Germany. But his genius was not confined to this branch of ſcience. His *Univerſal Theory of the Fine Arts*, is a capital production. A profound knowledge of the arts and ſciences, and a perfect acquaintance with true taſte, are eminently diſplayed in this work, and will ſecure to its author a permanent and diſtinguiſhed rank in the republic of letters. The firſt volume of this excellent work was publiſhed in 1771, and the ſecond in 1774. We ſhall not here give a catalogue of the writings of M. Sulzer; but we cannot help mentioning his *Remarks on the Philoſophical Eſſays* of the late Mr Hume, as a work of real merit, which does juſtice to the acuteneſs, while it often detects the ſophiſtry, of the Britiſh Bayle. The moral character of M. Sulzer was amiable and virtuous: ſociability and beneficence were its characteriſtical lines; and his virtues were animated by that ſacred philoſophy that forms the Chriſtian, ennobles man, and is the only ſource of that heart-felt ſerenity and ſedate fortitude which ſupport humanity, when every other object of confidence fails. His dying moments were calm, humble, and ſublime; and when he expired, the placid and compoſed air of his countenance made his mourning friends doubt, for ſome time, whether it was death or ſleep that had ſuſpended his converſation. He had no enemy; and his friends were numerous, affectionate, and worthy of the tender returns he made them.

The king of Pruſſia diſtinguiſhed him by repeated marks of munificence and favour. We learn, however, that his royal protector had never ſeen him before the end of the year 1777, tho' he had been member of the academy from the year 1750. The audience, indeed, though late vouchſafed, was honourable to M. Sulzer, with whom the monarch converſed for a long time with the greateſt affability and condeſcenſion.

SYNCOPATION, in muſic, denotes a ſtriking or beating of time, whereby the diſtinction of the ſeveral times or parts of the meaſure is interrupted.

However, it is more properly uſed for the connecting the laſt note of any meaſure, or bar, with the firſt of the following meaſure; ſo as only to make one note of both.

A ſyncope is ſometimes alſo made in the middle of a meaſure.

Syncopation is alſo uſed when a note of one part ends or terminates on the middle of a note of the other part. This is otherwiſe denominated *binding*.

It is likewiſe uſed for a driving note; that is, when ſome ſhorter note at the beginning of a meaſure, or half meaſure, is followed by two, three, or more longer notes before another ſhort note occurs, equal to that which occaſioned the driving, to make the number even, *e. gr.* when an odd crotchet comes before two or three minims, or an odd quaver before two, three, or more crotchets.

In ſyncopated or driving notes, the hand or foot is taken up, or put down, while the note is ſounding.

T.

TAGETES, French Marigold; a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants. There are three ſpecies; the moſt remarkable are,

1. The erecta, grows naturally in Mexico, but has been long cultivated in the Britiſh gardens, where it is commonly titled *African marygold*. Of this there are the following varieties: 1. Pale yellow, or brimſtone colour, with ſingle, double, and fiſtulous flowers. 2. Deep yellow, with ſingle, double, and fiſtulous flowers. 3. Orange-coloured, with ſingle, double, and fiſtulous flowers. 4. Middling African, with orange-coloured flowers. 5. Sweet-ſcented African. Theſe are all very ſubject to vary; ſo that unleſs the ſeeds are very carefully ſaved from the fineſt flowers, they are apt to degenerate: nor ſhould their ſeeds be too long ſown in the ſame garden without changing it, for the ſame reaſon; therefore, thoſe who are deſirous to have theſe flowers in perfection, ſhould exchange their ſeeds with ſome perſon of integrity at a diſtance where the ſoil is of a different nature, at leaſt every other year. If this is done, the varieties may be continued in perfection. This plant is ſo well known as to need no deſcription. It flowers from the beginning of July till the froſt puts a ſtop to it.

2. The patula, grows naturally in Mexico, but has been long in the Britiſh gardens, where it is diſtinguiſhed from the firſt by the title of *French marygold*. Of this there are ſeveral varieties, ſome of which have much larger flowers than others, and their colour varies greatly: there are ſome which are beautifully variegated, and others quite plain; but as theſe are accidents ariſing from culture,

ſo they do not merit farther diſtinction; for we have always found that ſeeds ſaved from the moſt beautiful flowers will degenerate, eſpecially if they are ſown in the ſame garden for two or three years together, without changing the ſeed.

Theſe plants are annual, ſo muſt be propagated from ſeeds every ſpring, which may be ſown upon a moderate hot-bed the beginning of April: and when the plants are come up, they ſhould have plenty of freſh air; for if they are drawn too much, they will not afterward become handſome, notwithſtanding they have all poſſible care taken of them. When they are about three inches high, they ſhould be tranſplanted on a very moderate hot-bed, which may be arched over with hoops and covered with mats, for theſe plants are hardy enough to be brought up without glaſſes: in this bed they ſhould be planted about ſix inches aſunder each way, obſerving to water and ſhade them until they have taken root; but as the plants acquire ſtrength, they ſhould be inured to bear the open air by degrees; and about the end of May they ſhould be taken up with a ball of earth to the root of each plant, and planted into the borders of the parterre-garden, or into pots, for furniſhing the courts, &c. ſhading them carefully from the ſun till they have taken new root, and alſo ſupplying them duly with water. When their flowers appear, if any ſhould prove ſingle, the plants ſhould be deſtroyed, and then thoſe in pots may be removed to the court, where the ſeveral varieties, being intermixed with other annual plants, afford an agreeable variety.

Theſe plants have a ſtrong diſagreeable ſcent, eſpecially when handled; for which reaſon they are not ſo greatly eſteemed for planting near habitations: but the flowers of the ſweet-ſcented ſort being more agreeable, are generally preferred, eſpecially for planting in ſmall gardens.

TAVIRA, or TAVILA, a conſiderable town of Portugal, and capital of the province of Algarve, with a handſome caſtle, and one of the beſt harbours in the kingdom, defended by a fort. It is ſeated in a pleaſant fertile country, at the mouth of the river Gilaon, between Cape Vincent and the Strait of Gibraltar, 100 miles weſt by north of Cadiz. W. Long. 7. 46. N. Lat. 37. 18.

TEA, (*Encycl.*) Tea, in the Chineſe language, is called *tia*, in Fokien it is called *te;* and as the Europeans landed firſt in that province, that dialect has been preſerved.

The Europeans learned to drink this infuſion in the 15th century; and ſince that time have vied with each other in giving the Chineſe the moſt money for this and other goods which are become faſhionable: it grows both in China and in Japan. It likewiſe grows in Tonkin; but the beſt tea, according to Du Halde, comes from Fokien.

It was univerſally believed that all teas come from the ſame ſhrub, and are only diſtinguiſhed by the different age, gathering, and preparation, till Doctor Hill lately ſuppoſed that he had diſcovered that the brown tea comes from the tea-ſhrub with ſix petals or flower-leaves which Kempfer has deſcribed and repreſented, but that the green tea is taken from the tea-ſhrub with nine-leaved flowers. Linnæus diſtinguiſhes it, beſides the flowers, by the longer and narrower leaves.

The difference of petals may, however, be conſidered as dubious, at leaſt as not invariable. See Plate CCCXXIII. where a figure of each is given; that of the bohea being taken from the Amœn. Acad. vol. 7.; that of the viridis from a print by Miller after a drawing of a plant, in the duke of Northumberland's garden at Sion, which was the firſt that flowered in England, and the flower conſiſted of only ſix petals, like the bohea. [This laſt figure is rather upon too ſmall a ſcale comparatively with the other.]

After all, there are many ſorts and varieties of tea differing one from another in the ſhape and quality of the leaves; and differently denominated, from theſe circumſtances, from the places where they grow, or from the various ways of preparing.

The general diſtinction of theſe, however, is into brown and green, according as they tinge the water.

1. *Brown Teas.*

Oſbeck's Voyage to China, &c.

Brown tea is *bonam té*, or *kuli-té*, which grows in ſome places about Canton, and is drunk by the Chineſe, but not by the Europeans: its taſte being the leaſt agreeable of any. The dried leaves are either yellow or browniſh. The tea-ſhrubs, which are ſold in flower-pots here, ſcarce grow to the height of an ell. The flower conſiſts of ſix white petals, of which the three loweſt are the ſmalleſt.

An-kay is a coarſe ſort of tea, from a place of this name.

Té-bohé, which we uſually call *bohea-tea*, is called *moji* by the Chineſe. This ſort is brought to Europe in greater quantities than any of the others. The beſt ſort ſmells agreeably, and in a ſhort time gives a brown colour to the water, and conſiſts of leaves of one colour; if any black ones are among them, it is a bad ſort.

Tao-kyonn is the name of the beſt ſort of bohea tea.

Kongo, or as the Chineſe call it *kong-ſo*, has an agreeable ſcent: its leaves are finer than thoſe of té-bohé; though it is ſcarce diſtinguiſhable from the beſt bohea, except in price; for congo is ſomewhat dearer.

Sutchong, or *ſootchuen*, which the Chineſe call *ſaa-tyang*, or *ſu-tyann*, is the deareſt of all brown teas. It gives a fine yellow green colour to the water, and has an agreeable taſte, unleſs you put too much into the pot, which ſpoils both taſte and colour.

Padre ſutchong is the beſt tea that can be drunk. The leaves of this tea are large, yellowiſh, not rolled up, but expanded; and packed up in papers of half a pound each, like tobacco. If it is not taken great care of at ſea, it is much altered for the worſe.

Lin-kiſam is a ſort of tea which hath narrow rough leaves and footſtalks. It is ſeldom uſed by itſelf, but mixed with other ſorts.

Back-ho, or *pack ho*, is that which we call *pecko*, which has leaves with dots. It is a mild tea, has a good taſte, and is ſaid to be the leaſt heating of any.

2. *Of Green Teas*, there are

Hyſon, called *hy tiann*, or *hi-kiong* by the Chineſe.

Singlo, or *ſanglo*, is ſo called from the place whence it comes. The Chineſe likewiſe call it *ſing-tia*.

Bing, or imperial tea.

Tio té is rolled up like peaſe. This ſort is rolled

Plate CCCXXII.

Fig. 4.
Ichneumon.

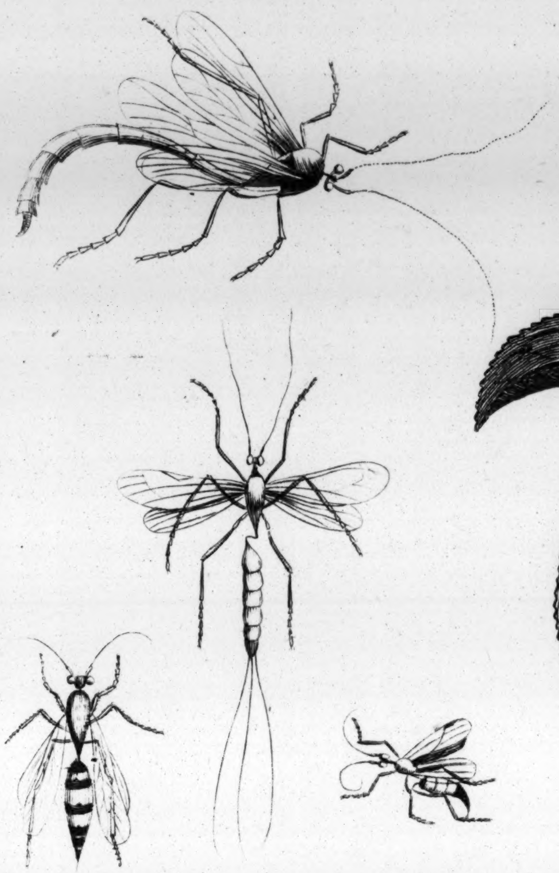


Fig. 1.
PANAX Quinquefolium.

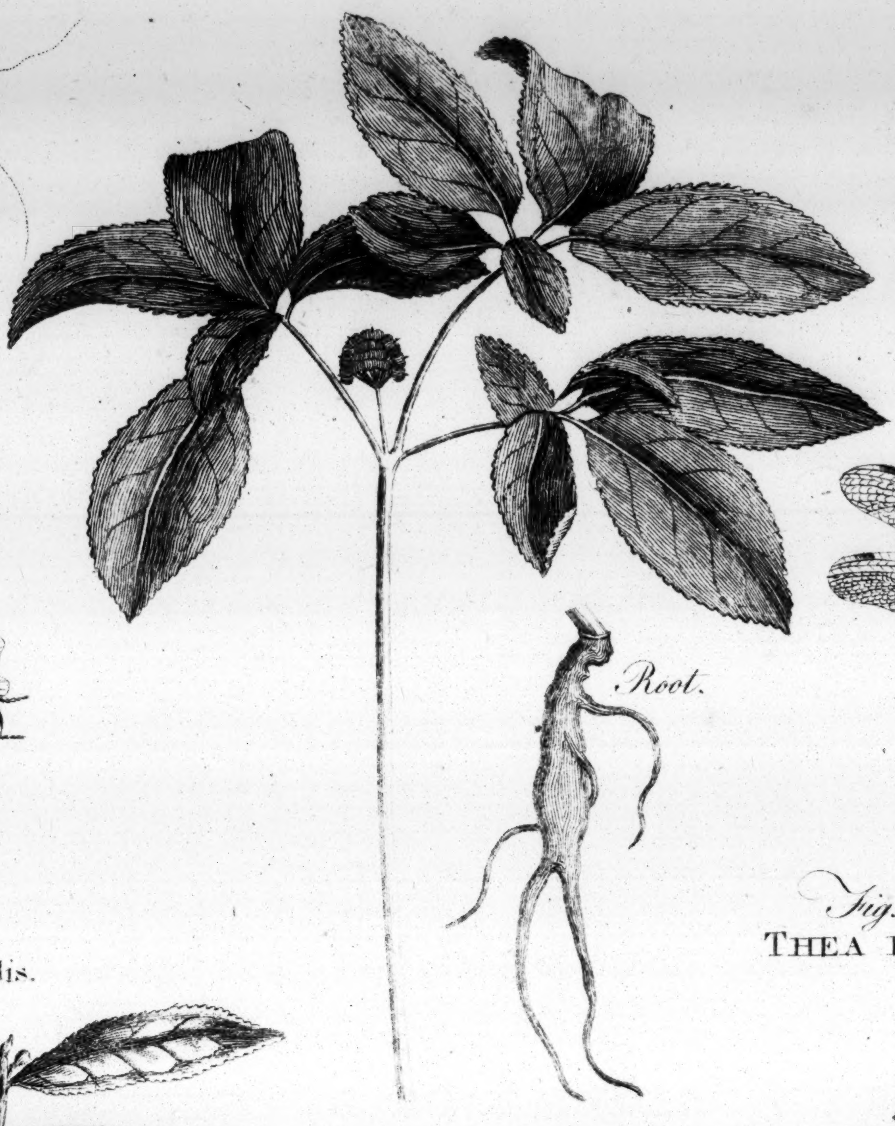


Fig. 6.
Libellulæ.
half the natural size.

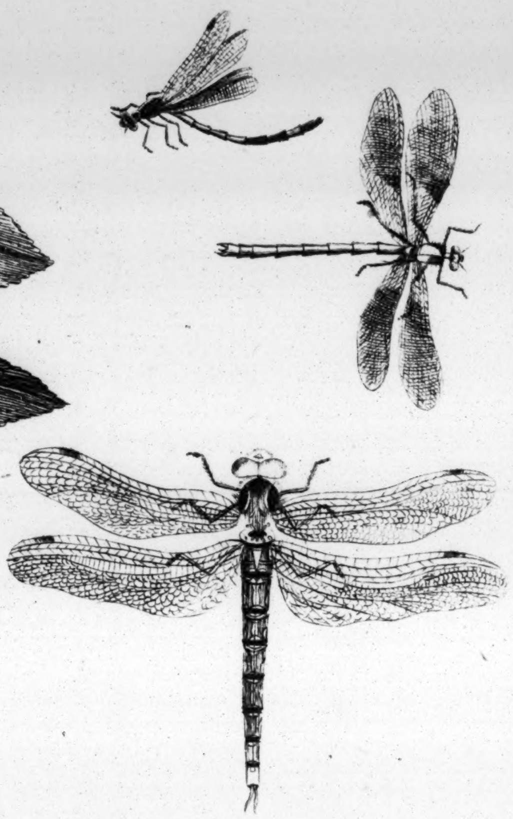


Fig. 2.
THEA Viridis.

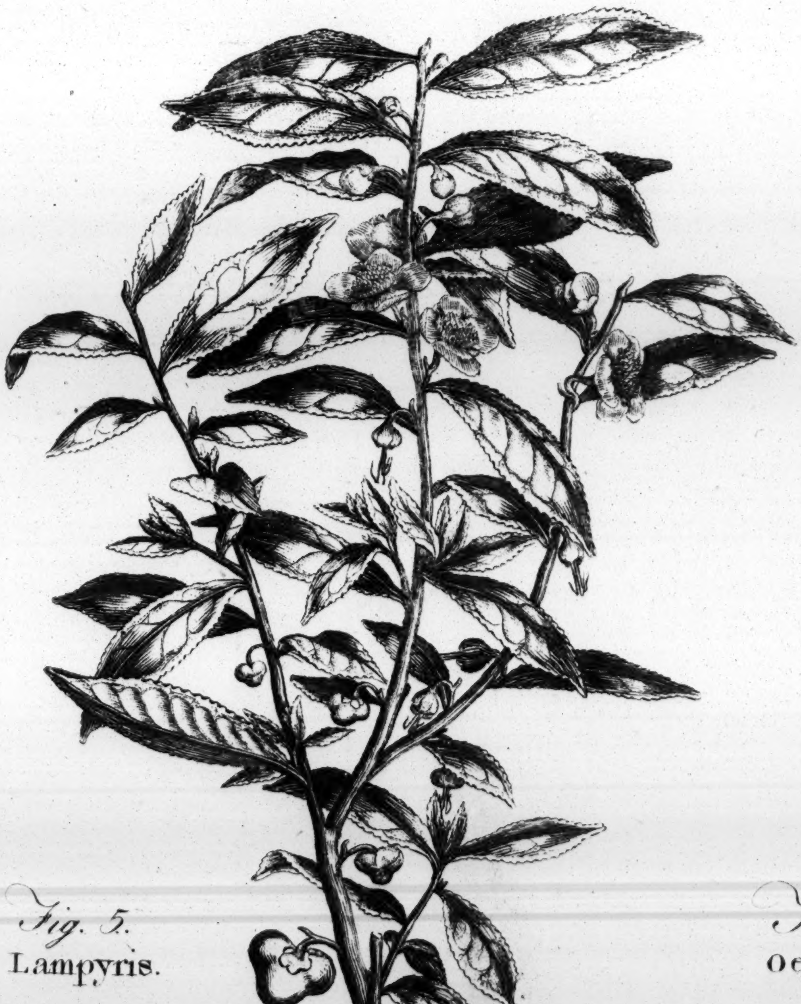


Fig. 3.
THEA Bohea.

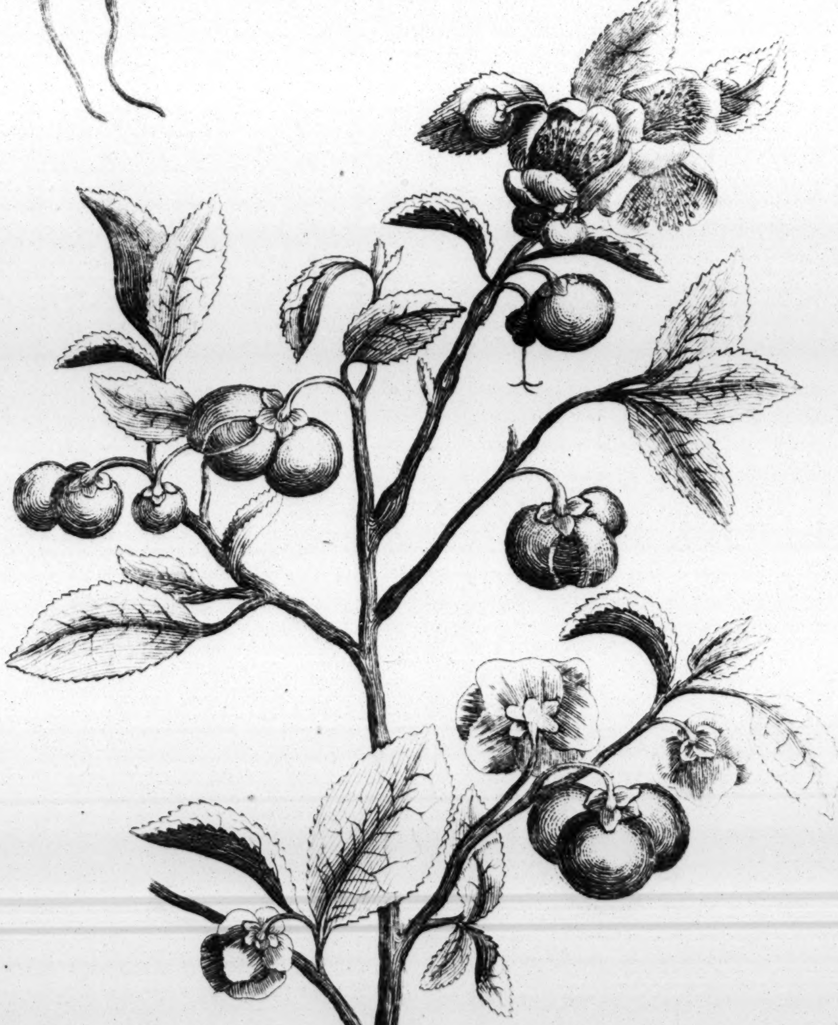


Fig. 5.
Lampyris.

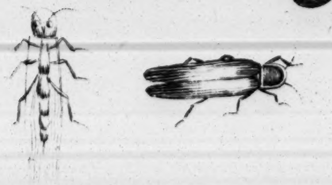
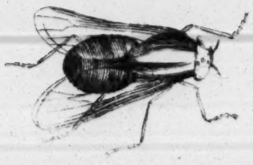


Fig. 7.
Oestrus.



A. Bell Sculpt.

3 MA 53

up between the hands in a rounder ſhape than the others. A ſmaller kind is called *gunpowder-tea*.

Hyoſn utchin, is diſtinguiſhable from the *hyſon ſkin* by its narrow and ſhort leaves.

Go-bé hath long narrow leaves.

The Chineſe likewiſe make tea-cakes, which they ſell very dear.

It is almoſt incredible what quantities of tea are annually exported into Europe and other parts; and what innumerable hands are employed in ſo unneceſſary an article. The countryman muſt with great care plant and nurſe the tea-ſhrubs: pluck every leaf in due time; ſeparate the new leaves from the old, and dry them with extreme accuracy. When the merchant has got the baſkets of tea, at a low rate, from the country people, he muſt often take care of it for years together; and is always uncertain when, or at what price, he ſhall ſell it. When the Europeans have fixed upon a place where they will make their bargains, they empty the baſkets (but let it be noted we are now ſpeaking of bohea tea, for the finer ſorts are ſold in cheſts); and if any bad tea is found in theſe baſkets, it is ſeparated from the reſt. The good tea is then packed up in new cheſts, the weight of which is deducted; and theſe cheſts are marked, and lined with lead in the inſide. A Chineſe gets into theſe cheſts, and treads down the tea as it is emptied out of the baſkets: this is very hard labour, and throws the treader, who is almoſt naked, into a profuſe perſpiration. Though great care is taken to prevent any thing from coming into the tea, yet it is hardly to be avoided: and ſometimes their feet are wounded and bleed. But the tea has already paſſed thro' ſo many dirty hands, that thoſe who uſe that drug have no reaſon to be diſguſted with this laſt mark of indelicacy in the package. As ſoon as ſome of the cheſts are packed by a number of kuleers, or Chineſe ſervants, they are paſted over with paper, and carried out of the warehouſe to the factories, where they are weighed by the Chineſe cuſtom-houſe officers, in the preſence of the interpreter, and marked red with a ſtiff bruſh, or with a wooden ſtamp.

Some poor people are ſatisfied with the leaves of rhamnus thea, which they put into their clayey water, inſtead of tea, to make it more palatable. In the account of the Dutch embaſſy to China, it is related that the Chineſe make uſe of a ſpecies of moſs inſtead of tea.

The high price of tea, at its firſt introduction, induced many phyſicians to think of a ſubſtitute; and it is well known that Simon Pauli thought the *myrica gale* to be the ſhrub itſelf. Other ſuccedanea are mentioned by authors; ſuch as the leaves of the

Prunus ſpinoſa,	ſloe-tree.
Origanum vulgare,	wild marjoram.
Rubus arcticus,	arctic bramble.
Veronica officinalis,	male ſpeedwell.
Veronica chamædrys,	wild germander.
Chenopodium ambroſioides,	Mexican ſweet blite.
Capraria biflora,	ſweet-weed or goat-weed.

The ſophiſtication of tea practiſed by the ſmugglers in ſome of the ſouthern parts of this kingdom is well known. In particular, they have reduced to a regular proceſs the management of the leaves of the aſh and elder; which, when prepared, is called *ſmouch*, and mixed, as is ſaid, in the proportion of one-third, with the ordinary teas. To what an extent the trade in this ſophiſticated tea had been carried, to the detriment of the trees, may be imagined, when the reader is informed, that an act of parliament has lately been obtained to prohibit it, under very ſevere penalties.

THELIGONUM, DOG'S CABBAGE; a genus of the polyandria order, belonging to the monœcia claſs of plants. There is only one ſpecies; viz. the cynocrambe or dog's-cabbage of Dioſcorides. This plant grows plentifully in the ſouth of France, in Italy and Tartary. It is annual. The ſtalks trail on the ground like thoſe of chickweed; they grow about a foot long; their joints are pretty cloſe, garniſhed with oval acute-pointed leaves, ſtanding on pretty long footſtalks, which are bordered. At each joint is placed one of theſe leaves; and from the ſame point come out ſeveral ſmaller, of the ſame ſhape, on ſhorter footſtalks. The flowers are produced from the wings of the ſtalks in cluſters, ſitting very cloſe; they are ſmall, of an herbaceous white colour, ſo make no great appearance. The male and female flowers grow from the ſame joint. The female flowers are ſucceeded by a ſingle roundiſh ſeed, which ripens in autumn.

It is preſerved in botanic gardens for the ſake of variety. The ſeeds of this muſt be ſown in autumn, in the place where the plants are to remain; for when they are ſown in the ſpring, the plants rarely come up the ſame year. They require no other culture but to keep them clean from weeds, and thin them where they are too cloſe.

THEOBROMA, in botany, a genus of the polydelphia order, belonging to the pentandria claſs of plants. There are two ſpecies, both natives of the Indies.

1. The firſt, which is the cacao, or chocolate-nut tree, is but of very moderate growth. See CACAO, (*Encycl.*) and Plate LXVI.

2. The guazuma, or baſtard cedar of Jamaica, riſes with an upright large trunk, branching numerouſly, and ſpreading 30 or 40 feet high; with oblong, heart-ſhaped, ſerrated, alternate leaves, four inches long; and numerous ſmall yellowiſh flowers at the ſides of the branches; ſucceeded by roundiſh, tuberculated rough fruit, containing the ſeed.

TIBERIUS, the third emperor of Rome, under whoſe reign our Saviour ſuffered. See ROME, nº 268, —281.

TIMBER, (*Encycl.*) Of all the different kinds known in Europe, oak is the beſt for building; and even when it lies expoſed to air and water, there is none equal to it. Fir-timber is the next in degree of goodneſs for building, eſpecially in England, where they build upon leaſes. It differs from oak in this, that it requires not much ſeaſoning, and therefore no great ſtock is required before-hand. Fir is uſed for flooring, wainſcoting, and the ornamental parts of building within doors. Elm is the next in uſe, eſpecially in England and France: it is very tough and pliable, and therefore eaſily worked: it does not readily ſplit: and it bears driving of bolts and nails better than any other wood; for which reaſon it is chiefly uſed by wheel-wrights, and coach-makers, for ſhafts, naves, &c. Beech is alſo uſed for many purpoſes: it is very tough and white when young, and of great ſtrength; but liable to warp very much when expoſed to the weather, and to be worm-eaten when uſed with-

Timber.

in doors; its greateſt uſe is for planks, bedſteads, chairs, and other houſhold goods. Aſh is likewiſe a very uſeful wood, but very ſcarce in moſt parts of Europe; it ſerves in buildings, or for any other uſe, when ſcreened from the weather; handſpikes and oars are chiefly made of it. Wild cheſnut timber is by many eſteemed to be as good as oak, and ſeems to have been much uſed in old buildings; but whether theſe trees are more ſcarce at preſent than formerly, or have been found not to anſwer ſo well as was imagined, it is certain this timber is now but little uſed. Walnut-tree is excellent for the joiner's uſe, it being of a more curious brown colour than beech, and not ſo ſubject to the worms. The poplar, abel, and aſpen trees, which are very little different from each other, are much uſed inſtead of fir, they look well, and are tougher and harder.

The goodneſs of timber not only depends on the ſoil and ſituation in which it ſtands, but likewiſe on the ſeaſon wherein it is felled. In this people diſagree very much; ſome are for having it felled as ſoon as its fruit is ripe, others in the ſpring, and many in the autumn. But as the ſap and moiſture of timber is certainly the cauſe that it periſhes much ſooner than it otherwiſe would do, it ſeems evident that timber ſhould be felled when there is the leaſt ſap in it, viz. from the time that the leaves begin to fall till the trees begin to bud. This work uſually commences about the end of April in England, becauſe the bark then riſes moſt freely; for where a quantity of timber is to be felled, the ſtatute requires it to be done then, for the advantage of tanning.

The ancients chiefly regarded the age of the moon in felling their timber; their rule was to fell it in the wain, or four days after the new moon, or ſometimes in the laſt quarter. Pliny adviſes it to be in the very article of the change, which happening to be in the laſt day of the winter ſolſtice, the timber, ſays he, will be incorruptible. Timber ſhould likewiſe be cut when of a proper age; for when it is either too young or too old, it will not be ſo durable as when cut at a proper age. It is ſaid that oak ſhould not be cut under 60 years old, nor above 200. Timber, however, ſhould be cut in their prime, when almoſt fully grown, and before they begin to decay; and this will be ſooner or later, according to the dryneſs and moiſtneſs of the ſoil where the timber grows, as alſo according to the bigneſs of the trees; for there are no fixed rules in felling of timber, experience and judgment muſt direct here as in moſt other caſes.

After timber has been felled and ſawed, it muſt be ſeaſoned: for which purpoſe ſome adviſe it to be laid up in a very dry airy place, yet out of the wind and ſun, or at leaſt free from the extremities of either; and that it may not decay, but dry evenly, they recommend it to be daubed over with cow-dung. It muſt not ſtand upright, but lie all along, one piece over another, only kept apart by ſhort blocks interpoſed, to prevent a certain mouldineſs which they are otherwiſe apt to contract in ſweating on one another; from which ariſes frequently a kind of fungus, eſpecially if there be any ſappy parts remaining. Others adviſe the planks of timber to be laid for a few days in ſome pool or running ſtream, in order to extract the ſap, and afterwards to dry them in the ſun or air. By this means, it is ſaid, they will be prevented from either chopping, caſting, or cleaving, but againſt ſhrinking there is no remedy. Some again are for burying them in the earth, others in a heat; and ſome for ſcorching and ſeaſoning them in fire, eſpecially piles, poſts, &c. which are to ſtand in water or earth. The Venetians firſt found out the method of ſeaſoning by fire; which is done after this manner: They put the piece to be ſeaſoned into a ſtrong and violent flame; in this they continually turn it round by means of an engine, and take it out when it is everywhere covered with a black coaly cruſt; the internal part of the wood is thereby ſo hardened, that neither earth nor water can damage it for a long time afterwards.

Timber, Tribulus.

After the planks of timber have been well ſeaſoned and fixed in their places, care is to be taken to defend or preſerve them; to which the ſmearing them with linſeed oil, tar, or the like oleaginous matter, contributes much. The ancients, particularly Heſiod and Virgil, adviſe the ſmoke-drying of all inſtruments made made of wood, by hanging them up in the chimneys where wood-fires are uſed. The Dutch preſerve their gates, portcullices, drawbridges, ſluices, &c. by coating them over with a mixture of pitch and tar, whereon they ſtrew ſmall pieces of cockle and other ſhells, beaten almoſt to powder, and mixed with ſea-ſand, which incruſts and arms them wonderfully againſt all aſſaults of wind and weather. When timber is felled before the ſap is perfectly at reſt, it is very ſubject to the worms; but to prevent and cure this, Mr Evelyn recommends the following remedy as the moſt approved: Put common ſulphur into a cucurbit, with as much aquafortis as will cover it three fingers deep; diſtil it to drineſs, which is performed by two or three rectifications. Lay the ſulphur that remains at bottom, being of a blackiſh or ſand-red colour, on a marble, or put it in a glaſs, and it will diſſolve into an oil; with this oil anoint the timber which is infected with worms. This, he ſays, will not only prevent worms, but preſerve all kinds of woods, and many other things, as ropes, nets, and maſts, from putrefaction, either in water, air, or ſnow.

TRIBULUS, CALTROPS; a genus of the monogynia order, belonging to the decandria claſs of plants. There are three ſpecies; the moſt remarkable is the terreſtris, with ſix pair of lobes to each leaf. It is a very common weed in the ſouth of France, in Spain, and Italy, where it grows among corn, and on moſt of the arable land, and is very troubleſome to the feet of cattle; for the fruit being armed with ſtrong prickles, run into the feet of the cattle which walk over the land. This is certainly the plant which is mentioned in Virgil's Georgics under the name of *tribulus*, tho' moſt of his commentators have applied it to other plants. It is called in Engliſh *caltrops*, from the form of the fruit, which reſembles thoſe inſtruments of war that were caſt in the enemies way to annoy their horſes.—This hath a ſlender fibrous root, from which ſpring out four or five ſlender hairy ſtalks, which ſpread flat on the ground, garniſhed at each joint with winged leaves, compoſed of ſix pair of narrow hairy lobes, almoſt of equal ſize; thoſe on the lower part of the ſtalk ſtand alternately, but toward the top they are placed oppoſite. The flowers come out from the wings of the ſtalk, ſtanding upon ſhort footſtalks; they are compoſed of five broad, obtuſe, yellow petals, which ſpread open. In the centre is ſituated an oblong germen, crowned by a headed ſtigma, attended by ten ſhort ſtamina, terminated by ſingle ſummits, and are ſucceeded by roundiſh, five-cornered, prickly fruit, which, when ripe, divides into five parts, each having a tranſverſe cell containing one or two ſeeds.—This plant is preſerved in botanic gardens for variety. It is propagated by ſeeds, which ſhould be ſown in autumn; for thoſe which are kept out of the ground till ſpring commonly remain in the ground a whole year before the plants come up. Theſe ſeeds ſhould be ſown on an open bed of light earth, where they are deſigned to remain; for as it is an annual plant, it doth not bear tranſplanting very well, unleſs it be done when the plants are very young. In the ſpring, when the plants come up, they ſhould be carefully cleared from weeds; and where they come up too cloſe, ſome of the plants ſhould be pulled out to give room for the remaining plants to grow; after this they will require no other culture but to keep them clear from weeds. If the ſeeds are permitted to ſcatter, the plants will come up the following ſpring, and maintain their place if they are not overborne with weeds.

TRILL, or Plain Shake and Gruppo, in muſic. The firſt is defined to be a ſhake upon one note only, in the making whereof the ſcholar is directed to ſing the firſt of the examples, (Plate CCCXIII. fig. 2.) beginning with the firſt crotchet, and beating every note with the throat upon the vowel o, to the laſt breath. The gruppo (as deſcribed by Playford) appears to be no other than the ſhake now practiſed, and which conſiſts in the alternate prolation of two tones in juxtapoſition to each other, with a cloſe on the note immediately beneath the lower of them. The trill (ſays Playford) being the moſt uſual grace, is made in cloſes or cadences; and when on a long note, exclamation or paſſion is expreſſed there, the trill is made in the latter part of ſuch note; but moſt uſually upon binding notes, and ſuch as precede the cloſing note. Notwithſtanding this, Mr Hawkins is of opinion that the trill is rather a defect than an ornament in ſinging; as being nothing more than the intermitted prolation of a ſingle tone.

TROPÆOLUM, Indian Cress; a genus of the monogynia order, belonging to the octandria claſs of plants. There are two ſpecies: 1. The minus, or ſmall Indian creſs, grows naturally in Peru. This was firſt brought to Europe in 1684, and was raiſed in the gardens of count Bevening in Holland. It has a trailing herbaceous ſtalk, garniſhed with leaves almoſt circular. The foot-ſtalk is inſerted in the centre of the leaf, like a buckler, as in the navelwort; they are ſmooth, of a greyiſh colour; the flowers come out from the wings of the ſtalks, ſtanding upon very long ſlender foot-ſtalks, of an admirable ſtructure, compoſed of five acute-pointed petals; the two upper are large and rounded, the three under are narrow; their tails join together, and are lengthened into a tail two inches long. After the flower is paſt, the germen turns to a roundiſh fruit, which is furrowed, and divided into three lobes, each including one ſtreaked ſeed. It flowers from Midſummer till the froſt ſtops it in autumn. There are two varieties of this, one with a deep orange-coloured flower, inclining to red, and the other with a pale yellow flower. 2. The majus, or greater Indian creſs, grows naturally about Lima; this has larger ſtalks than the former. The leaves are alſo larger, and their borders are indented almoſt into lobes; the flowers are larger, and their petals are rounded at their points. There are are two colours of this ſort as in the former; and one with double flowers, which is propagated by cuttings, for it does not produce ſeeds.—The firſt ſort is leſs common at preſent in the Engliſh gardens than the ſecond, though it was formerly more ſo; the flowers of the latter being larger, make a finer appearance, for which it is preferred: they are both eſteemed annual plants, though they may be continued through the winter if they are kept in pots, and ſheltered in a good green-houſe, in like manner as that with double flowers is preſerved; ſo may be propagated by cuttings as that is. But, as theſe ripen their ſeeds conſtantly every year, the plants are generally raiſed from them: theſe may be ſown in April in the places where they are to remain, which ſhould be where their ſtalks may have ſupport; for they will climb ſix or eight feet high, when they are trained up, and then their flowers make a good appearance; but when they trail upon the ground, they will ſpread over the neighbouring plants and become unſightly.—The flowers of theſe plants are frequently eaten in ſalads; they have a warm taſte like the garden creſs, and are eſteemed very wholeſome; they are likewiſe uſed for garniſhing diſhes. The ſeeds are pickled, and by ſome are preferred to moſt kinds of pickles for ſauce.

TRYING, in the ſea-language. A ſhip is ſaid to *try* or to lie *a-try*, when no ſails are abroad but the main-ſail or mizen-ſail.

TUBIPORA, or Tubularia, a genus of ſubmarine plants, belonging to the cryptogamia claſs, of the hardneſs of coral, and conſiſting of cylindric tubes riſing from a thin cruſt of the ſame ſort of matter with themſelves. See Plate CCCXVII.

TYLES, (*Encycl.*) There are various kinds of tyles for the various occaſions of building; as plain, thack, ridge, roof, creaſe, gutter, pan, crooked, or Flemiſh, corner, hip, dormar, ſcallop, aſtragal, traverſe, paving, and Dutch tyles.

Plain or thack tyles, are thoſe in ordinary uſe for covering of houſes. They are ſqueezed flat, while yet ſoft, in a mould. They are of an oblong figure; and by 17 Edw. IV. c. 4. are to be $10\frac{1}{2}$ inches long, and $6\frac{1}{4}$ broad, and half an inch and half a quarter thick. But theſe dimenſions are not over ſtrictly kept to.—Ridge, roof, or creaſe tyles, are thoſe uſed to cover the ridges of houſes, being made circular breadthwiſe, like an half-cylinder; they are, by the aforeſaid ſtatute, to be 13 inches long, and of the ſame thickneſs with the plain tyles.—Hip or corner tyles, are thoſe which lie on the hips or corners of roofs. As to form, they are firſt made flat like plain tyles, but of a quadrangular figure, whoſe two ſides are right lines, and two ends edges of circles, one end being a little concave and the other convex. The convex end is to be about ſeven times as broad as the concave end, ſo that they would be triangular but that one corner is taken off; then, before they are burnt, they are bent on a mould breadthwiſe, like ridge tyles. They have an hole at their narrow end to nail them on by, and are laid with their narrow end upwards; by ſtatute, they are to be 10½ inches long, and of a convenient breadth and thickneſs.—Gutter tiles, are thoſe which lie in gutters or valleys in croſs buildings. They are made like corner-tyles, only the corners of the broad end are turned back again with two wings. They have no holes in them, but are laid with the broad end upupwards, without any nailing. They are made in the ſame mould as the corner-tyles, and have the ſame dimenſions on the convex ſide. Their wings are each four inches broad and eight long. Pan, crooked, or Flemiſh tyles, are uſed in covering of ſheds, lean-to's, and all kinds of flat-roof buildings. They are in form of an oblong parallelogram, as plain tyles; but are bent breadthwiſe forwards and backwards in form of an S, only one of the arches is at leaſt three times as big as the other; which biggeſt arch is always laid uppermoſt, and the leſs arch of another tyle lies over the edge of the great arch of the former. They have no holes for pins, but hang on the laths by a knot of their own earth. They are uſually 14½ inches long, and 10½ broad. By 12 Geo. I. c. 25. they are to be, when burnt, not leſs than 13½ inches long, and 9½ inches wide, and half an inch thick.—Dormar or dorman tyles conſiſt of a plain tyle and a triangular piece of a plain one ſtanding up at right angles to one ſide of the plain tyle, and ſwept with an arch of a circle from the other end, which end terminates in a point. Of theſe tyles there are two kinds, the triangular piece in ſome ſtanding on the right, in others on the left ſide of the plain tyle. And of theſe again there are two kinds, ſome having a plain whole tyle, others but half a plain tyle. But in them all the plain tyle has two holes for the pins at that end where the broad end of the triangular piece ſtands. Their uſe is to be laid in the gutters betwixt the roof and the cheeks or ſides of the dormars, the plain part lying on the roof, and the triangular part ſtanding perpendicularly by the cheek of the dormar; they are excellent to keep out the wet in thoſe places, and yet they are hardly known any where but in Suſſex. The dimenſions of the plain tyle part are the ſame as thoſe of a plain tyle; and the triangular part is of the ſame length, and its breadth at one end ſeven inches, and at the other nothing. Scallop or aſtragal tyles are in all reſpects like plain tyles, only their lower ends are in form of an aſtragal, viz. a ſemicircle with a ſquare on each ſide. They are uſed in ſome places for weather-tyling.—Tranſverſe tyles are a kind of irregular plain tyles, having the pin-holes broken out, or one of the lower corners broken off. Theſe are laid with the broken end upwards, upon rafters where pinned tyles cannot hang.

Flemiſh or Dutch tyles are of two kinds, ancient and modern: the ancient were uſed for chimney foot-paces; they were painted with antique figures, and frequently with poſtures of ſoldiers, ſome with compartments, and ſometimes with moreſque devices; but they come much ſhort of the deſign and colours of the modern ones. The modern Flemiſh tyles are commonly uſed plaſtered up in the jaumbs of chimneys inſtead of chimney-corner ſtones. Theſe are better glazed, and ſuch as are painted (for ſome are only white) are done with more curious figures and more lively colours than the ancient ones. But both kinds ſeem to be made of the ſame whitiſh clay as our white glazed earthen ware; the modern ones are commonly painted with birds, flowers, &c. The ancient ones are only five inches and a quarter ſquare, and about three quarters of an inch thick; the modern ones ſix inches and a half ſquare, and three quarters of an inch thick.

U, V.

VAYER (Francis de la Mothe le), a Pariſian counſellor of ſtate, and preceptor to the duke of Anjou, only brother to Lewis XIV. was born at Paris in 1588. He was admitted into the French academy in 1639; but his ſtyle was leſs polite than that of his fellow-academicians. He was a man of a regular conduct, like that of the ancient ſages; however, his auſterity and wiſdom did not prevent his being accuſed of having no religion. This was probably founded on certain Dialogues written by him, and publiſhed under the name of *Oraſius Tubero*, and upon his ſhowing throughout his works in general too great an inclination to ſcepticiſm. He was greatly affected at the loſs of his only ſon; and his grief diſordered him ſo much, that he married again, though he was above 75, and had no reaſon to lament his firſt wife. He died in 1672, aged 84.

VESPA, the WASP, in zoology, a genus of inſects of the hymenoptera order; of which the following are the characters: The mouth is armed with jaws, but has no roſtrum: the upper wings are folded in both ſexes: the ſting is ſharp-pointed, and concealed within the abdomen: the eyes are lunular: the body is ſmooth, without hair: to which may be added, that the antennæ are broken, the firſt articulation being longer than the reſt; the under wings ſhorter than the upper; the abdomen joined to the thorax by a very ſhort ſtalk; and the ſtemmata three in number.

1. The crabro, has the antennæ and head of a dun colour, ſomewhat brown. The upper lip is yellow, and the eyes are blackiſh. The middle of the thorax is black; brown on the fore-part, the ſides, and behind. The legs are of the ſame brown colour, inclining to cheſnut. The firſt ſegment of the abdomen is black mixed with brown, and ſlightly edged with lemon colour; the others are black on the upper ſide, a portion of which is again covered by the upper ſegment, and yellow underneath. Upon the yellow are ſeen two black ſpots on each of the rings; one on each ſide, connected with the black colour of the upper part. This large ſpecies of waſps makes its neſt in the trunks of hollow trees, and in the timber-work of lofts. Its cakes or combs are compoſed of a ſubſtance reſembling coarſe paper or ruſty parchment. It is very voracious, devouring other inſects, and even bees. Of thoſe inſects, ſome live in ſociety, others are ſolitary. A diſtinguiſhing character of this genus of flies is their bodies being ſmooth and apparently without hairs. Their upper wings, when at reſt, are folded in two the whole length of them. At the riſe of each of thoſe wings is ſituate a ſcaly part, which performs the office of a ſpring to hinder the upper wing from

riſing too high in the flapping of their wings; a caution very important to thoſe carnivorous inſects who purſue their prey on full ſtretch of wing.

2. The vulgaris, or common waſp. Theſe raiſe ſubterraneous buildings, live in aſſociations, feed on plunder, and commit great outrages on our wall-fruit. This numerous commonwealth is founded by a ſingle female impregnated during the autumn, and that has weathered out the ſeverity of the winter. It digs a hole in a dry ſoil, contrives itſelf a ſinuous inlet, or elſe it takes up with the dwelling-place of a mole, where it haſtily builds a few cells and depoſits its eggs. Within the ſpace of 20 days, they have gone through the different ſtates of larvæ, chryſalids, and are turned to waſps. Nature, all-wiſe, provides for every thing. The mule-waſps, or that are of no ſex, are the only ones that labour at laying the foundation of the republic. The firſt eggs that are hatched prove to be neuter waſps. No ſooner are they come into exiſtence, but they fall to work, enlarge the hole, and go about upon wood, lattice-work, and window-ſaſhes, in ſearch of materials for building. With their teeth they cut, hack, and tear off ſmall fibres of wood, which they moiſten with a liquor they diſgorge, and then convey them to the work-ſhop. Other labourers are in waiting for them, who with thoſe materials ſet about the contruction of the waſp-neſt; an edifice outwardly compoſed of ſheets of paper, which not being in contact with each other, dampneſs cannot penetrate to the inſide. This latter part conſiſts of 12 or 15 ſtories, and between each runs a colonnade formed by the faſtenings which connect the cakes one to the other. Every ſtory is as it were a market-place, where the citizens may take their walks. The cells are hexagonal. It is the cradle in which the mother continues to lay eggs of neuter-waſps to the number of 15000 or 16000; after which it depoſits 300 eggs of females, and as many of males. The elder brothers, or firſt-hatched inſects, take amazing care of thoſe born after them, by proportioning their food to the delicacy of their ſtomach. Firſt, it conſiſts of the juice of fruits and meats, afterwards it is the carcaſes of inſects. The caterers provide for the labourers. Each one takes his own portion; there is no diſpute, no fighting. The republic grows daily more numerous, living in profound peace. Every individual, as ſoon as he has acquired ſufficient ſtrength, flies away to the fields. They then become a gang of banditti; they pillage our wall-trees, break into our fruit before its maturity, dart with the fierceneſs of hawks upon our bees, cut their throats to poſſeſs themſelves of their honey, plunder and lay waſte their commonwealth, riot on the fruits of their labour, and oblige them to remove. During the period of plenty, the waſps bring all the booty to the neſt, and ſhare it amongſt them. There is nothing then goes forwards but feaſting, rioting, and good-fellowſhip; but concord cannot be laſting among robbers. Towards the month of October proviſions begin to run ſhort; when this lively, this amicable young brood is fired with a kind of rage, and the neſt is now nothing but a ſcene of horror. The neuters and males tear from their cradles the eggs, the larvæ, the chryſalids, and the new-born inſects, without ſhowing mercy to any. They next fight one againſt another, though their duels ſeldom proceed to death as thoſe of the bees. The males alone are deſtitute of ſtings. The hopes of the ſtate, the ſolicitude for poſterity, the love of their native place, no longer exiſt; the whole commonwealth is overturned to the very foundation. Froſts and rains throw the citizens into a ſtate of languor. They almoſt all periſh, luckily for us and our bees. Some few females eſcape the diſaſters of inteſtine war and the ſeverity of winter, which in the enſuing ſpring become founders of new republics. One robber is ſometimes uſeful in bringing another to puniſhment. Some butchers hang up before their ſhop a calf's liver or any other tender meat. The waſps come in queſt of this delicate food; and, fond of enjoying it to themſelves, they purſue the blue-bottle flies, from whoſe eggs are produced the maggots that ſpoil meat: and this is the only advantage we can reap from waſps.

Barbut on Inſects.

3. The aërial waſps are a very ſmall ſpecies; nor is their ſociety numerous. Their hiſtory, as well as their manners, are the ſame as thoſe of the common waſp; but their buildings are on a different conſtruction. Their neſt is faſtened to the branch of a tree with a kind of a band, and is in bigneſs from the ſize of an orange down to that of an egg. Wood reduced to paper is the material part of it, which, if it were of a ruddy colour, might be taken for a large opening roſe. It is covered over with a varniſh impenetrable by water. One of thoſe neſts was neither mollified nor impaired by that element.—There are 25 other ſpecies.

VIRGULA DIVINA, or *Baculus divinatorius*, &c. a forked branch, in the form of a Y, cut off an hazel-ſtick, by means whereof people have pretended to diſcover mines, ſprings, &c. under ground. The method of uſing it is thus: The perſon who bears it, walking very ſlowly over the places where he ſuſpects mines or ſprings may be, the effluvia exhaling from the metals, or vapour from the water, impregnating the wood, makes it dip or incline, which is the ſign of a diſcovery.

Some diſpute the matter of fact, and deny it to be poſſible. Others, convinced by the great number of experiments alleged in its behalf, look out for the natural cauſes thereof: The corpuſcles, ſay thoſe authors, riſing from the ſprings or minerals, entering the rod, determine it to bow down, in order to render it parallel to the vertical lines which the effluvia deſcribe in their riſe.

The famous Father Kircher, in his *Mundus Subterraneus*, in which many intereſting particulars are found concerning mines, derides theſe practices, and denies, from his own experience, the truth of the aſſertions concerning them. He ſeems, however, to have ſome faith in ſympathies, and propoſes even new divining wands of his own invention; the effects of which, though more dependent on phyſical cauſes, are not, however, more certain. He believes, for inſtance, that a wand, one end of which ſhould be made of ſal gem, and the other of wood, being ſuſpended and balanced above a mine of ſalt, would be inclined towards the ground; and he ſupports his opinion by an experiment. This experiment conſiſts in evaporating over the fire a ſolution of ſal gem below the wand, which is by this means really made to incline. We need not be deeply learned in chemiſtry to diſcover, that the wand would have inclined in the ſame manner if Father Kircher had evaporated pure water inſtead of a ſolution of ſal gem; becauſe the water would have equally well attached itſelf to the ſaline end of the wand; conſequently this experiment proves nothing.

The ſame author propoſes alſo to diſcover mines of mercury by employing a wand, one end of which is made of gold, and the other of wood, in hopes that the emanations of the mercury would attach themſelves to the gold rather than to the wood, and would make it incline downwards. But this effect certainly cannot be produced unleſs the mercury was evaporating; for which purpoſe two conditions are neceſſary: 1. The mercury muſt be in a native metallic ſtate, and not mineraliſed, as it is in cinnabar; and, 2. it muſt alſo be expoſed to the heat of ſome ſubterranean fire, by which it is volatiliſed and ſublimed, the ordinary heat of the earth being far too little for this purpoſe. This ſecond phyſical or chemical divining wand propoſed by Father Kircher is therefore no better than the former; and probably the ſame judgment may be paſſed upon all other wands made upon the ſame principles and in imitation of theſe. Laſtly, the ſame author poſitively affirms, that he hung and balanced a wand, one half of which was made of alder-tree, and the other half of ſome wood that has no ſympathy with water, over a ſubterranean water, and that he obſerved the end of the wand incline towards the earth.

VITEX, the AGNUS CASTUS, or *Chaſte Tree;* a genus of the angioſpermia order, belonging to the didynamia claſs of plants. There are three ſpecies; of which the moſt remarkable is the agnus caſtus, or common chaſte tree. This grows naturally in Sicily near Naples, by the ſides of rivers, and in the Archipelago in moiſt places: it has a ſhrubby ſtalk 10 or 12 feet high, ſending out branches oppoſite the whole length, which are angular, pliable, and have a greyiſh bark, garniſhed with leaves for the moſt part placed oppoſite, compoſed of five, ſix, or ſeven lobes, which unite at the footſtalk, and ſpread out like the fingers of a hand, ending in blunt points, of a dark green on their upper ſide, but hoary on their under. The flowers are produced in ſpikes at the extremity of the branches, from ſeven to fifteen inches long, diſpoſed in whorls round the ſtalks, with intervals between each whorl: they are of the lip-kind; the two lips are each cut into three ſegments, the middle being larger than the two ſides; in ſome plants white, and in others blue: theſe are generally late before they appear; ſo that in bad ſeaſons they do not open fair. The flowers have an agreeable odour, and make a good appearance in autumn, when the flowers of moſt other ſhrubs are gone; for, in warm mild ſeaſons, theſe ſhrubs are in full flower in the middle of October.

This ſort is pretty common in many Engliſh gardens, where it has been long an inhabitant, but was not much propagated till of late years. It is very hardy; and may be propagated by planting the cuttings early in the ſpring, before they ſhoot.

VITRIFICATION, the production of glaſs, one of the moſt curious and moſt important operations in chemiſtry. See GLASS, (*Encycl.*)

The hardneſs, beauty, and perfect tranſparency, of glaſs render it very extenſively uſeful in ordinary life, in natural philſophy, in chemiſtry, and in many arts. Almoſt any form may be given to glaſs, and all kinds of veſſels and utenſils may be formed of it, which are capable of reſiſting the moſt powerful corroſives and ſolvents. Glaſs is capable of receiving and preſerving the fineſt poliſh. Its properties of tranſmitting and refracting the rays of light, and of reflecting theſe rays when one of its ſurfaces is covered with a metallic coat, render it very uſeful for conſtructing mirrors, teleſcopes, microſcopes, and all kinds of optical glaſſes; for collecting, ſeparating, and decompoſing the rays of light; and for exhibiting many wonderful catoptrical and dioptrical appearances and experiments. If to theſe admirable properties we add that of imitating the many brilliant precious ſtones, opaque or tranſparent, we ſhall eaſily be convinced that perfect glaſs is one of the moſt beautiful and excellent productions of human induſtry.

Perfect glaſs, or the moſt beautiful factitious cryſtal, is perfectly ſimilar in appearance to the whiteſt and moſt tranſparent natural vitrifiable ſtones. The only ſenſible difference between theſe natural and artificial productions is, that the latter are much leſs hard and more fuſible than natural cryſtal or any other vitrifiable ſtone. In fact, pure glaſs or artificial cryſtal is eſſentially of the ſame nature as vitrifiable ſtones; or we may rather ſay, that it is vitrifiable earth itſelf rendered more fuſible only by certain additions, as we ſhall ſoon ſhow.

The moſt ſimple and elementary of all earths, called by chemiſts *vitrifiable earth*, forms the hardeſt and moſt tranſparent of all natural bodies when its integrant parts are united together in a due ſtate of aggregation: but the parts of vitrifiable earth cannot form this aggregation, unleſs they have been previouſly ſo much ſeparated from each other that they poſſeſs a mobility, which enables them to unite together according to their natural tendency: the integrant parts of elementary earth may acquire this mobility by two methods; namely, by the interpoſition of the parts of water or of thoſe of fire.

Chemical Dictionary.

Almoſt all the vitrifiable ſtones that we know, as diamonds, rock-cryſtal, and other hard tranſparent ſtones, appear to have been once diſperſed in infinitely ſmall molecules through much water, from which they have afterwards been depoſited, and then have united together and formed the very hard tranſparent maſſes which we now ſee. Poſſibly ſome of theſe ſtones may have been formed by fire, and by a true fuſion. Of theſe two ways, that of the diviſion and elaboration by water cannot be practiſed by human art, on account of the many ages required for the operation.

By the ſecond method, namely, fuſion, the time required for which is better adapted to the ſhortneſs of our lives, we certainly might, with a ſufficient degree of heat, melt vitrifiable earth, and all other kinds of earths; ſince theſe, when ſufficiently purified, are reduced to the nature of vitrifiable earth; and we might convert theſe earths into maſſes of cryſtal, or of hard tranſparent ſtones, as perfect as the natural precious ſtones. In a word, nothing but a heat ſufficiently intenſe is required to melt any earthy matter, and to convert it into a diamond as brilliant and as hard as the moſt perfect natural diamonds: but here a great, and hitherto unſurmountable, difficulty occurs, namely, to produce a heat ſufficiently intenſe to melt the moſt pure and ſimple vitrifiable earth; for the moſt violent heat that art has ever produced is inſufficient to melt even many of the common impure earths and ſtones; and is therefore much leſs capable of melting that earth, which, becauſe it is the ſimpleſt and pureſt, is alſo the moſt unfuſible of all natural bodies.

Hence we conclude, that although we know by what means the parts of the pureſt earthy principle may be ſo united as to form bodies ſimilar to the natural precious ſtones, yet we cannot poſſibly put theſe means in execution: but if we cannot artificially produce ſolid maſſes of pure earth exactly ſimilar in all their properties to the natural precious ſtones, we can however very well imitate theſe beautiful natural productions, not in their hardneſs and unfuſibility, but in their tranſparency and luſtre; that is, in their moſt obvious and ſtriking qualities, by means of compoſitions of glaſs or factitious cryſtal. The ſolution of this problem is founded on the following principles.

Firſt, pure and elementary earth, which makes the principal baſis of all vitrifications, and therefore called *vitrifiable earth*, is indeed unfuſible with regard to us: but we know, that certain very fuſible ſubſtances are capable of uniting intimately with this earth, and of communicating to it ſome of their fuſibility; ſo that by their means we may reduce it to a perfect fuſion.

Secondly, the ſubſtances capable of acting upon the earthy principle are the inflammable principle or phlogiſton, and ſeveral ſaline matters: but we may remark, that as theſe ſubſtances do only act as fluxes by uniting intimately with the vitrifiable earth, and while they themſelves make part of the glaſs; and alſo, as the integrant parts of theſe fluxes are not capable of forming either with each other, or with the parts of vitrifiable earth, ſo ſtrong an adheſion as that which can be formed between the parts of the pure vitrifiable earth; it follows, that all factitious cryſtal muſt be much leſs hard than natural cryſtals or other hard ſtones, ſince theſe contain only pure vitrifiable earth.

Chem. Dict.

Thirdly, in conſequence of the principle, that all compound bodies partake of the properties of their component parts, factitious cryſtals ought to partake ſo much more of the properties of inflammable and ſaline matters, and ought to be removed ſo much more from thoſe of pure vitrifiable ſtones, as they contain a larger quantity of thoſe matters. Accordingly we find, that the ſmaller quantity of flux that is contained in glaſs, the greater hardneſs, luſtre, and reſemblance to natural ſtones it has, provided the fuſion has been complete. Thus glaſs is ſo much more perfect, as it poſſeſſes more of the properties of vitrifiable earth.

Theſe principles, which are inconteſtable, being once underſtood, are eaſily applicable to the art of making glaſs; ſince, if we could produce a fire ſufficiently intenſe, and had furnaces and veſſels capable of ſuſtaining it, we ſhould make glaſs equal to the precious ſtones: it is therefore evident, that the moſt important object in vitrification, is to have furnaces capable of producing the greateſt heat, and pots or crucibles capable of reſiſting, during a long time, this heat, and alſo the action of the vitreſcent matter that they contain. Theſe pots, as has been elſewhere obſerved, ought to be made entirely of the moſt refractory and pureſt clay, well waſhed and cleanſed from all ſandy, ferruginous, and pyritous matters, and mixed with a certain proportion of the ſame clay baked, and pounded not very finely. The quantity of baked clay that ought to be mixed with the crude clay, to prevent the pots from cracking, when dried or when expoſed to violent heat, is not abſolutely determined, but varies in different glaſs-houſes, according as the crude clay employed be more or leſs fat, as it is called.

The ovens and furnaces are different, according to the quantity of materials to be vitrified. See the article Glass, (*Encycl.*) In large works, wood or foſſil coal are uſed; and the furnaces are ſo conſtructed that the flame of the fuel circulates and burns within very intenſely. As theſe furnaces vary much in different countries and glaſs-houſes, and as a deſcription would not be very intelligible without figures, we ſhall refer the reader to other works in which theſe ſeveral furnaces are deſcribed and repreſented; particularly to the French edition of Neri's Art of making Glaſs, with Notes by Merret and by Kunckel; and to an excellent Memoir by Dr D'Antic of Paris. We ſhall here ſay only in general, that theſe furnaces are placed under large and lofty buildings called *halls*; that they are covered with a vaulted roof; and that they have no chimney, but only lateral openings, through which the melted glaſs is drawn from the pots. Under theſe openings is built a kind of platform or banquette, on which the pots containing the glaſs ſtand, one of which is oppoſite to each opening. In the middle of the furnace, below the banquette, is a ſpace, acroſs which iron bars are laid. In this ſpace, which communicates with a large cavity below called the *aſh-hole*, the fuel is placed. In theſe furnaces, which have not any chimney, as we have ſaid, the fire is nevertheleſs very intenſe. This intenſe heat is occaſioned by the great capacity of the furnace, by means of which a ſtrong draught of air paſſes continually from the aſh-hole: beſides, the flame being vividly agitated by air, and not being drawn out of the furnace by any chimney, circulates in every direction within the furnace, and produces a very violent heat. Moſt glaſs-houſe furnaces have alſo hollow towers that communicate with the cavity of the furnace, and which therefore increaſe the capacity of the whole. In theſe the heat is not nearly ſo intenſe as in the furnace. They are employed to contain the fritt, or the pieces of manufactured glaſs that are to be annealed. Such is the general diſpoſition of the furnaces of glaſs-houſes.

Chem. Dict.

Next to the good condition of the pots and furnaces, the moſt important and eſſential matter is the conſideration of the kinds and proportion of the fluxes. Of theſe we may obſerve two kinds, namely, the inflammable and the ſaline. As we cannot obtain the pure inflammable principle, we muſt, when we intend that it ſhould enter into the compoſition of glaſs, chooſe for this purpoſe ſome of the earthy ſubſtances with which it is found naturally combined; and theſe are particularly metallic earths, which are beſt adapted for conveying phlogiſton into vitreous compoſitions: but all theſe earths are not equally fit for this purpoſe. All metals are compoſed of an earthy matter intimately combined with a ſufficient quantity of the inflammable principle to be very fuſible, and at the ſame time very opaque. Some of theſe metals, namely, thoſe called *perfect*, are unalterable by fire, and cannot be entirely, or even partly, deprived of phlogiſton: but as every metallic ſubſtance is incapable of uniting with earthy matters while it retains its metallic ſtate, therefore no perfect metal can be vitrified. The caſe is different with thoſe metallic ſubſtances, the phlogiſton of which may be burnt, or otherwiſe deſtroyed. The earths or calxes of moſt, perhaps of all combuſtible metals, when not perfectly deprived of all their phlogiſton, are capable of being reduced to a vitreous ſtate, by means of their remaining inflammable principle. As they are not then in a metallic ſtate, they can facilitate the fuſion of vitrifiable earths, may contract with theſe an intimate union, and reduce them to a ſtate of perfect vitrification: but theſe phlogiſticated calxes of imperfect metals promote vitrification more or leſs, according

cording to their particular natures. Some of theſe, as, for inſtance, tin, cannot be without great difficulty brought to that preciſe degree of calcination that is neceſſary to vitrification; becauſe the heat required for this purpoſe deprives them of all their phlogiſton, and renders them in a high degree refractory. Others, in whatever manner they be calcined, either retain too little phlogiſton to be ſufficiently fuſible, although they ſtill retain enough to give them colour; or if they be not calcined ſo much as to loſe their fuſibility, they cannot be melted but into opaque maſſes, ſo nearly in a metallic ſtate that they cannot be united intimately with vitrifiable earths. Such, eſpecially, are the earths of iron and of copper.

Of all metallic earths, that of lead is fitteſt for vitrification. This metal, which contains a large portion of phlogiſton, is quickly deprived of ſo much of it, that it loſes its metallic ſtate, and is eaſily melted into a tranſparent vitreous maſs; but it has, at the ſame time, this remarkable property, that when once it has loſt as much phlogiſton as is neceſſary to diſpoſe it to vitrification, its calx ſtrongly retains as much of it as is neceſſary to give to it its greateſt degree of vitreſcibility; and that it may be ſooner diſſipated into vapours by the continued action of a very intenſe fire, than it can be changed into an earth totally dephlogiſticated, and conſequently refractory, like the calxes of tin and of regulus of antimony. Beſides, the fuſible earth of lead is one of theſe that retain the leaſt colour. All theſe qualities render it preferable to any other metallic earth for the purpoſes of vitrification. The earth of biſmuth, which in the above-mentioned properties reſembles the earth of lead, may probably be employed with equal ſucceſs: but as the calxes of lead are much more common than thoſe of biſmuth, the uſe of this ſemi-metal is not known to manufacturers of glaſs.

Chem. Dict.

In whatever manner the calx of lead has been prepared, provided it be really in a calcined and not in a metallic ſtate, it may be uſed in vitrification. Accordingly, the grey calx, or aſhes of lead, maſſicot, red-lead, litharge, ceruſs, and all the precipitates of lead, ſeparated from acids by unmetallic intermediate ſubſtances, being mixed with ſand or any other vitrifiable ſtone, and expoſed to a ſufficient degree of fire, do always promote the fuſion of theſe matters, and form with them glaſſes more or leſs hard and tranſparent, according to the ſtrength of the fire and the proportion of the ingredients.

The earth of lead conſtantly retains, as we have ſaid, enough of the inflammable principle to preſerve its fuſibility. When it is expoſed ſingly to the fire, it vitrifies with a very moderate heat. It has more phlogiſton than is requiſite for its vitrification. The fuſibility, fluidity, and activity of this glaſs of lead, when pure, are ſo great, that it cannot be contained in any crucible, all which it eaſily pervades; therefore pure glaſs of lead is never made. But as the calx of lead has more phlogiſton than is required for its own vitrification, it may divide this exceſs of inflammable principle with any unmetallic earths with which it is mixed, and thus may produce their fuſion and perfect vitrification. The glaſſes formed by a mixture of calx of lead with unmetallic earths, have more conſiſtence, hardneſs, and leſs fuſibility, than pure glaſs of lead. The proportions of calx of lead and of ſand employed in theſe kinds of glaſs are from one part to two of calx of lead, to one of ſand or of ground flints.

We may obſerve upon the ſubject of glaſſes that contain no other flux than phlogiſton or metallic earths, of lead, or of any other metal, that none of them are perfectly white, but are all more or leſs coloured; becauſe phlogiſton is, as chemiſts know, the principle of colours. Secondly, theſe glaſſes have a greater denſity or ſpecific gravity than any natural cryſtalline ſtone, all metallic earths being heavier than any that are not metallic.

Thirdly, metallic glaſſes are generally ſomewhat leſs brittle, are leſs liable to be broken by the alterations of heat and cold, and have more of a certain ſmoothneſs, or, as it were, unctuoſity, not eaſily to be deſcribed, than glaſſes made altogether of unmetallic earths. Theſe properties can only be attributed to the inflammable principle, a pretty conſiderable quantity of which is united with them. As theſe latter qualities of glaſs are valuable, a certain quantity of calx of lead generally enters into the compoſition of moſt fine glaſſes, which are diſtinguiſhed from ordinary glaſs by the name *cryſtal-glaſs*.

Chem. Dict.

From what we have ſaid concerning the properties of metallic earths in vitrification, we may perceive, that the more calx of lead, or other metallic earth, enters into the compoſition of any glaſs, the more fuſible, ſoft, coloured, and denſe this glaſs is; and reciprocally. The colours given to glaſs by calxes of lead are ſhades of yellow.

Saline ſubſtances are the ſecond kind of fluxes uſed in vitrification: but all theſe ſubſtances are not equally fit for this purpoſe; not that they are not all very fuſible, but for ſeveral reaſons hereafter to be mentioned.

Firſt, neither the pure and diſengaged acids, nor volatile alkalis, nor ammoniacal ſalts, can be employed as fluxes in vitrification; becauſe none of theſe ſaline matters is ſufficiently fixed. Their volatility is ſo great, that they may be totally diſſipated by fire before they could act in any degree upon vitrifiable earth.

Secondly, none of the neutral ſalts with baſis of fixed alkali, containing either vitriolic acid, or marine acid, can be employed as fluxes in vitrification. This proceeds, not from their want of fuſibility, or of the neceſſary degree of fixity, but from the union of the acid and the alkali; which is ſo ſtrong that they cannot act with ſufficient force upon other ſubſtances, and particularly upon vitrifiable earth. The ſaline matters fit for vitrification are, fixed alkalis, vegetable and mineral; nitres with baſis of fixed alkali; ſedative ſalt, and borax; fuſible ſalt of urine, or rather phoſphoric acid.

Of all ſaline matters, fixed alkalis, vegetable and mineral, are moſt frequently uſed in vitrification. Theſe alkalis are fuſible with a moderate heat; they are ſo fixed that they can reſiſt during a ſufficient time the heat of ordinary vitrifications; and they act powerfully upon flints, ſands, and other vitrifiable ſtones. The proportion of alkali to ſand, in order to make good glaſs, is, from one to two parts of the former ingredient, and two parts of the latter.

Nitre produces in vitrification nearly the ſame effects as fixed alkalis, although it be a neutral ſalt; the alkali and acid of which are united together nearly as they are in common ſalt, which however does not produce in vitrification ſimilar effects. The remarkable difference in this reſpect betwixt theſe two ſalts, and betwixt the nitre and the vitriolic ſalts, muſt be attributed to the great affinity of nitrous acid to the inflammable principle; which affinity is ſo ſtrong, that when nitre is expoſed to fire in veſſels not perfectly cloſe, the acid quits its alkaline baſis to unite with the phlogiſton of combuſtible matters, even though theſe be not ſenſibly in contact with it. Hence nitre expoſed during a certain time to the action of a ſtrong fire, is gradually alkaliſed, and then becomes capable of diſſolving very effectually vitrifiable earth. This alkaliſation is produced ſo much more eaſily in moſt vitrifications, that the ingredients employed generally contain ſome inflammable matter. Common ſalt cannot be alkaliſed in this manner, becauſe it cannot be decompoſed by the contact of inflammable bodies, and therefore is not uſed in vitrifications: but as vitriolic acid has a ſtrong affinity with phlogiſton, we might be inclined to think, that vitriolic ſalts with baſis of fixed alkali, which alſo are never uſed in vitrification, might perhaps be employed along with ſand or other vitrifiable matters containing a larger proportion of phlogiſton than the ingredients now commonly uſed do.

Chem. Dict.

Fixed alkalis or nitre cannot be formed into tranſparent glaſs by being melted ſingly; becauſe theſe ſalts contain too little of the earthy principle; for they form true glaſſes when they are mixed with a ſufficient quantity of this principle, as with ſands and other earthy matters: but borax, ſedative ſalt, and the fuſible ſalt of urine, may be melted without any earthy addition into tranſparent vitreous maſſes: and hence we may conclude, that theſe ſalts contain a larger portion of the earthy principle than nitre or fixed alkali. They nevertheleſs very powerfully promote the vitrification of other ſubſtances. Theſe ſalts are not employed in the manufacture of large quantities of glaſs, becauſe they are too dear. Borax is ſometimes uſed for making ſmall quantities of ſome particular kinds of fine glaſs.

Arſenic may be enumerated among vitrifying fluxes, as it is fuſible and vitreſcible ſingly, and is alſo capable of promoting the fuſion of vitrifiable earths; for which purpoſe it is frequently employed as an ingredient in vitreous compoſitions. As arſenic partakes both of the metallic and ſaline properties, it probably acts in vitrification both as a ſalt and as a metallic earth. The quantity therefore of arſenic neceſſary to promote vitrification, is intermediate betwixt the quantities of calx of lead and of ſaline ſubſtances that are neceſſary for that purpoſe. But we muſt obſerve, that as arſenic is very volatile, a great part of it eſcapes in vapours upon the firſt application of heat, and that the quantity remaining is always uncertain. Arſenic cannot well be employed as the ſole flux for vitrifiable earth. When we intend that a certain quantity of this matter ſhould remain in the compoſition of a glaſs, one of the beſt methods that can be uſed for this purpoſe, is at the ſame time to add nitre to the ingredients of this glaſs; becauſe the arſenic uniting with the alkaline baſis of the nitre forms the neutral arſenical ſalt in which the arſenic is conſiderably fixed. But as this neutral arſenical ſalt is eaſily decompoſed by contact of phlogiſton, therefore no calx of lead or other ſubſtance containing the inflammable principle ought to be mixed with arſenic in the compoſition of glaſs. It has been found by experiment, that this neutral arſenical ſalt is very difficultly manageable in vitrifications, not only for the reaſon now given, but alſo from the property it has of powerfully corroding and pervading crucibles and pots. In many mixtures, it quitted the vitrifiable earth with which it was mixed, and acted upon the crucible, which it penetrated and diſſolved. Theſe experiments ſeem to ſhow, that arſenic has a greater affinity with clays than with vitrifiable earths.

From Mr Pott's experiments, chemiſts know, that vitrifiable, calcareous, and argillaceous earths, each of which are ſingly infuſible, do reciprocally promote the fuſion of each other, when mixed together nearly in equal proportions, and expoſed to a very violent heat; and that from theſe mixtures matters perfectly vitrified are formed. But as we do not know the cauſe of this ſingular fuſibility, we cannot determine whether it is produced by a phlogiſtic or by a ſaline ſubſtance, or perhaps by both.

Glaſſes that contain no other fluxing ingredient than phlogiſtic matters or metallic earths, partake of the properties of theſe metallic earths; and alſo glaſſes that contain only ſaline fluxes, partake of the properties of ſalts. The latter, or ſaline glaſſes, when pure and well proportioned, are leſs heavy, leſs denſe, harder, whiter, more brilliant, more brittle, than the glaſſes containing calx of lead: and glaſſes containing both ſaline and metallic fluxes do alſo partake of the properties of both theſe ſubſtances. In general, glaſſes too ſaline are ſoft, and eaſily ſuſceptible of alteration by the action of air and water; eſpecially thoſe in which alkalis prevail: which latter glaſſes are alſo liable to be attacked by acids, as we evidently ſee from the properties of the vitrified matter that is made with an exceſs of alkali, for the preparation of liquor of flints. Glaſſes containing too much borax and arſenic, although at firſt very beautiful, do quickly tarniſh and become opaque when expoſed to air.

Chem. Dict.

From what we have ſaid concerning the properties of fluxes, phlogiſtic or ſaline, we may know how to adjuſt the proportions of theſe to the ſand or powdered flints for the various kinds of glaſs. Thus, if we require a glaſs that is denſe, fuſible, and not ſaline, one part and a half of red-lead or litharge may be mixed with one part of ſand, and fuſed together. If equal parts of ſand and of calx of lead be employed, a glaſs ſomewhat leſs denſe and harder will be produced.

If a glaſs be required of very little denſity, only ſaline fluxes muſt be employed. A glaſs of this kind may be compoſed of ſix parts of ſalt of tartar, or of potaſh, or of purified ſoda, mixed with eight parts of ſand or of flints; or of four parts of any of the abovementioned alkalis, mixed with two parts of nitre or of borax, and eight parts of vitrifiable earth. Theſe glaſſes muſt be left long in the fire, for the reaſons hereafter to be mentioned.

When a cryſtal-glaſs is required which ſhall be of an intermediate quality betwixt the metallic and ſaline glaſſes, it may be made from a mixture of one part of the above-mentioned ſalts, one part of calx of lead, and two parts of ſand or other vitrifiable earth. By varying the proportions of theſe ingredients, many different kinds of glaſſes may be produced, each of which may be good, if the quantity of each of the fluxes employed be proportionable to its vitrifying power. Several good receipts for glaſs and factitious cryſtal may be found in Neri's Art of Making Glaſs, with Notes by Merret and Kunckel; to which work we refer for many intereſting particulars. See alſo the article GLASS, (*Encycl.*) We ſhall however obſerve, that the proportions of the fluxes neceſſary to produce any required kind of glaſs cannot be preciſely aſcertained, for the following reaſons.

Firſt, the ſands, flints, and other ſtones commonly employed for making of glaſs, are not all equally fuſible. Thus the quartzoſe ſand obtained by waſhing an earth found near Nevers, known to manufacturers of glaſs and of pottery by the name of *ſand of Nevers*, may be almoſt entirely melted when expoſed to a good vitrifying heat; and by a moderate heat its grains may be conſiderably rounded. There are ſome other hard ſtones, which in a violent fire are ſtill more fuſible, and convertible into an almoſt tranſparent glaſs without addition. The fuſibility of theſe vitreſcible ſtones is cauſed by ſome unknown heterogeneous matter united with them. Theſe fuſible ſands and ſtones require a much leſs quantity of flux to promote their vitrification than other ſands or vitrifiable ſtones which are much purer, and therefore more refractory.

Secondly, although the phlogiſtic and ſaline matters employed as fluxes in vitrification are ſufficiently fixed to ſupport the degree of fire neceſſary for the fuſion of glaſs, they are nevertheleſs far from being ſo fixed as vitrifiable earth. The fire neceſſary for the perfect fuſion of glaſs, is even ſufficient to evaporate them entirely. Accordingly, in glaſs-houſes where the pots are uncovered, a vapour or ſmoke continually riſes from their ſurface, which is nothing elſe than the ſaline and phlogiſtic fluxes in a ſtate of continual exhalation. Hence the longer glaſs remains melted in the fire, the harder and more difficultly fuſible it becomes, and the more it partakes of the properties of pure vitrifiable earth. Accordingly, even when a very hard glaſs is required, ſuch a quantity of flux ought to be added as ſhall at firſt promote a perfect fuſion; and this fuſion ought to be continued a long time till a conſiderable quantity of the flux is gradually diſſipated, and till the glaſs has acquired the requiſite degree of hardneſs, provided that the fire be ſufficiently ſtrong to maintain the fuſion notwithſtanding the loſs of flux. From theſe obſervations it appears, that we cannot preciſely aſcertain the proportion of flux to vitrifiable earth, unleſs we knew the fuſibility of the ſand to be employed, and the degree of heat which can be excited in the furnace.

Chem. Dict.

The ſaline fluxes, and eſpecially the fixed alkalis employed in vitrification, are generally rendered impure by a mixture of ſeveral heterogeneous matters, and eſpecially by neutral ſalts not vitrifiable, and by a certain quantity of inflammable principle. In manufactories of bottles and other common glaſs, the alkalis employed are not previouſly purified, but are even mixed with the earth of the aſhes of the burnt plants, which earth is alſo much diſpoſed to vitrification. Accordingly, to make glaſs of this kind, ſand is mixed with common wood-aſhes, ſometimes even with thoſe which have been lixiviated, together with ſome unpurified potaſh, ſoda, or kelp; and from this mixture a brown, duſky, not very tranſparent glaſs is produced, which is preferred in common ſale for wine bottles to clearer and more tranſparent glaſs. But when a fine, white, and very tranſparent glaſs is required, the alkali muſt be perfectly purified from all heterogeneous matter, by lixiviation and calcination.

As a too large quantity of the inflammable principle is the chief cauſe of the colours and of the opacity of glaſs, when a perfectly colourleſs and tranſparent glaſs is required, not only the alkalis muſt be deprived of all their ſuperabundant phlogiſton, but alſo the ſands or flints employed muſt be purified from any of this principle which they may contain. The method uſed for this purpoſe is by mixing together the due proportions of ſands and ſalts, by expoſing this mixture during a conſiderable time to a red heat, not intenſe enough to melt it. By this calcination, the phlogiſton of theſe matters is burnt and diſſipated, all colour is deſtroyed, and the glaſs produced is alſo more clear and brilliant. This firſt mixture of materials of glaſs, when calcined, is called the *fritt;* and this fritt is uſed in large manufactories not only for the finer glaſs, but alſo for the common brown glaſs; not with an intention to render this latter kind of glaſs colourleſs, but becauſe, during this calcination, the ſalts and earth begin to act upon each other, and to incorporate in a certain degree; by which a great part of the efferveſcence and ſwelling occaſioned by the reaction of theſe matters, which happen when they are at once expoſed to a melting heat, are avoided. Accordingly, when matters not previouſly fritted are employed in ſmall experiments, the heat muſt be applied gradually; otherwiſe they ſo ſwell, that frequently the greateſt part of the mixture runs over the crucible.

Chem. Dict.

The due degree of heat is an eſſential point in making of glaſs; it ought not only to be very ſtrong, but alſo maintained during a long time. In great manufactories, the glaſs is kept fuſed during ten or twelve hours before it is taken out of the pots. Accordingly their glaſs is always more perfect than that which is haſtily made in ſmall quantity in two or three hours. Good glaſs, although kept in fuſion in a very great heat, is not perfectly liquid. It is always ſomewhat thick, and when taken from the crucible, it may be drawn out into fine wire or threads; which ſhows that it has a certain conſiſtence and a very ſenſible tenacity when it is red-hot. It is not tranſparent while it remains red-hot, not even when it has become perfectly hard. Another remarkable circumſtance is, that glaſs which is ſo brittle when it is cold and tranſparent, is very ductile when it is ſo heated as to be opaque. We might be induced to believe, that the diſengaged fire with which the glaſs is filled when it is red-hot, produces upon it the ſame effect that phlogiſton or combined fire produces upon metals. The ductility of red-hot glaſs is very uſeful; for by its means all imaginable ſhapes may be given to glaſs, and numberleſs veſſels and utenſils may be eaſily formed of it.

As ſoon as glaſs-veſſels have received their intended form, they muſt be cooled very gradually, otherwiſe they would have no ſolidity, and would be of little uſe, as they would be liable to be broken by the ſmalleſt ſtroke, or by a ſlight change of heat and cold. This inconvenience is prevented in glaſs-houſes by carrying the glaſs veſſels as ſoon as they are formed, and while yet red-hot, into an oven too little heated to deſtroy their form. but in which they may be very gradually cooled. This is called *annealing the glaſs*.

Notwithſtanding all the care taken in the manufactories of the finer kinds of glaſs, as cryſtal-glaſs and plate-glaſs, to make them perfectly good, they are nevertheleſs ſeldom found quite free from faults. The principal faults in glaſs are, colours, bubbles, and veins. The colours which generally hurt glaſs, eſpecially that kind which contains ſaline fluxes, are ſhades of green, olive, and blue. Theſe colours are deſtroyed by manganeſe; which being added in ſmall quantities, clears the glaſs, and is therefore ſometimes called by artiſts

Vitrification
Univerſe.

Univerſe,
Uſnea.

the ſoap of glaſs. This effect of manganeſe cannot eaſily be explained, for it has the property of tinging glaſs with a purple colour. Mr Montamy, in his *Traité des Coleurs pour la Peinture en Email*, has a very fine and ingenious thought upon this ſubject; which is, that the manganeſe deſtroys the above-mentioned colours, by adding to theſe a purple tinge, and by the mixture producing a blackiſh brown colour; and that as blackneſs is cauſed merely by an abſorption of the rays of light, therefore the blackiſh tinge given to the glaſs by the above mixture of colours, prevents the reflection of ſo many rays, and thus renders the glaſs leſs coloured than before. The cauſes of the bubbles and of the veins in all glaſs, even when moſt carefully prepared, and the methods of preventing theſe faults, are not ſufficiently known.

We ſhall obſerve, in concluding this article, that ſeveral cauſes leſſen or entirely prevent the tranſparency of glaſs, which is one of its moſt neceſſary qualities. As we cannot melt vitrifiable earth into tranſparent maſſes but by means of fluxes, and a ſufficiently ſtrong and long-continued heat, therefore when the vitreous mixture contains too little flux, or is expoſed to too little heat, ſome parts of the vitrifiable earth cannot be entirely fuſed, and therefore injure more or leſs, according to their quantity, the tranſparency of the glaſs. The ſame fault may be perceived in glaſs, when it contains ſome earthy matter not ſuſceptible of the action of fluxes, as vitrifiable earth is; ſuch as, for inſtance, moſt metallic earths that are too much dephlogiſticated, particularly the earth of tin. Accordingly, theſe earths are employed to make opaque or ſemi-tranſparent glaſſes, as enamels, artificial opals, and other ſuch ſtones. Another remark may be made concerning the tranſparency of ſome kinds of glaſs, that it is deſtructible by a too long expoſure to violent heat. As all fluxes, phlogiſtic or ſaline, are much leſs fixed than vitrifiable earth, and as ſome fluxes are leſs fixed than others, or leſs capable of becoming fixed by being mixed with vitrifiable earth; the cauſe therefore of the loſs of tranſparency which ſome glaſſes ſuffer by a too violent fire is, that a part of their flux is diſſipated, ſo that theſe glaſſes are decompoſed, and that they contain ſo much earth that the flux is incapable of keeping them completely fuſed. It has been obſerved that glaſſes formed by a mixture of argillaceous and gypſeous or calcareous earths, are more liable than any others to this loſs of tranſparency.

UNIVERSE, (*Encycl.*) As ſpace is in its own nature every way infinite, it gives us an idea of the infinity of the univerſe, which can therefore be only in part comprehended by us: and that part of the univerſe which we can have any notion of, is that which is the ſubject of our ſenſes; and of this the eye preſents us with an idea of a vaſt extended proſpect, and the appearance of various ſorts of bodies diſſeminated through the ſame.

The infinite abyſs of ſpace, which the Greeks call *το παν*, the Latins *inane*, and we the *univerſe*, does undoubtedly comprehend an infinity of ſyſtems of moving bodies round one very large central one, which the Romans called *ſol*, and we the *ſun*. This collection of bodies is therefore properly called the *ſolar ſyſtem*, and ſometimes the *mundane ſyſtem*, from the Latin word *mundus* the "world."

That the univerſe contains as many ſolar ſyſtems or worlds as there are what we call fixed ſtars, ſeems reaſonable to infer from hence, that our ſun, removed to the diſtance of a ſtar, would appear juſt as a ſtar does, and all the bodies moving about it would diſappear entirely. Now the reaſon why they diſappear is, becauſe they are opaque bodies, and too ſmall to be ſeen at ſo great a diſtance, without an intenſe degree of light; whereas theirs is the weakeſt that can be, as being firſt borrowed, and then reflected to the eye.

But the ſun, by reaſon of his immenſe bulk and innate light, which is the ſtrongeſt poſſible, will be viſible at an immenſe diſtance; but the greater the diſtance, the leſs bright it will appear, and of a leſſer magnitude: and therefore every ſtar of every magnitude may probably be a ſun like our own, informing a ſyſtem of planets or moving bodies; each of which may be inhabited, like our earth, with various kinds of animals, and ſtored with vegetable and other ſubſtances.

We can perceive, ſays Mr Maclaurin, no bounds of the vaſt expanſe in which natural cauſes operate; nor can we fix any border or termination of the univerſe; and we are equally at a loſs to trace things to their elements, and to diſcover the limits which encloſe the ſubdiviſions of matter. The objects which we commonly call great, vaniſh when we contemplate the vaſt body of the earth. The terraqueous globe itſelf is ſoon loſt in the ſolar ſyſtem; being in ſome parts ſeen as a planet or diſtant ſtar, and in great part of the ſyſtem unknown, or viſible only at rare times to vigilant obſervers, aſſiſted perhaps with inſtruments like our teleſcopes. The ſun itſelf dwindles into a ſtar: ſaturn's vaſt orbit, and the orbits of all the comets, croud into a point when viewed from numberleſs places between the earth and the neareſt fixed ſtars. Other ſuns illuminate other ſyſtems where our ſun's rays are unperceived: but all theſe are alſo ſwallowed up in the vaſt expanſe of the univerſe. Even all the ſyſtems of the ſtars that ſparkle in the cleareſt ſky, muſt poſſeſs a ſmall corner only of that ſpace over which ſuch ſyſtems are diſperſed. And after we have riſen ſo high, and left all definite meaſures ſo far behind us, we find ourſelves no nearer to a term or limit; for all this is nothing to what may be diſplayed in the infinite expanſe, beyond the remoteſt ſtars that ever have been diſcovered.

In this view of the univerſe, an auguſt idea ariſes in the mind, worthy of the infinite and wiſe Author of nature, who can never be ſuppoſed to have created ſo many glorious orbs, to anſwer ſo trifling a purpoſe as the twinkling to mortals by night now and then; beſides that the far greateſt part of the ſtars are never ſeen by us at all.

USNEA, in botany, a genus of moſſes, wholly deſtitute of leaves, and compoſed only of long ſlender filaments or ſtalks, which are uſually ſolid, rigid, and of a cylindric figure. The extremities, or other parts of theſe, are at times furniſhed with a ſort of orbicular bodies, dry and deſtitute of uſe, but ſeeming to ſupply the place of flowers. Theſe are hollow, in form of cups, but have no rim. The whole plants are fixed in the manner of miſſletoe to the barks of trees. Micheli has given accounts of flowers and ſeeds in theſe plants; but Dillenius ſuſpects the accuracy of this obſervation, and adds, that if there are ſuch, they are too minute to be of any ſervice in the general diſtinctions of the plants. See Plate CCCXX.

W.

Wand, Warburton.

WAND, DIVINING. See VIRGULA *Divina* in this *Appendix*.

WARBURTON (William), biſhop of Glouceſter, a learned prelate, was born at Newark upon Trent, in the county of Nottingham, Dec. 24. 1698. His father was George Warburton, an attorney, and town-clerk of the place, in which this his eldeſt ſon received his birth and education. While at ſchool, the biſhop ſhowed no indication of ſuperior genius. His original deſignation was to the ſame profeſſion as that of his father and grand-father; and he was accordingly placed clerk to an attorney, with whom he remained until he was qualified to engage in buſineſs upon his own account. He was then admitted to one of the courts at Weſtminſter; and for ſome years continued the employment of an attorney and ſolicitor at the place of his birth. The ſucceſs he met with as a man of buſineſs was probably not great. It was certainly inſufficient to induce him to devote the reſt of his life to it; and it is probable, that his want of encouragement might tempt him to turn his thoughts towards a profeſſion in which his literary acquiſitions would be more valuable, and in which he might more eaſily purſue the bent of his inclination. He appears to have brought from ſchool more learning than was requiſite for a practiſing lawyer. This might rather impede than forward his progreſs, as it has been generally obſerved, that an attention to literary concerns, and the buſtle of an attorney's office, with only a moderate ſhare of buſineſs, are wholly incompatible. It is therefore no wonder that he preferred retirement to noiſe, and relinquiſhed what advantages he might expect from continuing to follow the law. It has been ſuggeſted by an ingenious writer, that he was for ſome time uſher to a ſchool. In the year 1724, his firſt work, conſiſting of tranſlations from Cæſar, Pliny Claudian, and others, appeared under the title of "Miſcellaneous Tranſlations in Proſe and Verſe, from Roman Poets, Orators, and Hiſtorians," 12mo. It is dedicated to his early patron, Sir Robert Sutton, and ſeems to have laid the foundation of his firſt eccleſiaſtical preferment. At this period it is probable he had not abandoned his profeſſion, though it is certain he did not attend to it much longer. About Chriſtmas 1726 he came to London; and while there, was introduced to Theobald, Concanen, and others of Mr Pope's enemies, with whoſe converſation he was extremely pleaſed. In 1727, he publiſhed a work, entituled, "A Critical and Philoſophical Enquiry into the Cauſes of Prodigies and Miracles, as related by Hiſtorians," &c. 12mo, and was alſo dedicated to Sir Robert Sutton. He was at this time in orders, and on the 25th of April 1728, had the honour to be in the king's liſt of Maſters of Arts, created at Cambridge, on his majeſty's viſit to that univerſity. In June, the ſame year, he was preſented by Sir Robert Sutton to the rectory of Burnt Broughton, in the county of Lincoln; a living which he retained till his death, at which he ſpent a conſiderable part of his middle life in a ſtudious retirement, devoted entirely to letters, and there planned, and in part executed, ſome of his moſt important works. Several years elapſed, after obtaining this preferment, before Mr Warburton appeared again in the world as a writer. It was in this year 1736, that he may be ſaid to have emerged from the obſcurity of a private liſe into the notice of the world. The firſt publication which rendered him afterwards famous now appeared under the title of "The Alliance between Church and State; or, the Neceſſity and Equity of an Eſtabliſhed Religion and a Teſt-law, demonſtrated from the Eſſence and End of Civil Society, upon the fundamental Principles of the Law of Nature and Nations." At the end was announced the ſcheme of "The Divine Legation of Moſes demonſtrated on the Principles of a religious Deiſt, from the omiſſion of the doctrine of a ruture ſtate of rewards and puniſhments in the Jewiſh diſpenſation;" and met with a reception which neither the ſubject, nor the manner in which it was treated, ſeemed to authoriſe. It was, as the author afterwards obſerved, fallen upon in ſo outrageous and brutal a manner, as had been ſcarce pardonable, had it been "The Divine Legation of Mahomet."—It produced ſeveral anſwers, and ſo much abuſe from the authors of "The Weekly Miſcellany," that in leſs than two months he was conſtrained to defend himſelf, in "A Vindication of the Author of the Divine Legation of Moſes, from the Aſperſions of the Country Clergyman's Letter in the Weekly Miſcellany of February 24, 1737-8," 8vo. Mr Warburton's extraordinary merit had now attracted the notice of the heir-apparent to the crown; in whoſe immediate ſervice we find him in June 1738, when he publiſhed "Faith working by Charity to Chriſtian Edification; a ſermon preached at the laſt epiſcopal viſitation for confirmation in the dioceſe of Lincoln; with a preface, ſhowing the reaſons of its publication, and a poſtſcript, occaſioned by ſome letters lately publiſhed in the Weekly Miſcellany. By William Warburton, M. A. Chaplain to his Royal Highneſs the Prince of Wales." A ſecond edition of "The Divine Legation" alſo appeared in November 1738. In March 1739, the world was in danger of being deprived of this extraordinsry genius by an intermitting fever, which with ſome difficulty was relieved by a plentiful uſe of the bark. The "Eſſay on Man" had now been publiſhed ſome years; and it is univerſally ſuppoſed that the author had, in the compoſition of it, adopted the philoſophy of Lord Bolingbroke, whom on this occaſion he had followed as his guide, without underſtanding the tendency of his principles. In 1738, M. de Crouſaz wrote ſome remarks on it, accuſing the author of Spinoſiſm and Naturaliſm; which falling into Mr Warburton's hands, he publiſhed a defence of the firſt epiſtle, and ſoon after of the remaining three, in ſeven letters, of which ſix were printed in 1739, and the ſeventh in June 1740, under the title of, "A Vindication of Mr Pope's Eſſay on Man, by the Author of the Divine Legation." The opinion which Mr Pope conceived of theſe defences, as well as of their author, will be beſt ſeen in his letters. In conſequence, a firm friendſhip was eſtabliſhed between them, which continued with undiminiſhed fervour until the death of Mr Pope; who, during the remainder of his life, paid a deference and reſpect to his friend's judgment and abilities, which will be conſidered by many as almoſt bordering on ſervility. In 1741, the ſecond volume of "The Divine

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Legation" was publiſhed; as was alſo a ſecond edition of the "Alliance between Church and State." Mr Pope's affection for Mr Warburton was of ſervice to him in more reſpects than merely increaſing his fame. He introduced and warmly recommended him to moſt of his friends, and amongſt the reſt to Ralph Allen, Eſq. of Prior-Park, whoſe niece he ſome years afterwards married, and whoſe great fortune at length came to his only ſon. In 1742, Mr Warburton publiſhed "A Critical and Philoſophical Commentary on Mr Pope's Eſſay on Man." In which is contained a Vindication of the ſaid eſſay from the miſrepreſentations of M. de Reſnel, the French tranſlator, and of M. de Crouſaz, profeſſor of philoſophy and mathematics in the Academy of Lauſanne, the commentator. It was at this period when Mr Warburton had the entire confidence of Mr Pope, that he adviſed him to complete the Dunciad, by changing the hero, and adding to it a fourth book. This was accordingly executed in 1742, and publiſhed early in 1743, 4to, with notes by our author; who, in conſequence of it, received his ſhare of the ſatire which Mr Cibber liberally beſtowed on both Mr Pope and his annotator. In the latter end of the ſame year, he publiſhed complete editions of "The Eſſay on Man," and "The Eſſay on Criticiſm;" and, from the ſpecimen which he there exhibited of his abilities, it may be preſumed Mr Pope determined to commit the publication of thoſe works which he ſhould leave, to Mr Warburton's care. The publication of "The Dunciad" was the laſt ſervice which our author rendered Mr Pope in his life-time. "The Divine Legation of Moſes" having now been publiſhed ſome time, and various anſwers and objections to it having ſtarted up from different quarters, Mr Warburton, in 1744, turned his attention to theſe attacks on his favourite work; and defended himſelf in a manner which, if it did not prove him to be poſſeſſed of much humility or diffidence, at leaſt demonſtrated, that he knew how to wield the weapons of controverſy with the hand of a maſter. His anſwers are couched in thoſe high terms of confident ſuperiority, which marked almoſt every performance that fell from his pen during the remainder of his life. At this important criſis, 1745, Mr Warburton printed three very excellent and ſeaſonable ſermons, 1. "A faithful Portrait of Popery, by which it is ſeen to be the reverſe of Chriſtianity, as it is the Deſtruction of Morality, Piety, and Civil Liberty. A Sermon preached at St James's Church, Weſtminſter, Oct. 1745, 8vo." 2. "A Sermon occaſioned by the preſent unnatural Rebellion, &c. preached in Mr Allen's Chapel at Prior-Park, near Bath, Nov. 1745. and publiſhed at his requeſt," 8vo. 3. "The nature of National Offences truly ſtated. A Sermon preached on the General Faſt-day, Dec. 18. 1745." 8vo, 1746. Notwithſtanding his great connections, his acknowledged abilities, and his eſtabliſhed reputation, yet we do not find that he received any addition to the preferment given him in 1728 by Sir Robert Sutton (except the chaplainſhip to the Prince of Wales), until April 1746, when he was unanimouſly called by the Society of Lincoln's-Inn to be their preacher. In 1747 appeared his edition of Shakeſpeare, and his Preface to Clariſſa; and in the ſame year he publiſhed, 1. "A Letter from an Author to a Member of Parliament, concerning Literary Property," 8vo. 2. "Preface to Mrs Cockburn's Remarks upon the Principles and Reaſonings of Dr Rutherforth's Eſſay on the Nature and Obligations of Virtue," &c. 8vo. 3. "Preface to a Critical Inquiry into the Opinions and Practice of the ancient Philoſophers, concerning the Nature of a Future State, and their Method of teaching by double Doctrine," (by Mr Towne,) 8vo, 1747, 2d edition. In 1748, a third edition of "The Alliance between Church and State; corrected and enlarged." In 1749, a very extraordinary attack was made on the moral character of Mr Pope, from a quarter where it could be the leaſt expected. His "Guide, Philoſopher, and Friend," Lord Bolingbroke, publiſhed a book which he had formerly lent Mr Pope in MS. The preface to this work, written by Mr Mallet, contained an accuſation of Mr Pope's having clandeſtinely printed an edition of his Lordſhip's performance without his leave or knowledge. A defence of the poet ſoon after made its appearance; which was univerſally aſcribed to Mr Warburton, and was afterwards owned by him. It was called, "A Letter to the Editor of the Letters on the Spirit of Patriotiſm, the Idea of a Patriot King, and the State of Parties, &c. occaſioned by the Editor's Advertiſement," &c. which ſoon afterwards produced an abuſive pamphlet, under the title of "A Familiar Epiſtle to the moſt impudent Man living," 8vo; a performance, as hath been truly obſerved, couched in language bad enough to diſgrace even gaols and garrets. About this time the publication of Dr Middleton's Enquiry concerning the Miraculous Powers gave riſe to a controverſy, which was managed with great warmth and aſperity on both ſides, and not much to the credit of either party. On this occaſion Mr Warburton publiſhed an excellent performance, written with a degree of candour and temper, which, it is to be lamented, he did not always exerciſe. The title of it was, "Julian; or a Diſcourſe concerning the Earthquake and Fiery Eruption which defeated that Emperor's attempt to rebuild the Temple at Jeruſalem," 8vo, 1750. In 1751, he gave the public his edition of Mr Pope's works, with notes, in nine volumes 8vo; and in the ſame year printed "An Anſwer to a Letter to Dr Middleton, inſerted in a pamphlet intituled, The Argument of the Divine Legation fairly ſtated," &c. 8vo, and "An Account of the prophecies of Ariſe Evans, the Welch prophet, in the laſt century;" the latter of which pieces afterwards ſubjected him to much ridicule. In 1753, Mr Warburton publiſhed the firſt volume of a Courſe of Sermons preached at Lincoln's Inn, intituled, "The Principles of Natural and Revealed Religion occaſionally opened and explained;" and this, in the ſubſequent year, was followed by a ſecond. After the public had been ſome time promiſed the appearance of Lord Bolingbroke's works, they were about this time printed. Many anſwers were ſoon publiſhed, but none with more acuteneſs, ſolidity, and ſprightlineſs, than "A View of Lord Bolingbroke's Philoſophy, in two Letters to a Friend, 1754:" the Third and Fourth Letters were publiſhed in 1755, with another edition of the two former; and in the ſame year a ſmaller edition of the whole; which, tho' it came into the world without a name, was univerſally aſcribed to Mr Warburton, and afterwards publicly owned by him. To ſome copies of this is prefixed an excellent complimentary epiſtle from the Preſident Monteſquieu, dated May 26. 1754. At this advanced period of his life, that preferment which his a-

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bilities might have claimed, and which had hitherto been with-held, ſeemed to be approaching towards him. In September 1754, he was appointed one of his Majeſty's chaplains in ordinary, and in the next year was preſented to a prebend in the cathedral of Durham, on the death of Dr Mangey. About the ſame time the degree of Doctor of Divinity was conferred on him by Dr Herring, then archbiſhop of Canterbury. In 1757, a pamphlet was publiſhed, called "Remarks on Mr David Hume's Eſſay on the Natural Hiſtory of Religion;" which is ſaid to have been compoſed of marginal obſervations made by Dr Warburton, on reading Mr Hume's book; and which gave ſo much offence to the author animadverted upon, that he thought it of importance enough to deſerve particular mention in the ſhort account of his life. On the 11th of October, in this year, our author was advanced to the deanry of Briſtol; and at the latter end of 1758, received the honour ſo juſtly due to his merit, of being dignified with the mitre, and promoted to the vacant ſee of Glouceſter. In 1762, he publiſhed "The Doctrine of Grace; or, the Office and Operations of the Holy Spirit vindicated from the Inſults of Infidelity and the Abuſes of Fanaticiſm," 2 vols, 12mo; and in the ſucceeding year drew upon himſelf much illiberal abuſe from ſome writers of the popular party, on occaſion of his complaint in the Houſe of Lords, on the 15th of November 1763, againſt Mr Wilkes, for putting his name to certain notes on the infamous "Eſſay on Woman." In making his complaint, the biſhop, after ſolemnly diſavowing both the Poem and the Notes, averred, that the former was worthy of the Devil; then, after a ſhort pauſe, added, "No, I beg the Devil's pardon, for he is incapable of writing it." The year 1777 produced a third volume of his Sermons, dedicated to Lady Manſfield: and with this, and a ſingle "Sermon preached at St Lawrence Jewry, on Thurſday April 30. 1767, before his Royal Highneſs Edward duke of York, Preſident, and the Governors of the London Hoſpital, &c." 4to, he cloſed his literary labours. His faculties continued unimpaired for ſome time after this period; and in 1769 he gave conſiderable aſſiſtance to Mr Ruffhead in his life of Mr Pope. He alſo transferred 500l. to Lord Manſfield, Judge Wilmot, and Mr Charles Yorke, upon truſt, to found a Lecture in the form of a courſe of Sermons; to prove the truth of Revealed Religion in general, and of the Chriſtian in particular, from the completion of the prophecies in the Old and New Teſtament, which relate to the Chriſtian Church, eſpecially to the apoſtacy of Papal Rome. To this foundation we owe the admirable Introductory Lectures of biſhop Hurd, and the well-adapted continuation of biſhop Halifax and dean Bagot. It is a melancholy reflection, that a life ſpent in the conſtant purſuit of knowledge frequently terminates in the loſe of thoſe powers, the cultivation and improvement of which are attended to with too ſtrict and unabated a degree of ardour. This was in ſome degree the misfortune of Dr Warburton. Like Swift, and the great duke of Marlborough, he gradually ſunk into a ſituation in which it was a fatigue to him to enter into general converſation. There were, however, a few old and valuable friends in whoſe company, even to the laſt, his mental faculties were exerted in their wonted force; and at ſuch times he would appear cheerful for ſeveral hours, and on the departure of his friends retreat as it were within himſelf. This melancholy habit was aggravated by the loſs of his only ſon, a very promiſing young gentleman, who died of a conſumption but a ſhort time before the biſhop himſelf reſigned to fate, in the 81ſt year of his age.

Water, Watſon.

WATER-HEMLOCK, *Common.* This plant is very common in England. It is a well known fact in Sweden, that horſes will eat it, and that it frequently proves fatal to them by inducing a palſy: this effect, nevertheleſs, is judged to be owing to an inſect which inhabits in great plenty the ſtalks of this herb, and from this ſingular effect is called by Linnæus *curculie paraplecticus*, when in its perfect ſtate, as the larva only exiſts in this vegetable. The ſame caterpillar is found in the water-parſnip alſo in England.

WATER *Hemlock, Long-leaved.* Happily this plant is not very common in England: the roots are the moſt virulent vegetable poiſon that is indigenous here. Linnæus, in the *Flora Lapponica*, n° 103. gives a dreadful account of the havock it made among the horned cattle in Lapland, where it is common in the meadows near the ſea, and where theſe cattle will frequently eat it, upon being firſt turned to graſs in the ſpring, though they afterwards refuſe it: yet they will eat the roots at all times, which are the moſt virulent parts of the plant. Biſhop Gunner and Gmelin both confirm theſe bad effects. It is yet doubtful whether horſes are hurt by it; and certain that goats are delighted with it, and eat it without any ſubſequent ill effect: and the roots are collected by the Norwegian peaſants as fodder for thoſe animals.

WATSON (Robert), an elegant hiſtorian, was born at St Andrews, in Scotland, about the year 1730. He was the ſon of an apothecary of that place, who was alſo a brewer. Having gone through the uſual courſe of languages and philoſophy at the ſchool and univerſity of his native place, and alſo entered on the ſtudy of divinity, a deſire of being acquainted with a larger circle of literati, and of improving himſelf in every branch of knowledge, carried him, firſt to the univerſity of Glaſgow, and afterwards to that of Edinburgh. The period of theological ſtudies at the univerſities of Scotland is no leſs than ſix years: but during that period, young men of ingenious minds find ſufficient leiſure to carry on and advance the purſuits of general knowledge. Mr Watſon purſued his ſtudies with ardour. Few men ever ſtudied more conſtantly. It was a rule with him to ſtudy eight hours every day; and this law he obſerved during the whole courſe of his life. An acquaintance with the polite writers of England, after the union of the two kingdoms, became general in Scotland; and in Watſon's younger years, an emulation began to prevail of writing pure and elegant Engliſh. Mr Watſon applied himſelf with great induſtry to the principles of philoſophical or univerſal grammar; and by a combination of theſe, with the authority of the beſt Engliſh writers, formed a courſe of lectures on ſtyle or language. He proceeded to the ſtudy of rhetoric or eloquence; the principles of which he endeavoured to trace to the nature of the human mind. He delivered a courſe of lectures in Edinburgh on theſe ſubjects; and met with the countenance, approbation, and friendſhip of lord Kaims, Mr Hume, with other men of genius and learning.

At this time he had become a preacher; and a vacancy having happened in one of the churches of St Andrews, he offered himſelf a candidate for that living, but was diſappointed. Mr Henry Rymer, who then taught logic in St Salvador's College, was in a very infirm ſtate of health, and entertained thoughts of retiring from the cares and emoluments of his office, to live upon his ſmall ſalary or ſtipend. Mr Watſon underſtanding this, purchaſed, for not a great ſum of money, what, in familiar phraſeology, may be called the good-will of Mr Rymer's place; and, with the conſent of the other maſters of St Salvador's, was appointed profeſſor of logic. He obtained alſo a patent from the crown, conſtituting him profeſſor of rhetoric and belles lettres. The ſtudy of logic, in St Andrews, as in moſt other places, was at this time confined to ſyllogiſms, modes, and figures. Mr Watſon, whoſe mind had been opened by converſation, and by reading the writings of the wits that had begun to flouriſh in the Scotch capital, prepared and read to his ſtudents a courſe of metaphyſics and logics on the moſt enlarged and enlightened plan; in which he analyzed the powers of the mind, and entered deeply into the nature of the different ſpecies of evidence of truth or knowledge. By his hiſtory of Philip II. Dr Watſon attained in his lifetime a conſiderable degree of celebrity; and his hiſtory of Philip III. publiſhed after his death, has added to his fame. Of this laſt performance, however, he has only completed the four firſt books; the two laſt were written by the editor of his manuſcript, at the deſire of the guardians of his children.

On the death of principal Tulideph, Dr Watſon, through the earl of Kinnoull, was appointed his ſucceſſor; in which ſtation he lived only a few years. He married a lady of ſingular beauty and virtue, daughter to Mr Shaw, profeſſor of divinity in St Mary's college, St Andrews. By this lady he had five daughters, who have lately obtained a ſmall penſion from government, through the active humanity of Mr Dundas then Lord Advocate for Scotland.

WEATHER, (*Encycl.*) Many have laboured with extreme diligence to explore the ſecret cauſes of the various changes of weather, and to foretell theſe alterations with certainty, but hitherto with no great ſucceſs. Indeed, in this country at leaſt, the alterations of the weather are ſo many, and frequently ſo ſudden, that we can ſcarce ſuppoſe them to depend on any conſtant and regular cauſe. In the warm climates the weather is much more conſtant and uniform than with us; and even on the Continent in equal latitudes, it is leſs variable than here. Between the tropics, and probably for a conſiderable ſpace northward and ſouthward, the ſun appears to be the principal agent in determining the weather. At one ſeaſon of the year immenſe quantities of vapour are raiſed into the atmoſphere, which, when the ſolar influence becomes leſs, are condenſed into violent rains, and thus diſtinguiſh the year into the dry and rainy ſeaſons. In thoſe climates alſo the general courſe of the wind is evidently influenced by the ſun, as Dr Halley has obſerved, (See WIND, *Encycl.*) Indeed at ſome times violent ſtorms of wind, called *hurricanes*, whirlwinds, and ſtorms of thunder and lightning, will occur: but of theſe the ſun can only be accounted the remote cauſe; the immediate one being moſt probably the highly electrified ſtate of the atmoſphere. The inhabitants of thoſe climates, eſpecially the ſavages, who are continually expoſed to the atmoſphere, are able to foretell theſe tempeſts ſome time before. The ſigns which they obſerve, however, are in fact only the tempeſt beginning its operations in the atmoſphere; and no perſon whatever is able to foretell an hurricane or a ſtorm of thunder a month, or even a week, before it comes. The reaſon of this is, that the ſources of atmoſpherical electricity are not only inviſible to us, but ſo variable in themſelves, that though we knew them at one time, we have not the leaſt ſecurity they that would continue the ſame even for a day. In various parts of this work it has been ſhown, that the ſun communicates the electric fluid to the earth, and that this fluid muſt eſcape ſomewhere from the earth into the atmoſphere in the very ſame quantity in which it is communicated. As the electric fluid, however, cannot eaſily diffuſe itſelf in the atmoſphere, an accumulation of it over any particular ſpot muſt ſoon take place; in which caſe that ſpot will ceaſe to emit any more electric fluid. If then a new vent is opened, a current of electric matter may perhaps be directed from that place which emitted it before; and then the atmoſphere, inſtead of receiving electricity from the earth, will communicate its ſuperfluous quantity to it. In ſuch a ſituation of the atmoſphere, ſtorms of thunder may readily take place; but where there is nearly an equal degree of electricity in the earth and atmoſphere, an earthquake is moſt likely to enſue. (See EARTHQUAKE, n° 39. art. 10. *Encycl.*) Beſides the mere accumulation of electricity in the atmoſphere, there are other cauſes, ſuch as ſevere froſts, which may detain the fluid in various parts of the earth at particular times; and thus be indirectly the cauſe of thunder, earthquakes, &c. in other places. This will eaſily ſhow the difficulty, nay the impoſſibility, of predicting theſe ſtorms; as the cauſes of them may be very remote from the place where they happen. An hurricane in Jamaica, for inſtance, may be occaſioned by ſomething in New Britain, or an earthquake in Portugal by ſomething in Sweden or Norway.

In our own climate, nothing can be more variable and uncertain than the weather. Some have attempted to deduce its changes from the influence of the moon; but, though it cannot be doubted that the moon as well as the ſun has ſome influence on our atmoſphere, the changes in it are by far too many to be occaſioned by any regular and permanent cauſe.—The wind has likewiſe been thought conſiderably to influence the weather: but excepting with regard to heat or cold, we cannot find that this is to be depended upon; not to mention that the wind itſelf makes part of the weather, and ought to have its cauſe explained as much as the reſt. That alterations of the weather, however, do not depend immediately either on the ſun, moon, or wind, appears from a circumſtance mentioned by Mr Derham, viz. that "moles dig *before a thaw.*" This he aſcribes to *warm vapours* which they feel in the earth; but whatever it is, we from thence learn, that the cauſe of this alteration lies not in the atmoſphere, but in the earth itſelf, from whence it would ſeem to be communicated to the atmoſphere.

But though it is probable that the action of the electric fluid in the earth is the cauſe of thoſe ſudden changes which are met with in almoſt all countries; yet the general determination of the weather, or what is called the *climate*, evidently depends on ſome ſettled and permanent cauſe. The cold of winter and heat of ſummer are plainly occaſioned by the greater or leſs obliquity of the ſun's rays at thoſe ſeaſons. To the ſun alſo are we to aſcribe thoſe regular winds which, though moſt remarkable within the tropics, are yet in ſome degree to be met with even in our own country.

Along the eaſtern coaſt of Britain, at leaſt to a conſiderable extent, the wind blows from the ſouth-eaſt almoſt during the whole ſpring and ſummer. This we may naturally ſuppoſe to ariſe from the continual rarefaction of the air by the ſun. The cold air ruſhes in to ſupply the partial vacuity, but it does not follow the courſe of the ſun directly. The reaſon of this is, that the air is alſo rarefied over the continent oppoſite to Britain; and as the diſtance is but ſmall, the column of air incumbent on that part of the German ocean which lies to the ſouth-eaſt of this country prevails over that which lies directly to the eaſt, and will not allow it to come in. This continues with occaſional variations, owing to unknown motions in the electric fluid till after the ſummer ſolſtice. The ſame cauſe continues ſtill to act; but though the heat be now greater on land than it was before, the ſun begins ſoon to loſe his influence on the great Atlantic ocean which lies to the weſtward. Thus the eaſtern parts being more rare than the weſtern, a weſt wind begins to take place. The eaſterly wind, however, alſo continues; the two meet and oppoſe each other; the conteſt is decided by thunder and lightning, (ſee the article THUNDER, *Encycl.*) and ſeldom fails to end in the total defeat of the eaſt wind. The month of July, therefore, is remarkable in this part of the country for thunder, as the conteſt generally laſts ſome weeks. In the month of Auguſt the weſt wind prevails, and continues till the ſuperior denſity of the cold air in the northern regions counteracts it, and the wind blows from the north, north-eaſt, or north-weſt. As theſe winds do not directly oppoſe each other, the conſequence of their interference is not thunder, but rain, which uſually falls in great quantities in the month of October; after which the cold northerly winds bring froſt and ſnow.

Thus, notwithſtanding the exceſſive variableneſs of our climate, we may determine the general outline of the weather from evident cauſes. Thus in the months of January and February we may reaſonably expect froſt and ſnow, from the condenſed and cold air in the northern regions preſſing ſouthward to thoſe parts rarefied by the ſun. In March we very often meet with the ſame, by reaſon of the weak influence of the ſun at that time; but more frequently there are at that time ſtorms of wind from various quarters, but frequently from the weſt or north. The reaſon of this is, that the air over the land begins to be rarefied; in conſequence of which the denſer air ruſhes in from that quarter where the paſſage is moſt free.—In April, the rarefaction of the air being greater, and conſiderable quantities of electric matter thus paſſing from the earth into it, the winds ceaſe, or become more gentle, and rains commence. In the beginning of May the wind often blows very cold from the north, though the weather is more ſettled. Why this wind did not take place in April, ſeems not ſo eaſily accounted for; but moſt probably the difference of denſity between the northern and ſouthern air was not then ſufficient to allow of a ſtrong current from any quarter. During the latter part of May and the whole of June, the weather is uſually ſettled and clear; the ſun gradually exerting his greateſt influence. In July we have thunder and rain, for the reaſons already given. The latter part of Auguſt and the whole of September are uſually dry, with weſterly winds, in conſequence of the latter having prevailed in the conflict with the eaſt wind. The whole month of October, and great part of November, is uſually rainy, on account of the interference of the weſt and north winds; and in the end of November, and throughout the month of December, froſt and ſnow come on, though not with ſuch certainty as in January.

This, in general, is the weather we may expect throughout the year; but by many accidental cauſes, not eaſily diſcoverable, it may be very much altered. Some of theſe cauſes we have endeavoured to point out; but, beſides the reaſons already given, it is not impoſſible that an alteration may take place in our atmoſphere from cauſes entirely beyond it, and which exiſt only in the immenſe maſs of etherial fluid with which the univerſe is filled. Such cauſes, however, as they muſt be totally without the reach of our inveſtigations, can never be aſſigned as the reaſon of any kind of weather; yet in ſome ſeaſons there is ſuch a general cold over a great part of the earth, that we muſt certainly imagine the cauſe to have been very high in the atmoſphere. Of this the year 1782 furniſhes us with a notable example. During the whole of that ſummer the ſun appeared almoſt totally to have loſt his influence. No vegetable, not even graſs, came to perfection; and the harveſt was ſcarce finiſhed in the month of December. This was the caſe in Scotland, and it ſeems to have been ſimilar all over Europe. The cauſe of this extraordinary cold, we cannot diſcover; but its effects were very obvious and dreadful. The electric fluid being confined over ſo large a ſpace, broke out in the ſouthern parts with fury; and Sicily and Calabria were almoſt entirely ruined by earthquakes. The earth now poured out ſuch immenſe quantities of electric matter, that the atmoſphere ſeemed ſcarce able to contain it. It therefore diffuſed itſelf along the lower regions all over Europe. Heat and almoſt perpetual thunder were the conſequence: vegetation was exceſſively luxuriant; but the immoderate quantity of electricity having occaſioned continual fogs which obſcured the ſun, fruits had not their proper flavour; nor was the crop altogether what might have been expected. The electric fluid, in the mean time, having fully ſaturated the lower part of the atmoſphere, gradually aſcended higher; but as the earthquakes ceaſed to ſupply new quantities of it, the ſouthern parts of the atmoſphere became negatively electrified with reſpect to the northern parts. To reſtore the equilibrium, a vaſt quantity ruſhed from the north to the ſouth, viſible from the north of Scotland to Paris and farther, in the meteor which appeared on the 18th of Auguſt 1783. The immediate conſequence of this was, that the atmoſpherical vapours being left without a proper quantity of electric matter to ſupport them, violent rains took place and continued for ſome time; a very ſevere winter ſucceeded an hot ſummer, and no remarkable alteration in the weather took place till May.

In moſt parts of the world, the general ſtate of the weather is determined by their ſituation with regard to the ſea, mountains, &c. In general, mountainous countries are ſubjected to violent rains, ſtorms of wind, very often thunder and lightning. In ſome places, particularly the ſouthern part of the continent of America, the weather is almoſt a continual tempeſt. The Cape of Good Hope is alſo remarkable for ſtorms, but chiefly of wind; while Terra del Fuego and the oppoſite point of the continent is deluged with perpetual rains. The Iſthmus of Darien is alſo remarkable for rainy weather, while in the whole empire of Peru it ſcarce ever rains. Perſia, Egypt, and ſome other countries, are likewiſe deſtitute of rain, without having the inconvenience of earthquakes to which Peru is ſubject. The reaſon of theſe variations cannot be aſſigned without a more particular knowledge of the ſituation of thoſe countries than we can boaſt of. In general, however, it is known, that high mountains have the property of collecting clouds in their neighbourhood, and conſequently of producing rains, thunder, and ſtorms of wind. Where a country is nearly ſurrounded by a vaſt extent of ſea, it is commonly ſubject to great rains. Hence the climate of iſlands is more rainy than of continents; and hence probably the reaſon of the rains in South America and the Iſthmus of Darien, which approach to an inſular ſituation. The great drineſs of the air in Peru may be occaſioned by the violent determination of the vapours to theſe parts, which deprive that country of its due proportion: but this can only be hinted as a conjecture, and we have not ſufficient data to eſtabliſh any thing certain.

To conclude this article, we ought now to give an account of thoſe alterations in the air which predict a change of weather, or rather inform us that the weather actually is changing. Theſe, however, are but few, and not always certain. The brute creation are much more ſenſible of them than we; and give information by various means, according to their peculiar inſtincts. Thoſe who are much in the open air alſo will be much better able to perceive theſe alterations, than ſuch as are not. The barometer is the moſt certain index we have, and will frequently inform us of a change before the leaſt ſign of it can be otherwiſe perceived. But though we are thus informed that ſome change is about to take place, we are at a loſs to know what it is, and can only gueſs from the ſeaſon of the year what kind of weather we may reaſonably expect. Thus, in the ſummer-months, if the wind is eaſterly, the barometer falls, and the clouds in the weſt ſeem ſtationary, or move a little to the eaſtward, we may certainly expect thunder at no great diſtance. If the wind is briſk, and the clouds move before it heavily and ſluggiſhly, we are alſo to expect thunder, but at a diſtance. Indeed, we may judge of the approach of thunder-clouds by the time of the day in which they appear. When the ſun has reached the meridian, his power of rareſying the air above any particular ſpot is then greateſt. Hence, as this luminary is continually moving to the weſtward, the increaſe of the rarefaction towards that quarter muſt prevent any current of air from blowing from the weſt, and at the ſame time ſolicit a current from the eaſt: but if by ſome other cauſe a weſterly wind ſhall prevail, and drive the clouds directly againſt the eaſterly one, it is then plain that nothing further can ſtop their progreſs; they will be violently electrified, and diſcharge their contents directly over our heads. Hence the vulgar obſervation in this country, that if thunder begins at eleven in the forenoon, we will probably have but little; but a great deal, and very near, if it begins at twelve, or between twelve and one.

Another pretty certain indication of an approaching change of weather is a great clearneſs and tranſparency in the atmoſphere. This is commonly taken notice of when the moon is newly changed. If at that time we ſee diſtinctly the part of the moon which is not enlightened by the ſun's rays, we are pretty certain that rough ſtormy weather is ſoon to enſue. In warm climates this tranſparency is not confined to the atmoſphere, but extends even to the waters of the ocean: and when the bottom is viſible at a great depth, it is a certain prognoſtic of an hurricane. This tranſparency denotes ſome internal agitation of the electric fluid; for by a certain motion of it even the moſt ſolid bodies may be made tranſparent as glaſs, (ſee ELECTRICITY, *Encycl.* n° 4.); and the agitation becoming more and more violent, at laſt produces the moſt terrible commotions in the atmoſphere. Something ſimilar may be obſerved with regard to the tranſmiſſion of ſound; for in ſuch ſtates of the atmoſphere ſounds are heard much more difficultly and at a greater diſtance than others; but a ſufficient number of obſervations have not yet been made to determine this matter with any accuracy.

It would be tedious to enter into a detail of all the prognoſtics which are drawn from the various appearances of the clouds, of halos, parhelia, aurora borealis, &c. Every perſon expects rain when the ſky begins to grow hazy and dull; and halos and parhelia only appear in ſuch caſes. As for the aurora borealis, it is often ſeen for many nights together without any remarkable change in the ſtate of the atmoſphere. It is the natural effect of a conſtant and regular cauſe, and is probably too high in the atmoſphere to produce any remarkable effect; though it has been thought in ſome caſes to be productive of a current of wind from the ſouth-weſt, for which a probable reaſon is aſſigned under the article AURORA *Borealis*, n° ult.

WHEAT-EAR, (MOTACILLA *Oenanthe*), in ornithology, a ſpecies omitted to be deſcribed under MOTACILLA. It is a bird of paſſage, and begins to viſit us about the middle of March, and continues coming till the beginning of May: it has been obſerved that the females arrive about a fortnight before the males. They frequent warrens, downs, and the edges of hills, eſpecially thoſe that are fenced with ſtone-walls. They breed in the latter, in old rabbet-burrows, cliffs, and frequently under old timber: their neſt is large, made of dried graſs, rabbet's down, a few feathers, and horſe-hair: and they lay from ſix to eight eggs, of a light-blue colour.

They grow very fat in autumn, and are eſteemed a delicacy. About Eaſtbourn in Suſſex they are taken by the ſhepherds in great numbers, in ſnares made of horſe hair, placed under a long turf: being very timid birds, the motion of a cloud, or the appearance of a hawk, will drive them for ſhelter into thoſe traps, and ſo they are taken. The numbers annually enſnared in that diſtrict alone, amount to about 1850 dozen, which ſell uſually at ſix-pence per dozen; and what appears very extraordinary, the numbers that return the following year do not appear to be leſſened. The reaſon that ſuch a quantity are taken in the neighbourhood of Eaſtbourn is, that it abounds with a certain fly which frequents the adjacent hills, for the ſake of the wild thyme they are covered with; which is not only a favourite food of that inſect, but the plant on which it depoſits its eggs.

Wheat-ears are much fatter in a rainy ſeaſon than in a dry one; for they not only feed on inſects but on earthworms, which come out of the ground in greater numbers in wet weather than in dry.

The head and back of the male are of a light grey, tinged with red: over each eye is a white line; beneath that is a broad black ſtroke, paſſing acroſs each eye to the hind part of the head: the rump and lower half of the tail are white; the upper half black: the under ſide of the body is white, tinged with yellow; on the neck it inclines to red: the quill-feathers are black, edged with reddiſh brown. The colours of the female are more dull: it wants that black ſtroke acroſs the eyes, and the bar of white on the tail is narrower. Theſe birds diſappear in September, at leaſt from the northern parts of this kingdom; but in Hampſhire many of them continue the whole winter.

WHITE-Throat, (Motacilla *Sylvia*), in ornithology, a ſpecies omitted under the article Motacilla. It frequents our gardens in the ſummer-time; in the winter it leaves us. It builds in low buſhes near the ground, making its neſt externally of the tender ſtalks of herbs and dry ſtraw; the middle part of fine bents and ſoft graſs, the inſide of hair. It lays five eggs of a whitiſh green colour, ſprinkled with black ſpots. Its note is continually repeated, and often attended with odd geſticulations of the wings: is harſh and diſpleaſing: is a ſhy and wild bird, avoiding the haunt of man; ſeems of a pugnatious diſpoſition, ſinging with an erected creſt, and in attitudes of defiance.

The head of this bird is of a browniſh aſh-colour, the throat white: the breaſt and belly white, tinged with red (in the female wholly white): the back inclines to red: the leſſer coverts of the wings are of a pale brown; the greater duſky, edged with tawny brown; the quill-feathers duſky, edged with reddiſh brown; the tail the ſame, except the upper part of the interior ſide and whole exterior ſide of the outmoſt feather, which are white; the legs are of a yellowiſh brown.

WHYTE (Dr Robert), an eminent phyſician, born at Edinburgh on the 6th September 1714, was the ſon of Robert Whyte, Eſq; of Kennoway, advocate. This gentleman died ſix months before the birth of our author, who had alſo the misfortune to be deprived of his mother before he had attained the ſeventh year of his age. After receiving the firſt rudiments of ſchool-education, he was ſent to the univerſity of St Andrews; and after the uſual courſe of inſtruction there, in claſſical, philoſophical, and mathematical learning, he came to Edinburgh, where he entered upon the ſtudy of medicine, under thoſe eminent medical teachers, Munro, Rutherford, Sinclair, Plummer, Alſton, and Innes. After learning what was to be acquired at this univerſity, in the proſecution of his ſtudies he viſited foreign countries; and after attending the moſt eminent teachers at London, Paris, and Leyden, he had the degree of Doctor of Medicine conferred upon him by the univerſity of Rheims in 1736, being then in the 22d year of his age.

Upon his return to his native country, he had the ſame honour alſo conferred upon him by the univerſity of St Andrews; where he had before obtained, with applauſe, the degree of Maſter of Arts.

Not long afterwards, in the year 1737, he was admitted a Licentiate of Medicine by the Royal College of Phyſicians of Edinburgh; and the year following he was raiſed to the rank of a Fellow of the College. From the time of his admiſſion as a licentiate, he entered upon the practice of medicine at Edinburgh; and the reputation which he acquired for medical learning, pointed him out as a fit ſucceſſor for the firſt vacant chair in the univerſity. Accordingly, when Dr St-Clair, whoſe eminent medical abilities, and perſuaſive powers of oratory, had contributed not a little to the rapid advancement of the medical ſchool of Edinburgh, found that thoſe conſpicuous talents which he poſſeſſed could no longer be exerted in the manner which they once had been when he enjoyed bodily vigour unimpaired by age, and powers of mind unclouded by diſeaſe, he reſigned his academical appointments in favour of Dr Whyte.

This admiſſion into the college took place on the 20th of June 1746; and he began his firſt courſe of the inſtitutions of medicine at the commencement of the next winter-ſeſſion. The abilities which he diſplayed from his academical chair, in no particular diſappointed the expectations which had been formed of his lectures. The Latin tongue was the language of the univerſity of Edinburgh; and he both ſpoke and wrote in Latin with ſingular propriety, elegance, and perſpicuity. At that time the ſyſtem and ſentiments of Dr Boerhaave, which, notwithſtanding their errors, muſt challenge the admiration of lateſt ages, were very generally received by the moſt intelligent phyſicians in Britain. Dr Whyte had no ſuch idle ardour for novelties as to throw them entirely aſide becauſe he could not follow them in every particular. The inſtitutions of Dr Boerhaave, therefore, furniſhed him with a text for his lectures; and he was no leſs ſucceſsful in explaining, illuſtrating, and eſtabliſhing the ſentiments of the author, when he could freely adopt them, than in refuting them by clear, connected, and deciſive arguments, when he had occaſion to differ from him. The opinions which he himſelf propoſed, were delivered and enforced with ſuch acuteneſs of invention, ſuch diſplay of facts and force of argument, as could rarely fail to gain univerſal aſſent from his numerous auditors; but free from that ſelf-ſufficiency which is ever the offspring of ignorance and conceit, he delivered his concluſions with becoming modeſty and diffidence.

From the time that he firſt entered upon an academical appointment, till the year 1756, his prælections were confined to the inſtitutions of medicine alone. But at that period his learned colleague Dr Rutherford, who then filled the practical chair, who had already taught medicine at Edinburgh with univerſal applauſe for more than thirty years, and who had been the firſt to begin the inſtitution of clinical lectures at the Royal Infirmary, found it neceſſary to retire from the fatiguing duties of an office to which the progreſs of age rendered him unequal. On this criſis Dr Whyte, Dr Monro, ſen. and Dr Cullen, each agreed to take a ſhare in an appointment in which their united exertions promiſed the higheſt advantages to the univerſity. By this arrangement, ſtudents who had an opportunity of daily witneſſing the practice of three ſuch teachers, and of hearing the grounds of that practice explained, could not fail to derive the moſt ſolid advantages.

In theſe two departments, the inſtitutions of medicine in the univerſity, and the clinical lectures in the Royal Infirmary, Dr Whyte's academical labours were attended with the moſt beneficial conſequences both to the ſtudents and to the univerſity. But not long after the period we have laſt mentioned, his lectures on the former of theſe ſubjects underwent a very conſiderable change. About this time the illuſtrious Gaubius, who had ſucceeded to the chair of Boerhaave, favoured the

the world with his Inſtitutiones Pathologiæ. This branch of medicine had indeed a place in the text which Dr Whyte formerly followed; but, without detracting from the character of Dr Boerhaave, it may juſtly be ſaid, that the attention he had beſtowed upon it was not equal to its importance. Dr Whyte was ſenſible of the improved ſtate in which pathology now appeared in the writings of Boerhaave's ſucceſſor; and he made no delay in availing himſelf of the advantages which were then afforded.

In the year 1762, his pathological lectures were entirely new modelled. Following the publication of Gaubius as a text, he delivered a comment, which was read by every intelligent ſtudent with the moſt unfeigned ſatisfaction. In theſe lectures he collected and condenſed the fruits of accurate obſervation and long experience. Enriched by all the opportunities of information which he had enjoyed, and by all the diſcernment which he was capable of exerting, they were juſtly conſidered as his moſt finiſhed production.

For a period of more than twenty years, during which he was juſtly held in the higheſt eſteem as a lecturer at Edinburgh, it may readily be ſuppoſed that the extent of his practice correſponded to his reputation. In fact, he received both the firſt emoluments, and the higheſt honours, which could here be obtained. With extenſive practice in Edinburgh, he had numerous conſultations from other places. His opinion on medical ſubjects was daily requeſted by his moſt eminent cotemporaries in every part of Britain. Foreigners of the firſt diſtinction, and celebrated phyſicians in the moſt remote parts of the Britiſh empire, courted an intercourſe with him by letter. Beſides private teſtimonies of eſteem, many public marks of honour were conferred upon him both at home and abroad. In 1752, he was elected a fellow of the Royal Society of London; in 1761, he was appointed firſt phyſician to the king in Scotland; and in 1764, he was choſen preſident of the Royal College of Phyſicians at Edinburgh.

But the fame which Dr Whyte acquired as a practitioner and teacher of medicine, were not a little increaſed by the information which he communicated to the medical world in different publications. His celebrity as an author was ſtill more extenſive than his reputation as a profeſſor.

His firſt publication, an Eſſay on the Vital and other Involuntary Motions of Animals, although it had been begun ſoon after he had finiſhed his academical courſe of medical education, did not come from the preſs till 1751; a period of fifteen years from the time that he had finiſhed his academical courſe, and obtained a degree in medicine: but the delay of this publication was fully compenſated by the matter which it contained, and the improved form under which it appeared.

The next ſubject which employed the pen of Dr Whyte was one of a nature more immediately practical. His Eſſay on the Virtues of Lime-water and Soap in the Cure of the Stone, firſt made its appearance in a ſeparate volume in 1752. Part of this ſecond work had appeared ſeveral years before in the Edinburgh Medical Eſſays: but it was now preſented to the world as a diſtinct publication, with many improvements and additions.

His third work, intitled Phyſiological Eſſays, was firſt publiſhed in the year 1755. This treatiſe conſiſted of two parts; 1ſt, An Inquiry into the Cauſes which promote the Circulation of the Fluids in the very ſmall Veſſels of Animals; and 2dly, Obſervations on the ſenſibility and irritability of the Parts of Men and other Animals, occaſioned by Dr Haller's treatiſe on that ſubject. The former of theſe may be conſidered as an extenſion and farther illuſtration of the ſentiments which he had already delivered in his Eſſay on the Vital Motions, while the latter was on a ſubject of a controverſial nature. In both he diſplayed that acuteneſs of genius, and ſtrength of judgment, which appeared in his former writings.

From the time at which his Phyſiological Eſſays were publiſhed, ſeveral years were probably employed by our author in preparing for the preſs a larger and perhaps a more important work than any yet mentioned, his Obſervations on the Nature, Cauſes, and Cure of thoſe Diſorders which are commonly called *nervous*, *hypochondriac*, and *hyſteric*. This elaborate and uſeful work was publiſhed in the year 1764.

The laſt of Dr Whyte's writings is intitled, Obſervations on the Dropſy in the Brain. This treatiſe did not appear till two years after his death; when all his other works were collected and publiſhed in one quarto volume, under the direction of his ſon and of his intimate friend the late Sir John Pringle.

Beſides theſe five works, he wrote many other papers, which appeared in different periodical publications; particularly in the Philoſophical Tranſactions, the Medical Eſſays, the Medical Obſervations, and the Phyſical and Literary Eſſays.

At an early period of life, ſoon after he had ſettled as a medical practitioner in Edinburgh, he entered into the married ſtate. His firſt wife was Miſs Robertſon, ſiſter to General Robertſon late governor of New York. By her he had two children; both of whom died in early infancy, and their mother did not long ſurvive them. A few years after the death of his firſt wife, he married as a ſecond wife Miſs Balfour, ſiſter to the preſent James Balfour, Eſq; of Pilrig. By her he had fourteen children: but in theſe alſo he was in ſome reſpects unfortunate; for ſix of them only ſurvived him, three ſons and three daughters, and of the former two are ſince dead. Although the feeling heart of Dr Whyte, amidſt the diſtreſſes of his family, muſt have often ſuffered that uneaſineſs and anxiety which in ſuch circumſtances is the unavoidable conſequence of parental affection and conjugal love; yet he enjoyed a large ſhare of matrimonial felicity. But his courſe of happineſs was terminated by the death of his wife, which happened in the year 1764: and it is not improbable that this event had ſome ſhare in haſtening his own death; for in the beginning of the year 1765 his health was ſo far impaired, that he became incapable of his former exertions. A tedious complication of chronical ailments, which chiefly appeared under the form of diabetes, was not to be reſiſted by all the medical ſkill which Edinburgh could afford; and at length terminated in death, on the 15th of April 1766, in the 52d year of his age.

WILDERNESS, (*Encycl.*) Wilderneſſes, ſays Mr Miller, ſhould always be proportioned to the extent of the gardens in which they are made; for it is very ridiculous to ſee a large wilderneſs planted with tall trees in a

Wilderneſs.

ſmall ſpot of ground; and, on the other hand, nothing can be more abſurd than to ſee little paultry ſquares, or quarters of wilderneſs-work, in a magnificent large garden. As to the ſituation of wilderneſſes, they ſhould never be placed too near the habitation, nor ſo as to obſtruct any diſtant proſpect of the country, there being nothing ſo agreeable as an unconfined proſpect: but where, from the ſituation of the place, the ſight is confined within the limits of the garden, nothing can ſo agreeably terminate the proſpect as a beautiful ſcene of the various kinds of trees judiciouſly planted; and if it is ſo contrived that the termination is planted circularly, with the concave towards the ſight, it will have a much better effect than if it end in ſtraight lines or angles. The plants ſhould always be adapted to the ſize of the plantation; for it is very abſurd for tall trees to be planted in the ſmall ſquares of a little garden; and in large deſigns ſmall ſhrubs will have a mean appearance. It ſhould alſo be obſerved never to plant evergreens amongſt deciduous trees; but always to place the evergreens in a wilderneſs in a ſeparate part by themſelves, and that chiefly in ſight.

As to the walks, thoſe that have the appearance of meanders, where the eye cannot diſcover more than twenty or thirty yards in length, are generally preferable to all others, and theſe ſhould now and then lead into an open circular piece of graſs; in the centre of which may be placed either an obeliſk, ſtatue, or fountain; and if in the middle of the wilderneſs there be contrived a large opening, in the centre of which may be erected a dome or banqueting-houſe, ſurrounded with a green plot of graſs, it will be a conſiderable addition to the beauty of the whole. From the ſides of the walks and openings, the trees ſhould riſe gradually one above another to the middle of the quarters, where ſhould always be planted the largeſt growing trees, ſo that the heads of all the trees may appear to view, while their ſtems will be hid from the ſight. Thus, in thoſe parts which are planted with deciduous trees, roſes, honeyſuckles, ſpiræa frutex, and other kinds of low-flowering ſhrubs, may be planted next the walks and openings; and at their feet, near the ſides of the walks, may be planted primroſes, violets, daffadils, &c. not in a ſtraight line, but ſo as to appear accidental, as in a natural wood. Behind the firſt row of ſhrubs ſhould be planted ſyringas, althæa frutex, mezereons, and other flowering-ſhrubs of a middle growth; and theſe may be backed with many other ſorts of trees, riſing gradually to the middle of the quarters.

The part planted with evergreens may be diſpoſed in the following manner, viz. in the firſt line next the great walks may be placed the laurus tinus, boxes, ſpurge-laurel, juniper, ſavin, and other dwarf evergreens. Behind theſe may be placed laurels, hollies, arbutuſes, and other evergreens of a larger growth. Next to theſe may be planted alaternuſes, phyllireas, yews, cypreſſes, Virginian cedars, and other trees of the ſame growth; behind theſe may be planted Norway and ſilver firs, the true pine, and other ſorts of the fir-growth; and in the middle ſhould be planted Scotch pines, pinaſter, and other of the larger growing evergreens; which will afford a moſt delightful proſpect if the different ſhades of the greens are curiouſly intermixed.

But beſide the grand walks and openings (which ſhould always be laid with turf, and kept well mowed), there ſhould be ſome ſmaller ſerpentine walks through the middle of the quarters, where perſons may retire for privacy; and by the ſides of theſe private walks may alſo be ſcattered ſome wood-flowers and plants; which, if artfully planted, will have a very good effect.

In the general deſign for theſe wilderneſſes, there ſhould not be a ſtudied and ſtiff correſpondency between the ſeveral parts; for the greater diverſity there is in the diſtribution of theſe, the more pleaſure they will afford.

Winter, Winterania.

WINTER's Bark. See the two following articles.

WINTERANIA, in botany, a genus of the monogynia order, belonging to the dodecandria claſs of plants; for the characters of which, ſee the Botany *Table*. There is but one ſpecies, the canella; ſee Plate CCLXXXVI. It grows uſually about 20 feet high, and eight or ten inches in thickneſs, in the thick woods of moſt of the Bahama iſlands. The leaves are narrow at the ſtalk, growing wider at their ends, which are broad and rounding, having a middle rib only; they are very ſmooth, and of a light ſhining green. In May and June the flowers, which are pentapetalous, come forth in cluſters at the ends of the branches: they are red, and very fragrant, and are ſucceeded by round berries, of the ſize of large peas, green, and when ripe (which is in February) purple, containing three ſhining black ſeeds, flat on one ſide, otherwiſe not unlike in ſhape to a kidney-bean: theſe ſeeds in the berry are enveloped in a ſlimy mucilage. The whole plant is very aromatic, the bark particularly, being more uſed in diſtilling, and in greater eſteem, in the more northern parts of the world than in England. This bark is that which is commonly known in the ſhops by the name of *Winter's bark;* tho' truly not the right, as Sir Hans Sloane has judiciouſly informed us. See the following article.

Winterania *Aromatica*, the tree which produces the Winter's bark. Formerly this tree was utterly unknown to the Europeans till the return of Captain John Winter, who, in the year 1577, ſailed with Sir Francis Drake, as commander of a ſhip called the Elizabeth, deſtined for the South Seas; but immediately after they had gone through the Sreights of Magellan, Captain Winter, on the 8th of October 1578, was obliged by ſtreſs of weather to part company, and to go back again into the Sreights, from whence he returned into England in June 1579, and brought with him ſeveral pieces of this aromatic bark; which Cluſius, in his Exot. p. 75. calls after him *Cortex Winteranus*, or Winter's bark.

Several authors have mentioned it ſince in their botanical works; but all they have ſaid has been copied from Cluſius, *e. g.* Dalechamp hiſt. p. 1818. Parkinſon Theat. p. 1652. *Bauhin Pin.* 461. *Jonſton Dendr.* p. 232.

No more was heard of this bark till the Dutch fleet under admiral Van Nort returned from the Streights of Magellan in the year 1600. The author of their voyage calls this tree "Lauro ſimilis arbor licet procerior, cortice piperis modo acri et mordenti." *De Bry. Ind. Occid.* vol. 9. p. 18.

Afterwards all the navigators who paſſed through the Streights of Magellan took notice of the tree on account of the uſefulneſs of its bark; but none furniſhed any deſcription that could make it botanically known, before Mr George Handaſyd came from the

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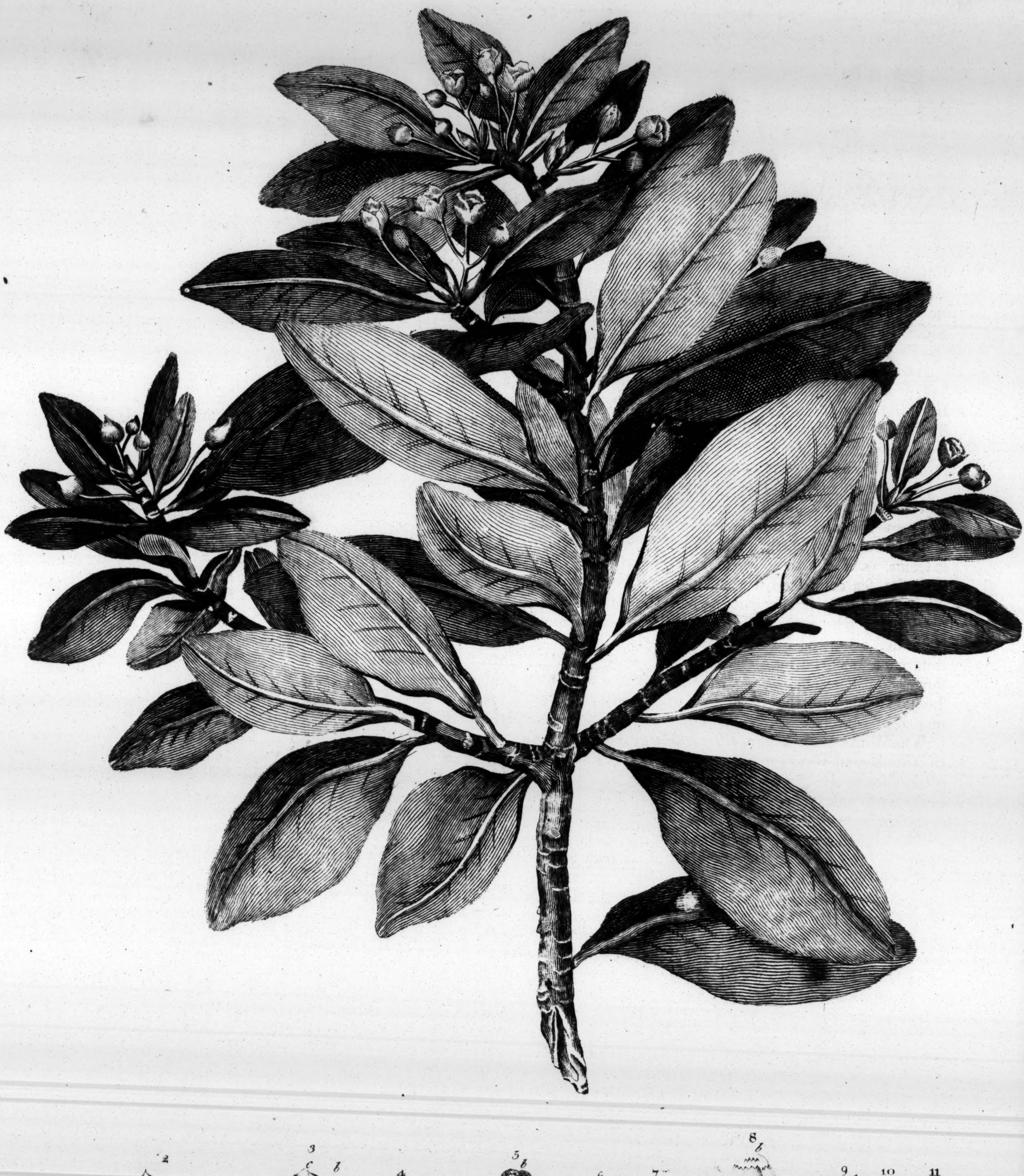
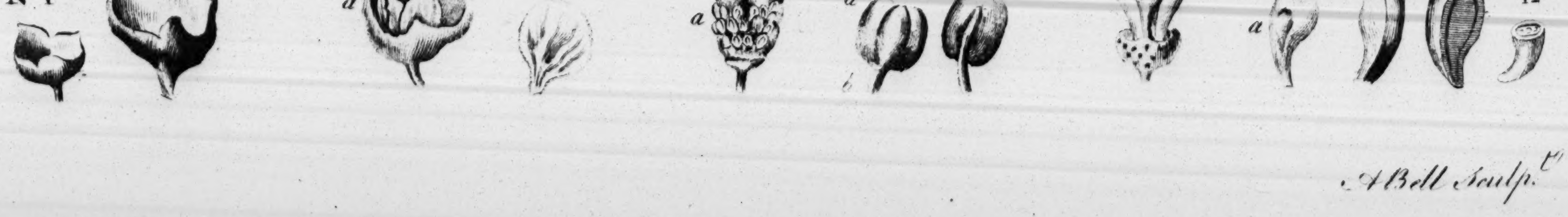
WINTERANIA Aromatica. Plate CCCXXIII.

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A Bell Sculp.t

Streights of Magellan, 1691, and brought with him ſome dried ſpecimens, which he gave to Sir Hans Sloane, and are now preſerved in the Britiſh Muſeum, Hort. Sicc. 8. fo. 100. 130. 148. 332. fo. 46. From theſe ſpecimens, and the account Mr Handaſyd gave of this tree, Sir Hans Sloane drew up a hiſtory, and gave a figure in the Philoſophical Tranſactions, 1693, n° 204. p. 922. t. 1. "Periclymenum rectum, foliis laurinis, cortice acri aromatico."

Still the ſyſtematical botaniſts could not give it a place in their catalogues, being unacquainted with its flowers and fruit.

Pomet, in his Mat. Med. p. 130. imagined our Winter's bark to be the ſame with the canella cinnamomea, Brown Hiſt. Jam. p. 275, fo. 3. Cateſby Carol. vol. 2. p. 50. which grows in the Weſt Indies, between the tropics, and is called by the druggiſts *canella alba*. This error has been followed by moſt of the modern writers, and the two trees propoſed under the ſame name, viz. *Winterania Canella*, Lin. Sp. Pl. 638.

At length Dr Fothergill procured figures to be taken from the ſpecimens brought by Captain Wallis from the Streights of Magellan, and prevailed with Dr Solander to give ſuch a hiſtory and deſcription of the tree as might enable botaniſts to place it in its proper rank. Theſe were communicated to the London Medical Society, and publiſhed in the fifth volume of their *Obſervations and Inquiries*.

From the obſervations made by Sir Joſeph Banks and Dr Solander during their ſtay in Terra del Fuego, it ſeems as if the trees in the Streights of Magellan, near the ſea coaſt, are ſtinted, perhaps from the high winds, and have ſmaller leaves than thoſe upon Terra del Fuego, where again the flowers were not ſo much expanded as in the Streights of Magellan. This laſt difference may be occaſioned by the ſeaſon, as the flowers on Terra del Fuego were ſeen in the month of January, and in the Streights of Magellan in the month of March.

The Winter's-bark tree, *Winterania aromatica*, is one of the largeſt foreſt-trees upon Terra del Fuego; it often riſes to the height of 50 feet. Its outward bark is on the trunk grey and very little wrinkled, on the branches quite ſmooth and green.

The branches do not ſpread horizontally, but are bent upwards, and form an elegant head of an oval ſhape.

The leaves come out, without order, of an oval elliptic ſhape, quite entire, obtuſe, flat, ſmooth, ſhining, of a thick leathery ſubſtance, evergreen, on the upper ſide of a lively deep green colour, and of a pale bluiſh colour underneath, without any nerves, and their veins ſcarcely viſible; they are ſomewhat narrower near the footſtalks, and there their margins are bent downwards.

In general, the leaves are from three to four inches long, and between one and two broad; they have very ſhort footſtalks, ſeldom half an inch long, which are ſmooth, concave on the upper ſide, and convex underneath. From the ſcars of the old footſtalks the branches are often tuberculated.

The peduncles, or footſtalks for the flowers, come out of the *axillæ foliorum*, near the extremity of the branches; they are flat, of a pale colour, twice or three times ſhorter than the leaves; now and then they ſupport only one flower, but are oftener near the top divided into three ſhort branches, each with one flower.

The bracteæ are oblong, pointed, concave, entire, thick, whitiſh, and ſituated one at the baſis of each peduncle.

Calix, or flower-cup, it has none; but in its place the flower is ſurrounded with a ſpathaceous gem, of a thick leathery ſubſtance, green, but reddiſh on the ſide which has faced the ſun: before this gem burſts, it is of a round form, and its ſize is that of a ſmall pea. It burſts commonly ſo, that one ſide is higher than the other, and the ſegments are pointed.

The corolla conſiſts always of ſeven petals, which are oval, obtuſe, concave, erect, white, have ſmall veins, and are of an unequal ſize, the largeſt ſcarcely four lines long; they very ſoon fade, and drop off almoſt as ſoon as the gem burſts.

The filaments are from 15 to 30, and are placed on the flat end ſide of the receptacle; they are much ſhorter than the petals, and gradually decreaſe in length towards the ſides.

The antheræ are large, oval, longitudinally divided into two, or as if each was made up of two oblong antheras.

The germina are from three to ſix, placed above the receptacle, turbinated, or of the ſhape of an inverted fig, flat on the inſide, and ſomewhat higher than the ſtamina; they have no ſtyles, but terminate in a ſtigma, which is divided into two or three ſmall lobes.

Dr Solander never ſaw the fruit in its perfect ripe ſtate; but could conclude from the unripe ones which he ſaw in abundance, that each germen becomes a ſeparate ſeed-veſſel, of a thick fleſhy ſubſtance, and unilocular; and in each the rudiments of three, four, or five ſeeds were plainly diſcernible. See Plate CCCXXIII. where n° 1. repreſents the ſpathaceous gem, after it is burſt open. 2. The ſame. 3. The ſame (*a*) with the corolla (*b*) remaining within it. 4. One of the petals ſpread out. 5. The ſtamina (*a*) and the piſtilla (*b*) after the gem and the corolla are taken away. 6. The outſide of an anthera (*a*) with its filament (*b*). 7. The inſide of the ſame. 8. The germina (*a*) ſituated on the centre of the receptacle, after the ſtamina have been removed; the lobated ſtigma (*b*.) 9. The convex or outermoſt ſide of a germen (*a*) with its ſtigma (*b*). 10. The inſide of the ſame. 11. A germen cut open longitudinally, ſo as to ſhow the rudiments of the ſeeds. 12. A germen cut through tranſverſely.

The weather is much more ſevere in the climate where theſe trees are natives, than in Britain; where, therefore, it is thought they would thrive very well.

The bark of the Winterania, or Winter's cinnamon, brought over by the Dolphin, in reſpect to figure, exactly reſembles that which was delineated by Cluſius. The pieces are about three or four inches ſquare, of different degrees of thickneſs, from a quarter to three quarters of an inch. It is of a dark brown cinnamon colour; an aromatic ſmell, if rubbed; and of a pungent, hot, ſpicy taſte, which is laſting on the palate, though imparted ſlowly. It has the name of Winter's *Cinnamon*, from a faint reſemblance in colour and flavour to that grateful aromatic, though differing from it greatly in every other reſpect. This bark is only brought to us from the Sterights of Magellan, and is the produce of the tree above deſcribed; much celebrated as an antiſcorbutic by the firſt diſcoverers, but unknown in the practice of phyſic, no quantity, except as a curioſity, having been brought to Europe till the return of the ſhips ſent out on the expeditions to the South Seas.

The bark which was ſubſtituted in the room of this is the canella alba of the ſhops, the bark of a very different tree, and brought from a different part of the world, diſagreeing with the former in almoſt every particular. It is of a light aſh or grey colour; in thickneſs it ſeldom exceeds two-eighths of an inch. The pieces are of different lengths and irregular ſhapes, and for the moſt part are taken from trees of ſmall ſize: its taſte is aromatic, and has more of the clove than the cinnamon. It yields an eſſential oil by diſtillation, and is brought to us chiefly from Jamaica, though it is found in ſome other of the Weſt-India iſlands. There are a few plants of it in the ſtoves of ſome curious botaniſts in England, particularly in that belonging to John Blackburne, Eſq; at Oxford, Lancaſhire.

Sir Hans Sloane gives a figure of it in his Hiſtory of Jamaica; from which it evidently appears to be a different genus from the Winterania aromatica.

For want of the knowledge of theſe circumſtances, and an opportunity of comparing the genuine Winter's bark with the canella alba, ſome of the moſt reſpectable writers on the materia medica have ſcarcely been able to avoid confuſion in treating this ſubject; which it is hoped for the future will be avoided, and the diſtinction between them ſufficiently eſtabliſhed.

From ſeveral experiments made by Dr Morris, the cortex magellanicus appears to be an aſtringent of a particular kind, and therefore likely to be of uſe in ſeveral manufactures. Water is the proper diſſolvent of this bark; though the ſaline, gummy, and reſinous parts are ſo blended in it, as in ſaffron and ſome other vegetables, that it parts with them readily in proof and rectified ſpirits of wine, though not in ſo great a quantity.

The infuſion and decoction of this bark were of ſo grateful an aromatic bitter taſte, that it ſeems likely to be a pleaſant vehicle for ſome of the nauſeous drugs, With this view, on ſubſtituting the powder of this bark for the cardamom ſeeds in making the infuſion of ſenna, as directed in the London Diſpenſatory, the nauſeous ſmell and taſte of that excellent purgative was ſo effectually covered, as to be ſcarcely diſtinguiſhed by the niceſt palate. Tincture of rhubarb alſo prepared with this bark inſtead of cardamoms ſeemed far leſs diſagreeable.

It muſt not be concealed, that the canella alba from Jamaica, which is generally ſold for the Winter's bark in the ſhops, was found to have the laſt mentioned property, though not in ſo high a degree.

WOOD, (*Encycl.*) The art of moulding wood is mentioned by Mr Boyle as a deſideratum in the art of carving. He ſays, he had been credibly informed of its having been practiſed at the Hague; and ſuſpects that it might have been performed by ſome menſtruum that ſoftens the wood, and afterwards allows it to harden again, in the manner that tortoiſe-ſhell is moulded; or, perhaps, by reducing the wood into a powder, and then uniting it into a maſs with ſtrong but thin glue. And he adds, that having mixed ſaw-duſt with a fine glue made of iſinglaſs, ſlightly ſtraining out what was ſuperfluous through a piece of linen, the remainder, formed into a ball and dried, became ſo hard as to rebound when thrown againſt the floor.

The people who work much in wood, and that about ſmall works, find a very ſurpriſing difference in it, according to the different ſeaſons at which the tree was cut down; and that not regularly the ſame in regard to all ſpecies, but different in regard to each. The button-mould makers find that the wood of the pear-tree cut in ſummer works tougheſt; holly, on the contrary, works tougheſt when cut in winter; box is melloweſt when in it has been cut in ſummer, but hardeſt when cut about Eaſter; hawthorn works mellow when cut about October; and the ſervice is always tough if cut in ſummer.

Woods are diſtinguiſhed into divers kinds, with regard to their nature, properties, virtues, and uſes. Of wood, conſidered according to its qualities, whether uſeful, curious, medicinal, &c. the principal is called *timber*, uſed in building houſes, laying floors, roofs, machines, &c.

Woods valued on account of their curioſity, are cedar, ebony, box, calambo, &c. which by reaſon of their extraordinary hardneſs, agreeable ſmell, or beautiful poliſh, are made into tables, combs, beads, &c.

The medicinal woods are guaiacum, aloes, ſaſſafras, nephriticum, ſantal, ſarſaparilla, aſpalanthum, &c.

Woods uſed in dyeing are brazil-wood, Campechy-wood, &c.

Foſſile WOOD. Foſſile wood, or whole trees, or parts of them, are very frequently found buried in the earth, and that in different ſtrata; ſometimes in ſtone, but more uſually in earth; and ſometimes in ſmall pieces looſe among gravel. Theſe, according to the time they have lain in the earth, or the matter they have lain among and in the way of, are found differently altered from their original ſtate; ſome of them having ſuffered very little change; and others being ſo highly impregnated with cryſtalline, ſparry, pyritical, or other extraneous matter, as to appear mere maſſes of ſtone, or lumps of the common matter of the pyrites, &c. of the dimenſions, and, more or leſs, of the internal figure of the vegetable bodies into the pores of which they have made their way.

The foſſile wood which we find at this day, are, according to theſe differences, arranged by Dr Hill into three kinds; 1. The leſs altered: 2. The pyritical: and, 3. The petrified.

Of the trees, or parts of them, leſs altered from their original ſtate, the greateſt ſtore is found in digging to ſmall depths in bogs, and among what is called *peat* or *turf earth*, a ſubſtance uſed in many parts of the kingdom for fuel. In digging among this, uſually very near the ſurface, they find immenſe quantities of vegetable matter buried, and that of various kinds: in ſome places there are whole trees ſcarce altered, except in colour; the oaks in particular being uſually turned to a jetty black; the pines and firs, which are alſo very frequent, are leſs altered, and are as inflammable as ever, and often contain between the bark and wood a black reſin. Large parts of trees have alſo been not unfrequently met with unaltered in beds of another kind, and at much greater depths, as in the ſtrata of clay and loam, among gravel, and ſometimes even in ſolid ſtone.

Beſides,

Beſide theſe harder parts of trees, there are frequently found alſo in the peat-earth vaſt quantities of the leaves and fruit and catkins of the hazel and the like trees: theſe are uſually intermixed among the ſedge and roots of graſs, and are ſcarce at all altered from their uſual texture. The moſt common of theſe are hazel nuts; but there are frequently found alſo the twigs and leaves of the white poplar; and a little deeper uſually there lies a cracked and ſhattered wood, the crevices of which are full of a bituminous black matter; and among this the ſtones of plums and other ſtone-fruits are ſometimes found, but that more rarely.

It is idle to imagine, that theſe have been thus buried either at the creation, or, as many are fond of believing, at the univerſal deluge. At the firſt of theſe times the ſtrata muſt have been formed before the trees were yet in being; and the peat-wood is ſo far from being of antediluvian date, that much of it is well known to have been growing within theſe 300 years in the very places where it is now found buried.

In this ſtate that is little altered from their original condition, it is that the fruits and larger parts of trees are uſually found: what we find of them more altered, are ſometimes large and long, ſometimes ſmaller and ſhorter branches of trees, ſometimes ſmall fragments of branches, and more frequently ſmall ſhapeleſs pieces of wood. The larger and longer branches are uſually found bedded in the ſtrata of ſtone, and are more or leſs altered into the nature of the ſtratum they lie in. The ſhorter and ſmaller branches are found in vaſt variety in the ſtrata of blue clay uſed for making tiles in the neighbourhood of London. Theſe are prodigiouſly plentiful in all the clay-pits of this kind, and uſually carry the whole external reſemblance of what they once were, but nothing of the inner ſtructure; their pores being wholly filled, and undiſtinguiſhably cloſed, by the matter of the common vitriolic pyrites, ſo as to appear mere ſimple maſſes of that matter. Theſe fall to pieces on being long expoſed to moiſture; and are ſo pregnant in vitriol that they are what is principally uſed for making the green vitriol or copperas at Deptford and other places.

The irregular maſſes or fragments of wood are principally of oak, and are moſt uſually found among gravel; though ſometimes in other ſtrata. Theſe are variouſly altered by the inſinuation of cryſtalline and ſtony particles; and make a very beautiful figure when cut and poliſhed, as they uſually keep the regular grain of the wood, and ſhow exactly the ſeveral circles which mark the different years growth. Theſe, according to the different matter which has filled their pores, aſſume various colours, and the appearance of the various foſſils that have impregnated them; ſome are perfectly white, and but moderately hard; others of a browniſh black, or perfectly black, and much harder; others of a reddiſh black, others yellowiſh, and others greyiſh, and ſome of a ferrugineous colour. They are of different weights alſo and hardneſſes, according to the nature and quantity of the ſtony particles they contain: of theſe ſome pieces have been found with every pore filled with pure pellucid cryſtal; and others in large maſſes, part of which is wholly petrified and ſeems mere ſtone, while the reſt is crumbly and is unaltered wood. That this alteration is made in wood, even at this time, is alſo abundantly proved by the inſtances of wood being put into the hollows of mines, as props and ſupports to the roofs, which is found after a number of years as truly petrified as that which is dug up from the natural ſtrata of the earth. In the pieces of petrified wood found in Germany, there are frequently veins of ſpar or of pure cryſtal, ſometimes of earthy ſubſtances, and often of the matter of the common pebbles: theſe fragments of wood ſometimes have the appearance of parts of the branches of trees in their natural ſtate, but more frequently they reſemble pieces of broken boards; theſe are uſually capable of a high and elegant poliſh.

Many ſubſtances, it is certain, have been preſerved in the cabinets of collectors, under the title of *petrified wood*, which have very little right to that name. But where the whole outer figure of the wood, the exact lineaments of the bark, or the fibrous and fiſtular texture of the ſtriæ, and the veſtiges of the utriculi and tracheæ or air-veſſels, are yet remaining, and the ſeveral circles yet viſible which denoted the ſeveral years growth of the tree, none can deny theſe ſubſtances to be real foſſile wood.

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